Foreign Field Research Program
Sponsored by
Office of Naval Research
Report No. 5

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and

The National Economy of Afghanistan

A study of Regional Resources
and the
Comparative Advantages of Development

by

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Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy, under the Joint Committee on Graduate Instruction, Columbia University.

PREFACE

This dissertation is based on field work carried out in Afghanistan between July 30, 1957, and February 28, 1958, preliminary research performed at the British Museum and the Royal Geographical Society in London in June and July, 1957, and supplementary, comparative field work in New Delhi and the Punjab in March, 1958.

The field research for this study was supported by the Foreign Field Research Program conducted by the Division of Earth Sciences, National Academy of Sciences—National Research Council, and financed by the Geography Branch, Office of Naval Research.

Most of my time in Afghanistan was spent in Kabul, the capital city, where all Ministries and foreign aid missions have their headquarters. I spent a total of six weeks in the Helmand Region, divided into two periods in October and January. During these visits I was able to cover the full length of every main canal then completed in the Helmand Valley Project, to tour every area included in the Project, and to visit all the storage and diversion dams. I made two separate visits to the Jalalabad-Laghman area of Eastern Province, two trips to the Ghorband and Bamian Valleys between the Hindu Kush and Koh-i-Baba Range, and one three-week journey across the whole of northern Afghanistan from Faizabad in the East to Herat in the West.

For a variety of reasons, it was impossible for me to secure my own transportation within Afghanistan. No doubt this study would be more thorough and more immediate had a vehicle been at my constant disposal, but I did manage to cover over 5000 miles by car and plane within the country. As a consequence, I feel greatly indebted to the persons who made transportation available at various times, as well as to those who facilitated the "housekeeping" arrangements for me and my wife. These include Mr. Sheldon T. Mills, United States Ambassador to Afghanistan; Dr. Najib-Ullah, Afghan Ambassador to the United States; Dr. Christy Wilson of the Kabul Community Church; Dr. Harold Amoss of the Asia Foundation; Drs. Ralph Spence, Willis Griffin and Meynard Eyestone of the Teachers College, Columbia University Team in Kabul; Mr. Nathaniel Patterson, Area Director for the International Cooperation Administration in the Helmand Valley; Drs. Abdul Kayeum and Abdul Wakil, Vice Presidents of the Helmand Valley Authority; and Mr. T.Y. Johnston of Morrison-Knudsen Afghanistan, Inc.

A second round of thanks is due to the many persons who contributed information, criticism and guidance in the preparation of this study. An exhaustive list of these sources will be found in the Table of Interviews appended to the Bibliography, but the contributions made by certain individuals were so outstanding as to require acknowledgement in this Preface. These persons include Robert W. Snyder, Director of the United States Operation Mission (International Cooperation Administration) in Afghanistan; H.A. Swanson, Chief of the Industry, Mining and Surface Transportation Division at the Mission; Paul Johnson, Chief of the Agriculture and Natural Resources Division; and James Cudney, Chief of the Communications Media Branch. Robert H. Burns and William Anderson, of the University of Wyoming Team, and Mohammed Payendah, of the Vocational-Agricultural School at Kabul, provided useful information on agricultural and pastoral techniques in Afghanistan, as well as excellent traveling companions on a road-tour of northern Afghanistan. Dr. George B.

Cressey of Syracuse University accompanied us on the early portion of this tour and furnished stimulating suggestions and field interpretations. His Excellency Governor Gholam Haider Adalat of Maimana Province was most generous in taking time to discuss the problems of the karakul industry during a visit to his province. Dr. Arnold J. Krochmal, Research Director of the Wyoming Team, gave much assistance regarding Afghan horticulture, that of the Jalalabad region in particular. Deputy Director Mohammed Yusuf Mail of the Royal Afghan Ministry of Agriculture, and Messrs. Mohammed Omar and Faizal Rahim, his assistants, furnished some of the more recent and reliable statistical data relating to crop production and planting schedules. Deputy Minister Saiyid Alishah Mazumi and Messrs. Ghulam Azizi, Mohammed Massa and Abdullah Rahimi, all of the Ministry of Mines and Industries, furnished valuable information on industrial programming and coal and petroleum exploitation in Afghanistan, and facilitated entree into RGA enterprises.

General thanks are due to the staff of the new Ministry of Planning, and especially to Dr. M.M. Hassanein, the United Nations Adviser to that Ministry, whose assistance made possible the author's analysis of recent Afghan foreign trade statistics. Bryan Baas, then Acting Economic Attache at the United States Embassy, and Edwin Bohlen, Second Secretary at the Embassy, also provided assistance with regard to Afghan trade patterns. Dr. Peter G. Franck, of Robert College, Istanbul, furnished valuable interpretations of the Afghan economy during his visit to Kabul in August, 1957, and during my visit to Istanbul at the end of March, 1958. He was also good enough to read and criticize a part of the manuscript.

Dr. Daniel Hopkinson, Resident Representative at the United Nations

Technical Assistance Mission in Kabul, was most cooperative in providing access to Mission materials and introduction to Mission personnel. Of the latter, I am especially indebted to R.P. Davidson, Albert T. Petersen, and Hans H. Buchmann, all of the Food and Agriculture Organization, for their assistance with and criticism of the chapter on the Kunduz Region.

Turning to the Helmand Region, several members of the Helmand Valley Authority, in addition to Drs. Kayeum and Wakil, must be thanked for their aid. These include Carl O. Kohler, Chief Adviser to the Authority, and Ghaffar Shuja, hydrologist and watermaster. Within the International Cooperation Administration in the Helmand, Nathaniel Patterson did more than any other single person to insure the success of my Helmand studies, but grateful appreciation must also be extended to P.P. Fitzhugh, the expert in animal husbandry, I.A. Heckmiller, hydrologist, and Ralph Bailey, public health officer. Richard Hughes of the Wyoming Team, who formerly ran the Marja experimental farm, provided invaluable assistance in familiarizing us with the Helmand Project areas. The same is true of George Anderson of the Morrison-Knudsen Afghanistan office at Kandahar, where George Byrne and Dale Shockley furnished access to certain useful reports and surveys concerning the Project. Mr. Shockley at Kandahar and Dr. Claude Fly at the San Francisco office of Morrison-Knudsen read and criticized the Helmand portions of this study, and while I cannot agree with all of their comments, I am grateful to them for their assistance. Ralph G. Wadsworth of the Tudor Engineering Company, Washington, D.C., is thanked for reading the same portions and for his comments.

Finally, I wish to thank in no perfunctory manner my wife, Constance George Michel, for her unstinted encouragement and assistance both while we were in the field as well as in the preparation of this manuscript. Both phases of the work required patience, persistence and devotion, in all of which she excelled. Her own study of Afghan social geography, prepared as a Master's Essay for Columbia University, provides a valuable supplement to the following work which concentrates on the physical and economic aspects of Afghan geography.

The present dissertation was prepared under the direction of John E. Orchard, Professor of Economic Geography and Chairman, Committee on Advanced Instruction and Degrees in Geography, Columbia University. Dr. Orchard's guidance was of great help in designing and executing this study, as well as in presenting the results in what is hoped to be a logical and correct manner. The work has also benefited from a number of suggestions made by the following members of the Columbia University faculty: Phillip Bacon, Associate Professor of Geography in Teachers College; Charles Issawi, Associate Professor of Near and Middle East Economics; Willard J. Jacobson, Associate Professor of Natural Sciences in Teachers College; and Leonard Zobler, Associate Professor of Geography in Barnard College.

. . .

Acknowledgement is gratefully extended to the United States International Cooperation Administration, and particularly to Afghanistan Desk Officers Weston B. Drake and Ruth Fitzmaurice, for unfailing cooperation over the course of this study and for the use of the following reports:

Kimler, Courtney. Field Survey of Afghanistan's Industry, Transportation, and Electric Power Resources (TOICA A-144). Prepared for International Cooperation Administration, Kabul, Afghanistan. Kabul: April, 1956.

Koebig and Koebig, Consulting Engineers. Report on Transportation Facilities of Afghanistan and Pakistan. Prepared for International Cooperation Administration, Los Angeles: 1957.

Tudor Enginerring Company, Inc. Report on Development of Helmand Valley, Afghanistan. Prepared for the International Cooperation Administration. Washington: Tudor Engineering Co., 1956.

A NOTE ON AFGHAN STATISTICS

The fiscal and statistical systems which "developed" nations have come to regard as prerequisite to governmental administration and commercial activity are lacking in most of the "underdeveloped" nations of the world. Afghanistan is no exception. Indeed, there may be some truth in the notion current among Western anthropologists that some societies have as little regard for statistical compilation as other societies have exhibited for recorded history. This is to say that the value attached to maintaining periodical series of data is much greater in some cultures than in others, and that the Western researcher who ventures outside his own cultural cocoon may find himself in a sort of statistical vacuum.

None of the foregoing is presented as adverse criticism of the non-statistical societies. Absence of statistical data becomes a disadvantage only when such a society attempts to adopt the business or administrative methods of the Western world or, conversely, when a researcher attempts to analyze such a society in the usual Western terms. But the author merely wishes to caution his reader, at the start, that he must not expect the neat periodical tabulations, correlations and computations to which he perhaps has been acclimated. The following study is one in which a great many qualitative statements and judgments must perforce be made without the usual statistical underpinning which Western scholarship assumes as a matter of course.

Lest the reader surmise, however, that the author is merely attempting to provide himself with a carte blanche for unsubstantiated generalization, let it be said that wherever reasonably accurate statistical materials were discovered they have been embodied in this study. Furthermore, use has been made of some data that are likely to be accurate within certain limits, and these limits have been indicated in the text or in footnotes. Finally, lest the reader further surmise that the author has failed to uncover valid statistical materials which are in existence but buried in some dusty ministerial closets, I should like to quote from two reports by Dr. Gregory Frumkin of the Geneva Office of the International Labor Organization who served as United Nations Statistical Adviser to Afghanistan in 1951-1952. Dr. Frumkin had access, on an official level, to many sources which were barred to the present author, and his reports provided some of the more useful data and interpolations which I have embodied into this study. Nevertheless, Dr. Frumkin felt constrained to state:

> Last year a prominent Afghan told me: "There is no such thing as Afghan statistics". He added that it would take many years before a satisfactory statistical organization could be set up and made to work properly. I think he was right.
>
> The student, expecially the Westerner, must not be deceived by the statistical vacuum in this country and by its primitive technical level. In Western countries people are accustomed to learn about a country's conditions through statistical and similar information. Books, reports, balance sheets are the main investigating tool of a student. In Afghanistan he has to discover and study things on the spot. A book or a report, far from being the starting point of an enquiry, will be its terminus.
>
> Such tentative production data as have recently been collected by the Ministry of Finance as a rule represent guesses made with the assistance of village eldermen, referred to as "grey beards, with great experience".[1]

And in his Synopsis of Afghan Agricultural Statistics, Dr. Frumkin remarks:

> Agricultural "statistics" which are under the responsibility of the Ministry of Finance, are embodied in a number of books and heaps of big sheets, but the subject appears to be somewhat outside the control of the Statistical Office of the Ministry.

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[1]Gregory Frumkin, Report on Journey to the Northern Provinces, in files of United Nations Technical Assistance Mission, Kabul, Afghanistan. (Kabul, 1952) (Mimeographed.)

Such data are a by-product of taxation. It should be noted, however, that a) the administrative staff frequently lacks the essential qualifications, b) there is no proper cadastral survey, c) there are no reliable data either on area or on production. Much of the information quoted or reported as to area appears to represent obsolete "estimates" made in times when taxation was mostly in kind. Current records of production do not exist.[1]

In all fairness to the Afghan Government, it must be pointed out that attempts are being made to correct the situation which Frumkin describes above. Some of his own recommendations have already borne fruit. The present United Nations Statistical Adviser, Dr. Mustafa Mohammed Hassanein, is doing excellent work with a young and enthusiastic staff at the new Ministry of Planning, and has already succeeded in producing a fairly reliable series of import-export data which are used in Part II of this study. In addition, the Public Administration Advisory Team, provided by the United States International Cooperation Administration to work with the Ministry of Finance, is aiding in the introduction of a modern system of fiscal accounting. However, the situation in 1957-1958 still bore sufficient resemblance to that encountered by Dr. Frumkin six years before to require this preliminary warning to the reader of the present study. The author could well adopt a third excerpt from Dr. Frumkin's reports as a concise summation of his use of certain Afghan statistics in this study:

An endeavor has been made by me to present the data in a logical and uniform way, accompanied by explanatory notes. The neat presentation of the subject should not deceive the reader: the data cannot in any way be considered as "statistics". However inadequate and misleading they may be, it is hoped that the assembling of such data in an intelligible way may facilitate the critical appraisement of the situation with regard to factual information. Agricultural statistics are, in the case of Afghanistan, still to be created.[2]

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[1]Gregory Frumkin, Synopsis of Afghan Agricultural Statistics, United Nations Technical Assistance Mission, Kabul. (Kabul: December, 1952), p. 1. (Mimeographed.)

[2]Ibid., p. 2.

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GLOSSARY

ACU - Afghan Construction Unit, a subsidiary organization of the Helmand Valley Authority

FAO - Food and Agriculture Organization of the United Nations

ICA - United States International Cooperation Administration (formerly Technical Cooperation Administration)

HVA - Helmand Valley Authority of the Royal Government of Afghanistan

HVP - Helmand Valley Project

MKA - Morrison-Knudsen Afghanistan, Inc.

RGA - Royal Government of Afghanistan

UN - United Nations

UNTAM - United Nations Technical Assistance Mission (to Afghanistan)

U.S. - United States of America

USOM - United States Operations Mission, synonymous with ICA

U.S.S.R. - Union of Soviet Socialist Republics

TCA - Technical Cooperation Administration, the forerunner of ICA

WHO - World Health Organization

Farsi Terms

Darra - River

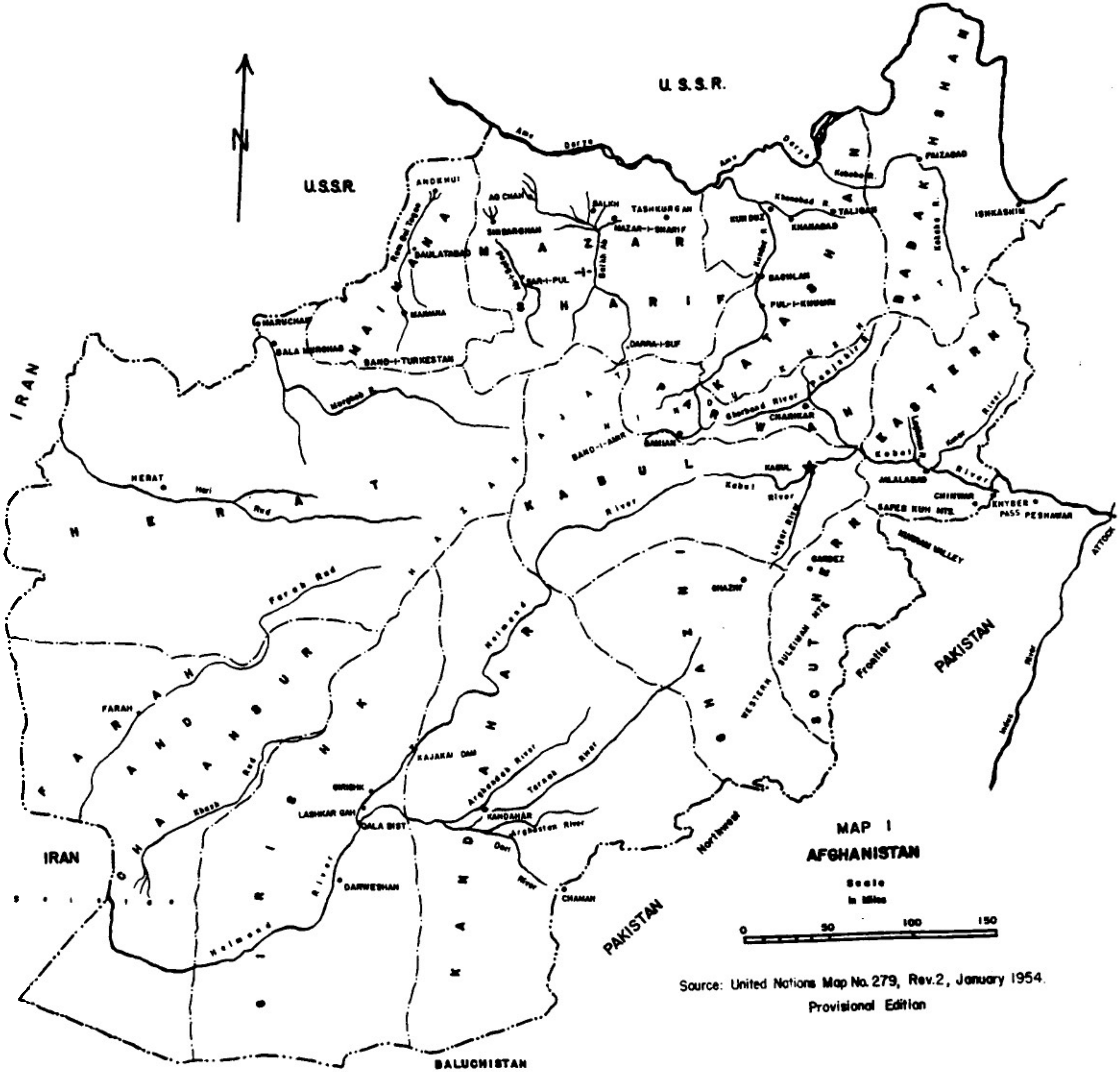
Dasht - Desert

Jui - An irrigation ditch, usually small.

Karez - A tunnel for irrigation water, built by connecting a series of wells, usually on an alluvial fan.

INTRODUCTION

THE LOGIC OF THE STUDY



MAP I
AFGHANISTAN

Scale
In Miles

0 50 100 150

Source: United Nations Map No. 279, Rev.2, January 1954.
Provisional Edition

INTRODUCTION
THE LOGIC OF THE STUDY

Historical Setting

The Kingdom of Afghanistan was formed as a national state by Ahmad Shah Durrani in the middle of the eighteenth century. Following the death of the Persian Emperor Nadir Shah in 1747, the Afghan contingents of his army withdrew to Kandahar where they chose their general, Ahmad Khan, to serve as King. He then chose the title Ahmad Shah Durrani. Under his leadership, the Abdali and Ghilzai tribal confederations united the Persian provinces north and south of the Hindu Kush with their diverse ethnic groups: Tajiks, Uzbeks and Turkmen in the North, Hazara Mongols in the central mountains, and Pushtuns, or "true Afghans", in the South. With the third battle of Panipat and the Afghan capture of Delhi, the Afghan Empire reached its zenith in 1761.

Ahmad Shah Durrani's successors were less successful campaigners, and had to contend with the power of the British in India and the British-supported Sikhs in the Punjab and Peshawar areas. Civil strife and dynastic quarrels were added to external threats, and it was only in 1880 that the kingdom emerged in its present configuration. Thanks to a Memorandum of Obligation with the British, the Amir Abdur Rahman was able to secure Herat and the northwestern areas against Persian and Russian threats. The western and northern boundaries were surveyed by British and British-Russian commissions between 1885 and 1903. As the price of British support, however, Afghanistan had to surrender control over tribal areas in the Northwest Frontier and over its own foreign policy.

The position of Afghanistan as a "buffer state" thus dates from the period when the Russian and British Empires were thrusting towards each other in South Central Asia, and particularly from the 1907 Anglo-Russian general settlement which cleared the way for their alliance in the First World War. As the lines were drawn, therefore, Afghanistan was not forced to choose between Russia and Britain, and managed to resist the invitations of Germany and Turkey to raise the Moslems in a jihad against the Allies. In 1919, however, King Habibullah was assassinated. His young successor, Amanullah Khan, undoubtedly influenced by the need to consolidate his position, launched an attack on the Northwest Frontier in an attempt to recover the tribal areas. Despite the success of General Nadir Khan in the Kurram Valley, the month-long conflict was abortive as far as Afghan aims were concerned, and after British and Indian forces had re-invaded Afghanistan the Amir sued for peace. Negotiations lasted for two years, by which time the British, more from weariness than from weakness, were ready to concede Afghanistan full independence and control over its foreign affairs. Since the Afghans had already entered into direct relations with the Soviet Union, and since it would have required a full-scale campaign to restore the old domination, the British did little more than recognize the fact that Afghanistan was prepared to plot its own diplomatic course in South Central Asia and the world.

Indeed, for most of the ensuing decade, King Amanullah did just that, both domestically and in foreign policy. After introducing a plethora of reforms, he embarked in 1927 on a tour of European and Middle Eastern capitals and the Soviet Union. He was apparently deeply influenced by what he saw, particularly in Turkey. But he lacked the degree of domestic control necessary to impose his more radical reforms[1] in the face of strong opposition from the conservative religious mullahs who succeeded in turning the tribes against him. When a local brigand led a rising against Kabul in 1929, the disaffected army proved unequal to the task and Amanullah was forced to abdicate and flee. The ensuing chaos and carnage in Kabul brought General Nadir Khan back from a health resort in France. After initial difficulties due to his lack of personal wealth, he was able to conciliate the tribes, organize an army and recapture the capital.

Nadir Khan was proclaimed King in October, 1929, and took up the tasks of restoring internal order and inaugurating a more moderate and reasonable program of modernization. Indeed, the wisdom of Nadir Shah lay in his ability to distinguish the practicable from the impossible, as well as in a concentration upon economic rather than social reforms. Nadir Shah was tragically assassinated in 1933, but his son, Zahir Shah, has continued his policies with considerable success since that time. Afghanistan obtained a new constitution, giving it the form of a limited monarchy. Actually, the office of Prime Minister was filled by one of the King's uncles until 1953, and since then by his cousin, Prince Sardar Mohammed Daud, so that close family relationships have reinforced the solidarity of the Afghan Government.

Afghanistan joined the League of Nations in 1934, starting a tradition of active interest in international organizations which has carried over into the United Nations, its Economic and Social Council, the International Bank for Reconstruction and Development and several of the United Nations subsidiary organs. Nor have foreign commercial relations been neglected. The regularization of state finances under Nadir Shah was augmented in 1939 by the

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[1]The Queen dressed in Western fashion on the tour and after her return to Kabul publicly discarded the veil and encouraged other women to follow her example.

establishment of a State Bank (Da Afghanistan Bank) with correspondents in Bombay, Karachi, Munich, Paris, London and New York. Concessions were granted for foreign minerals prospecting and foreign investments were encouraged. While the Afghan Government of the nineteen-thirties did not renew Amanullah's unsuccessful experiments with "technical assistance" from the Soviet and German Governments, it did embark upon a small-scale program of land development in the Helmand Valley with the aid of hired Japanese engineers. Furthermore, the Government of Zahir Shah, like that of his father, concentrated upon creating the matrix of stability, sound financing and improved communications within which German and Japanese firms could do business and provide engineering services and equipment in Afghanistan. In a laissez-faire business climate, the Bank-i-Millie Afghan, a private institution with many members of the royal house among its shareholders, was able to encourage the development of local private enterprise. The result was the rapid development of the Kunduz Valley, in northeastern Afghanistan, including the construction of the cotton gin and soap plant at Kunduz, the cotton textile factory at Pul-i-Khumri and the sugar beet processing factory at Baghlan. The main protagonist of this development was Abdul Majid Zabuli, who became Minister of National Economy from 1939 to 1950. His guiding principle seems to have been to secure a maximum return for the Bank's investors. Though in later years he was much criticized for failing to meet the capital needs of small businessmen and farmers, he must be credited with organizing the capital for Afghanistan's most successful industrial enterprises. To be sure, his task was facilitated by the Bank-i-Millie's monopoly of export-import financing, particularly of karakul exports which provided the major source of hard foreign currency. Until 1939 most of the karakul trade went to London; after the outbreak of war, it shifted to New York, and dollars replaced pounds sterling in

Afghanistan's foreign exchange earnings.

During the Second World War, neutral and remote Afghanistan was unable to obtain manufactured goods despite her ability to pay for them. As a result, she emerged with an excellent reserve of foreign currency, and with a determination to reduce her dependence upon imports for her economy. Plans were made for increasing domestic production of cotton piece-goods and sugar, two of the major import categories. At the same time, it was decided to devote a considerable share of the exchange reserves to development of the nation's resources in order to raise the standard of living of Afghanistan's ten million permanent inhabitants and two million nomads.

Geographical Setting

Since this study is primarily concerned with the effects and prospects of Afghan economic development, it will be well to provide the reader with a preliminary overview of the environment to which any enterprises or projects must adjust. Unfortunately, nature did not endow Afghanistan with an abundance of useful resources. The country, variously estimated at around 250,000 square miles in area, lies astride the Hindu Kush ranges which pose a formidable barrier to transportation except in the western portions where the mountains diverge and diminish in height. In the southwest, the ranges are finally buried in the sands of the Seistan Basin, a vast region of interior drainage with a chain of ephemeral lakes at its center. Even here, elevations are generally in excess of 2000 feet, rising to the north and east along the extension of the Iranian plateau. Both Kandahar and Herat, Afghanistan's second and third largest cities, lie at elevations of about 3000 feet, while Kabul, the capital and largest city, is about 5800 feet above sea level. The only section of Afghanistan lower than 1000 feet in elevation lies along the Amu Darya in the North from Termez to west of Andkhui. North of Kabul, the Hindu Kush and associated ranges reach 15,000 to 18,000 feet, while in eastern Afghanistan and the Wakhan Corridor heights of over 20,000 feet are common. The eastern margin of the Iranian plateau may be traced in a series of fault scarps, transverse to the Hindu Kush, and overlooking the Indus Plain. But only the Jalalabad Oasis, midway between Kabul and the Khyber Pass, offers an expanse of 2000-foot "lowland" comparable to that around Peshawar.

Afghanistan is not only high and rugged; it is dry. Located in the zone where the low-latitude deserts of Arabia and Iran pass into the middle-latitude deserts of Central Asia, Afghanistan is too far west to receive any substantial rainfall from the Arabian Sea monsoon system, although the mountains of the southeastern plateau scarp may bring down some of this moisture in the form of summer showers. Generally speaking, what rainfall is received occurs in winter and is traced by some observers to westerly winds and Mediterranean influence. If the Mediterranean is the ultimate source, then most of the moisture has apparently been lost on the way, for precipitation in western Afghanistan is on the order of five inches per year or less. However, the phenomenon popularly known as the "hundred days wind", which blows at Herat, comes predominantly from the North and in the winter months the whole country is affected by the Asiatic high which sends frigid northerly and northeasterly winds down to and across the Hindu Kush.

Perhaps when a more consistent record of readings has been established, the genesis of Afghanistan's climate can be more accurately determined. For our purposes, it is enough to describe its effects, and these apparently vary much more widely in response to elevation than they do in response to latitude. Kandahar, at 3200 feet, has an average annual rainfall of about eight inches. a mean January temperature of 43.5°F. and a mean July temperature of 87.6°F.

Kabul, at 5800 feet, has an annual rainfall of 12.46 inches, a mean January temperature of 28.2°F. and a mean July temperature of 76.3°F. In the North, low-lying but open to the Asiatic highs in winter, Baghlan reports a mean temperature of 36.9°F for the coldest month (22 December - 19 January)[1] and a mean temperature of 100°F. for the warmest month (23 June - 23 July). Baghlan, at 2000 feet, can be expected to be warmer than Kandahar in summer, and not as cold as Kabul in winter, despite its direct exposure to the northerly winds. Average annual precipitation at Baghlan amounts to some 9.76 inches, which is closer to that in Kandahar than in Kabul. Since all three stations exhibit late winter and early spring precipitation maxima, with practically rainless summers and autumns, it would seem logical that the orographic factor is mainly responsible for the observed quantitative differences. Certainly, one has to go fairly high into the mountains to find a dense snow cover. At Kabul in the winter of 1957-58, the snow cover was sporadic and became continuous only when one climbed to 7000 feet or so. Of course, the higher peaks can extract snow from even the cold and relatively dry winter northerlies. Thus, the 10,000 foot passes are frequently blocked, while the 15,000 foot mountains remain snow-capped for about ten months out of the year.

It is apparently this snow cover, plus the absorption and percolation of runoff in the highest valleys, that feeds Afghanistan's major streams, since large glaciers exist only in the extreme east of the country (Wakhan corridor). Even the vegetative cover is too sparse to serve as a reservoir, forests being confined to the eastern ranges and highland shrubs and grasses being generally sparse or ephemeral. In the light of the preceding data on rainfall patterns, it is almost superfluous to state that highland dry-farming of hardy grains

[1]See Chapter II for annual records.

is the only form of agriculture in Afghanistan that does not depend upon irrigation. The headwaters of most rivers can be traced to high mountain springs and seepages, and only the multiplicity of such sources in the central mountainous region can explain the maintenance of flow of the perennial streams past the end of the spring runoff period. Of these streams, only the Kabul reaches exterior drainage, flowing over the fractured edge of the plateau in a series of antecedent gorges to join the Indus at Attock. The Kunduz River drains the opposite or northern flanks of the eastern Hindu Kush into the Amu Darya, which forms about half of Afghanistan's northern border and then continues northwest to the Aral Sea. The streams which drain the western Hindu Kush, or its outlier, the Band-i-Turkestan Range, do not even reach the Amu Darya but die in the sands of the Karakum Desert. These include the Murghab, which waters the Merv oasis, and the Hari Rud, which serves Herat and then turns north to become the Tedzhen. The largest stream in Afghanistan, the Helmand, is consequent upon the uplifted Iranian Plateau. Together with its principal tributaries, the Helmand flows, in general, southwesterly, and ends in the afore-mentioned system of ephemeral lakes in the Chakansur or Seistan Basin on the Iranian border.

The drainage pattern, thus, is generally centrifugal from the central mountain region, and many of the major towns and cities are located where the streams emerge from the foothills onto the surrounding plain. This is not surprising, for the requirements of irrigated agriculture with respect to both perennial water supply and gently-sloping landform are exacting. If one superimposes upon them the dictates of a road system, which can penetrate the central mountains at very few places and must generally circumscribe them instead, the sites of such places as Pul-i-Khumri, Tashkurgan, Mazar-i-Sharif, ancient Balkh, Maimana, Bala Murghab, Herat, Farah and Kandahar are largely explained.

It should also be noted that Kabul, the capital of Afghanistan, is located in a well-watered upland basin which commands the most practicable route from the plains of India to the passes of the Hindu Kush and on to Central Asia. The Jalalabad Oasis is located on this same route where the Kabul River, after spilling over the eastern edge of the Iranian Plateau, is finally able to receive large tributaries and widen its floodplain to an extent comparable with that around Kabul City.

In Afghanistan, as in other arid countries, we can expect to find population concentrations where reliable water supply, suitable landform, and trade-transportation routes coincide. What is of even greater interest and significance for future development, however, is that there are apparently only two regions within Afghanistan where the water requirements of irrigation agriculture can be met to any great extent far enough away from the central mountains that the spread of cultivation will not be impeded by adverse landforms. These are the two regions in which major streams issuing from the mountains are joined by sizeable tributaries at some distance across the plain. The first of these is the lower Kunduz Valley in which the Kunduz River, after watering Pul-i-Khumri and Baghlan, flows out on the plain to the city of Kunduz where it receives the Khanabad River from the east and continues, reinforced, to the Amu Darya. In a sense, this region might also be termed the left-bank Amu region, because it is extended to the east by irrigation from the Amu Darya and from its higher Afghan tributary, the Kokcha River. Similarly, to the west, there are a number of would-be tributaries of the Amu Darya which fail to reach it but do serve to irrigate such places as Mazar-i-Sharif, Balkh, Aq Chah, Shibarghan, Andkhui, Daulatabad and Maimana. These might also be included in a "left-bank Amu region", but do not possess the capability for expansion since the water supply cannot be greatly increased as is the case in the "Kunduz Valley" with the Kokcha "extension". We shall have occasion to discuss the "Mazar-i-Sharif - Maimana extension" too, but for its potential in grazing rather than in cultivation agriculture.

The second of these regions of potential irrigation development is the Helmand Valley. At Qala Bist, some fifty miles after it has left the mountains, the Helmand River is joined by the Arghandab. The Arghandab itself includes the waters of several streams, the Tarnak, Arghastan and Dori Rivers, which join it in the vicinity of Kandahar, also at a fair distance from the mountains. Along these sub-tributaries, along the Arghandab, and along the Helmand above and below Qala Bist and extending to the Chakansur Basin, are the largest floodplain and terrace landforms in Afghanistan, served by the largest river system in terms of both length and flow. The availability of level land and plenty of water were among the major factors which led the Royal Government of Afghanistan (abbreviated as "RGA" henceforth) to select the Helmand Region for a small-scale development program prior to World War II, and for a much larger program beginning in 1946. Political and social factors also played a large part in choosing this region for governmental development rather than the Kunduz Valley where a start had already been made by private capital. We must now briefly review these political factors.

Political and Economic Considerations

With the independence and partition of India and Pakistan in 1947, Afghanistan revived its old claim to the Pushtun areas of the Northwest Frontier. At least, Kabul demanded that these tribal brothers of the "true Afghans" be accorded a right to elect for independence in the plebiscite. It was expected that an independent "Pushtunistan" would develop close ties with Kabul and serve to offset the minority position (about 40 per cent) of "true Afghans" or Pushtuns within Afghanistan. After all, in Afghan eyes it was only the intrusion of the British and the concessions they had extracted from Abdur Rahman which had placed the artificial "Durand Line" across the Pushtun areas and made it the Northwest Frontier of India. But the 1947 plebiscite offered only a choice between India and Pakistan, and, while less than half of the Northwest Frontier inhabitants voted, the majority elected for Pakistan.

Failing to secure the separation of "Pushtunistan", the next most desirable alternative for Kabul was to settle within Afghanistan the nomadic Pushtuns who spend the summer in the Afghan highlands and the winter in the Indus Valley. To achieve this settlement, it was essential to demonstrate that Afghanistan had more to offer them, economically as well as socially, than the new state of Pakistan. By concentrating developmental efforts in the Helmand Valley rather than in the North, Afghanistan could make many of the Pushtuns into full-time citizens, regular tax-payers, and active supporters of the dominant minority in Kabul. After all, the Helmand-Arghandab Region was the ancestral home of the Abdali Pushtuns who had founded the Durrani dynasty at Kandahar in 1747. So, from the viewpoint of the Kabul government two hundred years later, a re-emphasis upon the economic, social and political role of the South offered many advantages over any enhancement of what private investment had already achieved in the North. Furthermore, with the resignation of Abdul Majid Zabuli in 1950, the RGA began to take a far more active interest in the entire economic sector of Afghan life. In September, 1953, the uncle of the present King resigned his post as Prime Minister to be succeeded by the incumbent, H.R.H. Mohammed Daud Khan, a believer in strict governmental control of banking and commerce and a person who lacked his predecessor's financial ties with the private Bank-i-Millie. The high point of this shift in personnel and policy was apparently reached with the appointment of General Abdul Malik, formerly Quartermaster General of the Afghan Army, as Minister of Finance. General Malik had served for a number of years in Turkey where he had been impressed with the theory and practice of a state-guided economy. He proceeded to apply the principles of "etatism" in Afghanistan by forcing the Bank-i-Millie to sell 63 per cent of the stock of the Consolidated Cotton Company and 51 per cent of the stock of the General Electric Company (then building the Sarobi Dam) to the Ministry of Finance.[1] He also nationalized the Cement Company and negotiated the $5 million credit with Czechoslovakia under which the cement mill at Jabal Seraj has since been built. In order to cater to those sectors of the economy neglected by the Bank-i-Millie, two new banks were established in 1954 under the aegis of the RGA-owned Da Afghanistan or State Bank: the Afghan Commercial Bank, with a capital of about $6 million, to make low-interest small loans to traders and thus break the Bank-i-Millie's monopoly of import-export financing, and the Agricultural and Home Industry Bank, with a capital of about $7.5 million for loans to small farmers, artisans and cottage industries.[2] Textile resale prices and the profit rate of the Textile Company, owned chiefly by the Bank-i-Millie, were placed under strict control, and the foundations of the Bank itself were further threatened by a suit for tax evasion. This suit was finally dismissed after several years of litigation. General Malik, who in the interim had added the title of Minister of National Economy to that of Finance Minister, was removed from both positions in July, 1957, and placed under arrest on charges of conspiring to overthrow the Government.

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[1]See Peter G. Franck, "Economic Progress in an Encircled Land," <u>The Middle East Journal</u>, X, No. 1 (Winter, 1956), p. 48.

[2]*Ibid.*, p. 49.

There followed the recall of the ambitious but hastily-drawn Five Year Plan of Afghanistan, issued at the end of 1956 under General Malik's direction. The Ministry of National Economy was restyled as the Ministry of Commerce and its Planning Section was re-established as a new ministry under the close personal supervision of the Prime Minister himself, and instructed merely to coordinate and verify plans submitted by the various Ministries without the stipulation of target dates But there is little doubt that the removal of General Malik did not mark a return of the type of governmental thinking which prevailed prior to 1950 or 1953. Rather, it appears that there are at least two schools of thought among Afghan Government officials. One of them, strongly advocated by the present Minister of Mines and Industries, with the full support of Prime Minister Daud, calls for the continuation of what the Five Year Plan termed a "guided economy".[1] This policy was summed up by the Prime Minister himself in a speech on February 5, 1954:

> My Government's economic policy is based on the principle that both Government and private enterprises should function for the benefit of the country and general welfare of the people. In the future, the full economic resources of the country, private and public, will function in such a manner as to provide maximum benefit to all sections of the population. Therefore, for the coordination of the country's economic activities it is necessary that the Government, which represents all sections of the population, guide and regulate such activities.[2]

Despite the subsequent dismissal of Malik and the dropping of the suit against the Bank-i-Millie, there is no doubt that this fundamental policy of governmental guidance remains that of the Prime Minister and of the other most influential officials in the RGA. A less vociferous minority is known to favor a return to a freer type of economy with the major reliance for development

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[1]Afghanistan Mission to the United Nations, The Five Year Plan of Afghanistan, (New York, 1956), p. 1. (Hektographed.)

[2]Ibid., p. 2.

placed upon private capital and, presumably, upon the Bank-i-Millie. But this school of thought is currently out of favor and presumably will remain so for some time.

It might be thought that some definite correlation could be established between the rentier class and the partisans of a laissez-faire economy. Such, however, does not appear to be the case. In fact, the principal clients of the Bank-i-Millie are well-to-do merchants, not landowners, and it was founded by commercial, not agrarian, interests.

In contrast to other nations of South and Southwest Asia, Afghanistan's upper classes have derived their wealth more from trade than from the exploitation of mineral deposits or land ownership. The importance of the nomadic or powindah trade among the Pushtuns, together with the high social esteem given to mobile activities (leadership of the migration, skill in battle, raiding and horsemanship) in comparison with sedentary farming may account for this situation. There is still a considerable overlapping of tribal habitats and land settlement patterns. That is to say, many villagers consider their lands as the joint possession of the clan which occupies the village. The process so common in British India, whereby the tax collectors managed to identify themselves as the owners of the land, was never widespread in Afghanistan.

While there are some large landholdings in every region of Afghanistan, and particularly in the Kunduz Region where swampy areas were reclaimed in the 1930s and sold in large blocks, Afghanistan is far less troubled by land tenure problems than many Asiatic nations. Land ownership is much more widely distributed in Afghanistan than in neighboring countries, and while statistics are, as usual, conspicuous by their absence it is probable that between one-third and one-half of Afghanistan's farmers own some land. Of even greater significance is the fact ~~that most~~ lessors of land have fewer than three tenants, and frequently only one. The typical Afghan landlord is himself a farmer ~~and lives near the fields he rents.~~ The absentee landlord, residing in the city ~~and collecting~~ his rents through an agent, is far less common, except in northern Afghanistan and some downstream Helmand areas.[1] Between the two classes just described would be a sizeable number of khans who reside in the villages, own most of the fields surrounding them and hire laborers for their own cultivation at the same time as they rent fields to tenant farmers. The share-cropping system in Afghanistan is similar to that in many Middle Eastern countries: one-fifth of the crop goes to the man who provides each of the elements, land, water, seed, labor and implements with bullocks. But it is modified by the fact that the khan usually has tribal and social bonds with, and obligations towards, his tenants and hired laborers (who may coincide to some extent), and by the custom of making only annual agreements between landlord and tenant. This custom is of enormous importance, for it means that the Afghan tenant is free to change landlords if he is dissatisfied, or vice versa. Thus, the Afghan peasant is not bound to the soil, and while he may be in debt to a money-lender the money-lender is more likely to be a town or village merchant, or even a nomad, than the owner of the land which the peasant tills. The Agricultural and Home Industry Bank, established in 1954, is designed to help the small farmer to improve his status at the same time as the Helmand Valley Project offers him the opportunity to relocate if he finds his situation too difficult. The very rapid filling up of the newly settled lands

[1]Louis Dupree, "The Changing Character of South-Central Afghanistan Villages," Human Organization, XIV, No. 4 (Winter, 1956), pp. 26-29.

in the Project, combined with the long waiting lists for prospective settlers, indicates not only that many Afghan farmers thought they could improve their lot but that the traditional mobility of the tenurial system allowed them to take advantage of what they thought would be improved conditions.

It is a clear indication of the natural conditions which prevail in Afghanistan that water rights are as important, or more so, as rights in land. In fact, except in Mazar-i-Sharif Province, non-irrigated land may be cultivated by anyone, does not become personal property and is not taxed. The cultivator pays a small fee to establish his claim to the dry-farmed crop, but if he allows this land to lie fallow anyone may harvest what grows on it. Thus, rights in land become important only when water is brought to it. And if the canal is built by the members of a village, which usually means the members of a clan, then they share in the water which it carries in proportion to their land holdings or to some agreed pattern. The village watermaster, an elected official, supervises the use of village canal water and the hours during which a farmer may apply it to his fields. A well-to-do farmer may be recognized by his water rights as readily as by his land holdings. Only the very rich build and own private canals.

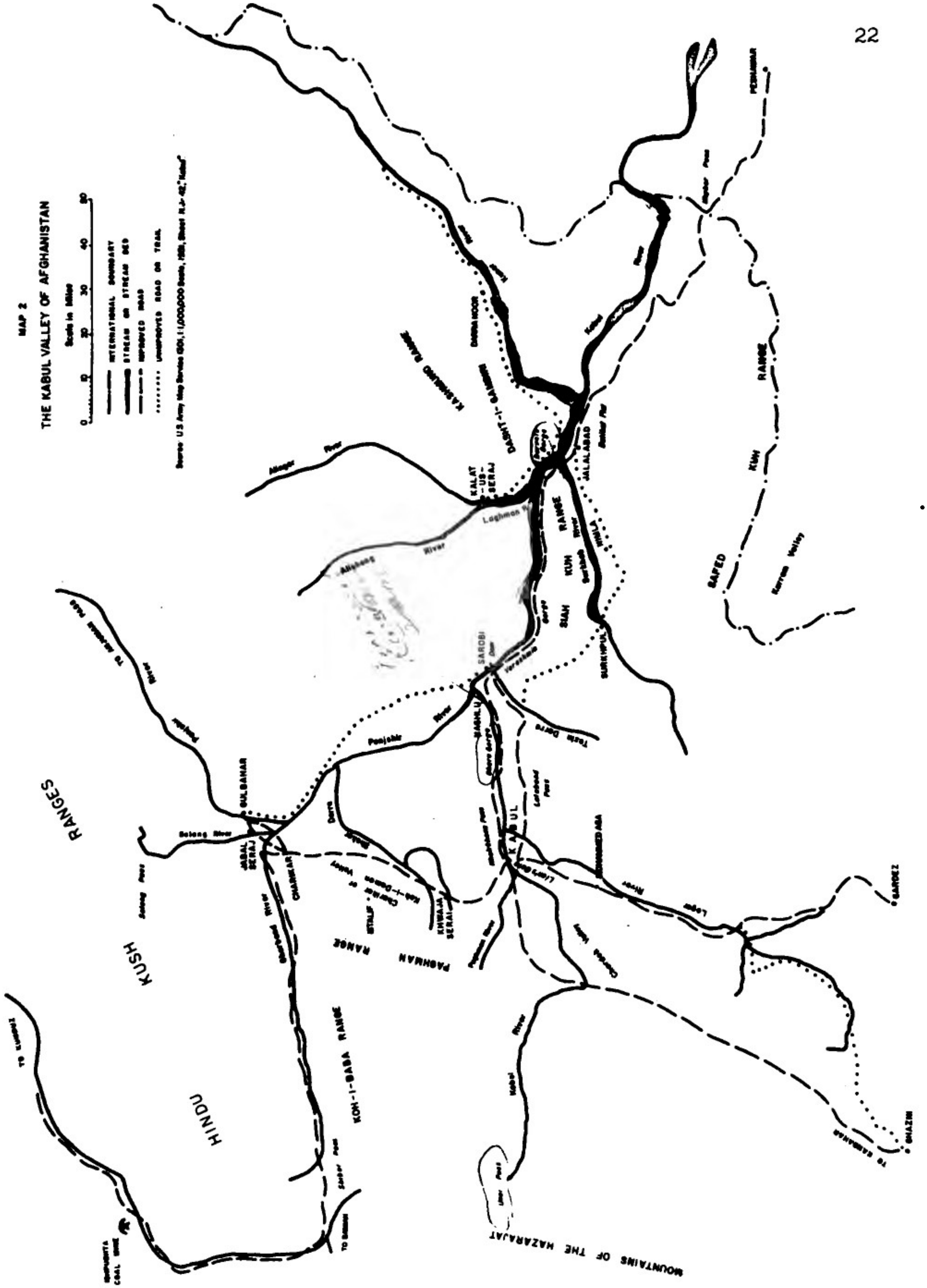
Methodology

The geographer may proceed from the physical and human resource base to an evaluation of regional potential, but he too must take into account political and social forces which modify the conclusions to be drawn from any purely economic assessment of regional or national prospects. In the following study, an attempt will be made to set forth a regional geographic analysis which can be used to appraise developmental decisions in Afghanistan. In the main, the regional analysis will be limited to the Kabul, Kunduz and Helmand Valleys since these are apparently the only regions which the Government of Afghanistan or private capital is now seriously concerned in developing. As we have seen, only the Kunduz and Helmand Regions offer prospects for substantial areal enlargement of irrigated agriculture, whereas the Kabul Region assumes its importance from being the hinterland of the capital and the largest city-market of the nation. While the land-form of most of the Kabul Valley inhibits large-scale agricultural expansion, the waters of the Kabul River offer a considerable hydroelectric potential which is gradually being harnessed to support the processing and service industries of the capital area. Social and political factors also tend to make Kabul City the locus of RGA- and foreign-supported "impact" schemes designed to serve or impress the more influential citizens of Afghanistan as well as the foreign community.

We shall, therefore, begin our study with a description of the Kabul Region, proceed to the Kunduz which is more intimately related to the first and finally discuss the Helmand Region which is less closely tied to Kabul. While all relevant factors will be indicated in their proper locational setting, most of the analysis will be postponed to Part II where inter-regional comparisons become possible. In this section, the economic choices confronting the RGA will be projected against the regional backgrounds. The desirability of concentrating upon agricultural production and increased domestic processing of agricultural raw materials will be contrasted with that of mineral development. Topical analysis will begin with a considera-tion of the regional resource base for those commodities which figure largest in the import-export pattern. Then the modifying factors of power and transportation requirements will, in turn, be analyzed. Thus the characteristics of the three regions will be presented so as to indicate which areas are best suited for the specific lines of development most beneficial to the regional and national economies. Finally, the means available to RGA for financing development, the policies which are likely to guide such development, and the political and social implications of these policies will be reviewed. The author will conclude with his own appraisal of the prospects for Afghan economic development.

PART I

REGIONAL STUDIES


MAP 2
THE KABUL VALLEY OF AFGHANISTAN
Scale in Miles
0 10 20 30 40 50
INTERNATIONAL BOUNDARY
STREAM OR STREAM BED
IMPROVED ROAD
UNIMPROVED ROAD OR TRAIL
HINDU KUSH RANGES
KOH-I-BABA RANGE
PAGHMAN RANGE
KASHMUND RANGE
SIAH KUH RANGE
SAFED KUH RANGE
MOUNTAINS OF THE HAZARAJAT
KABUL
CHARIKAR
JABAL SERAJ
GULBAHAR
ISTALIF
KHWAJA SERAI
SAROBI
KALAT-US-SERAJ
DASHT-I-GAMBERI
JALALABAD
NIMLA
SURKHPUL
GARDEZ
GHAZNI
PESHAWAR
Salang River
Salang Pass
Panjshir River
Alingar River
Kabul River
Logar River
Kurram Valley
TO KANDAHAR

I. THE KABUL VALLEY

The Kabul River

The Kabul River, the only major Afghan stream to reach exterior drainage, rises in the 9000-foot high Unai Pass (see Map 2, p. 22) and flows eastwards over the fractured edge of what Furon aptly terms the "Iranian" plateau[1] into the valley of the Indus, which it joins at Attock. The Kabul may probably be considered an antecedent stream which maintained its flow during the uplifting and faulting of the ranges of eastern Afghanistan. A number of terrace remnants to the east of Kabul City indicate that the stream was occasionally ponded back, but this may well have occurred in periods of Pleistocene glaciation rather than during the Tertiary uplifts. The evidence of downcutting in the eastern ridges of the Kabul Corridor, and in the Upper and Lower Gorges of the river, is so strong as to suggest that the flow was impeded for only relatively short periods, if at all, during the raising and faulting of the north-south trending ridges.

From its source, some thirty linear miles west of Kabul City, the river describes a large bend to the south, so that it actually flows some sixty miles before reaching the capital. The river enters Kabul from the southwest via the intensively cultivated Chardeh Valley. At the outskirts of the city, the Kabul River is joined by the Paghman, a short stream

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[1]Raymond Furon, L'Iran: Perse et Afghanistan (Paris: Payot, 1951), Introduction.

draining the southern end of the high Paghman Range which forms the western wall of the Kabul Corridor. In summer, when the Kabul River is almost dry, the Paghman still contributes a steady flow from snow-covered peaks which rise to 15,417 feet.

After meandering through the old quarter of Kabul City, the river crosses the swampy plain to the east for some five miles to its juncture with the Logar River. This tributary drains the southern section of the north-south Kabul Corridor. A highly seasonal stream itself, the Logar makes a substantial contribution to the spring runoff of the Kabul.

About ten miles below its juncture with the Logar, the Kabul River enters its Upper Gorge, the Tang-i-Gharu. This remarkable, fifteen-mile section of nearly vertical cliffs includes one eighty-foot waterfall and many sections of rapids. In all, the river drops almost 2000 feet in the Upper Gorge alone, while in some places the cliffs rise 700 feet above the bed of the stream. Construction of a road of any sort through this gorge had to await modern machinery and blasting techniques. The narrow shelf which in recent years has been cut into the cliffs and through five tunnels is a tribute to Afghan persistence and hard work. Supported by high stone retaining walls for most of its length, the Gorge Road generally follows the southern or right bank of the river, though three bridges have been constructed to locate short sections on the northern side. In the waterfall section, a double switchback carries the road up some 400 feet within a linear mile and provides some spectacular outlooks by day. At night the Gorge Road, despite its constantly-improving engineering, is enough to try the soundest nerves.

Below the waterfall section, the Kabul Valley widens and begins to exhibit small floodplain sections with some irrigated grain fields and pomegranate orchards. Here also is a section in which lateral alluvial fans pour their sands and boulders into the stream, almost blocking it in some places and seasons. Several 1000-foot high bluffs of alluvium were probably deposited as terraces while the stream was blocked by ice in the two-mile gorge section downstream. This "nodal" pattern, with small floodplains or terrace sections separated by transverse schist or granite ridges, is highly characteristic of northeastern Afghanistan where the raising of the Hindu Kush on a general east-west axis and the fracturing of the eastern edge of the Iranian plateau acted more or less at right angles to one another. The final node in the Upper Gorge is closed by a short, sheer gorge known as "Naghlu" which is to become the site of a Soviet-engineered storage dam and hydroelectric station. Surveys for its construction have now been completed, with the cost estimated at $20,000,000 for an initial capacity of 30,000 to 40,000 kva.[1]

Below the Naghlu section, the Kabul River describes a wide, five-mile long bend to the south, in the course of which it receives the waters of the Panjshir River which drains the southern flanks of the Hindu Kush and the upper reaches of the Kabul Corridor. The combined flow is now held in the 1,400,000 cubic-meter reservoir behind the Sarobi Dam. This project was begun in 1953 by the German firm of Siemens-Schukert on behalf of the subsequently-nationalized General Electric Company of Afghanistan. The chosen site, Sarobi, lies at the western entrance to the Lower Gorge of the Kabul. Here is the point where the direct route to the north along the

[1]Afghanistan Mission to the United Nations, <u>The Five Year Plan of Afghanistan</u> (New York, 1956), p. 165. (Hektographed.) The ultimate potential capacity of the dam is reported to be 60,000 kva. Courtney Kimler, <u>Field Survey of Afghanistan's Industry, Transportation and Electric Power Resources</u>, United States Operations Mission/Afghanistan (International Cooperation Administration) (Kabul: April, 1956), p. 5. (Hektographed.)

Panjshir meets the old route to Kabul City, which still is used for truck traffic and which diverges to the southwest along the Tezin Darra and thence over the Lataband Pass to the capital. Thus, the dam serves the purposes of a bridge as well, providing the only crossing of the Kabul River between the bridges of the Upper Gorge and the suspension bridge at Darunta above Jalalabad. The reservoir also receives the highly seasonal flow of the Tezin Darra, which has been bridged for the Gorge Road. Finally, it is possible to travel from Sarobi to the south and east along the old road via Surkhpul and Nimla to Jalalabad. This historic route has passed into disuse since the Lower Gorge Road was opened for truck as well as car traffic. Therefore, while it is undoubtedly correct that use of the Naghlu site for the first Kabul River dam would have offered greater reservoir capacity and power potential than the Sarobi site, selection of the latter provided many transportation advantages and gave considerable impetus to Sarobi town, the largest center on the Kabul River between the capital and Jalalabad.

The 80-foot Sarobi Dam, which cost $14,000,000, was substantially completed in May, 1957, with the putting into operation of the first 11,000 kva generator. A transmission line to Kabul had been built over the Lataband Pass route, and a second was being constructed along the Panjshir to the new textile plant at Gulbahar. As this plant comes into production, it will require the output of the second 11,000 kva generator installed in the Sarobi powerhouse, 3700 meters downstream and 52 meters below the dam. Provision has been made for future addition of a third unit of the same capacity, at which time a third intake gate can be added to the two now opening into the long 24-square-meter feeder tunnel from the dam to the turbine penstocks. Thus the capacity of Sarobi can be raised to

33,000 kva when needed, and construction of a lower intake, a 4700-meter tunnel and a 22,000 kva powerhouse could further increase it if desired.[1] However, it is likely that the construction of the Naghlu dam will preclude such an enlargement of the Sarobi project in the foreseeable future. Indeed, there are several other excellent potential hydroelectric sites on the Kabul River, integrated development of which should command high priority in planning circles of the Royal Government of Afghanistan (henceforth, RGA). No other streams in eastern Afghanistan offer such excellent sites and potential power heads along with an annual runoff estimated at about two million acre-feet.[2]

Below Sarobi, the Kabul River flows through its Lower Gorge, the Tang-i-Vereshmin. In length, though not in drop, this section is comparable to the Upper Gorge, with steep walls of schist or granite and no traces of floodplain or cultivation. The road through this section is confined to the southern bank, and is still being improved and widened. It reduces by some fifty miles and four hours the old journey to Jalalabad via Surkhpul and Nimla, which crosses the Siah Kuh range and, when the bridge is intact, the Surkhab River. The Nimla route would, if properly maintained, provide a valuable alternate to the Gorge Road. It did so in February, 1958, when engineers attempting to widen the Gorge Road blasted out its "natural tunnel" section and brought the overhanging cliff down into the river bed, thus forming a temporary lake and demonstrating the advantages of still

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[1]Kimler, pp. 4-5.

[2]A. T. Petersen and Saiffudin Shansab, Irrigation in Afghanistan, Soils Laboratory, Ministry of Agriculture, Kabul. In files of Ministry of Agriculture and United Nations Technical Assistance Mission, Kabul, Afghanistan. (Kabul: August 26, 1956), p. 2. (Typed.)

another potential dam site. However, so many humped crossings of small irrigation ditches (juis) would have to be reconstructed with small bridges or culverts before the Nimla road could be rendered fit for sustained and reasonably rapid movement that the alternate will probably be almost completely abandoned once the Gorge Road is completed and, as is now proposed, paved from Kabul to the Pakistan border.

The Jalalabad Oasis

Once clear of the Lower Gorge, the Kabul River flows practically unobstructed to the Pakistan border. This entire section of the valley may be described as the "Jalalabad Oasis". It is true that at Darunta the arid hills of the Dasht-i-Gambiri separate the Laghman Valley from the Jalalabad Basin, with a transverse schist ridge providing a site which is being surveyed by Soviet engineers for a dam to impound water for irrigating the oasis. But the climatic, vegetative and agricultural patterns of the Laghman Valley, of the Surkhab Valley below Nimla, and of the Jalalabad area itself are sufficiently similar to one another, as well as sufficiently distinct from other agricultural regions in Afghanistan, to warrant consideration as one unit in this study. The Kunar River, paralleling the Northwest Frontier of Pakistan for eighty miles, enters the Kabul River below Jalalabad. The Kunar Valley gives access to the high, forested regions of Eastern (Mashriqi) Province. Its lower reaches may also be included in the Jalalabad Oasis. Access from Jalalabad City to both the Kunar and the Laghman Valleys is provided by the suspension bridge which crosses the Kabul River at the eastern end of the Darunta Gorge.

Thus defined, the Jalalabad Oasis is roughly equivalent to the productive area of Eastern Province, of which Jalalabad City is the administrative capital, principal city and major market. The Jalalabad Oasis represents the only large floodplain development on the Kabul River between the city of Kabul and the Pakistan border. It is distinguished from the former by being approximately 4000 feet lower in elevation and, as a consequence, by possessing a completely different micro-climate and vegetative pattern. For these reasons we shall describe the Jalalabad Oasis before returning to a more complete discussion of the upland Kabul Basin.[1]

The Jalalabad Oasis is often termed "subtropical" on the basis of its distinctive crop pattern: citrus fruits, sugar cane and rice. But it must clearly be understood that, despite a high local humidity in summer arising from the confluence of the above-mentioned rivers, the Jalalabad climate has no relation to the humid subtropical climate type. The Jalalabad climate has more resemblance to the "dry summer subtropical" or "Mediterranean" type. Citrus, sugar cane, and rice can be grown only under intensive irrigation, as is the case with citrus in Southern California. Actually, the appropriate climatic analog for Jalalabad in the United States would probably be the Imperial Valley or the citrus-producing regions of Arizona. Dr. Arnold J. Krochmal has

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[1]By proceeding immediately with our discussion of the Jalalabad Oasis, we shall also lend a directional orientation to this chapter and make it possible to contrast, in a logical sequence of elevation, the other areas of the Kabul watershed: the environs of Kabul City including the Chardeh, Logar and Charikar Valleys and the higher Ghorband and Panjshir Valleys. This presentation has the advantage of making a direct transition to Chapter II, "The Kunduz Valley", and perhaps of serving to orient the future visitor to Afghanistan, who, if he enters by the usual road through the Khyber Pass, must follow this sequence.

compared it to the Salt River Valley in the latter state.[1] Jalalabad's six to eight inches of rainfall per year are distinctly limited to the winter or early spring months. Frosts are possible but infrequent, while the summer maximum daily temperature may reach 120°F. or somewhat higher.[2]

Because of its low elevation of 1800 to 2000 feet, and the sheltering effects of high mountains to the west, north and south, Jalalabad enjoys a climate unique within Afghanistan. Areas in the North or in the Southwest having equally low or lower elevations are open to winds from the north or west which cool them in winter and dessicate them in summer. Jalalabad, entrenched among the Kashmund, Siah Kuh and Safed Kuh ranges, is able to retain the warmth of its 34°30' sunshine in all seasons. Although the evaporation losses in summer are great, the combined contributions of three or four perennial streams draining snow-capped mountains maintain Jalalabad's agriculture in a state of relatively high intensity for Afghanistan. Indeed, in further contrast to the remainder of the country, Jalalabad seems to be the only area with a high relative humidity in summer. This feature, arising from the confluence of the streams, poses a severe malarial problem and makes the Jalalabad oasis in summer as disagreeable as the Indus Valley. In winter, however, moderate temperatures combined with the beauties of the Safed Kuh and Kashmund ranges have made Jalalabad the chosen residence for the King and for others high-placed in government or fortune.

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[1] Arnold J. Krochmal, Report of Trip to Jalalabad, July 12-13, 1957, Ministry of Agriculture, Kabul. (Kabul, 1957), p. 1 (Hektographed.) Dr. Krochmal is Director of Agricultural Research on the Wyoming University Team which provides technical assistance to the Royal Afghan Ministry of Agriculture by contractual arrangement with the United States International Cooperation Administration.

[2] No systematic meteorological records for Jalalabad are available.

Climatic, water-supply and soil advantages have combined with those of location to give the Jalalabad Oasis a relatively high population density. Though the figures are highly dubious, it is estimated that Eastern Province in 1952 had a population of 1,140,000 persons[1] most of whom are concentrated in the Jalalabad Oasis as we have defined it above.

Land-use patterns in the Jalalabad Oasis are also unusual. Citrus fruits are grown in ornamental plantings in the gardens of estates as well as in orchards. Both types of plantings are represented within the city limits and to a distance of twenty or thirty miles up the Surkhab Valley. There is also a beautiful garden of citrus and exotic trees at Kalat-us-Siraj in the Laghman Valley, but apart from the limes grown in the Abdul Khel region of this same valley neither of the northern tributaries, Laghman or Kunar, is particularly used for citrus irrigation.

The citrus fruits of Jalalabad and the Surkhab Valley include sweet and sour oranges, tangerines, grapefruit, lemons and limes. The thin-skinned sweet orange known as <u>Molta</u> grows on small, overpruned trees, commonly infected with leaf drop or limb necrosis.[2] Propagation methods are poor: "Cuttings of sour orange, <u>Citrus aurantifolia L</u>., are used as rootstock for <u>Molta</u> fruiting-wood, a very undesirable practice and one that leads to low yields and poor trees, and may be correlated with Quick Decline disease found in California and perhaps existing in Jalalabad."[3]

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[1]Sobeir Said, "Die Wirtschaftliche Bedeutung Afghanistans unter Geographischen Aspekten" (unpublished seminar paper, Professor F. Marbach, Bern University Switzerland, 1952), p. 5. Unfortunately we have no acceptable estimates of the arable area in the Jalalabad Oasis.

[2]Krochmal, pp. 1 and 5.

[3]<u>Ibid</u>., p. 1.

All citrus appears to be heavily attacked by scale and rust. Local farmers complain of fruit abscission, but without experimentation it is impossible to determine whether this is more than normal "drop" and, if so, whether it may not be due to a miscalculation in the frequency and quantity of application of irrigation water. Orange trees in Jalalabad yield a fair crop only every third year.

The sour oranges (Narindj) which have yellow skins are not as large as the usual Florida variety. Their taste is that of a combination of orange and grapefruit. The sweet oranges, on the other hand, are very similar in appearance and taste to the usual California product. Jalalabad grapefruit tend to be large, up to eight or nine inches in diameter, but have a very thick rind of about three-quarters of an inch so that the edible portion is not commensurate with the size of the fruit. The total annual production in Eastern Province of oranges and tangerines is estimated by Frumkin at 210 tons per year.[1] There are also substantial quantities of deciduous fruits, mulberries and nuts, of which 1800 tons of pomegranates, 334 tons of grapes and 7750 tons of mulberries represent the major categories produced in the oasis in one year.[2]

Dr. Krochmal's recommendations for development of the Jalalabad citrus industry include propagation studies to determine the best rootstocks, varietal studies for higher yields and larger fruits, study of water requirements for increased yields, improvement of cultural practices and development of methods for controlling insects and diseases including

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[1]Gregory Frumkin, Synopsis of Afghan Agricultural Statistics, United Nations Technical Assistance Mission, Kabul. (Kabul: December, 1952), Table IV and notes thereto. (Mimeographed.)

[2]Ibid.

fruit and flower drop.[1] In time, he believes, it may be possible to use the sour oranges for local juice extraction or other processing. At present, however, sweet oranges and grapefruit are sold locally or tranported to the Kabul market, often arriving in damaged condition due to poor packaging and the state of the roads. The proposed paving of the Gorge Route should greatly reduce injury to this fruit as well as the length of time it must spend _en route_ to market.

A second distinctive crop of the Jalalabad Oasis is sugar cane.[2] The local or _vatani_ variety has been grown here for generations. It is soft and quite sweet to the taste, containing about 15% sugar by weight. At one time, apparently, a hybrid, Coimbatore cane was introduced from India. This harder and less sweet cane has only 9-10% sugar content but is much more resistant to the two diseases which now affect about 40% of the sugar cane in the Jalalabad Oasis. "Red rot", caused by the fungus _Colletotrichum falcatum_, dries up the cane, wilts the tops and converts some of the sugar into alcohol. A second disease, a smut (_Ustilago scitaminea_), causes the cane to waste its energy in producing black shoots or "whips" at the joints between sections. These whips are filled with spores which propagate the disease when the whips burst or are broken. To control these diseases it is necessary carefully to remove the infected canes and burn them. No cane from an infected area should be used as seed.

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[1]Krochmal, _passim_. In addition to this report on Jalalabad, Dr. Krochmal is now preparing a study of Afghan agriculture which will represent the first definitive work on the subject since publication of the result of Vavilov's and Bukinich's 1924 field expedition in N.I. Vavilov and D.D. Bukinich, _Agricultural Afghanistan_, Institute for Applied Botany (Leningrad, 1929).

[2]Most of the technical information on sugar cane was obtained from Mr. M.L. Gattani, the United Nations Food and Agriculture Organization plant pathologist at Kabul in an interview on December 4, 1957.

Mr. Gattani, the United Nations (henceforth, UN) Food and Agriculture Organization (henceforth, FAO) plant pathologist at Kabul, has had posters prepared in Farsi, describing the diseases and instructing farmers how to combat them. He has also recommended to the RGA that several new varieties of Coimbatore cane be imported and tested at Jalalabad. These varieties are disease-resistant and, to some extent, frost-resistant. Thus it would be possible to plant seed sections of cane in November, instead of in March as is now the case, in order to advance and extend the ripening period some seven or eight months later. Sugar cane is generally considered to require a minimum of 3000 degree days over 60°F. in order to achieve full ripening and maximum sugar content. While we have no long-range meteorological data for Jalalabad, observers are agreed that cane planted in March is generally not fully ripened by November when it is customarily harvested. Furthermore, while a light frost will not kill sections of cane planted in the earth, or harm cut cane which is buried for storage until it can be processed, it does produce a chemical alteration in standing, uncut cane which drastically lowers its sugar content. Therefore, the whole future of a cane sugar industry at Jalalabad depends not only upon introduction of disease-resistant varieties but upon acceptance of varieties or planting shedules which will produce fully-ripened cane early enough in the autumn to allow a processing period or "campaign" several weeks in duration. Mr. Gattani believes that with pre-winter plantings enough cane could be provided for a three-month campaign from October through December. Others believe that the whole season at Jalalabad is too short or too cool for proper ripening of any varieties of cane on a scale sufficient to support a local extractive industry. Indeed, the entire present annual production of Eastern Province is estimated at only some 25,000 tons of sugar cane,[1] almost all of which is crudely processed to make <u>ghur</u>, an impure, dark-brown product containing all the molasses. Even on a basis of a 10 per cent recovery, the total present production of cane would thus contribute only 2500 tons of sugar as compared with the 20,000 tons imported into Afghanistan in 1956-57.

In the endeavor to reduce dependence upon imports, however, the RGA has assembled at Jalalabad the now-obsolete cane sugar processing equipment which it purchased from Maschinenfabrik Sangerhausen, Germany, in 1928, and transported to Afghanistan by 1934. Erection of a factory building was begun in 1952 and substantially completed in 1957, by the end of which year the equipment was in operating condition. The Indian technicians hired to supervise operations, however, had no idea how much sugar cane would be available from the local farmers. This would depend, of course, upon how much the Government Monopolies were willing to pay for sugar cane, since the farmers had the alternative of processing it themselves into <u>ghur</u>, or of consuming it directly by cutting and chewing. The technicians did know that the plant as constituted could produce only fifty tons of sugar per day on a basis of 5 per cent extraction of sugar from the cane. They expressed the hope that with experience and willingness on the part of Government Monopolies to make further investment in changes of equipment and layout production might eventually be raised to 120 tons per day on a basis of 10 per cent recovery from improved varieties

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[1]Frumkin, <u>Synopsis . . .</u>, notes to Table II.

of cane having 13 per cent sugar content.[1]

It is apparent that even if the whole present production of the province were collected, a most unlikely assumption, the plant as constituted could process the 25,000 tons of cane in twenty-five days. To keep the factory operating for ninety days would therefore require almost four times the present production of cane, or over four times present production if efficiency of extraction and yield of cane were raised to 120 tons per day and 10 per cent, respectively. Hence it is apparent that the program envisaged by Mr. Gattani will require not only introduction of new cane varieties and new planting habits among the local farmers but a substantial increase in the acreage devoted to sugar cane in the Jalalabad Oasis. Present yields are estimated at about six tons per acre, so that we may assume approximately 4200 acres are planted to sugar cane each year. This is not unlikely, as sugar cane fits into two of the three traditional rotation patterns of the Jalalabad area. (See Table 1 on the following page.)

To achieve a fourfold, or greater, increase in sugar cane production, therefore, the Government Monopolies would have to offer a price for sugar cane which would enable it to compete with rice, the most remunerative crops of the Oasis, or with other direct consumption crops. Taking transportation costs into account, the Government price for sugar cane would have to be even higher in order to further intensify production around Jalalabad or to compensate farmers for hauling it in from outlying

[1]Interview with Messrs. L.B. Paul, D.P. Bantra, and other technicians at Jalalabad Sugar Factory, November 26-27, 1957. In a letter to the author in October, 1958, Dr. Krochmal reported that the Government Monopolies had decided to invest in additional machinery to raise the capacity of the Jalalabad mill to 100 tons per day, and added that the previous production had amounted only to 25 tons per day rather than the 50 hoped for.

TABLE 1

JALALABAD CROP ROTATION PATTERNS

First Year	I	II	III
March planting	sugar cane	sugar cane	rice
Oct.-Nov. harvest	sugar cane	sugar cane	rice
Nov.-Dec. planting	winter wheat	-fallow-	winter wheat
Second Year	**I**	**II**	**III**
March planting		rice	
June harvest	winter wheat		winter wheat
July planting	corn (maize)		corn (maize)
Oct.-Nov. harvest	corn (Maize)	rice	corn (maize)
Nov.-Dec. planting	-fallow-	-fallow-	-fallow-
Third Year	Repetition of First Year		

districts. The resultant reduction in ghur production would probably raise the demand for processed sugar; inversely, if the Government price were not sufficiently high the farmers would always have the alternative of using the cane themselves for direct consumption or ghur production. Finally, this whole operation would have to be carried out within ninety miles of Peshawar, from which place imported sugar is now being sold on the Jalalabad market, and at an equal distance from Kabul, the principal domestic market to be supplied from the Jalalabad Sugar Factory. Therefore, while the suggested improvements in varieties, cultivation practices and processing capacity could be expected to supply about one-half of Afghanistan's annual sugar imports, reckoned on a basis of a ninety-day campaign at 120 tons per day, this could be achieved at Jalalabad only in direct competition with other, presently more profitable, crops, and in competition with imported sugar which finds at Jalalabad its most accessible market. For these reasons, the RGA, while continuing to experiment with operation of the Jalalabad mill, would be well-advised to consider the alternatives of increasing sugar-beet production in the Kunduz region, where approximately 5000 tons of sugar per year are now produced, and in the Helmand, where sugar beet cultivation could advantageously be introduced. We shall return to a consideration of the possibilities of increasing domestic sugar production after our review of the capacities of each of these regions to compete with Jalalabad.

Rice is the third distinctive crop of the Jalalabad Oasis, although Eastern Province ranked second to Kataghan Province (in the Kunduz Valley) in rice production in the years 1952-1955. Over this period, Eastern Province, which is agriculturally practically synonymous with the Jalalabad Oasis, produced an average of 75,000 metric tons of rice per year, or approximately 25 per cent of the annual national production.[1] Rice requires both more water and more labor than sugar cane, but it yields the farmer a higher return both in nutritive value and in price, measured on an areal basis. Farmers in the Laghman Valley area of the Jalalabad Oasis estimate their rice yields at about 2650 pounds per acre, from a sowing of 40 or 42 pounds of seed rice per acre. This yield compares well with the 3142 pounds per acre obtained by mechanical methods

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[1]Mohammed Yusuf Mail, Rice Production of Afghanistan, Ministry of Agriculture, Kabul. In files of Ministry of Planning, Kabul, Afghanistan. (Kabul, 1955), passim. (Mimeographed.)

in the United States. It is high in comparison with India's 1210 pounds per acre and Pakistan's 1344 pounds per acre, but low in comparison with the 3756 and 4833 pounds per acre obtained, respectively, in Japan and Egypt.[1] Yields in the Jalalabad Oasis could be raised if more fertilizer were available, and it is possible that experimentation would indicate higher yielding varieties which might be introduced. At present, although no pure strains exist, two general varieties are recognized at Jalalabad according to length of grain and type of leaf. The so-called look rice is characterized by a thin leaf and short grain, hulled samples averaging 0.18 inches in length. Boreek rice has a wider leaf and a longer grain with hulled samples averaging 0.26 inches. The boreek variety is preferred for consumption, but look rice will yield higher returns on the poor soils.

Probably no great improvement could be made in the traditional rice cultivation practices in the Jalalabad Oasis. Afghan skill in utilizing every piece of land to which water can be brought is well demonstrated in this area. Mechanization would do nothing to increase yield per acre and would play havoc with the bunds surrounding the basins or paddies as well as with the ownership pattern which they frequently serve to mark. Nor is it necessary to conserve labor inasmuch as the Jalalabad Oasis is rather densely populated, no large industrial development is expected, and the alternative crops such as sugar cane or citrus fruits require less rather than more labor than rice. Indeed, rice culti-

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[1]United Nations, Food and Agriculture Organization, Yearbook of Food and Agriculture Statistics, 1957, Vol. XI, Part I (Production) (Rome, 1958), pp. 48-49. Figures converted from kg/hectare to lbs/acre.

vation seems to offer an ideal land-use for the Jalalabad Oasis and one of the most profitable occupations for its people. In the traditional pattern, the basins or paddies are cleaned, leveled and given a pre-planting irrigation in late February or early March. Rice is then sown broadcast and the paddies flooded for 120 days. At the end of June, bunches of five or six plants are tranplanted by hand into rows in the mud of prepared paddies. These new fields are then flooded for 40 days, drained, and re-irrigated only once every 10 to 15 days. By the end of October, the rice is ready for harvest.

In contrast to rice cultivation, harvesting and threshing methods could considerably be improved both to reduce the amount of grain lost in processing and to make the farmers' task less onerous. In the present method, the harvester uses a small sickle with a very short blade, only three or four inches long. This forces him (or her) to bend low and hold the stalks with one hand while cutting them, about half an inch from the ground, with the other. Use of a scythe or a scythe-with-cradle would make this task both easier and more efficient.[1]

The cut grain is then laid in windrows in the paddies to dry for four days or so, then gathered and stacked in circular piles over which several yoked beasts are driven in circles to thresh the grain. The straw is then collected for use as fuel or to be mixed with mud for building purposes. On a breezy day, the chaff is winnowed out by hand in the open air on hard-packed mud winnowing floors. The grain which remains is then gathered and put into a small mud oven where it is roasted to harden it and to crack open the tough hull. Finally, it is brought to a crude, water-driven stamping mill where metal-shod walking beams pound the grain

[1]The loss of grain caused by the shattering of some heads when the scythe is used, however, tends to offset the saving in labor.

fed into earthen pits in the floor and from which the indifferently clean brown rice is removed. The brown rice may or may not be tumbled about to remove the bran. As do Americans, most Afghans prefer the polished but less nourishing white rice to the brown. However, rice is a luxury grain in Afghanistan, usually reserved for feasts or guests, and few people can afford it, even unpolished, as a regular item of consumption. A considerable amount of the rice produced at Jalalabad is shipped to Kabul where more ready customers for this product are to be found.

We have already indicated that Eastern Province contributes about one-quarter (actually 25.5 per cent) of Afghanistan's total annual rice production. Based on a yield of 2650 pounds per acre, this production of 75,000 metric tons would indicate that approximately 62,500 acres are annually devoted to rice under one of the rotation schemes indicated in Table 1. While rice at Jalalabad requires eight or nine months out of the year to ripen, it can readily be succeeded by winter wheat, and the wheat, in turn, by corn. Thus, it is common to obtain three crops in two years on some of the rice lands. Where rice and sugar cane are alternated, each requiring the major part of one year, the fields must either be left fallow in the winter or devoted to a quick-growing and hardy crop such as spinach or onions. Sugar cane, like rice, can form part of the winter wheat-summer corn biennial rotation pattern. Thus, in addition to 75,000 metric tons of rice and perhaps 25,000 tons of sugar cane, Eastern Province annually produces about 130,000 tons of wheat and 70,000 tons of corn.[1] Unfortunately, the absence of reliable data regarding yields per acre and the comparative importance of each of these rotation schemes makes it impossible to estimate the acreage devoted to each of these crops within the Jalalabad Oasis. But the amount of dry-farmed grain produced away from the Oasis would be insignificant when compared with that grown under irrigation. Eastern Province is responsible for about 11 per cent of the national corn crop but only about 6 per cent of the national wheat crop.[2]

The total area under cultivation in either Eastern Province or in the Jalalabad Oasis is also an unknown quantity. Frumkin's estimate of about 116,000 acres in croplands, orchards and gardens is undoubtedly too low. He himself characterizes the data furnished to him on "Land Use by Provinces" as "utterly unreliable and even misleading".[3] _If_ we may assume that these data reflect reasonably correct _proportions_, that is, if they may be taken as representative although incomplete, they indicate that orchards and gardens occupy less than 3 per cent of the area devoted to irrigated cropland in Eastern Province.

The prospects for increasing the cultivated area in Eastern Province depend primarily upon the possibility of making more water available from the Kabul River. This expansion will entail the construction of a storage dam in the Darunta Gorge, a project which, with its associated distributary system, is estimated to require five years and

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[1]Mohammed Yusuf Mail, _Corn and Wheat Production of Afghanistan_, Ministry of Agriculture, Kabul. In files of Ministry of Planning, Kabul, Afghanistan. (Kabul, 1955), _passim_. (Mimeographed.) Averages are computed for the three years 1952-1955 (Afghan years 1331-1334).

[2]_Ibid_.

[3]Frumkin, _Synopsis . . ._, Table 1 and notes thereto.

to cost $8 millions.[1] Initial surveys for the dam were conducted by Soviet engineers in the winter of 1957-58. At the same time, the Russians laid out a drain through the marshes which lie between the sugar factory, on a low terrace, and the river itself. Here the Government Monopolies hope to plant sugar cane, but the swampy soils are very heavy with clays, severely waterlogged and will require very careful management to support any crop at all. The more fertile soils in the Oasis are generally deep alluvial silt loams, light gray or tan in color. Their fertility has undoubtedly been maintained by additions from the muddy irrigation waters as well as by some application of manure and ashes over generations of cultivation. Drainage is generally adequate except in the areas immediately adjacent to the streams. A survey made by Morrison-Knudsen Afghanistan, Inc. (henceforth, MKA) in 1947 indicated that some 14,000 acres might potentially be suitable for irrigation from a dam at Darunta, while a further 27,000 acres in the Batikot Flat southeast of Jalalabad would require additional structures.[2] In the more distant future, it is possible that some additional lands could be irrigated in the lower Kunar Valley. The Laghman and Surkhab areas, however, appear to have little to offer in potential increments of irrigated land.

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To summarize the importance of the Jalalabad Oasis within Afghanistan, we may state that at present it is the only area of citrus fruit and large-scale sugar cane growth in the country. Furthermore, the Jalalabad

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[1]Afghanistan Mission to the United Nations, The Five Year Plan of Afghanistan, p. 46.

[2]Krochmal, p. 8. I was unable to obtain any confirmation of these estimates from MKA in Kandahar in January, 1958.

Oasis is the second most important rice-producing area of Afghanistan and "exports" much of this production to Kabul City. The principal local significance of rice cultivation is to put a heavy pressure upon land use by dominating two of the three common rotational systems. Although more wheat is grown in any given year than rice, and almost as much corn as rice, it can be said that where the local topography, available water and soil fertility are such as to allow rice cultivation, rice will be grown to the exclusion of other crops. Thus the hopes for an expansion in sugar cane acreage to the point where it can support a profitable processing industry run counter to the present economic interest of the Jalalabad farmer. The price incentives which can be offered are known only to the Government Monopolies, if they are known at all. We shall return to a discussion of the prospects for sugar cane, as well as those of the Jalalabad citrus industry, in Chapters VIII and IX, after we have surveyed the agricultural capacities and potentials of the other major regions of Afghanistan.

Kabul City and Environs

We must now shift our attention some ninety miles further west and some 4000 feet higher than the Jalalabad Oasis to the upper basin of the Kabul River. Here, as we have already indicated, the capital and largest city of Afghanistan has developed on the plateau where the Kabul River receives affluents from the Paghman Range on the west and the Logar Valley to the south. To the north, over a low ridge, the fertile Charikar or Koh-i-Daman Valley,[1] watered by the Panjshir and Shakar Darra Rivers,

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[1] Both names are used, "Koh-i-Daman" sometimes indicating the southern and "Charikar" the northern part of what is structurally and topographically one continuous valley.

provides an additional agricultural base for the capital. Apart from the ill-drained areas to the east of Kabul, this highland basin offers good alluvial soils and a healthy climate. Its meagre rainfall of 12.5 inches per year is supplemented by the runoff of perennial streams fed by the snows and springs of nearby mountains. The heat of summer at 34°40' north latitude is moderated by the 5800-foot elevation so that even the average maximum temperature for July is only 92°, while the average minimum for January is a bearable 19.2°F.[1] The relative humidity reaches its highest average of 73% in January, and falls to a mere 38% in June and July. Thus there is little cloudiness and the intense solar radiation in the high, clear atmosphere is able to heat the soil rapidly even in winter. What snow falls usually melts in a few days, and the moisture it contributes supplements the irrigation water applied to hardy winter vegetables, vetches, legumes and the winter wheat or barley which generally survives the cold. In many respects the climate of Kabul is comparable with that in northern Colorado or Wyoming, at the foot of the Rockies, with pleasant summers and vigorous but bearable winters.

But other factors in addition to an agreeable climate and the proximity of well-watered floodplains must be considered in explaining the development of Kabul City. Of primary importance is the fact that from Kabul it is possible to dominate all the major routes of eastern Afghanistan. The ancient caravan trails through the Kurram and lower Kabul Valleys converge at Kabul City before going west or north to the

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[1]Weather data from records kept by the British Embassy, Kabul, Afghanistan.

passes of the Koh-i-Baba or Hindu Kush ranges. While Kabul could be by-passed by following the Panjshir Valley, this route required crossing the Kabul River at Sarobi, a difficult feat, while whoever commanded Kabul City could easily reach out to dominate the Panjshir route as well. Furthermore, the routes from the south and southwest, via Gardez and Ghazni, also converge at Kabul to skirt the Paghman Range. Thus it was no personal whim but rather a strategic decision of far-reaching consequence when the son of Ahmad Shah Durrani transferred the capital from Kandahar to Kabul around 1775.[1]

Tactical as well as strategic considerations were of importance in the days of rifles and direct-trajectory artillery. The site of Kabul City is surrounded by hills on three sides. To the west is a steep ridge, pierced only in the narrow gorge cut by the Kabul River after receiving the Paghman. This cleft, known as the "Gate of the Lion", still contains the ruins of an old mud-and-stone wall built to secure it against attackers. Today it separates the older parts of Kabul from the rapidly expanding "Fourth Quarter". To the south, where the Logar River pierces the natural ramparts, the citadel or "Bala Hissar" was built and connected by walls to the defense works on the west. Today this fort serves as a military academy. To the north and northwest of Kabul, one can still observe the trenches dug during the 1929 insurrection to defend the capital against rebels attacking from the Koh-i-Daman Valley. A low pass in the ridge, called the Khairkhana, separates the immediate Kabul watershed from streams draining northeastwards into the Panjshir, which

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[1]No doubt Timur Shah was also influenced by the possibility of protecting his Indus Valley holdings from Kabul.

rejoins the Kabul at Sarobi. The highway to the north crosses this pass; the highways to the east follow the Kabul River to its Upper Gorge or traverse the swamps towards the Lataband Pass. To the south, one road parallels the Logar River towards Gardez while another ascends the Chardeh Valley southwestwards towards Ghazni and Kandahar. With a horse or camel, it is possible to ascend along the Kabul River to the Unai Pass and then move north or west into the Hazarajat. Due westwards, the Paghman Valley leads to the summer residences of the King and Prime Minister, at the foot of the towering Paghman Range. Thus, the site of Kabul City offers relatively easy access to the routes of eastern Afghanistan which lead to India, Turkestan or the Kandahar region and, indirectly, to the northwest and Herat.

A city located at or near the site of Kabul could be expected to become a sort of inland entrepôt from which imports could be dispersed and where goods for export could be collected, processed and packed prior to transport over the Lataband Pass or other routes to the markets of Peshawar and India. Such indeed has become its commercial function on a scale worthy of the strategic and administrative center of Afghanistan. All of the karakul exports, the principal earner of hard foreign currencies, are assembled in the Kabul warehouses of the exporting agencies before being shipped or flown to New York, London or West German markets. Despite the recent establishment of a Karakul Cooperative, most karakul exports are financed by the Bank-i-Millie, whose headquarters are in Kabul. All karakul skins must be cleared through the Kabul Customs House although they are produced exclusively in northern and northwestern Afghanistan. This is true also of the exported carpets, production of which centers in the area from Maimana to Herat. Most of the dried fruit exports, which in recent years have become the leading category of exports, are assembled and packed at Kabul for shipment to Pakistan or India. In the export of fresh fruits, Kabul rivals Kandahar in the south. The same is true for exports of wool, which are collected, sorted and packed for shipment in Kabul or Kandahar, both cities having small wool-processing plants. On the import side, the Government Monopolies at Kabul handle all imports of trucks, gasoline and kerosene, as well as all sugar sold in the country, whether imported or produced at Baghlan.[1] The leading categories of imports, cotton and artificial silk piece goods, tea and notions of all kinds, find at Kabul their largest market as well as the most convenient bulk-breaking point. The sprawling and more or less specialized bazars of the capital trade in everything from Jalalabad citrus fruits to rubber goods made in Japan or Akron. Imported leather is worked up by local cobblers or sold by Kabul middlemen for use in outlying cities and villages.

The oldest industries in Kabul are located just inside the "Gate of the Lion" where a small canal provides water for the wool textile plant and arsenal established during the reign of King Habibullah (1901-1919). The woolen mill works exclusively "on Government account", producing heavy, natural-colored material for military uniforms and blankets. Its equipment is archaic and largely in disrepair, since it includes some spinning mules and some machines bearing the date 1908 for which no replacement parts are available. A hydro-electric plant was established by King Habibullah at Jabal Seraj near Charikar in order to supply this plant as well as the arsenal and

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[1] Import and resale of the commodities mentioned is handled ex- [illegible] whether or not they pass through Kabul.

palace. Yet there are many hand-operated looms in addition to the ten power-driven automatic looms. Roving must be performed by hand, usually by small boys not yet in their teens. The capacity of the plant is limited to about 400 meters of cloth per day plus some excess yarn which is sent to the Government prison for weaving. Since the woolen mill is exclusively an RGA enterprise, it operates outside the regular economy and, indeed, is probably too obsolete even to be adapted for modern wool processing, although its mechanical wool washers and centrifugal cleaning machine could doubtlessly be put to good use in preparing local wool for export.

In startling contrast to the Government woolen mill is the Jangalak industrial center located southwest of the city on the right bank of the Kabul River. This small complex was built by the Unimac firm of Austria for the Textile Company. Housed in half a dozen prestressed concrete sheds and shops, the Jangalak section includes a well-equipped lumber mill for slabbing, planing and sanding the timber brought by truck from Eastern and Southern Provinces, a wood-working shop which can convert this lumber into anything from fruit crates to office furniture, and a metal-working shop where most of the machines have been ruined through operation without coolants. In one large shed, wooden truck frames and bus bodies are fitted onto the International Harvester chassis imported by Government Monopolies, and concrete blocks are made using cement imported from Pakistan. Another shed is to become a Soviet-financed and -supervised motor vehicle repair shop. A forge is provided to fashion hardware and parts for the wood-working and repair shops. Waste from the lumber-mill is burned in a steam-boiler to provide electricity for the complex and to drive a compressor which liquefies air to furnish oxygen for acetylene welding. All in all, the Jangalak center can perform many useful service functions for the Kabul community and for transportation maintenance in particular. It may serve as a model for the development of a similar "industrial district" at Kandahar, which will be discussed in Chapter III.

Adjoining the Jangalak center is the private Shaker Ceramic Factory, which went into production seven months after construction was begun in 1957. This remarkable achievement is due in large measure to the energy of the company's president, who had spent a number of years in Japan as an export-import trader and who was able to persuade the Japanese to help cut themselves out of the Afghan porcelain market by selling him the machines and lending him the technicians to establish a domestic ceramic industry. By November of 1957, the plant was producing 600 teapots, 2000 handle-less cups and 700 or 800 plates per day, and it was hoped to eventually reach a capacity of 10,000 pieces per day, at which point the staff of 120 employees and apprentices would have grown to about 300. The factory has its own trucks, which bring feldspar from the Kunar Valley, gypsum from Jalalabad, talc for glaze from Southern Province, kaolin and ball clay from the north, and ravelite from the Hazarajat. Local chellstone and quartz are used. The plant is also equipped to make porcelain insulators for the Communications Ministry, which can be used on the very transmission line that supplies the factory and Kabul from Sarobi. This line comes over the ridge behind the plant, where the Siemens Electric Company maintains its electrical equipment and parts storage depot. A closer degree of integration is difficult to imagine.

Between the Jangalak area and the city proper, but on the left bank of the Kabul River, is located the euphonious Hajari Najari plant, a privately-owned stone-cutting and furniture-making establishment. Its location beside the Ministry of Mines and Industries is apparently merely coincidental, although the Hajari Najari does process most of the semi-precious stones available in Kabul, prices for which are supposedly set by the Ministry. On a larger scale, the Hajari Najari cuts marble and "Oriental alabaster" and produces beautifully inlaid table-tops, carved lamp bases and stone cigarette boxes and ash trays. It is also the manufacturer of most of the upholstered furniture in the capital, although there are many imitators of its "Afghan modern" style in the bazar.

At the extreme western edge of Kabul City are located the grain elevator and modern bakery, collectively known as the "Silo", built by the Russians under a $3.5 million loan extended in 1954. This plant, operated by the Ministry of Finance for some unknown reason, turns out dark, whole-wheat bread in loaves which are generally unacceptable to the populace which prefers an unleavened pancake-like type of bread known as <u>nan</u>. So most of the "Silo's" output goes to the Afghan army, schools and institutions, while the people continue to bake their own. Paradoxically, most of the United States' wheat which was shipped to Afghanistan under Public Law 480 (allowing repayment in local currency which may be devoted to ICA-approved development projects) has gone into the "Silo" and been turned into Russian-type bread. So in this instance, at least, neither the U.S.S.R. nor the U.S.A. is receiving much credit for assistance extended to Afghanistan, inasmuch as it makes its appearance in a somewhat unpalatable form.

The remaining industries of Kabul are located on the eastern margins of the city. On the road which parallels the Kabul River is located a government-owned modern slaughterhouse and refrigerated meat-storage plant which processes sheep, goats and beef for the capital's open-air meat shops. The privately-owned Iqbal tannery and shoe factory is located close to the slaughterhouse which provides many of its hides. But neither the tannery nor the ice plant and storage facilities of the slaughterhouse are used at anything like their capacity, while the mechanized assembly line of the shoe factory has not been in operation since 1954. Two or three essential machines are lacking in the shoe assembly line, while half of those remaining have been damaged by improper use or lack of maintenance. So despite the existence of a shoe factory with a nominal capacity of from 120,000 to 180,000 pairs of shoes per year, Afghanistan continues to import shoes and the Kabul bazar is replete with shops in which local artisans make shoes and sandals from imported leather. The Iqbal tannery could probably process ten times the 10,000 or 12,000 cattle hides now handled each year. It has a well laid out system of concrete tanning pits, housed in sheds, a mechanical fleshing machine, three rotating vats for cleaning and chemical-treating operations, and a complete set of mechanical buffing, polishing and leather-cutting machines. Yet despite the existence of this equipment, the tannery is still employing hand-scraping and vegetable-tanning methods.

In the winter of 1957-58, a technical expert from West Germany arrived in Kabul to inspect the tannery and to assist the Iqbal Company in adopting modern chrome-tanning processes with the aid of credits extended by German manufacturers of chemicals and equipment. If the expert, Mr. Heinz Heckhoff, is successful in this endeavor, the next step would be to rehabilitate the shoe factory and then to increase the number of hides made available to the tannery from the slaughter-house or from farmers and herdsmen who slaughter their own animals. We shall consider some of the implications of Afghanistan's need to import processed leather while domestic sources remain largely untapped in Chapters VIII and IX.

Due east of Kabul City on the road to the Lataband Pass are located the coal-briquetting plant which mixes the powdered product of the Ishpushta mine with molasses from the Baghlan Sugar Factory and presses the mixture into hard cakes for use in Kabul factories, bazar forges and shops, offices and well-to-do homes. Nearby is the asphalt plant established with Soviet assistance for paving the streets of the capital some three years ago. Between these plants and the Kabul River are the site of the abortive cement plant which was to have been built some twenty or thirty years ago and the site of some new construction, part of which may be turned over to the United States Operations Mission (ICA) for use as a $400,000 motor vehicle repair shop for servicing the trucks being purchased by RGA Government Monopolies with loan funds advanced by the Richards Mission in 1957 (see Chapter XI). Such a shop might have been established in Jangalak had not the Russians been given priority, but the proposed location on the eastern outskirts will be more convenient for chassis and tank trucks shipped via Peshawar, most of which are now stored in a Government Monopolies repair shop nearby.

The agricultural patterns of the Kabul area are an expression of its location, its climate and soils, and of its administrative and commercial functions. In the gardens of the city and in the adjoining sections of the Chardeh and Logar Valleys, the production of vegetables and fruit for the urban population takes precedence over the more extensive grain farming characteristic of areas further removed from the capital. The same is true of the Koh-i-Daman or Charikar Valley to the north of the capital which, because of its abundant water, fertile coalescing floodplains and moderated winter climate (Charikar is almost 1000 feet lower than Kabul and is sheltered by the mountains to the north and west) is able to supply a considerable amount of truck produce to the capital over the easy road which connects them.

While a growing season of only seven months between frosts can be counted on, it frequently lasts longer, and by planting hardy vegetables after the August grain harvest two crops a year can usually be obtained. Actually, in the Logar Valley and some parts of the upper (southern) Koh-i-Daman, water is more of a limitation than either growing season or land, so that a second crop is started on a previously fallow field as early in the summer as it is possible to divert irrigation water from a ripening field of grain. The second crop will generally be a legume, a vetch or a root-crop, two grain crops in one year being unusual. For a given piece of land, the Kabuli farmer generally must choose between winter wheat which can profit by snow melt-water plus some irrigation in the spring runoff period, followed by beans, tomatoes, lettuce or spinach, or spring wheat or corn which will ripen too late to allow planting of anything but the hardy root crops such as turnips, carrots or potatoes in the same field. Since winter wheat generally survives, providing it is not attacked by rust in the spring rainy period as occurred in 1957, the first pattern usually prevails.

Farther from the city, grains become relatively more important, as do deciduous fruit trees, grapes and melons which cannot compete for land and water closer to Kabul. There are few canals near or far from the city, however, which are not lined with poplars for wood and building poles, willows for firewood and thatch, or mulberry trees for fruit, firewood and boards. In each of the tributary valleys there is some degree of specialization. The narrow Paghman Valley is known for its excellent potatoes and many orchards and tree plantations. The broad, flat-floored Chardeh Valley becomes a patchwork of wheat, corn and rice fields once the city is left behind. In the Logar, where water is particularly scarce, grains and melons are common with most fields fallowed in one out of two or three years. Paradoxically, wherever a water-supply can be assured a water-intensive crop such as rice, or trees for poles and wood, is grown.

Since the whole Kabul "corridor" decreases in elevation from south to north, that is, from the upper Logar Valley through the city of Kabul and, ignoring the low Khairkhana ridge, on through the Koh-i-Daman Valley to the Charikar area, it is in the latter region that crops requiring warmth and a long growing season are most intensively cultivated. Grapes reach their greatest intensity in the Khwaja Serai area of the southern, higher and better-drained Koh-i-Daman Valley. On the driest areas, melons with their long, water-gathering root systems are planted and carefully tended by farmers who will maintain an all-night vigil to prevent theft of the ripening crop. Toward the northern end of the valley around Charikar, cultivation of rice and some permanent pasture along the coalescing Shakar Darra, Ghorband and Panjshir Rivers is common. There is also some vertical zonation of the Koh-i-Daman Valley contributed by the alluvial fans which extend eastwards from the Paghman escarpment and which presumably have helped to force the Shakar Darra and Ghorband-Panjshir Rivers towards the east before their conjunction. At the high apexes of these fans are located such deciduous fruit centers as Istalif, which can tap the mountain streams for its irrigation canals and also take advantage of air-drainage into the valley in winter. Lower down come the fields of wheat, barley and corn, then the vineyards, more or less clustered along the Kabul-Charikar road for ease of collection and marketing. Finally, to the north and east come the lowland rice fields and pastures. To the east of Charikar, terrace remnants at Jabal Seraj and Gulbahar provide some variation in this pattern, while along the Ghorband or Panjshir Rivers, which drain the southern flanks of the Hindu Kush, one can climb to 10,000-foot passes, passing successively through the upper limits of rice, corn, wheat and barley cultivation. The Ghorband and Panjshir Valleys, painstakingly terraced to conserve every possible foot of cultivable land to which water is brought in an elaborate system of canals and aqueducts, are also major suppliers of deciduous fruits and nuts to the Kabul market and for export.

As for production statistics, we meet our usual handicaps and impasses. But since the upper basin of the Kabul River lies in two provinces, Kabul and Parwan, with the boundary between them traversing the Koh-i-Daman Valley just north of Istalif, we may make some acceptable comparisons of grain production and perhaps of land use in these provinces. For these purposes, it is permissible roughly to equate Kabul Province with the Logar, Chardeh, Paghman and southern Koh-i-Daman (Khwaja Serai region) Valleys since the agricultural production of the large western extension of the province into the mountains of the Hazarajat cannot be very substantial in comparison with the production directly tributary to Kabul City, the capital of the province as well as of the nation. With respect to Parwan Province, the major agricultural areas include the well-watered lowlands around Charikar, its capital, the lower reaches of the Panjshir and Ghorband Rivers before their junction, and the fertile Bamian Valley beyond the Shibar Pass which actually lies within the Kunduz-Amu Darya watershed. There is, however, no present possibility of breaking down the totals given for Parwan, but it would be correct to assume that any agricultural produce exported from the Bamian Valley finds its way to Kabul and not to the cities of the North. Here, then, for what they are worth, are the grain production figures for Kabul and Parwan Provinces.

TABLE 2

GRAIN PRODUCTION IN KABUL AND PARWAN PROVINCES

	Kabul Province		Parwan Province	
	Average Annual Production (1952-55)		Average Annual Production (1952-55)	
	in Metric Tons	as % of National	in Metric Tons	as % of National
Wheat	157,608	7.5	157,399	7.4
Corn	37,890	6.0	4,166	2.0
Rice	36,456	12.4	24,683	9.0

[a]Mail, Rice Production of Afghanistan and Corn and Wheat Production of Afghanistan, passim.

Considered together, Kabul and Parwan Provinces thus produce about 16 per cent of the wheat grown in Afghanistan, 8 per cent of the corn, and 21 per cent of the rice. If we add to these figures those given on page 42 for Jalalabad Province, we see that the Kabul River Valley as a whole produces about 22 per cent of Afghanistan's wheat, 19 per cent of its corn, and approximately 47 per cent of its rice. Although these figures are subject to rather large margins of error, they still serve to emphasize the relative importance of the Kabul Valley within Afghanistan and to indicate that considerable amounts of grain are available within the watershed for support of the large population centered in and around the capital. In most years, however, wheat is brought to Kabul from Kandahar and even Herat.

Estimates furnished to Frumkin,[1] which must be considered quite unreliable, indicated that the cultivated areas of Kabul and Parwan Provinces were approximately equal, 155,650 and 149,370 acres respectively, and that the proportion of orchard and garden land in Parwan was about three times that in Kabul, 15.1 per cent and 5.2 per cent respectively. If we may assume that the estimates, though incomplete, are reasonably fair samples, they serve to bear out the relative importance of Parwan in fruit and nut production. Similarly, if Frumkin's estimates that 10.5 per cent of the cultivated land in Kabul Province and 5.0 per cent of that in Parwan are non-irrigated land are also representative, they would indicate the relatively minor shares of dry farming on the upland areas which comprise the western parts of Kabul

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[1]Frumkin, <u>Synopsis . . .</u> , Table 1.

Province and the western and northern parts of Parwan Province. On the other hand, it makes sense that dry farming is apparently much more significant in the higher portions of the Kabul River Valley than it is in the Jalalabad Oasis, for example.

It is safe to conclude that most of this non-irrigated cultivation represents spring wheat or barley which can be planted on the uplands in March or April as soon as the earth has thawed and in time to profit by the melt-water and spring rains. But in terms of both area and yield, spring wheat is far less important than winter wheat in the Kabul Valley and in Afghanistan in general, just as dry farming is far less important than irrigated agriculture. This conclusion, which agrees with our statement on page 55 regarding the cropping pattern around Kabul, is supported by Warren L. Smith, research agronomist and statistician on the Wyoming University Team in Kabul, who estimates that 90 per cent of the wheat grown on irrigated land, and an even higher percentage of the yield from irrigated fields, is winter wheat.[1]

Winter wheat is planted in the Kabul area from early September to late November. At least one preplanting irrigation is always necessary; more are desirable. From December on, winter rains and melting snows can usually be relied upon as sources of moisture. By July of the following year, the crop can be harvested. Usually, the same short sickle used for rice at Jalalabad is employed to cut wheat. Recently, however, UN FAO technicians have been introducing Austrian-made scythes and scythe-cradles. Cut grain is not bundled or stacked as it would be in Europe; rather, it

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[1]Warren L. Smith, Varietal Tests of Winter Wheat in Afghanistan, Bulletin 101, The Royal Afghan Ministry of Agriculture and the University of Wyoming Ali-Abad Agricultural Research and Experimental Station, Kabul, Afghanistan (Kabul: November, 1957), p. 1. (Mimeographed.)

is merely laid in windrows or in large piles to dry in the low-humidity air. Then the cut-over field is carefully gleaned by the womenfolk, and even the upper roots may be pulled out by the crown for use as fuel before cattle, donkeys or sheep are turned onto the fields to browse on what little stubble remains. Threshing is performed by yoked teams of animals outdoors on smooth, hard-packed earthen threshing floors. After hand-winnowing the straw is separated for use as fuel or mixed with mud for construction, and the grain is carted to one of the many small, local, water-driven mills along the irrigation canals or small streams. These mills are located at small drop sites and utilize horizontal millstones driven by a vaned wooden wheel mounted horizontally beneath the milling floor. The new Soviet-built grain elevator, flour mill and bakery which came into operation in 1956 is conveniently located for receiving the grain produced in the Chardeh Valley as well as RGA-imported supplies.

At the Ali-Abad Experimental Station of the Ministry of Agriculture, which is located at the northern end of the Chardeh Valley, the University of Wyoming ICA-contract team has conducted varietal tests of twenty-four native and seven imported wheat strains. In 1956, a "normal" year with no significant rust problem, the native varieties yielded best. In 1957, with severe rust infestation due to heavy spring rains, imported rust-resistant strains outyielded most of the native varieties. In the following table, the imported varieties are indicated by the symbol +. All varieties were grown as winter wheat and were not irrigated.

TABLE 3

WHEAT VARIETAL TESTS AT ALI-ABAD STATION, KABUL[a]

1956

Rank	Variety	Yield in Bushels/Acre
1	Kandahar Red	39.98
2	Logar Valley	33.25
3	Maimana No. 2	31.70
4	+ Nebred	31.38
5	Girishk No. 1	31.25

1957

Rank	Variety	Yield in Bushels/Acre	% Rust
1	+ Nebred	48.13	4
2	+ Cheyenne	36.23	5
3	Herat Pink	31.40	75
4	Maimana No. 1	31.13	82
5	+ Pawnee	30.95	80

[a]Smith, Table 1, pp. 6-7. Because of the limited nature of the sample made, a difference of 9.65 bushels/acre will be statistically significant in 19 cases out of 20 in the 1956 data and one of 9.91 bushels/acre in the same number of cases in the 1957 data. It is unfortunately impossible to make comparisons between the two years in terms of individual varieties since the 1957 test was conducted on land of higher fertility. Ibid., p. 10.

Based on these data, Mr. Smith concludes:

> The variety Nebred has been found to be superior to local varieties in seasons of high rust incidence and in rust-free seasons to yield not significantly from the best. Cheyenne similarly has been found second to Nebred in these respects. Present data strongly indicate that distribution of Nebred might well result in considerable increase in wheat yields.[1]

[1]Ibid., p. 13.

The difficulty in recommending import and distribution of Nebred wheat lies not only in the expense involved, including that of demonstrating its superiority to farmers who cannot visit the Ali-Abad station, but in the fact that, according to the Afghans, the severe 1957 rust infestation was truly exceptional. If this is so, then it would seem advisable to concentrate upon a local variety such as "Kandahar Red", growing it for seed at the experiment station and perhaps attempting to inbreed a certain amount of rust-resistance. As Mr. Smith would agree, much more research is needed, including varietal testing of pure lines of native varieties which are only beginning to become available in sufficient quantities on the farm. For 1958, 39 test varieties were planted and the Nebred seed on hand was planted for seed increase, to be followed by distribution.

Improvement of wheat yields through better seed selection and cultivation and harvesting techniques is certainly indicated for the Kabul area where horizontal expansion is inhibited partly by competition of other crops (near the city) but principally by scarcity of land and water. Improved rotational practices, including more use of legumes, introduction of the "green manure" concept, which depends upon provision of cheaper wood or coal briquets as an alternate source of fuel to roots and stalks, and a reduction of harvesting, threshing and milling losses, all would go far to increase effective wheat production in Kabul and Parwan Provinces, and in other parts of the nation as well.

We shall return to the implications of the recurrent shortages of grain, which have to be met by imports, in Chapter VIII. But it should be noted here that no other crop is so vital to the Afghan standard of living. Though not as highly valued as rice, wheat is definitely the staple of the Afghan diet. Grown in every province, it furnishes the substance of the round, unleavened, pancake-shaped nan which is, literally, the Afghan's daily bread. This bread is usually baked in small pits dug in the ground or in the raised earthen floors of the bake-shops. A fire is built at the bottom of the pit and the dough, made merely of a mixture of flour and water, is slapped on the sides where it quickly bakes and can be peeled off by the dexterous baker before it dries out completely and falls into the embers. In such a city as Kabul, nan will be baked early in the morning and again late in the afternoon, as it is preferably consumed hot from the oven. For most Afghans a large slice of nan and a cup of warm tea constitute a full meal, and it is indeed one which makes up in nutritional value what it may lack in variety since the whole-wheat flour retains most of its natural protein, minerals and vitamins. This point is worth emphasizing, for probably 80 per cent or more of the food energy obtained by Afghans is derived from wheat. Meat and dairy products are available as a matter of course only to the nomads and to well-to-do city dwellers. A good variety of seasonal fruits and vegetables is available in the bazars, of course, but they serve more to lend variety to the diet rather than to boost its calorific content.

Maize in Afghanistan serves both as human food and animal fodder. Both hot, roasted corn-on-the-cob and pop-corn can be purchased ready-to-eat in the bazars, and shelled corn or corn meal is a minor item in the peasants' diet. Most corn in Afghanistan is of the flint variety, tending to be hard by Western standards but less prone to shrivel and rot. In the Kabul area, it is planted in late April or early May. As is the case with wheat, corn is sown broadcast on pre-irrigated, lightly-plowed, bunded fields. It may be irrigated half a dozen times over the summer. By the end of September it is generally ready for harvest, which means uprooting the entire plant. Shocking is done by hand and usually by the women, with the ears being dried on well-guarded rooftops for several days before the corn is stored in mud-and-straw bins. The corn leaves, the stalks, and the dried roots are used as fuel. So are the corn cobs after shelling. In some areas where rushes or willow branches are not to be had, the corn stalks may be used to make thatch roofs or as reinforcements in mud-wall construction. The use of the corn plant for silage is entirely foreign to Afghan agriculture, but the Wyoming University team and the Ministry of Agriculture have been experimenting with mechanical choppers and earthen silage pits. The Ministry's cattle herd is partly fed with corn silage, and sorghums introduced for the same purpose have been grown on the Ali-Abad farm. So far, the results with sorghums have not been overly encouraging, but further testing is in order before conclusions are drawn.

The Westerner is usually impressed with the thinness of stand and shortness of plants in Afghan corn fields, factors due to the mixed varieties used, the lack of fertilization and to a general shortage of water. But the number of ears on each plant is good, and they are usually well-covered with regular and fairly large kernels. While experiments at Ali-Abad and in the Helmand Valley have indicated that American varieties of dent corn can do well under proper conditions, there is as yet no sufficient basis for recommendations concerning importation or up-breeding of local maize varieties.

Both corn and wheat cultivation may be observed in almost any cultivable part of Afghanistan with little variation in local technique. Both crops are dry-farmed in the upper valleys and on hills where no irrigation water is available. The result is, as one would expect, even thinner stands than elsewhere, with stunted plants, especially as the upper limits for each grain are reached (roughly, 8000 feet for corn and 11,000 feet for wheat). But despite diminished yields, the crops grow, and people eke out an existence with their aid.

We have already indicated that deciduous fruit and nut cultivation, while found in both the Chardeh and Paghman Valleys, is most concentrated in the Koh-i-Daman or Charikar Valley and along the two streams which flow into it at its northern end, the Panjshir and Ghorband Rivers. In the southern part of the Koh-i-Daman Valley, which lies within Kabul Province, grape production is concentrated around Khwaja Serai and the north-south highway, with deciduous fruits including apples, peaches, pears and plums higher on the alluvial fans such as the one at Istalif. In the northern end of the valley, within Parwan Province, both vineyards and orchards are concentrated around the towns of Charikar, Jabal Seraj and Gulbahar, all of which can be irrigated by canals from the coalescing streams along former terraces or present floodplains. This production is supplemented by that which is brought down from the Panjshir and Ghorband Valleys. Most of it is forwarded to Kabul, and a large proportion of the fruit production of Kabul and Parwan Provinces finds its way into foreign trade via Peshawar. Since the processing, packaging and forwarding of deciduous fruits is an important source of revenue to the upper Kabul River Valley as well as to Afghanistan as a whole, we shall now consider some of its aspects and possibilities for improvement.

Grapes provide the largest single source of fresh and dried fruit production in the Koh-i-Daman Valley, which is dotted by mud-walled drying houses, easily recognized by their small, square air vents high up on the sides and the absence of any other opening except for one small, easily-sealed door. Within the houses, bunches of grapes are hung from poles set into slots in the wall, and the grapes dry to raisins in from two to nine months after the harvest, which extends from the end of August to the end of November. If the season is unusually humid, however, mildew may attack the grapes and spoil the resulting raisins. Another method of preserving the late-harvested grapes is to wrap them in cotton inside small, round boxes made of thin wood (not unlike those used for Camembert cheese). In this form, the grapes can be kept in mud-walled "cold-storage" houses through the winter without losing much of their large, firm and juicy quality. They can then be offered at a premium price on the Kabul market in February or March or even be exported without damage thanks to their excellent, though costly, method of packaging.

Methods of grape cultivation in Afghanistan are different from those in Europe or the United States. Due to the scarcity of wood in any form, trellises cannot be built. So the vines are set out in piles of earth which have been heaped up between irrigation furrows. The plants grow as straggling bushes.[1] Naturally, this interferes with pruning and thus reduces yields from plants which often carry excessive dead-weight. But it simplifies the propagation of the vines, which need merely to be

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[1]Around Kandahar, in low, southern Afghanistan where the sun gets too hot even for grapes, the practice is to dig deep, parallel trenches, plant the vines in the bottom and train them along the sides by means of pegs driven into the earth. These trenches almost invariably run east-west, with the vines trained on the southern or shady side.

buried until they have taken root and then cut from the parent vine.

Unfortunately, the grapevines of the Koh-i-Daman or Charikar Valley are heavily infected with powder mildew, estimated at 30 per cent to 40 per cent coverage at Istalif or Charikar. Mr. Gattani of the UN FAO is introducing sulfur dusting, using muslin sacks as spreaders, to combat this disease. Downy mildew, for which Bordeaux mixture is a specific, has not yet put in its appearance in this region.

Attention has also been directed to improving the processing of grapes. In 1947, Alfred M. Sabin was employed by MKA on behalf of the Afghan government to investigate the deciduous fruit industry. He received a considerable amount of cooperation from the Itehadia Company, the largest of the private fruit dealers in Kabul, and was able to conduct experiments in mechanical drying. For seedless grapes he found that cost of processing 5000 kilos, including washing, dipping in lye, sulfuring, drying, screening and sacking would be $22.20 or $4.44 per metric ton, excluding fuel costs. If an oil-burning drier were used, the total cost would rise by $12.84 per ton; a coal-burning drier would add $7.80 to the $4.44 figure.[1] Since the present method of drying in the raisin houses was estimated to cost only $6.65 per ton in total, it would be hard to justify a shift to mechanical processing even on the grounds of sanitation and improved appearance. Where labor costs may amount to only $.60 per day for one man working eight hours, it is indeed difficult to justify mechanization in many areas besides that of fruit-processing.

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[1] Alfred B. Sabin, Preliminary Report on Survey of Processing and Packing of Fruits and Fruit Products - The Kingdom of Afghanistan. Prepared for Morrison-Knudsen, Afghanistan, Inc. (Kandahar: November 1, 1947), Table 7. (Hektographed.) This report will be cited henceforth as Sabin Report.

Apples, quinces and stone-fruits grown on the alluvial fans and terraces within the Koh-i-Daman or Charikar Valley tend to be the produce of fairly large orchards owned by well-to-do farmers or landlords. In the Panjshir and Ghorband Valleys, the pattern of ownership, like the fields themselves, is much more fragmented. At any rate, the collection, processing, packaging and exporting of deciduous fruits and nuts are entirely in the hands of private individuals in the Kabul region, as they are at Jalalabad, in Kandahar or in northern Afghanistan. Even the Itehadia Company at Kabul or the Pushtoon Industries at Kandahar control only relatively small shares of the total market. This feature, unfortunately, has its drawbacks as far as quality control and uniform standards are concerned. While there appears to be no lack of supply, over 50 per cent of the deciduous fruits exhibited in the Kabul market are diseased due to insects or damaged due to improper collecting, packaging and transportation practices. Walnuts, the major nut export of the Kabul region, and mulberries are by nature more resistant to damage and come through in far better condition. We shall consider the problems of the fruit processing and exporting industry further in Chapter IX.

Jabal Seraj and Gulbahar

To the northeast of Charikar, a short, steep river flows due south from the 12,000-foot Salang Pass in the main Hindu Kush range and joins the Ghorband River just before its juncture with the Panjshir. Where the "Salang" River issues from the mountains, a large terrace remnant provided the site for a canal, small reservoir and penstock intake which were constructed here in the years 1914-1918 under the direction of an American engineer. The hydroelectric station at the foot of the terrace utilizes the 120-foot drop to produce an average of 1600 kw. Most of this power goes, during daytime hours, to Kabul City, but 200 or 300 kw are used in the small cotton textile mill built in Jabal Seraj between 1934 and 1938 by the RGA and sold to the Textile Company in 1941. This obsolete mill has an annual capacity of one million meters of piece goods plus about 350,000 square meters of special weave textiles made on hand looms. It also has small-scale finishing and dyeing facilities which have long been used to process part of the white piece goods output of the Textile Company's Pul-i-Khumri mill, located north of the Hindu Kush. The Pul-i-Khumri capacity has recently been raised to 25 or 26 million square meters per year, and a brand new, completely-integrated cotton textile mill with an ultimate capacity of 35 million square meters of piece goods has been completed at Gulbahar, to the east of Jabal Seraj and on a terrace overlooking the Panjshir River. The Gulbahar plant will take over all finishing and dyeing operations from Jabal Seraj, which will be used only as a training shop for textile workers and perhaps to produce special-order, hand-woven goods. In like manner, the 22,000 kva Sarobi Dam and hydroelectric station have dwarfed the output at Jabal Seraj and will supply the bulk of the power needed for the Gulbahar mill over a 55-mile, 110,000-volt transmission line. As we shall see in Chapter X, however, there will probably be a shortage in the Sarobi-Kabul-Gulbahar grid during the fall and winter months when demand is highest in relation to run-off in the Kabul watershed. For this reason, a 2800-kva thermal plant has been included in the Gulbahar complex, and there are plans for developing the hydroelectric potential of the Panjshir above Gulbahar if the Naghlu installation on the Kabul River is not undertaken in time to meet the growing demand for electricity in the grid. Inasmuch as the Gulbahar textile plant will draw on Kabul watershed power, and because its location is largely market-oriented with respect to the capital, it definitely forms a part of the Kabul region industrial picture. But for the purposes of this study, we shall defer a more complete description and analysis of the Gulbahar installation to Chapter II where we can consider it in relation to the major sources of raw material in the Kunduz region and in its proper historical and technological relation to the textile facilities at Pul-i-Khumri and the ginning facilities at Kunduz.

One final industrial installation must be mentioned here, however. This is the newly-completed cement plant at Jabal Seraj. The 100-metric ton per day mill, built under the $5 million loan extended by Czechoslovakia in 1954, was located at Jabal Seraj after a good deal of discussion regarding the proper location of Afghanistan's first cement plant. Surveys made by an industrial engineer on the United Nations Technical Assistance Mission[1] had recommended that the mill be built at Pul-i-Khumri, near the Kar Kar coal mines and with abundant local supplies of good limestone and gypsum. A ready market for cement is also to be found in the Kunduz Valley. However, the Ministry of Mines and Industries decided that the Kabul market should

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[1]Marcel Croisier, _Extraits de l'Etude Generale sur les Possibilities de Fabrication de Ciment en Afghanistan_. In files of United Nations Technical Assistance Mission, Kabul, Afghanistan (Kabul, 1952), _passim_. (Typed.)

take precedence even if it was necessary to bring coal from north of the Hindu Kush to supply the plant. A belt of semi-metamorphosed (crystalline) limestone had been located by the German firm of Kochs in the folded and faulted strata just north of Jabal Seraj where the Salang River cuts through the sedimentary formations. So the plant was assembled, a small-gauge railway constructed and a quarry opened. However, the initial supply of gypsum for the mill was brought all the way from Pul-i-Khumri, while the extremely friable coal of the Ishpushta mine, located just north of the main Hindu Kush range and near the Great North Road which follows the Bamian and Surkhab Rivers, was being trucked in over the 9800-foot Shibar Pass and over almost 125 miles of unimproved roads. At the end of February, 1958, the plant had built up a four-months supply, calculated on the basis of from 24 to 30 tons of coal per 100 tons of cement, and was just beginning to operate its limestone crushers preparatory to making the first batch of cement. Enough gypsum was on hand for six months' operation, calculated at three tons per 100 tons of cement. But it appeared highly desirable for the plant to develop a local source of gypsum as quickly as possible. Limestone and water are available in sufficient quantity, but the cement mill also runs the risk of a shortage of electric power since it will require 12,000 kwh per 100 tons of cement. The electricity and coal needs of the Jabal Seraj cement factory will be reconsidered under "Power Resources and Requirements" of Afghan industry in Chapter X and related to the hope of building a second Czech-financed cement mill, with a capacity of 200 metric tons per day, at Pul-i-Khumri.[1]

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[1]Information on the cement plant is from an interview of February 8, 1958, with Mr. Puchek, one of the Czechoslovakian engineers at Jabal Seraj.

Before we make our figurative journey over the Shibar Pass and into the Kunduz watershed, it would be well to point out that there is one possibility for radically reducing the long haul between the Jabal Seraj cement mill, the Gulbahar textile plant and their raw material bases in the Kunduz Valley. This involves the construction of a motor vehicle road over the Salang Pass and down to the Kunduz River at Doshi. Such a road would shorten the present journey from Charikar to Doshi by about 80 miles, putting Jabal Seraj and Gulbahar within about 90 miles of Pul-i-Khumri instead of the present 180. It would apparently entail, however, the construction of a 900-foot rock tunnel beneath the highest part of the Salang Pass, especially if it were to be fit for truck traffic and snow-free for most of the winter. Soviet engineers have surveyed this route, and it may be included among the projects financed by their $100 million dollar 1955 loan to Afghanistan. It is said that the cost of the road, including the tunnel, would amount to something like $19,000,000.

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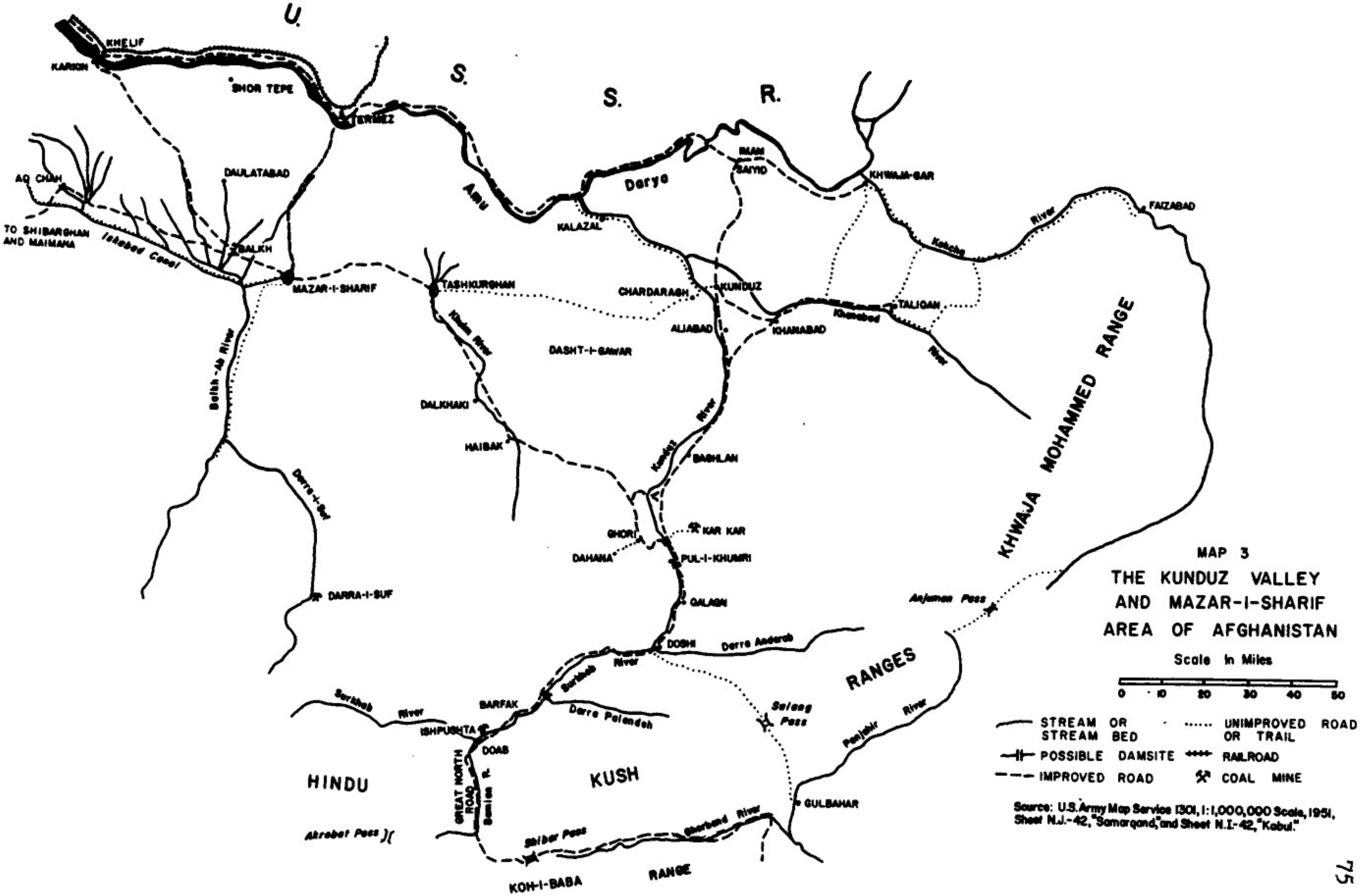
In summarizing the present economic importance of the upper Kabul River Basin, including Kabul City and its environs and the entire Koh-i-Daman or Charikar Valley, it may be said that this is the region exhibiting the greatest diversity of industrial and commercial functions. It boasts both the earliest industrial developments, in the Kabul arsenal and woolen mill and the Jabal Seraj hydroelectric plant which supplied them, and the most recent, in the Gulbahar textile mill and the Jabal Seraj cement plant. In addition to the spinning and weaving of wool and cotton, the region is engaged in the processing of hides and skins, and of karakul pelts and fruits for the export market.

Kabul City is the principal recipient of imported materials and manufactured goods, performing both the distributive and commercial-financial functions involved. Its location makes it the transportation hub of eastern Afghanistan, and its facilities include, or soon will include, shops for completing, repairing and maintaining the vehicles which are imported to serve its hinterland. The administrative function of the capital city enhances the concentration of population at Kabul, and renders it the primary recipient of both governmental attention and of foreign-aid "impact" projects. Its importance as a market should increase as road conditions improve and as the administrative-commercial functions multiply, bringing still more people into the region and, presumably, raising their living standards and capacity to buy.

The climate, soils and perennial water supply of the upper Kabul Basin have provided a sound foundation for the support of its inhabitants. In addition, the Kabul River and certain of its affluents offer a hydro-electric energy potential which is as yet only slightly harnessed. A properly-paced development program can make additional power available to meet the growing demands of industry in Kabul City and in the Char-ikar Valley, although it is possible that temporary bottlenecks will occur. The major limitations, however, would appear to be the dependence of the region upon external sources of such raw materials as cotton and coal and the restrictions imposed by landform and elevation upon expansion of agriculture. These limitations would remain even if the presently unreliable and highly seasonal runoff were regulated by means of storage dams on the upper Kabul and its tributaries. Therefore, while the upper Kabul region can continue for some time to provide most of its own consumption needs in grain, vegetables and fruits, it cannot embark upon any large-scale cultivation of cotton, sugar beets, or other technical crops needed as raw materials for consumer industries. The abilities of the Kunduz and Helmand Valleys to supply these products for the needs of Kabul and of Afghanistan as a whole will be explored in the following chapters.



MAP 3

THE KUNDUZ VALLEY AND MAZAR-I-SHARIF AREA OF AFGHANISTAN

Scale in Miles

0 10 20 30 40 50

Source: U.S. Army Map Service 1301, 1:1,000,000 Scale, 1951, Sheet N.J.-42, "Samarqand," and Sheet N.I-42, "Kabul."

II. THE KUNDUZ VALLEY[1] AND RELATED AREAS

Generally speaking, the Kunduz River drains the northern slopes of the Hindu Kush mountains into the Amu Darya. It is true that the southernmost tributary of the Kunduz, the Bamian River, rises south of the Hindu Kush, between it and the *en echelon* Koh-i-Baba Range, and then flows north in a remarkable, antecedent gorge cut through the main range. At Doab ("two waters") the clear Bamian is joined by the muddy Surkhab ("red water") and the resultant stream, under the latter name, flows east to Doshi where it receives the Darra Anderab and turns north under the name "Kunduz". Near the city of Kunduz, the river receives the Khanabad River, and then flows northwest to join the Amu Darya at a point due south of Stalinabad and approximately opposite the mouth of the Vaksh. The watershed of the Kunduz River is roughly coincident with the Afghan province of Kataghan, whose present capital is at Baghlan, midway between Doshi and Kunduz City.

It should also be pointed out that the Kokcha River, which drains the complex Afghan portion of the Pamir Knot, including parts of the Hindu Kush, enters the Amu Darya about sixty miles upstream from the mouth of the Kunduz. Since only the lowest portion of the Kokcha River can be used for any extensive irrigation, and since this portion is connected by the

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[1]The author is indebted to Mr. R.P. Davidson, Agronomist, and Mr. Albert T. Petersen, Irrigation Engineer, both of the United Nations Food and Agriculture Organization staff in Kabul, who provided much valuable information on the Kunduz region and who read and criticized a draft of this chapter in December, 1957. Responsibility for any remaining errors and for all conclusions rests, of course, with the author.

left-bank floodplain of the Amu Darya with the lower Kunduz, we shall consider the areas irrigated from the Kokcha, or from the Amu Darya between the Kokcha and the Kunduz, as a part of the Kunduz Valley region for the purposes of this chapter and this essay. This means that we are excluding the mountainous province of Badakhshan from our discussion.

To the west of the Kunduz Region, but connected to it by roads across the foothills and alluvial fans to the south of the Amu Darya, lie the provinces of Mazar-i-Sharif and Maimana, both of which take their names from their capital cities. In these provinces, the principal agricultural regions are not along the Amu Darya but either at the base of the foothills or at some distance out on the alluvial fans where the ground-waters can be easily tapped for irrigation. Four or five small rivers issue from the ranges which parallel the Hindu Kush but fail to reach the Amu Darya, although they probably did so at one time. Now their lower courses and distributaries serve to feed canal systems making possible the oasis agriculture of such cities as Tashkurghan, Mazar-i-Sharif, Balkh, Aq Chah, Shibarghan, Andkhui, Daulatabad and Maimana, none of which is located on the Amu Darya. This "Mazar-Maimana Region", as we shall term it, is important not only as a granary for its own population but as a valuable adjunct to the cotton production of the Kunduz-Kokcha region and as the major area of karakul sheep grazing in Afghanistan. Thus, we must consider the Mazar-Maimana Region as a supplier of much of the cotton which is ginned at Kunduz and processed at Pul-i-Khumri and Gulbahar, and as the source of most of the karakul which is marketed through Kabul. Therefore, we shall include a discussion of the northern plains regions of Mazar-i-Sharif and Maimana Provinces in this chapter, although they are not actually a part of the Kunduz watershed. Thus our discussion of the Kunduz Valley will be broadened by including areas both to the east (Kokcha) and west (Mazar-Maimana) which are economically, though not physiographically, a part thereof, and whose surface transportation connections with Kabul are exclusively through the Kunduz Valley.

The Upper Valley

The Bamian Valley, between the Hindu Kush and the Koh-i-Baba ranges, is a fertile and intensely-cultivated oasis which became a center of Buddhist culture in the first centuries A.D. After the advent of Islam, and more particularly after the invasions of the Mongols, the population was decimated and the valley declined. Though it never recovered its earlier significance or population, the Bamian oasis was of some importance as a way-station on the old caravan routes between the Shibar and the Ak Robat passes until the 1930's. In that decade, under the inspiration of Nadir Shah, the "Great North Road" was cut and blasted through the Bamian Gorge, a magnificent, sheer-walled canyon previously impassable to man or beast. Today, the combined effects of this road and the increasing use of trucks for transportation have made the Bamian oasis of little importance except to nomads seeking the summer pastures of the high central plateaus. Bamian remains of great interest to the few tourists who visit Afghanistan, but even this feature is capitalized upon by only one shoddy hotel. The agriculture of the oasis is of primarily local significance.

Practically no cultivation is possible in the Bamian Gorge, but there are "nodal" oases along the upper Surkhab River and around Doab where the rivers meet. The importance of Doab lies in its way-station function which includes the services of a vehicle repair shop and of a modern, government owned hostel. If the poor, twisting road up the Surkhab is improved and extended towards the untapped coal deposits at Darra-i-Suf, it will be possible to reach Mazar-i-Sharif along this route and the crossroads function of Doab will be greatly enhanced. As it is now, almost all of the traffic is generated by the Kunduz Valley and its connections with Mazar-i-Sharif, or by the small and inferior deposits of coal which are mined at Ishpushta, in a lateral canyon some five miles below Doab along the Surkhab.

Between Doab and Doshi, the Surkhab cuts through a dozen rock barriers, usually swinging wide behind them to broaden the valley to a mile or so of well-watered floodplain. Some of these sections are devoted to cultivation of wheat, corn, rice and melons, but for four-fifths of this sixty-mile journey the traveler finds himself in barren terrain with only a meagre cover of sage-brush and camel's thorn on the alluvial fans and well-worn talus slopes. In the vicinity of Barfak, the road departs from the river and crosses some true badlands territory where the weary traveler may be slightly relieved by the vivid coloring of the sedimentary formations. The major economic significance of the Doab-Doshi stretch lies in the possibility of utilizing one or more of the short gorge sections as the site of a storage dam to hold water for regularized discharge to supply irrigation needs in the Kunduz region. The best of these sites is probably that below the mouth of the Darra Palandeh (see Map 3), where it might also be possible to generate some hydroelectric power to supplement the production at Pul-i-Khumri.

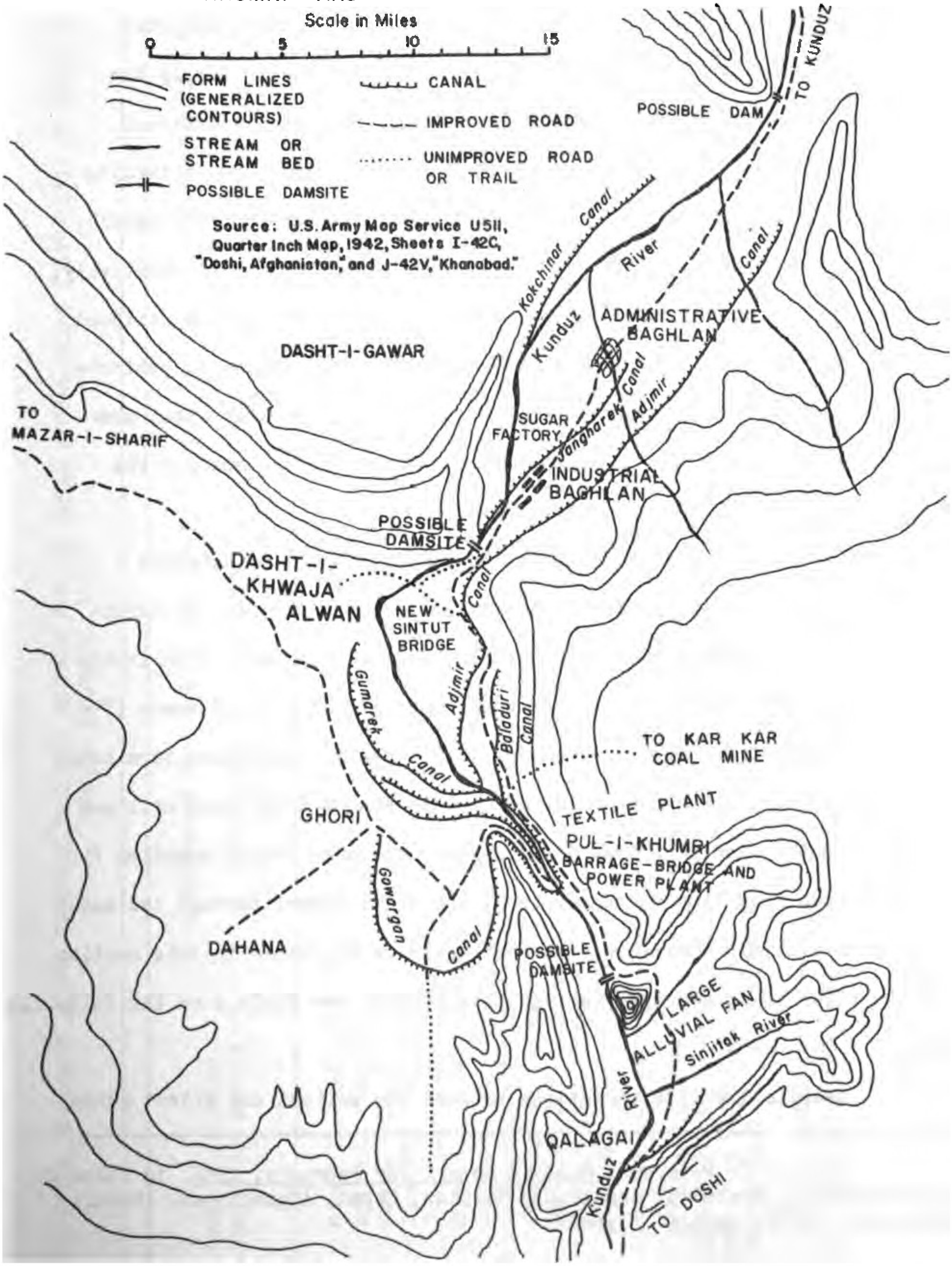
At Doshi, where the Darra Anderab joins the Surkhab to form the

Kunduz River, an oasis of 2000 or 3000 acres is devoted to rice in the low-lying flood plain fields and to rotated wheat and corn in the higher fields fed by a small canal system. There is also some nodalized cultivation upstream along the Darra Anderab. Doshi is another way-station on the highway, with spare-parts shops in its bazar and a few restaurants specializing in eggs fried in butter or lamb's fat.

Below Doshi, the sedimentary cliffs close in again, and the road is confined to the right bank of the Kunduz for a dozen miles or so. Then the bluffs retreat to the east, and the road crosses the enormous alluvial fan formed by the intermittent Sinjitak stream (see Map 4). The dimensions of the fan are approximately five miles from north to south and two and one-half miles from its apex to the 30- to 60-foot high bluffs which overhang the floodplain of the Kunduz River. At the northern extremity of the fan another intermittent stream enters the Kunduz, while the lower reaches of the fan are severely gullied, posing serious problems of road construction and maintenance. The entire five-mile, north-south section of the road across the Qalagai fan was being reconstructed in the autumn of 1957 with Soviet equipment and engineering assistance. Many stone-and-concrete culverts had to be built to provide for carrying the spring run-off safely under the road, but the shifting nature of the distributaries made it uncertain that complete success could be achieved in this respect.

Only a small section of the Qalagai fan is under cultivation, being watered by a short canal leading from the Kunduz River around the base of the hills on the southeastern edge. But since the general slope of the fan is from 3 to 4 per cent towards the river, and since the soil and drainage

MAP 4
THE KUNDUZ VALLEY
PUL-I-KHUMRI AND BAGHLAN NODES



characteristics of the fan appear to be good, it has been suggested that cotton cultivation might be expanded in this area to supply the mill further north at Pul-i-Khumri. From 5,000 to 10,000 additional acres could be watered by improving the diversion structure, enlarging the canal, and, if power were available, pumping water from the canal to the higher reaches of the fan for gravity distribution. Alternatively, water might be pumped directly from the river and gravity flow utilized throughout. Mr. A.T. Petersen, the UN FAO irrigation engineer, estimated that the project would require between 1,000 and 2,000 kilowatts, presumably from the station at Pul-i-Khumri, and he has recommended the project to the RGA for early consideration.[1]

The irrigated portion of the Qalagai fan would be extended mainly in the southern half. The lowest part of the fan, in the northwest, is not presently cultivated and could be flooded over with little loss beyond some relocation of the road. Such flooding would ensue if the advantages offered by a transverse sedimentary ridge which terminates the fan on the north and which is cut by the Kunduz River were utilized in the construction of a dam. A seven-year discharge record compiled by Mr. Petersen from flow measurements at the Pul-i-Khumri barrage indicates that approximately 2 million acre-feet would be available in this section of the river in an average year. In this respect see Table 4 on the following page.

Despite the wide variations between the wettest and driest years

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[1]Albert T. Petersen, Monthly Report for February, 1957, in files of United Nations Technical Assistance Mission, Kabul, Afghanistan. (Kabul; March 18, 1957), *passim*. (Typed.)

TABLE 4

KUNDUZ RIVER DISCHARGE AT PUL-I-KHUMRI[a] BASED ON RECORDS FOR THE SEVEN AFGHAN YEARS (1329-1335) OR MARCH 21, 1950 THROUGH MARCH 20, 1956[b]

Western Calendar Equivalent Period	Discharge Measured in Cubic Meters/Second			Discharge in Acre Feet	
	Maximum 1334 (1955-6)	Minimum 1335 (1956-7)	Average of 7 Yrs.	Average	Cumulative
March 21 - April 20	36	29	32.6	68,400	68,400
April 21 - May 21	78	98	86.9	182,400	250,800
May 22 - June 22	334	152	251.0	562,600	813,400
June 23 - July 23	387	69	224.7	487,100	1,300,500
July 24 - August 23	169	44	95.0	206,300	1,506,800
August 24 - September 23	70	37	49.8	107,600	1,614,400
September 24 - October 23	49	34	43.1	90,700	1,705,100
October 24 - November 22	47	36	38.28	80,400	1,785,500
November 23 - December 21	43	34	36.14	73,500	1,859,000
December 22 - January 19	37	31	32.14	65,200	1,924,200
January 20 - February 18	32	31	30.9	64,800	1,989,000
February 19 - March 20	30	31	29.3	61,600	2,050,500

[a]Albert T. Petersen, Kunduz River Discharge at Pul-i-Khumri, Seven Years Records (1329-1335), in files of United Nations Food and Agriculture Organization, Kabul, Afghanistan. In addition to the Qalagai Dam, Mr. Petersen has suggested several other storage sites on the lower Kunduz which are indicated in the text and on the detail maps, as well as that at the juncture of the Darra Palandeh and the Surkhab.

[b]The Afghan year runs from March 21 through March 20, and is reckoned from the Hejira in 621-622 A.D. Hence, the Afghan year 1329 corresponds to the period March 21, 1950 through March 20, 1951, and so forth.

of record, which are characteristic of precipitation and run-off in semi-arid regions, and which reach a factor of over five times for the period June 23 - July 23, it is apparent that the maximum discharge occurs in June and the minimum in February-March. A storage dam located just above Pul-i-Khumri would, of course, never have to hold the total annual discharge of some 2 million acre-feet at any given time. But it could do a great deal towards retaining the peak run-off for late summer irrigation needs as well as towards preventing the destructive floods which often wipe out irrigation structures and newly-planted crops. Such damage is particularly harmful because much of the growing season is lost before the diversion structures and canals can be repaired. A final advantage of a storage dam at the northern end of the Qalagai alluvial fan would accrue from the ability to apportion run-off in response to the needs of the power station at Pul-i-Khumri and any others that may be constructed further downstream. Since there might well develop some conflict between irrigation and power needs, however, the Qalagai project would best be undertaken by or under an RGA-constituted authority and preferably as a part of an integrated development scheme for the entire Kunduz River Valley.

The Pul-i-Khumri Node

The only existing hydroelectric development on the Kunduz River was undertaken by private enterprise. In the years 1938-1943, the Textile Company, with the backing of the Bank-i-Millie, built a cotton spinning and weaving mill at Pul-i-Khumri and in connection therewith replaced the old bridge with a concrete barrage and power drop structure, surmounted by a one-lane roadway. The barrage design, construction and installation of equipment were undertaken by Siemens Electric of Germany, and the power plant went into operation in 1942. It includes three 2000 kva generators, but seldom operates at more than 3500 kw in summer or 2000 kw in winter due to the lack of storage capacity and the highly variable run-off indicated above. The power generated serves the textile mill, the workers' settlements and town of Pul-i-Khumri, and has recently been extended over a 10-mile transmission line to the northeast to provide 80 to 120 kw for operating the hoists, ventilators and other equipment installed by ICA in the coal mine at Kar Kar. The existing hydroelectric capacity at Pul-i-Khumri is, therefore, quite strained at most seasons, and the RGA is looking for means of increasing output at minimum expense. Soviet engineers have been asked to survey the possibility of constructing a short, 6.5 meter feeder canal from the barrage and installing a new drop structure with additional turbo-generators at the downstream end. Mr. Petersen has concluded, however, that full utilization of the present 6000 kva capacity plus the proposed addition of 3000 or 4000 kva would require a flow of 60 cubic meters per second, a quantity which is available only three to five months of each year unless additional storage capacity is provided (see Table 4).

Further demands upon the Pul-i-Khumri power station will result from recent additions to the capacity of the textile mill. The original, British-made equipment included 15,000 spindles and 550 power looms with a capacity of 6.7 square meters of cloth each per hour. In 1953, the spinning capacity was doubled by the addition of 15,000 more spindles of German make. Since then, substantial improvements have been made at Pul-i-Khumri under the direction of the Gherzi Company of Zurich which is also supervising the design and installation at the new Gulbahar plant. A new building has been completed at Pul-i-Khumri and the entire plant provided with an electric heating and air-conditioning system for temperature and humidity control. A third increment of 15,000 spindles, and 304 automatic looms, all of German manufacture, have been added to the 30,000 spindles and 550 looms previously installed. The theoretical annual capacity of the Pul-i-Khumri mill has thereby been raised from 16 to 28 million square meters of cloth. On the more practical basis of 85 per cent efficiency, it is expected that about 25 million square meters of all-white cotton piece goods will be produced per year. Even this output will represent a more-than-50 per cent increase in production over the level attained in recent years; see Table 5. The large increments between 1952-53 and 1953-54 represent the installation of the first 15,000 additional spindles. These created an imbalance which at first was corrected by operating the old looms on a three 8-hour shift basis while holding the spinning sections to a two 8-hour shift basis. Now, with the addition of the 304 automatic looms, and the raising of the spindle capacity to 45,000, the plant will operate on a two 8-hour shift basis throughout. It is still expected that spindle output will exceed loom capacity so that about 52,000 five-kilogram skeins of yarn per year will be available for sale on the bazar or directly to household weavers from whom the Company later buys back woven goods at stipulated prices.

Since 1955, textile wholesale prices and profit rates have been controlled by the government and are confidential matters. Some information is available, however, with respect to wages and fringe benefits at the plant. The number of employees, who include many young boys chosen for their small hand size and manual dexterity in a country where

TABLE 5

PRODUCTION AT PUL-I-KHUMRI COTTON TEXTILE PLANT[a]

Equivalent Period[b]	Piece Goods in '000 m^2	Yarn in '000 5 kg. skeins
1942-43	7	11
1943-44	1,680	82
1944-45	3,655	97
1945-46	4,013	114
1946-47	6,231	104
1947-48	6,475	89
1948-49	7,734	82
1949-50	8,566	61
1950-51	8,686	57
1951-52	9,553	63
1952-53	9,925	76
1953-54	13,170	141
1954-55	16,362	21
1955-56	16,503	52
1956-57	estimated same as 1955-56	

[a]Interview with Sardar Anwarj, Vice President of <u>Shirkat Nasradji</u> (The Textile Company) at their Kabul office, November 11, 1957.

[b]See Note b, Table 4.

the employment of women in factories is still unthinkable, is rising along with capacity. There is some seasonal fluctuation in response to the demands of agriculture, but the yearly maximum of factory hands has now passed 3000. In addition, there are an office and supervisory staff of some 250 persons, about 75 maintenance workers including a fire brigade, half a dozen German or Austrian instructors, and one German doctor. Wages in the spinning department run from 200 to 350 Afghanis per month, and may average 250 to 260 or about $5. The efficient weaver working on a piecework basis may average $9 or $10 per month, and bonuses are given to those who exceed 80 per cent of the rated capacity.[1] Fringe benefits include one free meal per shift, free work clothes, housing and medical care. Obviously, the wage-benefit structure is designed to discourage labor turnover, which nevertheless remains a serious problem despite the fact that Pul-i-Khumri has a population of about 12,000 persons.

Adjoining the factory, and now spreading to the opposite, eastern side of the Kunduz River, are rows of small, white-washed adobe houses providing about one-quarter of the workers with some of the best family housing to be found in Afghanistan. The factory's kitchen and dining room serve about 800 persons at one time, and there is a hospital with 95 beds and three doctors. Warehouse capacity for four months' production and an eighteen-month supply of spare parts are provided, and the factory has its own foundry and machine and carpentry shops to handle simple repairs, parts-fabrication and a few jobbing orders from the local bazar or passing vehicles. One of the original purposes of the Jangalak complex at Kabul was to fabricate spare parts for both the Pul-i-Khumri textile plant and the new factory which has been built at Gulbahar.

Although they are located on opposite slopes of the Hindu Kush, the Textile Company plants at Pul-i-Khumri and Gulbahar will be so closely integrated in function that it is more logical to discuss them

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[1]Courtney Kimler, Field Survey of Afghanistan's Industry, Transportation and Electric Power Resources, TOICA A-144 of International Cooperation Administration (Kabul: April, 1956), p. 11. (Hektographed.) Mr. Kimler served as Industry Consultant for ICA in Kabul.

both at this point. Hence we have postponed consideration of Gulbahar from its mention in the chapter on the Kabul Valley (see page 70), and we ask the reader to bear in mind that we are about to make a locational hiatus and will return to the Kunduz region after completing this discussion of Textile Company operations.

Two generalizations will help to clarify the cotton-processing situation in Afghanistan: 1) although it is climatologically possible to grow cotton both in the Jalalabad Oasis and in the Helmand Valley, all cotton which has been processed by the Textile Company has come from areas north of the Hindu Kush, namely the Kunduz Valley and the Mazar-i-Sharif area; 2) the Pul-i-Khumri cotton textile factory has never had its own dyeing, printing and finishing facilities, but has shipped a portion of its white piece goods output to the old plant at Jabal Seraj for these operations. The new mill at Gulbahar will take over these operations from Jabal Seraj and will continue to perform them, on a much larger scale, for Pul-i-Khumri until such facilities are constructed north of the mountains. Unless and until a second cotton-growing base is created in the Helmand Valley, the Gulbahar mill will remain dependent upon the North for its raw material, and the general flow of cotton will be from the producing areas of the North to Pul-i-Khumri and Gulbahar for processing and then on to the Kabul and southern markets, with a temporary back-flow of finished goods from Gulbahar to the markets of the North.

The Gulbahar textile factory is the largest industrial enterprise in Afghanistan and one of the most modern of its kind in the world. Designed by the Gherzi Company of Zurich, and constructed by the

German firm of Hochtief, its cost is estimated at $26 million, including that of equipment.[1] Construction was begun in March, 1953, and was 80 per cent completed in February, 1958, when the first cleaning and spinning sections went into operation. Its annual capacity when in full operation will be 35 million square meters of unfinished white piece goods and up to 60 million square meters of finished and dyed goods including those brought from Pul-i-Khumri.

The Gulbahar factory is located on an old terrace to the east of and about 150 feet above the Panjshir River where it issues from the mountains. A small barrage in the river impounds water which is raised at a rate of 1200 cubic feet per hour by eight pumps into a 35,600 cubic-foot reservoir located on a hillside above the factory. Thus a clean water supply is assured. There is also a possibility of harnessing the Panjshir further upstream to provide hydroelectricity for factory operations. At present, power is obtained via a 55-mile power line from the hydroelectric station at Sarobi. The abundant supply of clean water, the available and potential hydroelectricity, and the proximity to the Kabul market, about 45 miles to the south, were the major factors determining location of the plant.

Operations at Gulbahar are housed in two huge, windowless and completely air-conditioned buildings, one for cleaning and spinning operations, the other for finishing, dyeing and weaving. A separate completely-integrated "waste" plant will process cotton of a staple length too short for the main spinning section. The operations sections

[1]Information on Gulbahar from visit of February 8, 1958, including interviews with representatives of the Textile Company, the Gherzi Company and Hochtief.

of the plant include a total of 100,000 square meters of floor space. Thanks to the air-conditioning system, it will be possible to replace the entire interior atmosphere of these sections twenty-one times per day and to adjust temperature and humidity to conform to the optimum conditions for each particular operation. Overhead fluorescent fixtures provide even lighting in the windowless plants.

In addition to the operations sections, the Gulbahar factory has outlying warehouses, workshops and training sections, office buildings, and 100 housing units which were built nearby under a separate $400,000 contract in 1957. A modernistic mosque and a rapidly-growing bazar section complete the picture of self-sufficiency.

The Gulbahar plant will operate for some time on a one-shift basis until enough workers have been trained to raise operations to the 35 million square meter level, which presupposes a two 8-hour shift regime. Eventually, over 2000 employees will be required to run the factory's 35,000 spindles and 1700 looms. About 55 foreign technicians will be on hand for the first three years of plant operation, after which trained Afghan counterparts will take over.

It should be noted that the Gulbahar plant is designed for the permanent handling of at least 8 million square meters of piece goods from the Pul-i-Khumri factory in addition to its own maximum production of 35 million square meters. Until Pul-i-Khumri obtains its own finishing and dyeing sections, it will be sending more than 8 million square meters south to Gulbahar each year. With increasing sophistication of the market, i.e., with Afghan consumers able to afford and demanding colored cloth, the amount of undyed piece goods which can be sold will continue to fall.

The Gherzi Company representative at Gulbahar estimates that it is already below the 20 million square meter level.[1] To supply the growing market, the Gulbahar weaving mill will include 112 special 4-color looms in addition to its 1600 automatic looms.

Two possible bottlenecks may retard full utilization of Gulbahar capacity. The first is a shortage of power. The Sarobi hydroelectric station can produce 22,000 kw if both 11,000 kva generators are operated simultaneously and at full capacity. But such operation would be foolhardy for any protracted period because of its deleterious effects upon the equipment. At present, demand in the Kabul region amounts to a daily maximum of about 7300 kw, and the second Sarobi generator can be kept in standby condition or used alternatively to even out deterioration. But Gulbahar in full operation will require 14,000 kw, of which Sarobi could supply 12,000 in the late spring and summer months of heavy run-off but only 7000 in fall and winter when less water is available. To make up the difference, a 2800 kw thermal plant has been installed at Gulbahar, but even this addition will leave a shortage of about 4000 kw in fall and winter months. Hence the desirability of constructing a hydroelectric station on the Panjshir becomes more obvious unless the RGA indicates that the third 11,000 kva unit will be added at Sarobi or the new hydroelectric station completed at Naghlu (see pages 25-27) before Gulbahar demand reaches its peak. These alternatives, as well as the difficulties inherent in reliance upon thermal power in Eastern Afghanistan (the Gulbahar thermal plant would require 5000 to 6000 tons of coal or the equivalent in fuel oil

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[1] *Ibid*.

each year) will be further explored in Chapter X.

The second bottleneck may develop in the supply of raw material. Out of an annual estimated production of 20,000 tons of ginned cotton, including 15,000 tons from Kataghan Province and 5000 from Mazar-i-Sharif, the expanded Pul-i-Khumri operations will require 3700 tons, Gulbahar 5200, and the old plant at Jabal Seraj about 700 tons.[1] While the total of these requirements is slightly less than the annual production of ginned cotton, Afghanistan has agreed to export considerable amounts of ginned cotton to the Soviet Union, Czechoslovakia and West Germany in repayment of development loans. Thus there arises an urgent need for expanding the production of raw cotton in Afghanistan in order to meet both domestic and foreign commitments. The possibilities of doing so, both in the old areas of cultivation in the North and in the new lands of the Helmand Valley, will be a recurring theme of this study. Indeed, since even with Gulbahar and Pul-i-Khumri operating at capacity domestic cotton textile production will amount only to about one-half of the estimated 120 million square meters annually consumed,[2] a considerable amount of foreign exchange could be saved by increasing both the quantity of raw cotton grown in Afghanistan and the amount domestically processed. This aspect will receive particular attention in Chapter VIII. For the present, it is enough to note that a lack of cotton may actually serve to retard full production at Gulbahar until such time as sufficient hydroelectric power is available. Whether such

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[1]Interview with Mr. Akbar Saifi, Vice President of The Textile Company, at Gulbahar, February 8, 1958.

[2]Consensus in discussion at Gulbahar, February 8, 1958. Cf. Donald N. Wilber (ed.), Afghanistan ("Country Survey Series"; New Haven: Human Relations Area Files, 1956), p. 240.

a situation would be preferable to one in which the cotton was available and the power was not may, however, be doubted.

Transportation of ginned cotton from the North, of white piece goods from Pul-i-Khumri, and of coal for the thermal plant from Ish-pushta or Kar Kar is an additional but less serious problem. The 200-odd mile trip over the present roads is a two-day, tedious and rough journey, but no insuperable obstacle. Construction of the proposed Salang Pass route would, of course, considerably shorten this trip.

We must now shift our attention back north to the Pul-i-Khumri node, the importance of which is not limited to hydroelectric power and the textile mill, but extends to transportation and agriculture as well. The former significance is summed up in the name "Pul-i-Khumri", which means "bridge of Khumri", for the dam causeway replaced a bridge which served for many years as the only road span across the Kunduz River. Downstream it was possible to ford the Kunduz in the dry season, and there was a ferry service at Kunduz town, but for the heavy run-off period at least "the bridge of Khumri" offered the only sure way across the stream. And even in the dry season, many travelers and most vehicle drivers between Kunduz and Mazar-i-Sharif would take the long way round via Pul-i-Khumri rather than try to cross the Gawar Desert which lies between the two cities. The indirect route has been shortened within the last year by the construction of a road bridge at Sintut, just above the transverse ridge which closes the Pul-i-Khumri node on the north (see Map 4), but Pul-i-Khumri remains an important way-station on the roads from Mazar-i-Sharif or Kunduz to Kabul, which converge at the barrage.

From the narrow funnel where the barrage is located, the flood-plain widens and sweeps around the northern end of the limestone ridge to the west of the river. This extension, in the vicinity of Ghori (see Map 4) forms the major agricultural section of the Pul-i-Khumri node, and is irrigated by four major canals. The highest of these, the Gow-argan Canal, begins at the barrage and describes a large S-curve at the foot of the ridge and out into the Ghori area. The other canals leave the river further downstream and trend northwestwards in the direction of the Dasht-i-Khwaja Alwan area. The area irrigated by the Gowargan Canal, which lies southwest of the road to Mazar-i-Sharif, is devoted mainly to irrigated grains and cotton. As usual, the better-watered areas are planted to rice, and the higher areas to wheat or corn and cotton, with patches of melons, vegetables and vetches. On the higher non-irrigated slopes in the vicinity of Dahana, barley replaces wheat and the quality of the crop has given some fame to the region. Northeast of the road, sugar beets assume considerable importance, and it was actually to improve connections with this area that the Sugar Company at Baghlan employed Unimac of Austria to build the Sintut bridge at a reported cost of $62,000. It is hoped to extend the largest of the three canals watering this area, the Gumarek, further north to add 5000 or 10,000 acres here for cultivation of sugar beets and cotton. But any extension of the canal system depends upon provision of additional storage upstream.[1]

To the east of the river, two canals water the Pul-i-Khumri node. One of these, the Baladuri, also begins at the bridge-barrage. The other,

[1]Interviews with Albert T. Petersen, December, 1957, at United Nations Food and Agriculture Organization office, Kabul, Afghanistan.

known as the Adjmir, begins opposite the Gumarek Canal and passes through the Sintut gorge into the Baghlan node. The Adjmir Canal is thus over 25 miles in length, and serves some 30,000 acres, although its average flow in 1956 was only 8 cubic meters per second. It was recommended for pilot project improvement by Mr. A. T. Petersen, the UN FAO irrigation specialist, who pointed out that the diversion structure at the head of the canal is composed only of stones, brush and reeds, which are usually washed away by the spring floods, and that the canal must be maintained across eight washes on alluvial fans, one or more of which usually discharges debris into the canal or breaks its banks each year. In the spring of 1956, a heavy rainstorm caused the Adjmir Canal to burst its banks near Baghlan, washing out or damaging 70 houses in that city. In all, the losses due to breaks in the intake structure or in the canal banks were estimated to have cost the equivalent of 10,000 tons of sugar beets plus an unknown quantity of wheat in that season alone. Mr. Petersen's recommendations include improvement of the diversion structure and inlet, realignment of a section of the canal, and provision of storm drains and wasteways to ensure that canal flow and distribution are maintained throughout the growing season and from one year to the next.[1] His calculations of the areas served by the principal canals in the Pul-i-Khumri node furnish an estimate of the total area under irrigated cultivation there.

[1]A. T. Petersen, "Progress Report on the Improvement of the Adjmir Canal", letter to the Royal Afghan Ministry of Agriculture, dated March 7, 1957. In files of United Nations Food and Agriculture Organization, Kabul, Afghanistan.

TABLE 6

ACREAGES SERVED BY CANALS IN THE PUL-I-KHUMRI NODE[a]

West of the Kunduz River		East of the Kunduz River	
Canal	Acres	Canal	Acres
Gowargan	12,500	Baladuri	4,500
Juinao	2,000	Adjmir (out of 30,000 total)	7,500
Gumarek	4,500		
Darkat	1,500		
Gugarak	1,500		
Total	22,000	Total	12,000

[a]Albert T. Petersen, "Notes on a Short Reconnaissance Survey to the Baghlan and Kunduz Areas in the Kataghan Province". Memo in files of United Nations Food and Agriculture Organization office, Kabul, Afghanistan. (Kabul: January, 1956)

The combined total of 34,000 acres may be taken as minimal, since not all of the canals west of the Kunduz are listed and since there is also some dry-farming, particularly of barley, in this area. The allocation of three-fourths of the Adjmir acreage to the Baghlan node, on the basis of the author's observations, may also be challenged, but is probably conservative as at least two-thirds of the canal's length is within that node, which we shall now consider.

The Baghlan Node

Separated by one limestone ridge on the south from the Pul-i-Khumri node and by another on the north from the Kunduz node, the Baghlan area probably has somewhat less irrigable land than the former and far less than the latter. A. T. Petersen estimates that a total of about 65,000 acres are irrigated from the Kunduz River in the Pul-i-Khumri and Baghlan nodes together, and furnishes the following breakdown of canal service.

TABLE 7

ACREAGES SERVED BY CANALS IN THE BAGHLAN NODE[a]

West of the Kunduz River		East of the Kunduz River	
Canal	Acres	Canal	Acres
Kokchinar	no estimate	Adjmir	22,500
		Jangharek	5,000
		Shabudin	1,500
		Bagishamal	2,000
		Total	30,000

[a]Petersen, "Notes on a Short Reconnaissance Survey . . . ".

Again, 30,000 acres would be a minimal estimate since the Kokchinar Canal, which fringes the Gawar Desert (see Map 4) is not included and since other, minor canals may be left out as is any acreage contributed by dry-farming. The largest contribution is that made on the east bank by the Adjmir Canal, and hopes for improving agriculture in the Baghlan node center upon the rehabilitation of this canal to prevent washouts and consequent losses. In the autumn of 1957, it was reported that the Governor of Kataghan Province has joined with local landowners in an "Irrigation Committee" to implement the UN FAO plan and the surveys made by the FAO topographers in September, 1957.[1] While this local initiative may result in some conflict with the operations of the

[1]Albert T. Petersen, Monthly Reports for September and October, 1957, in files of United Nations Food and Agriculture Organization office, Kabul, Afghanistan. (Kabul: October 15 and November 16, 1957), passim.

Ministry of Agriculture in Kabul, it is indicative of the urgency of the problem in local thinking. While it might be possible to increase the area under irrigation by constructing a dam in the Sintut gorge, which would necessitate relocation of the road and the bridge, it is certainly of more immediate importance and less costly to restore and improve the canal.

Baghlan is the capital of Kataghan Province, the administrative offices having been moved here from Khanabad several years ago. They are now housed in a series of new concrete and adobe buildings located in the center of the node. To the south of "Administrative Baghlan" is the old town of that name, with the main bazar area. At the southern end of the node, separated by some five miles from "Old Baghlan" is the industrial area usually referred to as "New Baghlan". This section was built in the late 1930's and early 1940's around the sugar beet processing plant which went into production in 1940. It includes the factory, its experimental dairy farm, the District Agricultural Office, and a fairly new, arcaded bazar along with attractive residences, a hotel, and gardens. The population of Baghlan District, which includes all of these towns, is probably over 35,000 people.

The sugar factory at Baghlan was another creation of Abdul Madjid Zabuli and the Bank-i-Millie. Machinery made by Skoda and originally intended for Argentina, it is said, was purchased in 1938 after the Nazi "conquest" of Czechoslovakia. The total cost of purchase, transportation, assembly and housing of the machines was approximately $1 million, with the Bank supplying the bulk of the capital. The (Baghlan) Afghan Sugar Manufacturing Company has not been nationalized, and about 85 per cent of the ownership remains in private hands. The sugar, however, can only be marketed through the Government Monopolies, which also control all imports of sugar. Thus it is impossible to obtain data on either processing or wholesale costs. In the Kabul bazar, which is as far south as Baghlan sugar is transported, it sells for about ten cents a pound, the same as sugar imported from Pakistan. In the Baghlan bazars, it meets with competition from imported Soviet cube or block sugar which, however, commands a slightly higher price since it is "refined", i.e., goes through a final activated charcoal treatment to whiten it. Baghlan sugar is not refined, and is sold in granulated form.

The Baghlan sugar factory has a rated capacity of 60,000 to 70,000 metric tons of beets per season on a basis of 700 tons per day for 90 to 100 days. But Mr. Nau, the Austrian chief engineer, considers 55,000 tons the optimum from operational and maintenance points of view.[1] However, the matter has never been put to an actual test, inasmuch as the supply of sugar beets has never exceeded 45,000 tons in any season and has usually been considerably less; see Table 8 on the following page. It is apparent that the area devoted to sugar beets has varied considerably and that the quantity of beets available for processing is by no means solely dependent upon the area planted. Variations in the quality of the seed, in the amount and regularity of irrigation water, in the intensity of summer heat, and in the fertility and drainage of the soils all contribute to variations in the yield per acre, which averaged 4.3 metric tons for the years 1954-56 but only 2.7 tons per acre for the three preceding years.

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[1]Interview and visit to the Baghlan sugar factory, September 21, 1957.

TABLE 8

SUPPLY OF SUGAR BEETS FOR PROCESSING PLANT AT BAGHLAN[a]

Year	Number of Acres Planted to Beets	Metric Tons of Sugar Beets Available for Plant	Number of Days for Processing
1940	2,800	8,378	23.5
1941	4,800	28,829	40.5
1942	5,800	22,165	32.
1943	9,700	30,536	40.
1944	9,300	37,655	82.
1945	9,800	36,600	58.
1946	11,400	25,051	?
1947	sugar beet land devoted to wheat under Government decree		
1948	"	"	"
1949	11,600	31,900	43.
1950	8,600	33,708	48.
1951	11,100	33,538	47.5
1952	11,600	22,846	41.
1953	12,200	39,928	56.
1954	9,600	41,273	63.
1955	9,177	44,815	60.5
1956	9,158	33,489	57.

[a]Private communication (in German) from the Afghan Sugar Manufacturing Company to the author, November, 1957.

Generally speaking, sugar beets require fairly heavy irrigation until late in the growing season, heavy but well-drained soils, and no extremes of heat. In recent years, some progress has been made in applying waste from the plant as fertilizer or in adapting good rotational patterns, but all too little experimentation has been conducted with respect to best-suited varieties of seed. In 1952, one test of half a dozen varieties, conducted by the Agriculture Department of the Sugar Company, produced the following results.

TABLE 9

VARIETAL TEST OF SUGAR BEETS AT BAGHLAN, 1952[a]

Seed Variety	Average Weight of Beets in grams	Percent Sugar	Purity in Percent	Beet Yield per acre in kg.	Sugar Yield per acre in kg.
Danish	666	15.35	86.3	21,039	2786
American	730	17.00	87.2	15,608	2314
Persian 4628	788	17.40	85.6	15,713	2200
Persian 4496	605	15.60	85.3	20,537	2200
German	761	15.20	85.1	16,293	2107
Afghan local	622	15.80	85.1	16,030	2140

[a]L. C. Jain, The Economic Development of Afghanistan, in files of United Nations Technical Assistance Mission, Kabul, Afghanistan, Industry Section, Chapter VI (Kabul, 1953), p. 1. Jain served as UN economic adviser to Afghanistan from January until November, 1953.

The calculations on sugar yield per acre in the right-hand column indicate that the Danish variety, despite the small size of the beet, is the highest yielder both in tons of beets and in tons of sugar per acre planted. However, nothing has been done towards introduction of Danish sugar beet seed or towards testing other varieties which might yield even better results. The problem of increasing the per-acre yield is a very serious one, for sugar beets must compete with the better-paying cotton crop in the Kunduz Valley and in some years must compete with wheat as well. The completion of the Sintut bridge leading to the Ghori region, where approximately two-thirds of the sugar beets are now grown, will insure the regular delivery of the beets grown in that area but will not increase the total amount available unless it is supplemented with an extension of the Gumarek Canal (see Map 4) and of the irrigated area devoted to sugar beets. In the absence of a large-scale development program along the Kunduz, which would provide ample land and water for cotton, grain, and sugar beets, the only possibilities open to the Sugar Company are continued efforts to improve yeild by furnishing better seed, making waste available for use as fertilizer, and encouraging the farmers to use better plows which will turn under stubble and weeds and bring new minerals to the surface. Improved cultural practices and the adoption of rotations including alfalfa would also serve to eliminate the Dodder, Black-root, and Fusarium yellow diseases which infect a part of the crop, but fortunately the disease problem is not serious.[1]

It might appear that the simplest solution to the short supply of sugar beets would be to raise the present price of $5.00 to $5.40 per ton which is paid by the Sugar Company to the farmers for their crop. Since the Sugar Company has no control over the retail price of sugar, which is set by Government Monopolies, there is no way for it to pass along this increased cost. Furthermore, since the Consolidated Cotton Company has been nationalized, it is not to the interest of the RGA to improve the competitive position of sugar beets vis-a-vis cotton in the Kunduz region. The only competitive measure left to the Sugar Company is the practice of extending credit to the farmers in the form of advance payments and seed at the start of the season. The farmers, many of whom are large landholders with 100 acres or more at their disposal, must then contract to deliver their sugar beets at fixed prices to the Company. Actually, since there is no alternative use for the beets, the Sugar Company can count on the crop once it is in the

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[1] Ibid., p. 3 and interviews with R.P. Davidson, Agronomist on UN FAO staff, Kabul, on December 11, 1957, and at Baghlan, on September 20-21, 1957. Cf. Report to the Royal Government of Afghanistan on Sugar Beet Production, United Nations Food and Agriculture Organization Report No. 148 (Rome: August, 1953).

ground, barring floods, breaks in the canals or unusual dry or hot spells. One final difficulty, however, resides in getting the farmers to plant their crops early enough so that the plant can spread its operations over three months or more instead of being deluged with beets in the last few weeks of the growing season. Here a system of payments which put the premium upon early deliveries would be of considerable help in enabling the plant to make full use of its operational capacity.

The Sugar Company owns half a dozen trucks and hires more to bring in the beets during the processing period or "campaign". The beets are weighed as they come into the factory compound, then are dumped into large, V-shaped cement troughs for washing. From these they are conveyed by water in sluices to a forked conveyor which lifts them to the top of the plant and drops them into slicing machines. The sliced pulp is then gravity-fed into the boiling vats where about 13 per cent by weight is recovered in the form of a heavy syrup. The pulp is removed, dried, and either returned to the farmers for use as fertilizer or fed to the dairy cattle on the company's experimental farm which adjoins the factory.

After purification of the syrup, vacuum-evaporation, crystallization, centrifuging and purging, the sugar is mechanically dried, vibrated to break it into granules, screened and conveyed into bins or hoppers from which it can be poured into sacks. No "refined" sugar is produced, the end-product being off-white in color but perfectly acceptable and palatable. Second-run "brown" sugar also finds a local market in the making of <u>ghur</u>. But the molasses, which contains 20 per cent alcohol by weight, may not legally be distilled and so is either mixed with the pulp for stock-feeding or dumped into the Kunduz River.[1] The sugar lost in the molasses and at other stages in processing amounts to about 3 per cent by weight of the cleaned beets, so that the final yield in sugar averages about 12 to 13 per cent of the weight of cleaned beets processed (see Table 8).

TABLE 10

RECOVERY AND PRODUCTION OF SUGAR AT BAGHLAN[a]

Year	% Sugar in Beets	% Final Recovery	% Lost, including that in molasses	Production in Metric Tons	Production in Sacks
1940	16.94	13.00	3.94	1096.5	12,160
1941	16.90	12.40	4.50	3580.9	39,788
1942	16.29	13.20	3.09	2944.5	32,717
1943	16.03	12.70	3.33	3883.0	34,145
1944	14.47	11.60	2.87	4364.9	48,999
1945	14.73	11.70	3.03	4305.5	47,839
1946	14.53	11.10	2.87	2774.0	30,822
1947	sugar beet land devoted to wheat under Government decree-no production.				
1948	"		"	"	"
1949	15.45	12.00	3.03	3841.0	42,677
1950	16.51	13.50	3.43	4580.0	50,901
1951	15.28	12.60	3.45	4241.8	47,132
1952	16.67	14.20	3.01	3261.6	36,240
1953	15.27	12.58	2.68	4880.4	54,227
1954	16.67	12.95	2.45	5351.4	59,460
1955	16.289	13.503	2.69	6046.5	67,184
1956	16.952	14.207	2.745	4786.5	52,816

[a]Private communication (in German) to the author from the Afghan Sugar Manufacturing Company, Kabul office, November, 1957.

Sugar beet processing at Baghlan is conducted fairly efficiently according to R. P. Davidson, the UN FAO agronomist, who does not regard the 3 per cent loss exhorbitant considering the legal prohibition on dis-

[1]Small quantities of molasses are sent to Pul-i-Khumri and to

tillation into alcohol. The problem is clearly one of beet production, since the existing capacity is not fully utilized and since the Sugar Company has indicated, to Mr. Davidson and to the author, its desire to double processing capacity at Baghlan if a sufficient supply of beets could be assured. Ultimately, the problem rests with the RGA which controls the price structure, including any commission charged by Government Monopolies, as well as the foreign exchange reserves which would have to be allocated to procure additional processing equipment. At present, the sugar produced at Baghlan is sold only as far south as Kabul. The whole of southern and southwestern Afghanistan must be supplied with imported sugar while some Soviet cube-sugar is offered for sale in the North. We shall discuss the problem of utilizing foreign exchange to import products which could be produced domestically, and the alternatives of growing and producing sugar from cane at Jalalabad or from beets in the Helmand, in Chapters VIII and IX.

While awaiting the RGA decision on the type and location of increased sugar production, the Sugar Company at Baghlan is not just marking time. It has started an experimental livestock farm on which 500 cattle, 600 to 700 sheep, 100 horses, 20 mules and 20 camels are being fed largely on a mixture of sugar beet pulp and molasses. The purposes of the experiment include the breeding and nourishing of better milch cows and of superior draft animals in general.

The Sugar Company has also established a silkworm breeding station where Japanese, Chinese and Italian worms are being cross-bred under the guidance of two UN FAO experts. The mulberry tree thrives in northern Afghanistan, and some specialists consider the leaves produced here superior to those of the Far East. It is felt that silkworms fed on these superior leaves will produce better fiber.[1] Silkworm eggs are distributed from the station to local families who raise the worms on wooden racks, replenished every two hours with hand-picked, tender leaves. When the worms have spun their cocoons, they are now sold back to the station for processing, but a program is under way to teach farmers how to kill the worms in boiling water and to unwind the cocoons on frames. Simple apparatus for reeling, twisting or "throwing" and weaving were exhibited by the Sugar Company at the Jeshyn Fair in Kabul in August, 1957. Bicycle wheels had been adapted as flywheels on some reeling and throwing machines, while others had food treadles. Two men working together could handle about fifteen pounds of cocoons per day. Silk weaving has been done for centuries throughout northern Afghanistan , and presently earns about $.16 per square meter. Each weaver can expect to produce about five square meters per day, and since it is estimated that the total marketed production of natural silk cloth in Afghanistan amounts to about 67,000 square meters per year[2] there must be upwards of 50 looms in operation for the commercial sector alone. The possibilities of expanding this production for export, or to replace some of the imported natural silk or artificial silk goods, remain to be developed. The relative scarcity of labor in the Kunduz Valley and the competition of agriculture and other industries militate against the widespread adoption of silk growing. On the other hand, this is an industry well-

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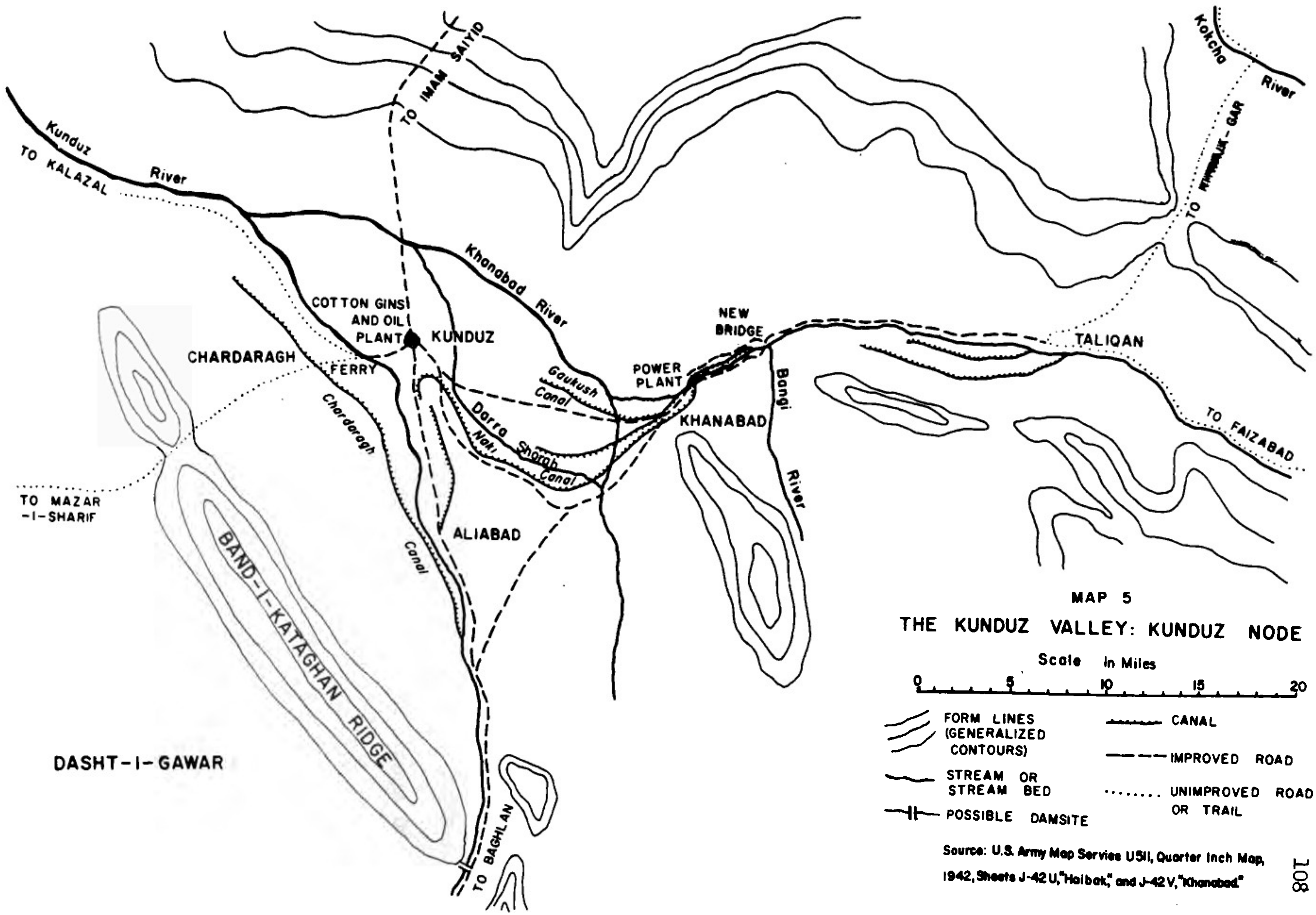
[1] Dr. Kintson Keh of the UN FAO staff in Kabul is of this opinion. Cf. Kimler, p. 18 and report of the visit of United States Embassy and International Cooperation Administration officials to Baghlan in May, 1957, in files of U.S. Embassy and U.S. Operations Mission, Kabul.

[2] Kimler, p. 18.



MAP 5

THE KUNDUZ VALLEY: KUNDUZ NODE

Source: U.S. Army Map Service U511, Quarter Inch Map, 1942, Sheets J-42 U, "Haibak," and J-42 V, "Khanabad."

adapted to tap the labor of women, children and old men in the villages if it turns out to be more profitable than the weaving of cotton and woolen goods. While it is doubtful that Afghanistan can ever become a serious exporter of raw silk in the face of competition from Japan and from synthetics, it is conceivable that domestic production can replace the import of raw silk and of natural silk piece goods, which reached 35.7 metric tons in 1956-57.[1] An increase in the 15 per cent ad valorem duty on silk piece goods imports would serve as an incentive to the domestic production, but it must first be determined whether the domestic cost can be competitive with imports even if such additional protection is extended.

A final contribution made by the Sugar Company has been the maintenance, since 1955, of the only meteorological station in the Kunduz Valley. Since we are about to turn our attention to cotton production, it will be well to indicate here, by means of the temperature and precipitation records, how well the Kunduz climate is suited for the growth of cotton. See Table 11 on the following page.

The Kunduz Node

While the data in Table 11 represent only the beginning of a meteorological record for the Kunduz Valley, they suffice to indicate that the climate in the lower reaches of the river is highly suitable for cotton and other heat-tolerant, irrigated crops. The warm, practically rainless growing season from March through October eliminates almost all danger from pests and disease[2], allows careful control of

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[1]From import data made available to the author by the Ministry of Planning, Kabul, in December, 1957.

[2]R. P. Davidson states that only aphis pests have been found but no bollworms or stainers.

TABLE 11

METEOROLOGICAL DATA FOR THIRTY-ONE MONTHS AT BAGHLAN[a]

Year: Equivalent Period	Average Temp. in °C. 1955-6	1956-7	1957	Rainfall in Millimeters 1955-6	1956-7	1957
March 21 - April 20	19.5	19.1	14.9	101	13.5	87
April 21 - May 21	24	30.2	20.5	51	51	95
May 22 - June 22	32	25.2	missing	0	0	missing
June 23 - July 23	37	38.6	missing	0	0	missing
July 24 - August 23	38	31.8	29.2	0	0	0
August 24 - September 23	39	28.8	25.3	0	0	0
September 24 - October 23	25.3	20.6	18.3	0	1	13
October 24 - November 22	20.7	15.7		0	0	
November 23 - December 21	10.8	8.9		0	19	
December 22 - January 19	5.4	0.0		20	10	
January 20 - February 18	8.3	1.0		27	94	
February 19 - March 20	10.9	12.0		49	51	

[a]Data in files of A. T. Petersen, Irrigation Engineer, UN FAO office, Kabul, Afghanistan.

the water which is made available to the plants, and generally insures a dry harvest period. Conditions are quite similar to those in the irrigated cotton areas of southwestern U. S. and California. The winter and early spring precipitation serves to build up soil moisture, while the discharge of the Kunduz River (see Table 4) rises from April through June when the water requirements of cotton are greatest. The cotton is usually sown broadcast in late April and May, after the basin-fields have been given a pre-planting irrigation and light plowing. By late July, when available water may decrease, the peak demands of cotton have been met and the irrigation supplies may be diverted to other crops. Cultivation and harvesting of cotton is performed entirely by hand in the Kunduz Valley. The harvesting usually begins in late September lest showers or early frost damage the crop. After the bolls have been picked, the stalks and roots are also pulled out for use as fodder or fuel. The raw cotton is brought to agents of the Consolidated Cotton Company of Kunduz who pay the farmers approximately four cents per pound with slight variations to reflect four rough grades based on length, strength and color of fibre. The raw cotton is then collected by Cotton Company trucks or rented vehicles and brought to one of the many gins in the lower Kunduz, Khanabad and Kokcha areas. The southernmost of these gins is located in Baghlan, while the cotton growing area extends downstream from Pul-i-Khumri to below Kunduz, eastwards along the Khanabad River as far as Taliqan, and recommences along the Amu Darya below the Kokcha River from Khwaja-Gar to Imam Saiyid (see Map 3). There is also a considerable cotton-producing region centered around Mazar-i-Sharif, which contributes approximately 5000 metric tons of ginned cotton annually through its own "Industrial Society", established in 1951.

The only data concerning the relative importance of the different cotton producing areas are those which date from a survey made by Frumkin in 1951.[1] At that time, he found that the "Industrial Society" of Mazar-i-Sharif processed about 7000 out of an estimated 9800 metric tons of raw cotton available in Mazar-i-Sharif Province, while the seven ginning plants operated by the Consolidated Cotton Company of Kunduz within Kataghan Province processed the following quantities: Kunduz, 7,202 metric tons; Baghlan, 378 metric tons; Khanabad, 994 metric tons;

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[1]Gregory Frumkin, Report on Journey to the Northern Provinces, in files of United Nations Technical Assistance Mission, Kabul, Afghanistan. (Kabul, 1952), pp. 35 ff. and Annex D. (Mimeographed.)

Taliqan, 1423 metric tons; Khwaja-Gar, 3383 metric tons; Imam Saiyid, 5380 metric tons; and Kalazal, 1358 metric tons. These figures come to a total of 20,118 metric tons of raw cotton. Frumkin stated at the time of his survey that it was quite possible that about one-third of the cotton grown in Kataghan was not ginned by the Consolidated Cotton Company. This inference provides one explanation of the fact that the Cotton Company has been able to double its production of ginned cotton from approximately 6700 metric tons in 1951 (on the basis of 33 per cent recovery of lint) to almost 15,000 metric tons in 1957.[1] In fact, Kimler reports that the Company's purchases of raw cotton jumped from 14,160 metric tons in 1953 to 32,350 metric tons in 1954 and to 47,270 metric tons in 1955.[2] So it is quite possible that, at the time of Frumkin's survey, as much as one-half of the cotton produced in Kataghan Province was not being ginned by the Company but being cleaned in cottage industry! There does not seem to be any other explanation for the Company's ability to increase its purchases so rapidly. Since the price structure reported by Frumkin in 1951 is almost identical with that given in 1957, whereas the Afghani has depreciated in the interim, it appears that even at four cents a pound the Cotton Company can buy all the raw cotton it needs, at least up to the 45,000 or 47,000 metric ton level attained in 1955 and 1957. We have already seen that at this price cotton has been able to keep sugar beets off many of the fields

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[1]Interviews of January 2 and February 12, 1958 with Mr. Beheroz of the Consolidated Cotton Company Office in Kabul, Afghanistan.

[2]Kimler, p. 7.

in the Baghlan node.

The Consolidated Cotton Company of Kunduz, 63 per cent of whose stock was acquired by the Ministry of Finance in 1955, is gradually adjusting to provide a larger ginned cotton base for Afghanistan's textile industry and for exports. In 1957, it replaced the old gins at Kunduz with eight new British models each having a capacity of 1500 pounds per hour and capable of extracting up to 37 per cent by weight of lint from long-staple cotton.[1] It has also replaced or increased the number of gins in the outlying towns and plans to add several new ginning centers to its operations. But the most spectacular improvements are those being carried out in Kunduz itself, a rapidly growing city with a present population of perhaps 30,000, where the Company has employed Unimac of Austria to build new warehouse and operating facilities including equipment for making cooking oil, margarine and soap from cottonseed oil. The old operations of the plant have largely been modernized with the installation of air-suction and blower systems to carry the raw cotton from the storage sheds directly to the ginning plant and to feed the ginned cotton automatically to the cleaners and the hydraulic baling press. A narrow gauge railway then transports the bales to either of two warehouses with an 8000-bale capacity each.

From the gins, the cottonseed is carried to machines which dehull it and then press it to extract the oil, about 20 to 24 per cent by weight being obtained. When installation of new oil recovery equipment

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[1]Data on plant and operations from interviews with Messrs. Fox and Meyer, Austrian and German engineers, at the Cotton Company plant in Kunduz, September 25-26, 1957.

is completed, it will be possible to process 100 tons of seed in a 24-hour period. The presses will have to operate almost around the clock to handle the seed produced by the new gins, some 86 or 88 metric tons per 8-hour shift. Storage capacity for 2000 cubic meters of cottonseed oil is also being completed. For some years, the Cotton Company has used its cottonseed oil to make coarse laundry soap, utilizing lye from wood ashes.[1] Now it is building a modern processing plant to manufacture both laundry and hand (refined) soap in a three-to-one ratio. Another plant, nearly completed in the fall of 1957, will refine cottonseed oil for cooking purposes and to make margarine which, it is hoped, will be able to compete with sheep's fat on the Afghan market. The refining equipment, manufactured in Hamburg-Harburg, West Germany, includes machinery for forming one- and five-kilo tin cans out of imported tin-plate. Metal drums or wooden barrels of 200-kilo capacity will also be used if arrangements can be made to manufacture them as well.

When it is considered that every piece of machinery and every steel tank-plate, including those for the hydrogenation vats which must be tin-lined and for the pressure tank to store the hydrogen, have had to be shipped from Germany, most of it by way of the U.S.S.R., the accomplishment over the past five years is commendable. But the engineers on the scene estimated that it might require another two or three years before the margarine and soap plants can come into operation. Supply of tin-plate for making cans will be a continuing

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[1]Unfortunately, most of the seed-cake is being burned in the plant's boiler room which supplies steam to operate the baling and seed presses. Only a small part of the seed-cake is now being locally sold for use as livestock feed.

problem since it must be imported. So will the supply of diesel oil for the plant's generators, though the completion of a 1400 kva hydro-electric station on the Khanabad River, also being built by Unimac for the Cotton Company, will considerably reduce the plant's fuel needs.

In contrast to the Textile Company, the Consolidated Cotton Company is unlikely to be bothered by a shortage of raw material, since all cotton whether consumed domestically or exported must first be ginned. It has been reported, however, that some of the better grades of cotton, ginned at Imam Saiyid, Khwaja-Gar and Taliqan, are being exported directly to the Soviet Union and so never reach the Kunduz plant. In addition to the Soviet Union, Czechoslovakia and West Germany have trade or credit agreements with Afghanistan which call for exchange of raw cotton, among other commodities, in return for manufactures, motor vehicles or gasoline. While Afghanistan can obtain hard foreign exchange by the export of karakul and soft exchange by the export of fruit to Pakistan or India, cotton and wool are the major items of interest to the Soviet bloc countries and West Germany. The Bonn government, in fact, sent a cotton grading and marketing expert to Afghanistan in the winter of 1957-58 as part of its new technical assistance program. The expert's task will be to assist in improving present grading practices down to the level of the individual cotton farmer. It has been estimated[1] that from 5 to 10 per cent of the cotton grown in northern Afghanistan is 1 9/16 inches long, but the average

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[1]By Mr. Fox at the Cotton Company in Kunduz.

staple length is between 1 and 1 3/16 inches. With more careful seed selection, production and grading, Afghanistan should be able to compete on the 1 3/8 inch or "Egyptian high-count" cotton market. Standardization of cotton grades would mark a great advance in Afghan cotton marketing. At present, Afghan cotton can be sold only by means of lot samples and not by specifying a standard grade. The result of this time-consuming and uncertain procedure, distasteful to most buyers, is the relegation of Afghan cotton to a position in the world market which is lower than its average quality could justify. A further result is that several thousand tons of Afghan cotton are now held in storage in Hamburg for the lack of buyers.

Along with improved grading procedures should go standardization and up-grading of the seed used. The original cotton seed introduced into northern Afghanistan from Russia was American Upland. This subsequently was mixed with strains brought from Central Asia. In 1952, American technicians added three more strains to the mixture. Mr. Davidson, whose specialty is cotton, has suggested the use of isolated trial plots where crossbreeding would be impossible for five more American varieties, using Acala 1517 as the control strain. In the meantime he has recommended to the Cotton Company that it try to segregate the seed from the better grades of cotton ginned and return only this to the farmers. It is a Company practice to issue about 48 pounds of seed per acre to the farmers with whom it enters into contracts for the return of specific amounts of cotton. The Company sells seed too, and even exports a small quantity.

Mr. Davidson, supported by Kataghan agricultural officers, puts the average yield of raw cotton at about 960 pounds per acre. If this is correct, then the purchase by the Cotton Company of 45,000 metric tons of raw cotton would indicate that slightly over 100,000 acres are devoted to cotton production in Kataghan Province. And since there is certainly some additional production for cottage industry use, the figure is likely to be greater rather than less. In fact, Kimler reports that the Company's purchases of 32,350 metric tons of raw cotton in 1954 represented the produce of 85,500 acres, while the purchase of 47,270 metric tons in 1955 represented 169,000 acres![1] Of course, these acreage figures may be exaggerated since it is to the farmers' advantage to report low yields in order to obtain more free seed and higher cash advances from the Company. We cannot assume that the proportions established by Frumkin in 1951 (see page 111) still hold true today among the various cotton gins, especially as the overall ginned production has increased so spectacularly and as the local ginning capacities have been changed. We do know, for example, that about two-thirds of the cotton now being ginned at Taliqan comes from Khwaja-Gar where the gins are overtaxed.[2] But we unfortunately cannot make any quantitative determinations with respect to the concentration of cotton production within Kataghan Province. Qualitatively speaking, on the basis of personal observation, the importance increases

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[1] Kimler, p. 7.

[2] Interview with Mr. Hans H. Buchmann, UN FAO Farm Implements Specialist, Kabul, December, 1957.

northwards from Pul-i-Khumri to Kunduz and remains great to the east around Khanabad and Taliqan. On the basis of expert observation, cotton is the single most important crop on the lands irrigated from the Kokcha and Amu Darya Rivers in the vicinity of Khwaja-Gar and Imam Saiyid.[1]

In the Khwaja-Gar - Imam Saiyid region, as along the Kunduz River, the insurance and increase of the water supply is the key to maintenance and expansion of cotton production. In 1957, for example, the spring run-off which broke the banks of the Adjmir Canal in the Pul-i-Khumri and Baghlan nodes also caused breaks in canals in the Imam Saiyid area with a resultant loss of about 30 per cent of the cotton before the system was repaired. In order to add new acreage to this area, which is reported to have excellent soils thanks to loessal materials added to its alluvium, it will be necessary to make more use of water from the Kokcha River. The problem there is that the river in its lower course has cut a deep gorge along the strike of south-dipping sandstones and so flows at a depth of 15 to 30 feet below the cultivable terraces. Hence some type of mechanical device is required to lift the water to the level of the fields. One survey of the problem has been made by the Swedish firm SINTAB, which proposed a high dam and gravity flow canals at an estimated cost of $12 million. A second survey, by Siemens-Schuckert Company, suggests that the porous sandstone of the gorge will not provide a satisfactory reservoir. Their plan is to construct a low barrage in the gorge to provide a sufficient head for

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[1]Interviews with R. P. Davidson and Hans H. Buchmann. Mr. Buchmann is one of the few foreigners who has been admitted to this politically sensitive Uzbek area on the left bank of the Amu Darya.

the generation of around 4500 kw and to use this power to pump up enough water to irrigate 125,000 acres. This scheme would cost only $2.5 million. No decision has been reached by RGA on the relative merits of these two alternatives. A. T. Petersen feels that more careful soil and topographical surveys are necessary before a wise choice can be made.

Another problem indicated by the UN FAO specialists is that the Khwaja-Gar - Imam Saiyid area is underpopulated. The section is inhabited principally by Uzbeks and Turkmeni, many of whom formerly owned lands on both sides of the Amu Darya and moved freely across the frontier to till their lands or to transfer their animals from pasture to pasture. Since the Bolshevik revolution, and more particularly since the collectivization program of the early 1930's, they have taken up permanent residence in Afghanistan. Some of them, particularly among the Uzbeks who have a long tradition of sedentary agriculture, are excellent farmers. But there are not enough of them, and it has been an RGA policy to encourage these minority groups to move further south away from the frontier. Thus any program to increase cotton production along the Amu Darya would have to include the resettlement, presumably of Afghans, in the Khwaja-Gar - Imam Saiyid area to work the new lands. With additional water and farmers, Mr. Buchmann of the UN FAO estimated that this area could produce up to four times as much cotton as it now does, but he declares himself unable to estimate the present size of the crop. Mr. Davidson indicated that between 15,000 and 20,000 tons of the 45,000 tons processed by the Cotton Company comes from areas adjacent to the Kunduz River. This would imply that 20,000 to 25,000 tons, or somewhat over one-half of the total, comes from areas irrigated from the Kokcha, Amu Darya and Taliqan-Khanabad Rivers.

Taliqan lies at the extreme eastern end of the Kunduz node as we are defining it, where the Taliqan River joins the Khanabad River. These perennial streams drain the western flanks of the Khwaja Mohanned Range of Badakhshan Province westward into the Kunduz River (see Map 3). The town of Taliqan has a Cotton Company ginning plant and five or six warehouses, and processes much of the Khwaja-Gar crop for export to the Soviet Union. There is an unimproved road connecting those two towns, another from Taliqan to Faizabad in Kataghan Province, and a much better one along the bluffs and barren alluvial fans north of the Khanabad River leading to Khanabad and Kunduz (see Map 5). South of the river are high, fertile terraces, well-irrigated from upstream intakes and devoted to wheat and cotton. Where the Khanabad River issues from the foot-hills to widen its floodplain, a six-span stone and concrete bridge carries the new road across the river to join the old one along the terraces and into Khanabad. One kilometer below the bridge is the new diversion structure and intake for the six-kilometer canal which feeds the Cotton Company's power station on the north bank opposite Khanabad. This installation, built by Unimac of Austria and Siemens Electric of Germany, utilizes a flow of seven cubic meters per second and a drop of thirty meters to drive four turbo-generators with a combined capacity of 1400 kva. The power is carried via a thirty-kilometer transmission line to the cotton gins and cottonseed oil processing plants at Kunduz.

The foot-hills on the eastern margins of the Khanabad Oasis evidently receive more than the average precipitation for the region, since they are covered with a patchwork of dry-farmed grain fields, a rather unusual sight in Afghanistan. Perhaps the source of moisture is a proximate one, for the lower reaches of the Khanabad River are wide, poorly-drained and swampy. In fact, the Khanabad Oasis is somewhat similar to that at Jalalabad and seldom suffers from a shortage of water. Much of the land below the bridge and south of the river was drained about thirty years ago under the direction of an energetic provincial governor who encouraged well-to-do Kabulese and retired government officials to invest in the land, at about $1 an acre, clear the dense marsh vegetation and install drainage works. Malaria continued to be a severe problem at both Khanabad and Kunduz until the UN WHO teams began work about ten years ago. Now the disease has been practically eradicated, the population of Khanabad has risen to over 20,000 and the value of some of the land in the Khanabad region has risen to $100 per acre. There still remain areas to be cleared and drained, and waterlogging is a common problem on many farms in wet years, but the fertility is maintained by alluvial increments from the river and canal waters. In fact, it is quite likely that the lowlands around Khanabad represent the most intensively cultivated area in all of Afghanistan. They serve to make Kataghan Province the leading producer of rice in the country, with approximately one-third of the annual crop as compared to one-quarter from Eastern Province. Rice, wheat, corn, gram or field beans, a rich variety of vegetables, melons, flax, sesame, hemp, alfalfa and clover follow each other in a multitude of rotational patterns on the rich, clayey soils. The horticultural products of the bottomlands include edible beets, potatoes, onions, carrots and vetches, along with deciduous fruits, grapes, and some pistachio and mulberry trees. No citrus can be grown, however, due to the severe winters when this part of Afghanistan is exposed to the Central Asian high pressure system.

To the west of Khanabad on the road to Kunduz a slight rise in the landform marks the edge of the Khanabad River floodplain, and cotton replaces rice as the dominant crop on the higher and better-drained soils. Thus Khanabad may be regarded as the center of rice production, with cotton growing areas to the east, towards Taliqan, and to the west, towards Kunduz, as well as on higher lands within the Khanabad Oasis. Flax and sesame, valued for their seeds, hemp for rope-making, and various pasture-fodder crops are to be found in the areas of both cities, as are wheat and corn. The comparative importance of the region in industrial or technical crops (cotton, sugar beets toward the south, flax, sesame, hemp) and in rice and other specialties is reflected in the fact that despite the intense cultivation in the Khanabad-Kunduz area, Kataghan Province as a whole contributes an average of only 10 per cent to Afghanistan's annual wheat production and about 6 per cent of the annual corn production.[1]

This combination of diversified and intensive cultivation is largely due to the relative fertility and good drainage characteristics of soils in the Kunduz region. Loessal and alluvial soil additions, plus increasing use of rational rotation patterns and organic fertilizers

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[1]Based on the data compiled by Mohammed Yusuf Mail, Director of Agronomy, Ministry of Agriculture, Kabul, 1955, on the provincial production of rice, wheat and corn in the years 1952-1954, in the files of the Ministry of Planning, Kabul, Afghanistan.

such as sugar beet pulp, maintain these soils in somewhat better condition than those of the upper Kabul Valley or the lands along the Helmand. Another factor in preserving the comparatively good condition of Kunduz Valley soils is the pattern of land ownership. Many of the areas drained in the 1930s became the property of well-to-do persons and have been kept in large units of 500 to 1000 acres and even more. On such large tracts, it is much easier to follow rotational patterns which restore soil fertility than it is on the smaller holdings common, say, in the Kabul Region. Large landowners are better able to employ fertilizers, whether artificial, natural or green manures, as well as to make use of mechanization. Most of the privately-owned farm tractors in Afghanistan, where there are not very many, are to be found in the Kunduz Region.

Generally speaking, the Kunduz sandy loams are well-suited for cotton, wheat, corn and melon production in all areas of good drainage. This includes the alluvial terraces of both the Kunduz and Khanabad Rivers and most of the Kunduz flood plain. But the Khanabad flood plain is too low and wet for these crops and so is mainly devoted to rice and horticulture. Where clayey alluvium or loess predominates, the soil tends to cake and to have a high water table during the spring run-off period. Here drainage is required. Alkali problems exist in some areas, particularly along the Kunduz River to the northwest of Kunduz City. For such areas, R. P. Davidson has found that the introduction of alfalfa into the rotation is as beneficial as a dressing of 100 kilograms of ammonium nitrate and

100 kilograms of superphosphate per acre.[1]

The irrigation needs of the Kunduz node agricultural area are drawn from both the Khanabad and the Kunduz Rivers. The principal canals are shown on Map 5 but the complex nature of the pattern, which includes the intermittent flow of the Darra Shorab River, and the Naki Canal which behaves as a distributary of the Khanabad River in periods of high run-off, are better indicated by the following tabulation which also indicates the approximate area irrigated from each canal. These are listed roughly in order from west to east.

TABLE 12

CANALS AND ACREAGES SERVED IN THE KUNDUZ NODE[a]

Canal	Acreage	Canal	Acreage
Chardaragh	50,000	Gur Tepa	7,500
Aliabad	5,500	Tobrakash	8,000
Naki, West branch	7,000	Sadgow	8,000
Naki, East branch	5,500	Kushi	6,000
Gaukush	8,000	Said Ali	5,500
Malarghi	2,500	Abadula	8,000
Jargozar	2,000		
Nawabat	1,500	Unallocated land	70,000
Total	82,000	Total	113,000

[a]Albert T. Petersen, "Notes on a Short Reconnaissance Survey to the Baghlan and Kunduz . . . ", passim.

The grand total of 195,000 acres represents A. T. Petersen's estimate of lands presently irrigated in the Kunduz node as we have defined it except for the areas between Taliqan and the bridge over the Khanabad River, so that we may safely assume that at least 200,000 acres are being irrigated here. The amount of dry farming cannot be estimated on the basis

[1]Interview of September 21, 1957, at Baghlan.

of present data, but we have pointed out its importance in the region immediately to the east of Khanabad.

The areas irrigated from the Khanabad River might be extended by further clearing and drainage, but it appears that no more water can be drawn from the river than is presently done without provision of some storage facilities upstream. In fact, Mr. Petersen found in November, 1956, that the Naki and Gaukush Canals together were subtracting 27 cubic meters per second or just about the total flow of the river at that time. Since the intakes of these canals lie downstream from the Cotton Company power plant barrage, it may be necessary to construct a second barrage, just below the intakes, behind which the tailrace from the power plant could return the flow into the river channel and thence into the canals. Otherwise, Mr. Petersen fears, there will not be sufficient flow in the Khanabad River to operate the power plant and maintain irrigation needs in the dry season of most years.[1]

The situation along the Kunduz River is somewhat better. Here Mr. Petersen feels that both the Chardaragh and the Aliabad Canals could be extended if improved intakes and canal cross-sections were constructed. The Chardaragh Canal, to the west of the Kunduz River, is already over 30 miles in length, and sections of it have been allowed to cave in. This deterioration has slowed the velocity to only twelve cubic meters per second with the result that many of the

[1]Albert T. Petersen, Monthly Report for November and December, 1956, in files of United Nations Food and Agriculture Organizatio office, Kabul, Afghanistan. (Kabul: January 12, 1957), passim.

numerous laterals do not receive sufficient water, especially at the lower end of the canal. Restoration of proper functioning would include replacement of the present stone and reed barrage in the Kunduz River with a proper concrete dam to raise the water level about one meter and to provide a small storage capacity. It would also be necessary to clean out the canal, restore proper gradients, and install gates to regulate flow into the laterals. With this accomplished, the supply of water could be insured to the 50,000 acres under cultivation and it might be possible to add up to 10,000 additional acres at the lower end of the canal. However, the extension of irrigation along the lower Kunduz is likely to run into problems of alkalization. Except in the Kalazal cotton area, a number of canals have been abandoned here, probably due to increasing alkalinization or salinization of the soils.

In the Aliabad area, east of the Kunduz River, there is also a present shortage of water which has forced some water-driven mills to cease operations although the existing crude diversion structure is intact. The terraces east of the Kunduz in this vicinity already support over 5,000 acres of cultivation including much cotton, but this acreage might be doubled if barrages were constructed in the river and electric power employed to pump water up onto the terraces for a gravity canal system. There is a good site for a large dam and storage reservoir behind the transverse ridge (Band-i-Kataghan) which separates the Kunduz node from the Baghlan node to the south.

Thus it appears that the development of the Kunduz River, from Qalagai through Pul-i-Khumri and Baghlan to Kunduz, would logically entail an integrated system of storage dams and diversion barrages, with the utilization of discharge to generate enough hydroelectric power to drive pumps for raising water onto fertile terraces where it cannot practically be brought by gravity flow. The same general approach would apply to the lower Kokcha-area. If we may take 400,000 acres as a reasonable approximation of the total area presently irrigated in the Kunduz River Valley and lower Kokcha-Amu Darya region, then it might be possible to add approximately 150,000 acres to this by implementing the proposals set forth above for the Qalagai, Dasht-i-Khwaja Alwan, Adjmir, Chardaragh, Aliabad and Kokcha areas. Not the least of the benefits of such an integrated development scheme would be the firming-up of water supply to the presently-irrigated areas and the elimination of such destructive spring floods as that of 1957. The two million acre feet annually discharged in the Kunduz Valley would provide five acre feet for the area presently under cultivation from the Kunduz and all additions up to 340,000 acres, calculated on a basis of 85 per cent efficiency in water use.[1] This appears to be ample for the irrigation of all areas and additions discussed in this chapter, which are summarized in Table 13 on the following page. The 119,000 figure (see Table 13) must, again, be considered as minimal; quite possibly the amount of land irrigated from the Kunduz River alone is around 200,000 acres. But the point is that there are definite possibilities for expansion of irrigated acreage along the Kunduz <u>if an integrated approach is</u>

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[1]The figure of 5 acre-feet is taken as a safe maximum above the requirements calculated by A.T. Petersen for certain crops in the Kunduz region and including allowances for losses in distribution and by evaporation and consumptive transpiration: cotton, 48"; sugar beets, 40"; winter wheat, 30". Albert T. Petersen, "Some Notes on Irrigation in Afghanistan", in files of UN FAO office, Kabul, Afghanistan. (Kabul: March 20, 1957), <u>passim</u>. (Typed.)

TABLE 13

AREAS IRRIGABLE FROM THE KUNDUZ RIVER ALONE

Area	Acreage Presently Irrigated	Possible Additions in Acres
Qalagai	?	5,000 to 10,000
Pul-i-Khumri Node	34,000+	5,000 to 10,000
Baghlan Node	30,000+	none designated
Kunduz Node	55,000+	15,000
Totals	119,000+	25,000 to 35,000

adopted. To these possibilities may be added the smaller potential remaining along the Khanabad River, which would have to be tapped through a combination of additional storage capacity and further drainage work, and the 125,000-acre potential on the lower Kokcha.

Either the integrated development of the Kunduz or the expansion of irrigation from the Kokcha will cost the Afghan government several millions of dollars. Whether such expenditures are feasible in the foreseeable future is doubtful, in view of the heavy RGA commitment in the Helmand Valley and under other developmental programs. To the extent that it has not already been mooted by prior commitments, the question of alternative allocations of developmental capital will be analysed in the final chapters of this study. For the present, it is enough to establish that there are definite possibilities for expansion in the North which, although not on as large a scale as that undertaken in the Helmand, might yield a more immediate and higher per-acre return then is possible in the South, <u>if the funds for an integrated development were available</u>. Part of this argument has been presented in the form of qualitative statements regarding the agriculture of the Kunduz and Kokcha region and in the form of the available quantitative figures relative to the importance of this region in such crops as cotton, sugar beets and rice. The remainder of the argument must wait until we are able to present comparable information concerning the Helmand Valley Region. But we can both summarize the agricultural productivity of the Kunduz Valley Region and provide a basis for later comparisons with the Helmand if we present here the data which were gathered by the author on his brief visit to this region and which were later verified by Mr. R. P. Davidson of the UN FAO Office in Kabul as being reasonable estimates.

TABLE 14

AVERAGE YIELDS OF LEADING CROPS IN KATAGHAN PROVINCE, 1956 HARVESTS[a]
(in pounds per acre)

Crop	Average Yield Baghlan	Average Yield Kunduz	Crop	Average Yield Baghlan	Average Yield Kunduz
Cotton	960	960	Flax	864	1,280
Rice	2560	2880	Sugar Beets	9216	-
Wheat	1440	1440	Potatoes	2560	-
Corn, shelled	2560	3040	Onions	1600	-
Barley	1120	960	Carrots	4480	-
Millet	1260	-	Vetches	960	800
Sesame	896	800	Watermelons	8000	16,000[b]
Hemp	-	22,400	Melons	6400	16,000[b]

[a]Data from interviews with Baghlan and Kunduz District Agricultural Officers on September 22 and September 28, 1957, respectively, checked by R. P. Davidson when he read the first draft of this chapter in Kabul, December, 1957.

[b]Melons at Kunduz are larger and therefore heavier than those at Baghlan. The white melon of Kunduz is considered by many to be the finest flavored in Afghanistan.

Mazar-i-Sharif and Maimana

Before we turn our attention to southwestern Afghanistan, we must say a few words about the provinces of Mazar-i-Sharif and Maimana which, although not administratively or topographically part of the Kunduz Valley are nevertheless sufficiently similar thereto in their economy as to warrant consideration as extensions of the same region. These similarities are of two major sorts: 1) the principal non-consumption crop of all three provinces is cotton, much of which finds its way to the mills of the Textile Company; 2) the Afghan karakul-grazing region extends across the entire north-central portion of the country and includes the foothill and lowland pastures of Maimana, Mazar-i-Sharif and Kataghan Provinces. In addition to these similarities, the three provinces are bound together by the fact that transportation is much easier among them than it is from either Maimana to Herat or from Kataghan to Kabul, and by the fact that Mazar-i-Sharif and Maimana surface transportation must pass through Kataghan, and principally through Pul-i-Khumri, in order to reach the capital and major market place of Afghanistan. Until very recently, all karakul fur, followed this route, but in 1956 direct air transportation was established between Mazar-i-Sharif and Kabul and in 1957 this service was extended to Maimana. Some, but not all, of the karakul is now being flown directly to Kabul, where it must clear through the marketing agencies and customs before being exported.

Topographically, both Mazar-i-Sharif and Maimana Provinces are, like Kataghan, tributary to the Amu Darya, but none of their major streams succeeds in reaching that river today although at least some of them probably did at times in the past. Instead, like the Murghab and Hari Rud Rivers to the west, these streams die in the deserts after serving to support oases in their delta regions. From east to west, these streams and their delta oases are the Khulm River which waters Tashkurghan, the Balkh-Ab which still supplies the village of that ancient and glorious name as well as the modern city of Mazar-i-Sharif, the Ab-i-Safed which waters Shibarghan and the Ram-Gul-Tagao which supports most of the agricultural centers of Maimana Province and ends in the vicinity of Andkhui.

It is possible to reach Mazar-i-Sharif directly from Kunduz City by fording the Kunduz River and then driving westwards across the shifting sands of the Dasht-i-Gawar. But as we have explained earlier in this chapter, it is more practical for vehicles to ascend the Kunduz Valley as far as Pul-i-Khumri and then to take the road which leads northwestwards across the barrage-bridge through Ghori and over a low pass into the valley of the Khulm River. The first oasis of any size watered by the Khulm is Haibak, which produces some cotton for shipment to Pul-i-Khumri and which boasts both Zoroastrian and Buddhist temples to attract the archaeologist and tourist. There is some small cultivation northwest of Haibak along the Khulm as far as Dalkhaki where the river cuts through an east-west ridge, but considerably more to the south of Tashkurghan ("the place of the rock" in Turkic) where the Khulm is evidently antecedent upon transverse ridges of faulted and folded sedimentary rocks, producing a spectacular gorge which has given the city its name. In all probability, both Alexander the Great and Jenghiz Khan passed through this near-vertical cleft in their invasions of Afghanistan. On the northern side of the uplift, a hogback ridge of grey sandstone runs for miles to east and west and stands as a rampart against the sand seas of Central Asia which extend northwards as far as the eye can see, interrupted only by partly-buried "island-mountains".

The Tashkurghan oasis supports a city of over 20,000 persons engaged in agriculture and in commercial and service functions generated by the traffic which converges here from Kunduz, Haibak and Mazar-i-Sharif. There are many walled orchards for deciduous fruit in and near the city, but to the west, towards Mazar-i-Sharif City, the belt of irrigated agriculture trends northward following the line where the water table in the alluvial fans comes close enough to the surface to be tapped by wells or by karezes. The road, which stays higher on the fans to avoid the finer sands lower down, crosses nearly barren country supporting only sagebrush and camel's thorn in scattered clumps.

Mazar-i-Sharif, the principal city of northern Afghanistan, has a population in the vicinity of 45,000 people. It is the present-day successor to Balkh,[1] the silk-road city known to Marco Polo, which lies some twenty miles to the northwest. The importance of Mazar-i-Sharif is partly religious, since it takes its name, meaning "the tomb of the saint", from the magnificent 15th-century mosque built over the supposed resting-place of Ali, the son-in-law of Mohammed.

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[1]Exploration at Balkh by the French Archaeological Mission has uncovered evidence that the site was occupied by a major city as far back as the 7th or 8th century A.D. Attempts to identify Balkh as the site of Bactra, the capital of the Bactrian kingdom conquered by Alexander the Great and the center of the succeeding Greco-Bactrian, Tokhari and Kushan empires have thus far proven unsuccessful.

The town also has considerable military significance as the major center of the Afghan Army north of the Hindu Kush and as the site of a modern airfield, separate from the commercial airport, where Soviet instructors are training Afghan jet pilots. The major function of Mazar-i-Sharif today is as the principal depot where shipments of Soviet gasoline and diesel fuel are stored after being imported from the Russian railheads at Khelif and Termez (see Map 3) or from fuel barges brought along the Amu Darya to these points. The oil-storage capacity in the vicinity of Mazar-i-Sharif is now presumably about 50,000 cubic meters, and the importance of this fuel to the Afghan economy may roughly be judged from the fact that on one day in October, 1957, no less than 10 tank trucks were counted moving south on the road between Tashkurghan and Haibak. Other tank trucks carry fuel westwards into Maimana Province, and it is not uncommon to see camel caravans laden with the characteristic blue, 13-gallon cans in which the Russian package their "benzin" moving westwards from Mazar-i-Sharif.

Also of significance for our study is Mazar-i-Sharif's function as the center of a cotton growing area second in importance only to that in the Kunduz-Kokcha region. When Gregory Frumkin visited the "Industrial Society" in Mazar-i-Sharif in 1951, he found that they were collecting cotton from Balkh, Aq Chah, Daulatabad (to the north of Balkh and not to be confused with the town of the same name in Maimana Province), Shibarghan (on the road to Maimana), Sar-i-Pul (south of Shibarghan) and Shor Tepe (north of Daulatabad and near the Amu Darya). The officers of the Society estimated that the total cotton production in Mazar-i-Sharif Province for 1951 was 9800 metric tons, of which they had bought 7000 tons as shown in the following table. Frumkin has made extrapolations designed to show the general features of cotton production within the provinces.

TABLE 15

COTTON PRODUCTION IN MAZAR-I-SHARIF PROVINCE, 1951[a]

Town or Area of Purchase	Cotton Purchased in Metric Tons	Estimated Total Output in Metric Tons	Yield in Pounds/Acre	Estimated Area in Cotton in Acres
Balkh	3868	5407	864	14,325
Aq Chah	1526)		416)	
Daulatabad	794)	3462	416)	19,040
Shibarghan	156)		416)	
Sar-i-Pul	597	836	800	2,385
Shor Tepe	59	82	320	590
Totals . . .	7000	Average	617.6	36,340

[a]Frumkin, Report on Journey to the Northern Provinces, Annex H. Frumkin bases his yield estimates upon data obtained in interviews, and calculates the acreages under cotton from them, but he does not explain the reasons for the variations in yields. Some variations may be explained by the fact that Balkh is situated highest on the distributary system of the Balkh-Ab (see Map 3) and hence has first call upon the available irrigation waters. Aq Chah is at the far end of the Iskabad Canal, fed by the Balkh-Ab, while Daulatabad is at the lower end of one of the distributaries. Shibarghan and Sar-i-Pul are both fed by the Ab-i-Safed (see Map 1) but Sar-i-Pul is upstream and gets first call. Shor Tepe,

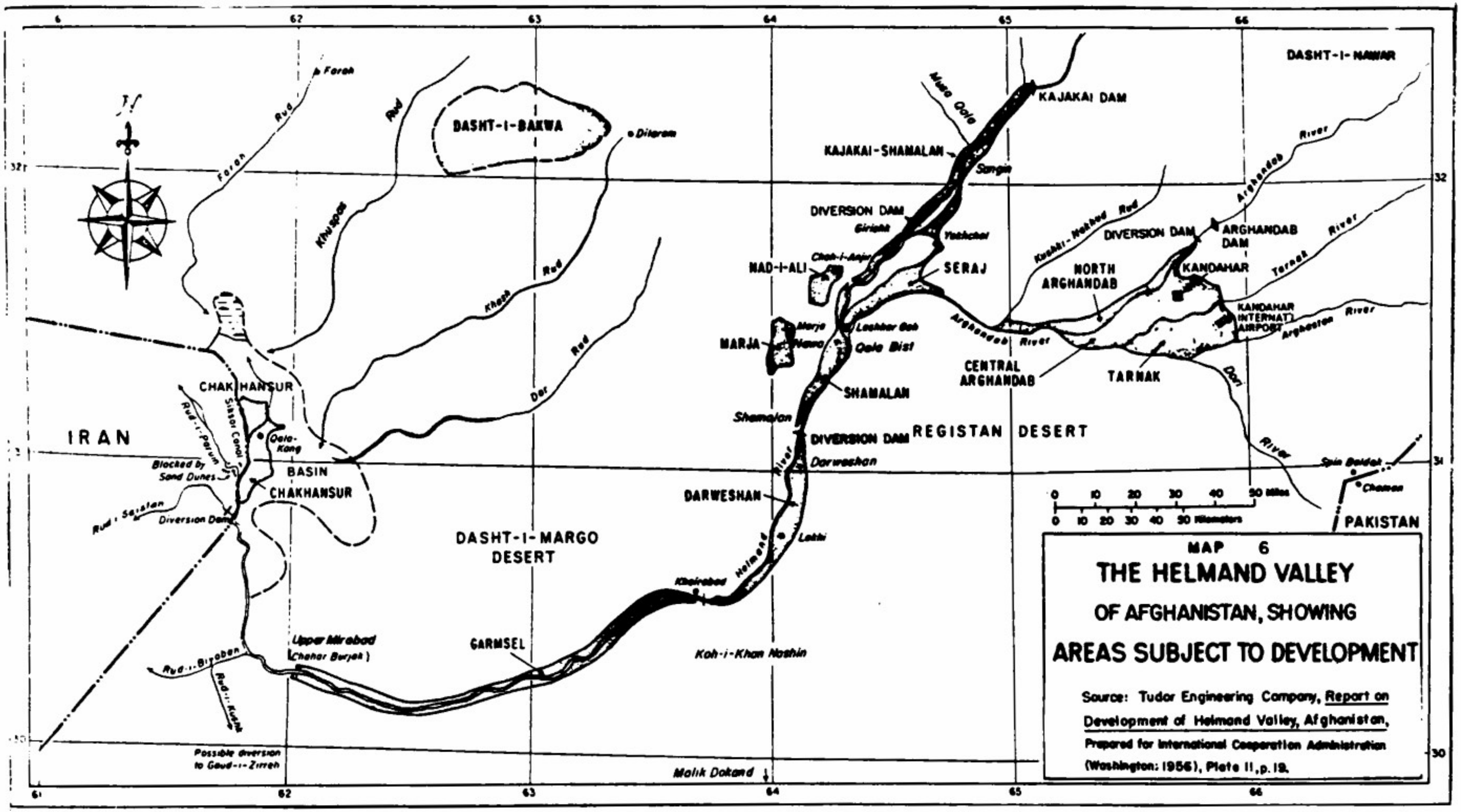
with the lowest yield of all, must rely upon irrigation from the Amu Darya. It is also interesting to note that Mazar-i-Sharif itself is not included in the cotton growing districts. This is partly the result of pressure upon the land near the city to grow food crops for the population, but it can also be seen from the map that the major part of the Balkh-Ab's water is carried, naturally or by canal, to the west of Mazar-i-Sharif and not towards the city itself which is fed by only a few small canals. Thus it would be difficult to explain the present site of the principal city in the "Bactra-Balkh" area merely on the basis of periodical shifts in the distributary pattern, although there may have been a time when more of the flow diverged towards the east than is now the case.

Unfortunately, very little information exists regarding the flow of the Balkh-Ab or the amount of water available in the distributaries or canals. Presumably, in a withering stream of this sort, all the water which can be tapped by present means is already utilized, so that it is probably futile to speculate upon possibilities of expanding the area under cultivation until the time when the RGA is able to undertake a program of run-off measurement as a preliminary to the possible erection of storage dams in the mountains to the south. One of the sources of the Balkh-Ab, the Band-i-Amir lakes in the central Hindu Kush, provides one of the most beautiful scenic vistas in Afghanistan, but it will require more than their storage capacity to increase the amount of water available for irrigation in the Mazar-i-Sharif region.

Under the present conditions, Mazar-i-Sharif Province provides a valuable supplement to the cotton-growing capacity of the Kunduz River Valley region. Despite the low per-acre yields, which presumably could be increased by better seed selection and rotational practices, the contribution of about 5000 tons of ginned cotton in 1957 represented one-quarter of the cotton available for industrial processing or export in Afghanistan. That part of the Mazar-i-Sharif production which is destined for domestic spinning can easily be transported to the mill at Pul-i-Khumri and forwarded from there, if desired, to Gulbahar. Later, if improved roads are built between Mazar-i-Sharif and Doab to tap the Darra-i-Suf coal measures (see Map 3 and Chapters X and XI), it will be even easier to supply the Gulbahar mill from the cotton fields and gins of Mazar-i-Sharif Province. In the meantime, that portion of the cotton producing industry located in Mazar-i-Sharif Province - that is to say, the "Industrial Society" which may be independent of the nationalized Cotton Company but which is reportedly a more recent creation of the Bank-i-Millie - is in an excellent position to supply ginned cotton for export to the Soviet Union on Afghan Government account. The Society would also be in a good position to build up a local cotton spinning and weaving industry were it not for the fact that the Pul-i-Khumri and Gulbahar mills will for some time to come need all the cotton which can be produced within Afghanistan and which is not exported.

The author has no detailed information regarding the agriculture of Maimana Province. The province is separated by fine sand or loessal hills from the Shibarghan area of Mazar-i-Sharif, and on the north, beyond Andkhui, it merges into the sands of the southeastern Karakum rather than extending to the Amu Darya which is no longer the Afghan-

Soviet border this far west. To the south, the Band-i-Turkestan Range, a northwesterly branch of the Hindu Kush, separates the province from that of Herat and can be crossed by vehicle only in the Murghab Valley at the west. A large part of the province of Maimana lies in foothill country, and its capital is located where the Ram-Gul-Tagao River, or one of its principal tributaries, issues from these foothills. The low hills are covered with sagebrush, or its equivalent, and with tough bunch-grass which is, apparently, the favorite food of the karakul sheep. At any rate, these sheep, whose skins bring $7.50 or more each on the New York market, thrive on this sparse vegetation so long as their water and shelter needs are met, and the greatest concentration of karakul sheep in Afghanistan is within Maimana Province. The problems of ensuring their well-being, and of meeting competition from the Soviet Union and the Union of South Africa on the world karakul (Astrakhan or "Persian lamb") market will be further analyzed in Chapters VIII and IX. Our consideration must first be directed to the third major economic region of Afghanistan, the Helmand Valley.



MAP 6

THE HELMAND VALLEY OF AFGHANISTAN, SHOWING AREAS SUBJECT TO DEVELOPMENT

Source: Tudor Engineering Company, Report on Development of Helmand Valley, Afghanistan, Prepared for International Cooperation Administration (Washington: 1956), Plate II, p. 19.

III. THE HELMAND VALLEY
GEOGRAPHICAL AND HISTORICAL SETTING

The Helmand and Arghandab Rivers

The Helmand River is the longest stream in Afghanistan, with a watershed occupying over forty per cent of the country's area. The Helmand itself rises between the Koh-i-Baba and Paghman Ranges, some twenty-five miles due west of Kabul City. In fact, the Helmand and the Kabul Rivers drain opposite slopes of the 14,000-foot Unai Pass and at one point flow within five linear miles of one another. The general course of the Helmand is southwestwards to its junction with the Arghandab at Qala Bist, some 350 miles from the source. Thereafter, the combined waters describe a huge semi-circle, some 250 miles long, to the south, west and north. They never reach exterior drainage, but are absorbed in the marshes and sinks of the Chakansur Basin along the Iranian frontier.

Though its flow varies greatly from season to season and from year to year, the Helmand is one of the few perennial streams in Afghanistan. Prior to the filling of the Kajakai reservoir in 1953-54, the lowest recorded <u>natural</u> flow in the Helmand above the dam was 1620 second feet on July 22, 1953, and the highest was some 50,100 second feet on April 26 or 27, 1949.[1] As a result of the con-

[1]The present gaging station is located two kilometers below the Kajakai dam and records controlled runoff from approximately 16,300 square miles. The figure given for July 22, 1953, was obtained from a gaging station maintained above the reservoir, filling of which was begun in April, 1953.

struction of the Kajakai and Arghandab dams, the middle and lower Helmand Valley[1] has had an assured minimum flow throughout the summer irrigation period. In the water year 1955-56, for example, the minimum regulated discharge dropped to 1600 second feet only in the period from September 5 to 8, well after the maximum summer irrigation demands had been satisfied. The greatest regulated discharge, 44,500 second feet, was reached on April 21, 1955, at the height of the spring run-off period.

It cannot be assumed, however, that complete regulation of the Helmand has been achieved. For one thing, the rock-fill Kajakai Dam is protected by an ungated spillway cut through the rock of a ridge a quarter of a mile west of the dam. When the reservoir is filled to its 1,495,000 acre-feet capacity, spillage automatically begins through this channel and back into the river below the dam. During the unprecedented heavy run-off of April-May, 1957, a flow of 39,570 second feet was reached over this spillway on April 16, and on May 5 the flow reached 51,900 second feet.[2] Far more serious, however, was the contribution from the Musa Qala and other, normally dry, stream beds between Kajakai and Lashkar Gah, which reached 130,000 second feet on April 16. The bridge joining Lashkar Gah to the west-bank project lands was washed out, and the Shamalan experimental farm completely inundated

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[1]We shall define "middle Helmand Valley" as the area from Kajakai to Khairabad, at the southern end of the Darweshan area (see Map 6) and the point at which the Helmand's course becomes predominantly westwards. "Lower Helmand Valley" will indicate the stretch from Khairabad to the Chakansur Basin. Unless otherwise indicated in the text, "Arghandab Valley" indicates only the stretch from the Arghandab Dam to the confluence with the Helmand at Qala Bist.

[2]Hydrological records consulted at the Helmand Valley Authority Hydrology Department in Lashkar Gah on January 22, 1958.

and, for all practical purposes, ruined.

The Arghandab River rises near the Dasht-i-Nawar ephemeral lake. Records from the gaging station twenty miles upstream from the Arghandab Dam indicate that the flow of this stream is even more irregular than that of the Helmand. The maximum unregulated flow of 28,000 second feet was recorded on March 11, 1949, and the minimum of 44 second feet on September 7-8, 1948. In the spring floods of 1957, the flow at the gaging station reached 22,500 second feet on May 6, and water passed over the automatic spillways of the dam during the period from April 4 to July 19.[1] The extremely erratic behavior of the Arghandab, even when compared with the Helmand (see table below), poses serious problems both in reservoir operation and in planning irrigation use of the water. Roughly 100,000 acres of land in the Kandahar region are irrigated from the Arghandab in any given season. The Dori, Arghastan and Tarnak Rivers, which join the Arghandab near Kandahar, are also highly seasonal and erratic in their flow. Some small use is made of their waters in the ancient and highly developed irrigation system of this area, but the Helmand Valley Project has not attempted to draw on them except to the extent that their flow contributes to that in the Helmand above the new Darweshan diversion dam.

Like other Afghan streams, the Helmand and Arghandab derive most of their water from winter and early spring rain augmented through summer by melting snows in the central mountains. Arid lands, lacking vegetative cover to retain rainfall, are noted for rapid run-off. It may be assumed that the spring flood pattern of the Helmand-Arghandab

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[1] *Ibid.*

is a reflection of precipitation in the headwaters area, combined with meltwater, even though no precipitation records are yet available for the source areas.

TABLE 16

ANNUAL RUN-OFF OF HELMAND AND ARGHANDAB RIVERS IN ACRE FEET[a]

12-Month Period Ending Sept. 30	Helmand River Below Kajakai	Arghandab River at Reservoir
1947-48	3,885,160	574,010
1948-49	5,193,500	872,970
1949-50	5,256,000	1,144,970
1950-51	6,171,000	1,042,900
1951-52	4,827,000	816,410
1952-53	3,611,200	493,800
1953-54	5,186,600	1,358,000
1954-55	3,831,100	464,100
1955-56	6,209,400	1,439,530
1956-57	9,041,200	(2,229,670)

[a]Tudor Engineering Company, Inc., Report on Development of Helmand Valley, Afghanistan, prepared for International Cooperation Administration (Washington: Tudor Engineering Co., 1956), p. 21, supplemented by interview with I. A. Heckmiller, ICA-sponsored Hydrologist at Lashkar Gah on January 22, 1958. (First source will hereafter be cited as Tudor Report.) Figure in parentheses is approximate.

Some records are available for Kandahar and the Nad-i-Ali and Marja tracts. The first set was maintained since 1939 by the British and then the Pakistan Consulate at Kandahar, and taken over by Morrison-Knudsen Afghanistan, Inc. (MKA) in 1951. The second set was maintained from 1951 on by MKA, first at the Chah-i-Anjirs camp at Nad-i-Ali and then, beginning in 1955, at the Marja camp. Both sets indicate that January is the wettest month in the middle Arghandab-Helmand region. Some rainfall also occurs in December, February and March, dropping off in April and May. The months of June through November are almost, if not entirely, rainless. At the same time, the evaporation rises to many times the rainfall so that there is a net loss of soil moisture over the year.

TABLE 17

MEAN RAINFALL AND EVAPORATION AT KANDAHAR IN INCHES[a]

Month	Rainfall	Evaporation	Month	Rainfall	Evaporation
January	2.46	1.70	July	.17	10.28
February	1.53	2.86	August	0.00	10.06
March	1.61	3.75	September	0.00	7.18
April	.47	6.28	October	.03	4.97
May	.23	8.83	November	.18	2.75
June	0.00	10.09	December	1.16	1.70

[a]Rainfall data for period 1939-57; evaporation data for period 1951-57 only. Morrison-Knudsen Afghanistan, Weather Summary, Drawings FSKA 166 and 356, Kandahar, Afghanistan. Calculations by the author.

It is important to note that for every month but January the average evaporation exceeds the average precipitation. This continuing natural dessication poses severe problems for the farmer and the irrigation engineer inasmuch as evaporation of water from the surface accelerates the capillary rise of soil water and the deposition of salts in the upper horizons.

One hundred miles further west, along the Helmand, the situation is even worse. See Table 18 on the following page. Evaporation rates vary according to temperature. The temperature regimes for Kandahar and Chah-i-Anjirs/Marja are given in Table 19, and cross comparisons are made with rainfall and evaporation in Figure 1.

TABLE 18

MEAN RAINFALL AND EVAPORATION AT CHAH-I-ANJIRS OR MARJA IN INCHES[a]

Month	Rainfall	Evaporation	Month	Rainfall	Evaporation
January	1.46	2.74	July	.09	17.35
February	.91	4.17	August	0.00	15.82
March	1.51	5.99	September	0.00	12.11
April	.33	9.78	October	,10	8.66
May	.04	14.14	November	0.00	6.13
June	0.00	18.19	December	.62	3.10

[a]All data calculated from MKA, Weather Summary, Drawings FSKA 166 and 356, Kandahar, Afghanistan. Data for 1951-54 are from the station at Chah-i-Anjirs. In January, 1955, this station was moved to the Marja camp, about 20 miles away. The difference in location may have a slight effect upon the averages, but since no other data are available these presented are done so with this qualification.

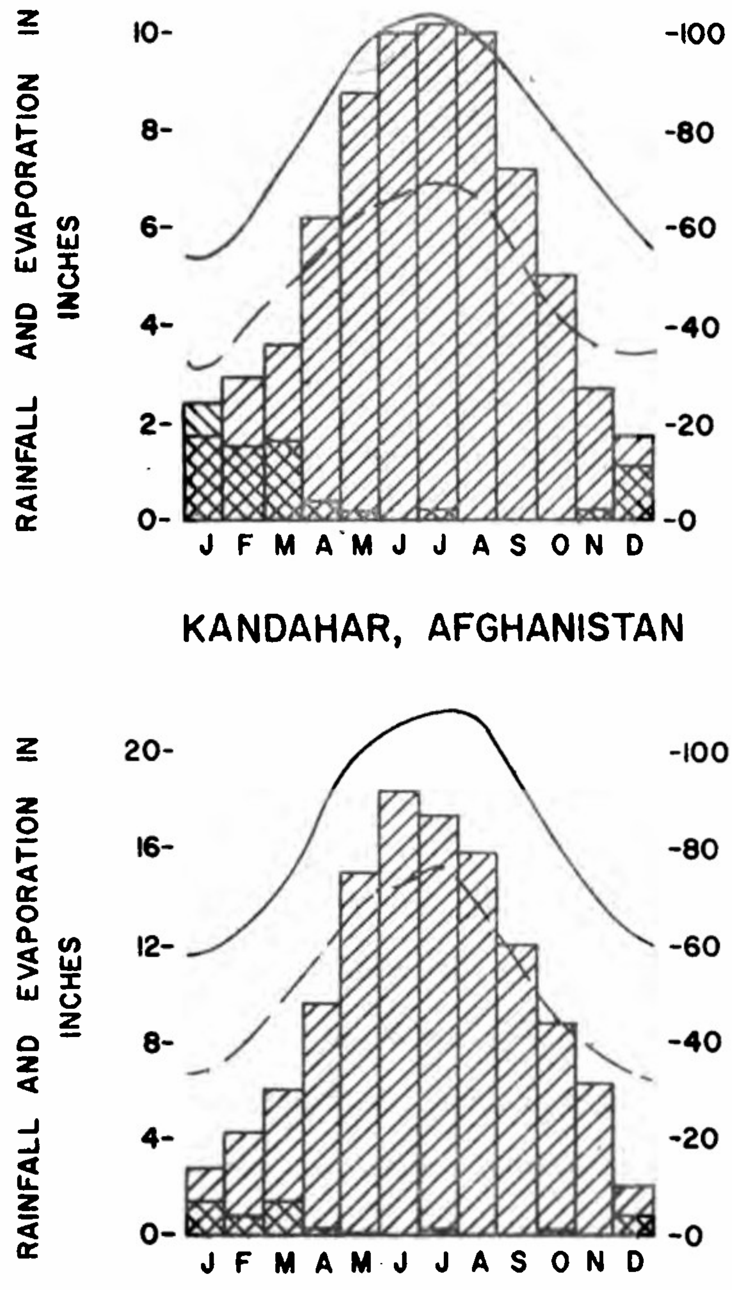
TABLE 19

MEAN MONTHLY MAXIMUM AND MINIMUM TEMPERATURES IN DEGREES FAHRENHEIT[a].

Month	Kandahar		Chah-i-Anjirs/Marja	
	Maximum	Minimum	Maximum	Minimum
January	54.2	32.7	58.4	33.9
February	61.0	39.7	64.8	40.1
March	71.5	46.5	72.0	48.8
April	82.5	53.5	88.2	58.4
May	93.7	61.1	99.1	67.6
June	101.7	66.2	106.4	72.8
July	103.8	71.5	108.5	77.0
August	100.2	67.2	103.1	68.7
September	92.4	55.9	97.2	59.2
October	79.5	44.7	81.9	44.2
November	69.8	36.6	72.0	39.0
December	60.0	34.1	62.8	34.8

[a]Same as Table 18.

FIG. 1 — CLIMOGRAPHS FOR KANDAHAR AND CHAH-I-ANJIRS OR MARJA, AFGHANISTAN



CHAH-I-ANJIRS OR MARJA, AFGHANISTAN

MEAN MONTHLY MAXIMUM TEMPERATURE

MEAN MONTHLY MINIMUM TEMPERATURE

EVAPORATION

RAINFALL

Thus it appears that it is generally warmer at Chah-i-Anjirs or Marja than in Kandahar. Although the difference may be less than one degree in winter, it spreads to five or six degrees in mid-summer. The difference is due, in the main, to the slightly higher elevation at Kandahar and to the fact that the terrace tracts of Nad-i-Ali and Marja lie west of the Helmand with deserts on all sides. Kandahar, between the Arghandab and the Tarnak, has considerable expanses of trees in and near the city.

Rainfall is also somewhat greater at Kandahar, with almost eight inches falling in the average year, than west of the Helmand where only five inches occur. Rainfall is also more effective at Kandahar where evaporation totals only 10.01 inches during the four months (December-March) when 6.76 inches of the precipitation occurs. West of the Helmand, the 4.50 inches of rain falling in these months is pitted against an evaporation of 16.00 inches.

No records of relative humidity are available, but it is apparent from the above data that it must be extremely low except in localities adjacent to streams and canals.

In terms of analogs, the Environmental Protection Division of the Quartermaster Research and Development Command of the United States Army found Kandahar to be closely analogous to Yuma, Arizona, in the following respects: mean temperature of warmest month (Kandahar 87.6°F. in July; Yuma 91.3°F. in July), mean daily maximum temperature of the warmest month (Kandahar 103.8°F. in July; Yuma 106.0°F. in July), and mean daily temperature range of the warmest month (July), but Yuma has a higher absolute maximum temperature and is also warmer than Kandahar in the winter. Kandahar is wetter than Yuma (7.83 compared to 3.4 inches in an average year) although it is less cloudy. However, there is little doubt that the most analogous area in the United States for the Helmand Valley is that of southern Arizona or southeastern California, especially when comparable elevations are selected.[1]

Thus, the climate of the Helmand Valley may be described as very dry (semi-arid to arid), cool in winter, hot in summer but generally quite viable. As is the case in southern Arizona water is the *sine qua non* for existence, and almost all agriculture is irrigated agriculture. Population is concentrated along the streams and canals, reaching its greatest density in the Kandahar area where irrigation, agriculture and trade have been most highly developed. The city of Kandahar itself has between 75,000 and 80,000 people. The six districts of Kandahar Province, including the capital, which lie within the Project area are estimated to contain some 224,000 people.[2] These are concentrated in and around the city, especially to the south and west as far as the Tarnak and Arghandab Rivers and upstream on both sides of the Arghandab about as far as the diversion dam (see Map 6). In the new province of Girishk, which includes the remainder of the project areas, some 378,000 people are said to live.[3] As would be expected, they are concentrated on and near the Helmand floodplain above and below Girishk. This area has been settled for centuries, and for at

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[1]United States Army, Quartermaster Research and Development Center, Environmental Protection Division, *Analogs of Yuma Climate in South Central Asia* (Natick, Massachusetts: June, 1955), Figures 2, 3, 4, 5, 6, 7, 8, and 10.

[2]*Tudor Report*, p. 84.

[3]*Ibid*.

least 250 years by Afghans. In the 1930's the RGA settled a number of Uzbek families from northern Afghanistan in the Seraj area, between the confluent Helmand and Arghandab.

History of the Helmand Valley Project

The Seraj area was the first in the Helmand Region to benefit from government construction. During the years 1910-1914, Governor Osman of Kandahar, inspired perhaps by tales of the ancient "Sughra" Canal in the Seraj, had a new canal dug from an intake placed in the Helmand at Sanjin, just below the mouth of the Musa Qala. The canal extended southwards and eventually some of its branches reached the Arghandab above Qala Bist. In 1930-31, German engineers (perhaps the same crew that built the girder bridge over the Helmand at Girishk) repaired the Seraj canal and installed a siphon near the intake. Finally, in 1941, the present King had three jetties built in the Helmand to protect the Seraj intake.[1]

Meanwhile, attention shifted to the opposite bank of the Helmand. Late in the 1930's, the RGA called in a team of Japanese engineers to improve the old Deh Adam Khan Canal which had been functioning for some 200 years. It began above Girishk and irrigated lands on the right bank of the Helmand as far as the water would reach. The Japanese planned to enlarge the canal and change its alignment in order to increase the area which could be irrigated from it. However, only some nine miles of the new canal were dug, using hand methods

[1]Most of the historical information in this and the following paragraphs was obtained in an interview with Mr. Sayyed Wahdat Shah, Vice President in Charge of Technical Matters, Helmand Valley Authority, at Kandahar on January 28, 1958.

exclusively, before the exigencies of World War II caused the departure of the Japanese in February, 1942. The Afghans continued to work under the direction of Mr. Sayyed Wahdat Shah, a Cornell-trained engineer, who had completed another sixteen miles by 1946. Mr. Shah also made two important changes in the plans: 1) he relocated the proposed intake structure to its present position above Girishk where a small island divides the Helmand, and 2) he rerouted the section he supervised onto higher land, preferring to cut and blast through the hard conglomerate of the terraces rather than to fill on the floodplain as the Japanese had been doing. The problems which arise from filling on soils containing highly permeable gypsum phases will be discussed later in this chapter; suffice it to say that they were recognized by at least one engineer before the "Helmand Valley Project", as such, began.

By 1946, Mr. Mohammed Ludin, Minister of Public Works and former General Director of Irrigation, had persuaded the RGA to irrigate not only the floodplain below Girishk but the Nad-i-Ali and Marja tracts on the terraces or benches to the southwest. This involved enlarging and partially rerouting what was now called the "Boghra" Canal, bifurcating it in the vicinity of Chah-i-Anjirs, and running separate branches to the floodplain and terrace areas. It also involved the construction of a much larger diversion dam and intake than had been planned, along with many reinforced concrete outlet and drop structures. In short, the Ludin plan required the use of modern equipment and engineering techniques far beyond what the Afghans themselves could supply.

At the same time, the RGA in Kabul and particularly the Minister of National Economy, Abdul Madjid Zabuli Khan, were thinking in terms of a more coordinated development program than had been pursued before the war, and one which could be financed from reserves accumulated during the conflict when karakul exports earned many dollars but few imports were obtainable. The defeat of Germany and Japan ruled out approaches to either of the nations which heretofore had provided most of Afghanistan's engineering services. Of the victorious Allies, both Russia and Britain had long been considered foes of Afghanistan. But the United States appeared sufficiently remote, disinterested and well-equipped to meet the need. So the RGA turned to the Idaho firm of Morrison-Knudsen (MK henceforth) to continue the work in the Helmand and to undertake other irrigation and road construction projects in Afghanistan.

At first, the RGA employed MK as a sort of adjunct to the Ministry of Public Works, and MK engineers carried out many surveys in the capital and various parts of the country. For some time it appeared that MK would reconstruct the 151-mile Kabul-Torkham road.[1] The contract signed between RGA and MK in 1946 called for work on this road, on the 315-mile stretch from Kabul to Kandahar, and on the 73-mile link from Kandahar to Girishk. But when MK estimated $26.4 million as the cost of these three projects, construction was "postponed".[2] At one time it was even

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[1]The MK barracks, later taken over by the Ministry of Public Works, can still be seen a few miles west of Jalalabad on the road to Kabul.

[2]Peter J. Franck, Obtaining Financial Aid for a Development Plan, The Export-Import Bank of Washington Loan to Afghanistan, U.S. Congress, 83rd Cong., 2nd Sess., Committee Print, September 30, 1953. Printed for the Use of the Committee on Banking and Currency (Washington, 1954), p. 14 including footnote 25.

rumored that MK would construct a two-kilometer bridge across the Amu Darya at Termez! And for a number of years MK was slated to build the Sarobi Dam in the Kabul River gorge. But here, too, MK's estimate was too high and in 1950 the RGA awarded the contract to Siemens-Schuckert of West Germany. By that time, MK had become exclusively concerned with the Helmand Valley Project.

In 1946, the Morrison-Knudsen Company established an affiliate, Morrison-Knudsen Afghanistan, Inc., (MKA) in San Francisco to handle its work in Afghanistan. The RGA turned over to MKA the old palace of Manzel Bagh, east of Kandahar, for use as a base camp and administrative headquarters. The proximity of the Helmand-Arghandab region to the railhead at Chaman, Northwest Frontier Provinces (then India; after 1947, Pakistan) made logistical problems much simpler than they would have been for a project of like magnitude located near Kabul or north of the Hindu Kush. Still, the first task was to rebuild or improve the access roads in the area. The Chaman-Kandahar road was re-aligned, widened and reconstructed with proper foundation aggregate and a surface of loose gravel that, properly maintained, is almost as good as asphalt or concrete in that practically rainless area, and much easier to repair in case of flash floods. Proper bridges were put across the Arghastan and Arghandab Rivers, while fording of the Tarnak was facilitated by a concrete dip, well-ballasted above and below to prevent undercutting by the stream. Smaller streams and washes were similarly provided with concrete dips, another superior adaptation to local conditions where bridges can be wrecked by flash floods whereas the rubble deposited on the dips can be cleared away by bulldozers within a few hours after the water has subsided.

MKA also improved the Kandahar-Girishk road to render it suitable for rapid movement of men, materials and equipment to the forward operations camp which they established on the eastern bank of the Helmand a few miles above Girishk. This was at the point chosen by Mr. Shah for the diversion dam and opposite the proposed intake structure for the Boghra Canal. As we have indicated, MKA was brought into the Helmand by RGA to build these two structures and to enlarge and extend the Boghra Canal so as to provide water for the Nad-i-Ali and Marja terrace tracts in addition to the Helmand floodplain (henceforth called "Shamalan" area, designating all the floodplain watered by the Boghra Canal). In addition, the RGA wanted MKA to construct a combination storage and power dam on the Arghandab River above the fruit-growing region near Kandahar. "Adding 315,000 acre-feet of stored water to the natural flow in the low-water season was expected to meet the full water requirements of 4.3 acre-feet of water a year for 120,000 acres. . . . The reservoir cost was estimated at nearly $9.7 million with an additional $1 million for canal repairs, land levelling, and road building."[1]

The idea for the Kajakai Dam on the Helmand River apparently originated with MKA. In April, 1948, with work on the diversion dam and the first 30 kilometers of the Boghra Canal well under way, an MKA survey revealed that the Nad-i-Ali and Marja terrace soils were shallow, underlain by dense gravelly subsoils, poorly drained and saline in places.[2] The floodplain soils in the Shamalan were afflicted in places by high

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[1] Ibid., p. 16.

[2] Ibid., p. 17 and footnote 28.

water table and surface accumulation of salts. But, despite the presentation of this information to the RGA, its import, and particularly that of the dense subsoils, was apparently minimized by one or both of the parties.

> By the fall of 1948, the Government had mixed feelings about further Helmand development. . . . the diversion of water to the tablelands during the low-water season would take water away from bottomlands downstream unless an upstream reservoir stored floodwater. While prestige considerations suggested completion of the limited Boghra project, economic wisdom seemed to advise an enlargement of its scope before continuation. The growing shortage of exchange forced a decision.
>
> M-K advocated an integrated valley development, including a major reservoir dam upstream at Kajakai, and completed field surveys for the dam by September, 1948. For a comprehensive project M-K was reluctant to count on more than 400,000 acres for irrigation and settlement until a thorough survey of the entire valley had been made. But the Afghans saw no need for such a survey. M-K and the mission [Afghan economic mission to Washington] concluded that even a 20 percent margin of error in estimating the acreage or water supply could not detract from the project's intrinsic value.
>
> A comprehensive project, based on intelligent guesses by M-K and the mission was estimated to cost $63.7 million, with $53.7 million of it in foreign exchange.[1]

While the contractor was thus the moving force behind the Helmand storage dam (Kajakai) project, the RGA, or rather the Afghan Economic Mission established in Washington in the fall of 1948 under the direction of the Minister of National Economy, Abdul Madjid Zabuli Khan, must take the responsibility for continuation of the Boghra project. MK's agronomist had recommended that it be deferred until surveys had established that there was enough water available to serve both the terrace lands and the presumably more fertile floodplain areas.[2] But

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[1] *Ibid.*, pp. 17-18.

[2] *Ibid.*, p. 20 and footnote 35.

the diversion dam and the Boghra intake structure were more than half completed by the beginning of 1949.

> . . . the calculation of economic benefits from a single canal project was particularly difficult. Without a reservoir the large diversion needed would withdraw much water from other areas. But without the maximum use of water in the Boghra area, the investment there could not be fruitful. So the mission was forced to present the Boghra benefits as directly dependent on the building of a reservoir. . . . The construction cost for the Boghra was estimated at $7.2 million above the $2.5 million already spent.[1]

The Helmand Valley Project had now begun to mushroom. Starting with the simple desire to rehabilitate and extend the old Deh Adam Khan Canal on the floodplain near Girishk, using foreign engineering but local hand labor, the idea had grown into that of a bifurcated Boghra Canal to irrigate the entire Shamalan floodplain plus the large Nad-i-Ali and Marja tracts on the terraces. To accomplish this, MKA was brought into the Valley. The contractor soon suggested that it would be necessary to provide a storage dam and reservoir on the Helmand in order to accomplish the RGA's objectives. Of course, it would have been possible to call a halt to the half-completed Boghra works, especially in view of the soil and drainage problems which were becoming apparent, but this would have resulted in a serious loss of face for both RGA and MKA within Afghanistan. It might also have meant operating at a level that was uneconomical for MKA, and thus ultimately for RGA, given the facilities, equipment, materials and manpower that had already been brought into the Valley. It appeared that a level of spending of $4 million per year was necessary to keep MKA operating above the break-even point. So the alternative was to turn to the United

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[1] *Ibid.*, p. 20.

States Export-Import Bank for a development loan.

On February 11, 1949, the Afghan Economic Mission in Washington submitted a request to the Export-Import Bank for a loan of $55 million to finance Helmand Valley development and other items in Minister Zabuli's plan. On May 31, the Bank rejected the request but suggested that certain specific projects might be resubmitted. Despite the Minister's conviction that his plan represented an integrated whole of interdependent agricultural and industrial projects, the list was reduced and resubmitted to the Bank. This time, the Bank indicated that top priority should be given to the Helmand Valley Project in order to expand agricultural acreage and eliminate the repeated food shortages in Afghanistan. It also indicated that the Helmand Valley Project would involve about as much of a commitment as the bank was willing to make. Minister Zabuli protested that the agricultural projects alone could not produce returns in time to meet Afghanistan's repayment and foreign exchange commitments, but the Bank remained adamant. Finally, after extensive negotiations and revisions, the Bank approved a $21 million loan in November, 1949. This was to include the gross dollar requirements of MKA's Arghandab, Kajakai and Boghra Canal projects.

> As of September 1, 1949, the Afghans had paid M-K $11.1 million for purchases in the United States and Pakistan and $8.9 million for services and purchases in Afghanistan (inclusive of a $1.3 million contractor's fee). About $4.6 million of this was the value of machinery, equipment, camps and shops. In an M-K letter to Department of State, September 29, 1949, M-K admitted that "there should have been more . . . to show for this large expenditure."[1]

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[1] *Ibid.*, p. 34, footnote 64.

Delays over details of the loan and RGA's second contract with MKA held up the signing of the loan agreement until April 21, 1950. Meanwhile, Minister Zabuli was having difficulties in the Afghan Parliament over the dwindling foreign exchange reserves, the high cost of MKA projects, and the rising cost of living. In June, 1950, he resigned, and the loan agreement and MKA contract were tabled in Kabul until the autumn. It actually took until March of 1951 before red tape was cleared away and the RGA could draw on the loan funds.

The contractor was now able to return to work. The Boghra diversion dam and intake structure had been completed by the end of 1949. Water was turned into the first section of the canal in the spring of 1950. By this time, thirty-eight miles of canal had been dug and six concrete siphons, passing under streams or washes, were completed. The Boghra Canal included a drop structure near Girishk where a small hydroelectric station could later be installed. The 1950 loan provided funds for partial lining of the canal from station 56+500[1] to station 75+100 (see Map 7) where it was to bifurcate a second time with one branch going to the West Marja tract and the other curving eastwards and ending in a desert sink. About 67 per cent of the East Marja Branch was also to be lined to prevent leakage in gypsum or other permeable soils.

Leakage from the Boghra Canal and its laterals, combined with poor irrigation practices, soon brought the water table in the Nad-i-Ali area up from a depth of sixteen feet to within a few inches of the surface.[2] Although no groundwater survey had been made, the increasing

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[1]This designation indicates 56.5 kilometers from the start of the canal.

[2]Franck, Obtaining Financial Aid . . ., p. 39.

surface salt accumulations afforded visual evidence of the poor drainage characteristics of the tract, and particularly of the seriousness of the problem of impermeable substrata which had previously been underestimated. Lining of canals and laterals, installation of drains, and training of settlers in better water use practices now became pressing needs.

MKA's original task had been to construct dams and intakes, main canals and wasteways, laterals and sublaterals. From the latter, RGA and the settlers were to construct feeders and farm ditches bringing water to land which they had previously demarcated, leveled and prepared for crops. But the Afghans fell so far behind with their part of the task that in 1951 they asked MKA to assume it for 16,000 acres in the Nad-i-Ali tract. By the end of 1952, the contractor, on schedule, had completed drop structures and lateral outlets on the Boghra Canal to the end of the Nad-i-Ali tract (station 51+000) and had completed the land preparation as requested. But while 10,500 acres were under cultivation, only 1,500 were being worked by settlers. Large landowners were farming 6000 acres, the RGA had incorporated 2000 into an experimental farm, and MKA was farming the remainder. Meanwhile, 15,000 settler applications had piled up due to the lack of administrative machinery for processing them either in Kabul or in the Valley. Finally, in July, 1952,[1] under prodding by the Export-Import Bank, the RGA established the autonomous Helmand Valley Authority (HVA henceforth) to process settler applications, determine plot sizes and farm and village locations, and help the settlers construct their homes, prepare their land and follow superior cropping and water use practices. The engineer of the Export-Import Bank had advocated in May, 1952, the

[1]Officially promulgated only on December 4, 1952, however.

increase of farm size from 10 or 12.5 acres to 15, and the adoption of irrigated pasture for sheep and cattle, with wheat sown on only one-fourth of the acreage in any given year.[1] The HVA did decree an increase in plot sizes, as recommended, but the task of converting the grain-growing Afghan farmer to animal husbandry was to prove almost impossible. The Bank's engineer estimated, also in May, 1952, that the additional cost of Helmand Valley development, including settlement of farmers and proper training of technicians to assist them and to operate the project, would amount to some $46 millions.[2]

The unanticipated high costs for settlement and drainage, along with a much slower rate of return than had been hoped for, caused the RGA-HVA to drop the 23-kilometer West Marja extension of the Boghra Canal, thereby saving some $844,000. But the bifurcation structure at station 75+100 (see Map 7) was built, and the West Marja extension can be added if and when cultivation practices have advanced to the point where profitable use can be made of its soils. It should be pointed out that the Boghra Canal was designed and constructed with both East and West Marja tracts in view, and before detailed soil and drainability surveys had been made of either. This means that the cross-section of the Boghra down to the bifurcation at 75+100 is designed for a flow of 2500 second feet. Operation of the canal for East Marja alone, at a rate of only 1500-1600 second feet, has given rise to serious difficulties of maintenance and water supply through outlets designed

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[1]Ibid., p. 40.

[2]Ibid., p. 41.

for the originally projected rate of flow.

MKA reconnaissance surveys indicated a higher proportion of good land in the East Marja tract than in either West Marja or Nad-i-Ali, so construction of the East Marja branch of the Boghra Canal was continued. MKA also proposed constructing 25 of the 40 miles of the Shamalan branch along the route of old canals on the Helmand floodplain rather than on the terrace to the west. This avoided disturbing the old ownership pattern in the areas that were under cultivation in the Shamalan tract and reduced the estimated cost by about $500,000.[1] Thus, the Shamalan Canal, which takes off from the Boghra at station 31+681, merely intercepts and feeds the old canal intakes. Since the complex floodplain is highest close to the Helmand, the canal follows the river and the laterals are all on the western side, between the canal and the terrace bluffs. Collector drains return the waters to the Helmand by passing <u>under</u> the canal at suitable places. This system is a logical one except for the fact that the Shamalan in some places is so close to the Helmand as to be threatened if the river shifts its course. During the floods in the spring of 1957, the berm of the Shamalan Canal was nearly breached in two places, and was saved only by emergency sandbagging operations. As has been indicated, the flood completely wrecked the experimental farm built between the canal and the river opposite Lashkar Gah. Receding waters left the water table in the Shamalan tract, already aggravated by several years of over-irrigation and poor drainage, higher than ever. In the fall and winter of 1957-58, salt accumulations were painfully evident along much of the Shamalan

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[1] <u>Ibid</u>., p. 38, footnote 74; p. 40, footnote 81.

Canal.

As for the storage facility aspects of the second MKA-RGA contract, the Arghandab Dam, 18 miles north of Kandahar, was completed on schedule and at a saving of some $2.5 million over the original estimate. It was dedicated on December 27, 1952. More thorough surveying along the Arghandab led to an increase in the estimate of irrigable land from 120,000 to 156,000 acres, meaning an increase in new land which could be brought under cultivation from an estimated 20,000 to 56,000 acres.[1]

Construction at Kajakai, which required preliminary work on the long, winding road from Kandahar and on the shorter one from Girishk, had encountered some delays and extra costs. However, storage in the reservoir began in April, 1953.

By that time, the funds from the Export-Import Bank loan were nearly exhausted. After seven, interrupted, years of work, and the expenditure of over $40 millions, the RGA and MKA had storage dams on the Arghandab and Helmand, a diversion dam and two long feeder canals on the Helmand, and some 18,500 acres of partially developed, sparsely settled land in the Nad-i-Ali tract. It had become obvious that a system of deep drains would have to be incorporated into the Nad-i-Ali project. Indications from surveys in the East Marja tract led to the same conclusion while, as mentioned above, the West Marja project was completely abandoned. In addition, it became apparent that the Boghra Canal would have to be lined from stations 47+100 to 56+500 to prevent leakage into the Nad-i-Ali water table.

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[1] _Ibid._, pp. 38, 45.

In order once again to save the Project, an optimistic, 87-page prospectus was prepared, augmented by economic justifications projecting income from the Helmand and Arghandab areas to the year 2050. With this document, the Helmand Valley Development Program, July, 1953 (HVDP of 1953 henceforth)[1], the RGA approached the Export-Import Bank for a second loan in the amount of $36 millions. The plan called for drainage and land development work in Nad-i-Ali, water delivery and drainage systems in East Marja and the Shamalan, and land development on the East Marja tract. It proposed to build a new intake structure on the Helmand, midway between Kajakai and Girishk,

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[1]There has been some confusion as to the origin of this prospectus. While the author was in Afghanistan, MKA provided him with an 87-page, hektographed document bearing the title Helmand Valley Development Program, July, 1953. He assumed that this document was prepared by Morrison-Knudsen, Afghanistan, Inc., and hektographed by them in Kandahar. However, he has since been informed by Mr. Claude L. Fly, of the International Engineering Company, Inc., a Morrison-Knudsen affiliate in San Francisco, California, that

> . . . this /the Helmand Valley Development Program/ is the program of the Government of Afghanistan, and that MKA played only such part in its development as requested by the Government. The Chief of ICA Helmand Valley Operations, Mr. Torbert, was Chairman of the Committee to develop the outline and material for this document. The document was a product of the committee composed of ICA, HVA, Export-Import Bank and MKA representatives with some participation by the Food and Agricultural Organization of the United Nations and the U.S. Embassy at Kabul. (Excerpt from a letter from Claude L. Fly to the author, August 18, 1958.)

Prior to the receipt of Mr. Fly's letter, it was the author's impression that the work of the committee which he mentions was embodied in the Report on the Development Program of the Government of Afghanistan, dated October 1, 1953, and published by the International Engineering Company, Inc., while the July, 1953, Helmand Valley Development Program reflected only the work of MKA. At any rate, the references in the present study are to the July, 1953, 87-page plus tables, hektographed, document, which will be cited as "HVDP of 1953" henceforth.

complete with canals, laterals and trunk drains to serve the Seraj area. The prospectus also called for installation of generators in the Boghra drop structure near Girishk and for the construction of a complete power plant at the Arghandab Dam. A diversion dam was to be built downstream on the Arghandab to serve canals extending along both sides of the stream. One of these proposed canals, the "South Arghandab Canal", was to extend as far as the Tarnak region, south of Kandahar and between the Arghastan and Tarnak Rivers (see Map 8). Here, 70,000 acres of land were to be irrigated and provided with drains at a cost of $6.5 millions.[1] The plan further called for the development of the Darweshan floodplain area, downstream from the Shamalan and on the opposite bank of the Helmand, and of part of the Chakansur Basin at the end of the river to utilize excess water stored in the Kajakai reservoir. The Helmand Valley Project was continuing to grow apace! As a final item, the RGA included the paving of Kabul's streets, saying that this project was much needed to impress local public opinion.

After further surveys and justifications by the United States Technical Cooperation Administration, operative in the Helmand after July, 1953, and its own staff, the Export-Import Bank granted a loan of $18.5 million, or roughly half the sum requested. The Bank specifically excluded the Kabul street-paving which was subsequently undertaken by the Russians. Arghandab power, the right-bank "North Arghandab Canal",

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[1]Franck, <u>Obtaining Financial Aid-. . . ,</u> p. 45.

Tarnak drainage, and the entire Seraj and Chakansur proposals were also dropped. But RGA and MKA were guaranteed the funds necessary to continue with the remaining features of the plan.

A third contract was signed between RGA and MKA on June 21, 1954, but approved by RGA only on February 18, 1955. Moreover, during the period May 21 to November 30, 1955, the Afghan-Pakistan dispute over the Pushtun border region resulted in the closing of the frontier to MKA and other shipments. As a result of both sets of delays, all work except that on Marja and Shamalan irrigation and drainage and that on interproject roads was postponed until early 1956.

In the next two years, Project operations moved swiftly. Arghandab Diversion Dam and the South Canal were completed in the spring of 1957. The name "South Canal" was now applied only to the portion paralleling the Arghandab River, from the south end of which the "Tarnak Canal" was extended in a large eastward loop to the banks of the Tarnak River (see Map 8). The canal was carried under this river in a siphon and then sealed at the northeast corner of the Tarnak area, pending allocation of further funds for the Tarnak irrigation and drainage network.

Along the Helmand, the power installation at Girishk, begun in mid-1956, was scheduled for completion in April, 1958, though leakage in the Boghra Canal, behind the drop structure, would have to be repaired before a full head of water could be provided for generation. Here, MKA had abandoned Mr. Shah's cutting method and had built the canal on permeable bottomland soils. Further downstream, the diversion dam at Darweshan (see Map 7) was begun in May, 1957, and completed in February, 1958. Some 50 miles of the Darweshan Canal, complete with drains, would be completed by the time the second loan funds were exhausted. It was unlikely that further Export-Import Bank funds would be forthcoming for the Project, but the United States International Cooperation Administration (ICA), successor to the Technical Cooperation Administration (TCA), had now become sufficiently involved in the Helmand that funds might reasonably be expected from this source.

United States' Point Four assistance was extended to the Helmand Valley Project (HVP) on June 23, 1952.[1] The first technicians arrived in the Valley in the fall of 1952, but could not become effective until the spring of 1953. A United States Operations Mission had been established since early 1951 in Kabul and was engaged in giving technical assistance in education, agriculture, industry and administration to the Afghan government. As a result, the program in the Helmand began as a step-child, and although it later obtained its own area director very little could be done in the Valley without time-consuming correspondence and/or journeys to Kabul, not to mention Washington. In point of fact, it was not until the Soviet Union entered the field of Afghan development assistance on a large scale in December, 1955, that the United States Government began to take a more serious view of its program in Afghanistan. It then became obvious to Washington that the practical distinction between the Helmand Valley Project, which had been commenced years before by the Afghan government, with Afghan funds, and the American Point Four program, of which technical assistance to the Helmand Valley Authority was a comparatively minor facet, <u>simply did not exist in the minds of the Afghan people in general or of most Afghan officials</u>. Because an American engineering and construction firm, Morrison-Knudsen Afghanistan, Inc., had been employed to do the

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[1]Letter to the author from Ruth Fitzmaurice, Afghanistan Desk, International Cooperation Administration, Washington, D.C., February 16, 1959.

work in the Helmand, that Project had become, in the Afghans' eyes, the measure of American ability and American prestige. While American technicians had been sent into the Helmand in 1952 only at the urgent request[1] of the RGA, faced with an almost insuperable problem of settling nomads and displaced farmers on lands with very serious tillage problems, these settlers and their compatriots did not distinguish between the TCA or ICA adviser who was supposed to "recommend" but not "do" and the MKA engineer who was supposed to "do" but not "recommend". Since there existed, within the MKA organization, a Land Development Department which was charged with soils and drainage analysis, crop experimentation, and the development of cultural techniques which could be recommended to the Helmand Valley Authority, the confusion of the Afghans may readily be understood. MKA had maintained agronomists, hydrologists and soil technicians on its staff since the inception of its work in Afghanistan. Given this background, the assignment of TCA agronomists, hydrologists, extension supervisors, community development specialists, public health advisers, and administrative specialists to assist the HVA could hardly fail to be interpreted by the Afghans as an endorsement by the United States Government of the RGA-MKA program, over and above that implied by the Export-Import Bank loans.

Still, the fact remains that American Point Four assistance to the Helmand Valley Project came about after the nature and size of the project had largely been determined by the RGA and its contractor.

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[1]A similar request was made at the time by RGA to the United Nations Technical Assistance Mission in Kabul, but without effect.

Aid was extended on an ad hoc basis to meet a special plea of the RGA, and without the deliberation on the part of TCA or ICA that would have been necessary to formulate and activate an integrated program of technical assistance. Technical assistance was grafted onto the Helmand Valley program in mid-growth. Those who assign responsibility to the TCA or ICA for the formulation of the Project or for its development through the second Export-Import Bank loan, simply do not know the facts or have not taken the care to distinguish a private American construction firm from an agency of the United States Government. The Export-Import Bank, which is supposed to ascertain that its loans will contribute to the economy of the country they sustain and that there is every likelihood of repayment, and which maintains a degree of field supervision, may have to bear part of the responsibility. But in the last analysis, primary responsibility for Helmand Valley development up to the spring of 1958 has remained with the Government of Afghanistan and with its hired contractor, Morrison-Knudsen.

Now that the second Export-Import Bank loan has been exhausted, the RGA has applied to ICA for further developmental assistance. Some of this has been awarded, more is forthcoming or under deliberation. MKA is no longer working for the RGA, but for ICA, and that agency will have to assume far more responsibility than the Export-Import Bank ever had for the use of its funds. We shall analyze the present position of the projects in the Helmand Valley as well as the alternatives open to ICA and the RGA. In so doing, we shall make use of the information presented above, as well as that contained in the Tudor Report, the first independent engineering study made of the Helmand Valley Project. The Tudor Report was prepared in the summer and autumn of 1956. When it became apparent that the Helmand Valley Project would largely devolve upon the International Cooperation Administration, ICA/Washington called in the Tudor Engineering Company to make an unbiased survey of the accomplishments to date, and the problems which had arisen. Under the leadership of former Governor Leonard B. Jordan of Idaho, the Tudor field team arrived in Afghanistan July 19, 1956. Six weeks later they returned to the United States and began the preparation of their report, which was submitted to ICA in November.

The short period spent in the field combined with the complexity of the Project compelled the team to rely on secondary source materials.[1] They were in no position to make independent surveys. But with access to the MKA files at Kandahar, San Francisco and Washington, and a good deal of assistance from the ICA mission in Afghanistan, the Tudor team assembled a surprisingly accurate and competent study of the Project. Furthermore, based on the team members' extensive experience with other irrigation and development projects, a series of recommendations for future action were embodied in the report. Naturally, these recommendations could not please all the parties concerned. By the time of the Tudor survey, too many false starts had been made and too many conflicts of interest had arisen for the RGA, MKA, the Export-Import Bank and ICA to see eye-to-eye on all future lines of action. Nor was the Tudor Report in any way binding on any of these parties. It represented only a survey

[1]Interview with Mr. Ralph G. Wadsworth, Assistant Team Leader, at the offices of the Tudor Engineering Company in Washington, D.C. on June 16, 1958.

by an outside party hired for the job by ICA, which remained at liberty to accept, reject or alter the recommended courses of action. But the report did bring together in workable, or debatable, form most of the relevant information available at the time. And, by presenting its recommendations in the form of a two-phase program, with one phase nearing completion and the other to be deferred for a number of years, the Report formed the basis for a logical discussion of the relative priorities to be assigned to various features of the Project. In order to clarify these aspects, and to bring the Tudor information up to date, we shall now examine, area by area, the various tracts now included or definitely planned for development in the Helmand Valley Project. At the end of this examination, we should be in a position to review the Tudor recommendations and priorities and to analyze them in terms of information gathered by the author in the field and in terms of the most recent developments in ICA policy.

Throughout the forthcoming area analyses, the following points should be kept in mind by the reader:

1) Almost all of the existing information with respect to soil and drainage characteristics in the Helmand comes from the Engineering Department of MKA in Kandahar. MKA was finally authorized by RGA to proceed with detailed soil and drainage surveys only in 1955-56 for Marja, 1956-57 for Nad-i-Ali, and the same general period for other project areas. During the Tudor survey, this information, <u>in its incomplete and partially tabulated state</u>, was made available to the team,

and found its way into the Tudor Report. Later and more complete tabulations were made available to the author during his stay in Afghanistan. These tabulations were then in the form of a final draft of the Helmand Valley Survey Report on "Soil and Water Resources of Southwestern Afghanistan". This draft had yet to be submitted to the San Francisco office of MKA and then to the Helmand Valley Authority. Revisions would be made by MKA and HVA before any of the information was published. HVA-RGA approval would be necessary before funds could be dispersed for publication. At the time of writing, the Helmand Valley Survey Report (HVSR henceforth) had not been published and it was possible that it would not be approved or released. Therefore, we must use the preliminary figures, bearing in mind that they do not, and never may, represent commitments on the part of MKA or HVA and RGA. They are certainly better than the partial estimates available to the Tudor team, but it would be an injustice to the parties concerned to present or handle them as final figures.

2) All MKA estimates refer to potential land classes, that is, to the classification which the land may acquire if and when certain reclamation and improvement practices are undertaken. In a footnote to the HVSR draft, MKA points out:

> Costs of reclamation are not made a part of the classification - only physical potentialities are considered. If costs, when determined, are considered too high, a lesser degree of use may be found or the land omitted from development.[1]

In conformance with standards established in the United States, MKA divided the project lands into the following general classifications:

> Class I - Land which is suitable for irrigation of all climatically adapted crops with no restrictions in use other than good irrigation farming practices. Such practices include the use of good rotations with soil-building crops. The use of moderate amounts of manures and commercial fertilizers may be required for high yields but fair to good yields can

[1] HVSR draft, Supplement No. 6, Table 7, footnote 5.

be maintained for a long period of time with minimum fertility management. Routine smoothing and floating for seed bed preparation and irrigation is a regular practice. Only simple surface drainage coupled with proper use of water should be necessary to maintain the soil in a well-drained condition. Surface soils should be easily tilled with no special treatment necessary to control crusting, salts or alkali. The soils are deep and roots, air and water penetrate readily; yet the water holding capacity is good. Topographic conditions are such that land development is relatively easy.

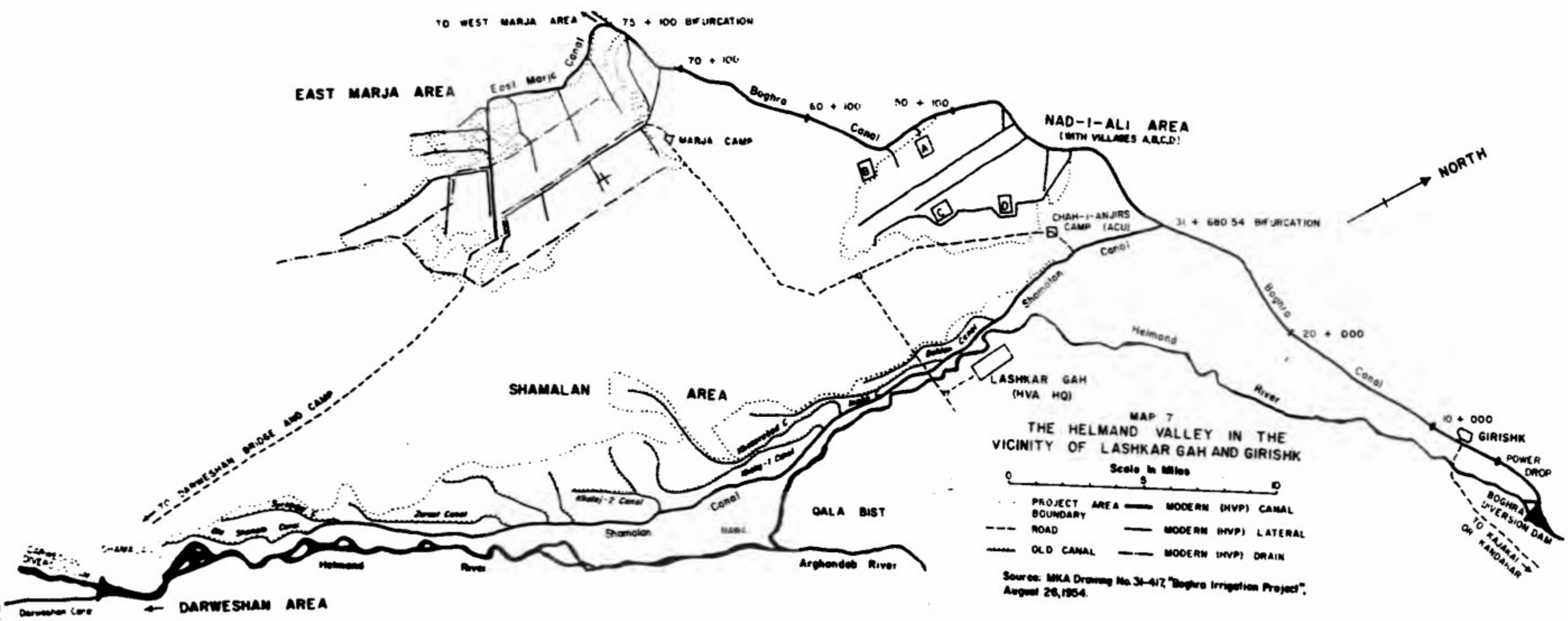
Class II - Land which is suitable for irrigation of a majority of the climatically adapted crops but requires one more easily applied practice in addition to good irrigation farming methods to maintain productivity. Generally Class II lands will be less productive, be adapted to a narrower range of crops, be more expensive to develop, or be more costly to farm than Class I lands. Special practices which may be required include: (1) Land leveling, (2) Wind or water erosion control, (3) Special irrigation development such as bench leveling, and irrigation methods such as contour irrigation and restricted water use, (4) Special tillage operations to correct surface crusting on hard pan layers, (5) Removal of rocks, trees, or other debris, (6) correction of low fertility by special application of fertilizers or soil amendments, and (7) Minor improvement of surface and subsoil drainage and removal of salts where such improvements are easily accomplished and will result in higher sustained yields. If temporary limitations such as stoniness or need for leveling can be removed and do not recur these lands may be reclassified as Class I.

Class III - Land which is suitable for irrigation of a limited number of climatically adapted crops but requires special treatment to overcome major deficiencies and maintain yields. Generally these are lands of marginal and restricted suitability requiring careful management for even fair to good yields of adapted crops. Major drainage measures such as deep open ditches and tile drains may be needed. Reclamation practices to control salinity and alkalinity may be required. Other measures may include extensive leveling of uneven topography or terracing and contour irrigation of steep slopes. Some soils of this class have such low water holding capacity and high permeability that irrigation must be frequent and with high heads and short runs. Soils with low fertility requiring continuous use of large quantities of fertilizers will be placed in this class. Class III includes some lands subject to annual damaging overflows but otherwise productive. Economic justification of development of Class III lands must carefully weigh costs of development and farming costs against net returns which will commonly be low from these lands.

Class IV - Land which is not suitable for continuous irrigation of common tilled crops but has limited use for these crops. It can be irrigated safely and with fair to good yields when in vegetation such as trees for woodland products or grasses and legumes for hay or pasture. Such lands may be too shallow, too steep, too frequently overflowed or too wet, saline or alkaline for practical and economic development as cropland. Under special situations, such as easily available water supplies, irrigation to produce trees for fuel or forage for livestock may be justified.

Class V - Land which is unsuited for irrigation of crops. Such lands include steep or broken areas, mountains, river wash, stream beds, extremely rocky or gravelly soils, sand dunes, marshes, and salt or alkali flats are not practical to reclaim.[1]

[1]Volume II, Technical Handbook, Land Development Department, MKA, Kandahar, ;ust 21, 1954, quoted in Tudor Report, pp. 30-31. See also HVDP, pp. 67-68.



MAP 7
THE HELMAND VALLEY IN THE VICINITY OF LASHKAR GAH AND GIRISHK

IV. THE HELMAND VALLEY
THE PROJECT AREAS ALONG THE HELMAND

Virgin Lands - Nad-i-Ali and Marja

As the Helmand Valley Project was translated into reality, it was land in the Nad-i-Ali tract that was first to be newly settled. Then called simply "Boghra", none of the tract's 25,000 gross acres was under cultivation at the start of operations in 1947. Ruins of an old fort in Nad-i-Ali village indicate that it was garrisoned centuries ago, but there is no record of old irrigation systems or of long-continued cultivation such as characterizes other sections included in the Project.

> The project is located on an old river terrace, with land slopes ranging from 0.120 to 0.075 percent. The soils are shallow over permeable gravels. The gravels are underlain successively by a few inches to a foot or two of slowly permeable conglomerate. . . . Interspersed in the irrigable soils and intercepting many of the canals, laterals and farm ditches, are numerous highly permeable sand and gravel ridges which are often underlain by gypsum deposits. In addition to being shallow, these soils have a low water-holding capacity and, therefore, require frequent irrigation.[1]

The HVSR draft reports 754 soil samples from Nad-i-Ali, of which 497 were non-saline, 180 saline-alkali, 31 saline and 46 non-saline-alkali.[2] It establishes the gross project acreage as 25,000, but excludes 4376 of these acres, including villages, as "non-reclaimable". Of the 20,624 acres remaining, over half (11,366) are said to have no salinity or alkalinity affecting crops and to require only drainage.[3] Another 3594 acres are

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[1] Tudor Report, p. 32.

[2] HVSR draft, Table 40, p. 96. For definitions of these categories, see U.S., Department of Agriculture, Diagnosis and Improvement of Saline and Alkali Soils, Agriculture Handbook No. 60, (Washington: U.S. Government Printing Office, 1954), pp. 4-6.

[3] HVSR draft, Table 41, p. 97.

affected by "slight to moderate salinity and alkalinity" but "crops do well". 5664 acres have moderate to severe salinity and alkalinity, but could be reclaimed.

These estimates are considerably more optimistic than those in the HVDP of 1953, which were based on a much larger total area. Allowing for the difference in base areas, they are more optimistic than those in the Tudor Report.

TABLE 20

NAD-I-ALI: ESTIMATED PERCENTAGES IN EACH LAND CLASS

Report	Total Area	Class I	II	III	IV
HVDP of 1953	40,095	0	0	3	97
TUDOR REPORT, 1956	18,500	0	2	14	84
HVSR draft	20,624	0	8	63	29

In the HVSR draft, based on surveys made in 1955-57 and only partially available to Tudor, MKA has apparently upgraded a considerable amount of land formerly in Classes III and IV. Some of this is traceable to the fact that the contractor surveyed 25,000 acres and completely eliminated 19% of them as "non-reclaimable". However, the increase in the remaining acreage, from 18,500 to 20,624 is not sufficiently large to account for the overall reduction in Class IV land from 84% to 29%. Apparently , the contractor's confidence in the possibilities of drainage and leaching increased considerably between the time of the Tudor visit and the compilation of the HVSR draft. The Tudor team recognized the difficulties inherent in reclamation and stated:

> Despite the construction of 80 miles of tile and open drains, extremely serious waterlogging and salinity problems have occurred as the combined result of canal seepage, flat gradients, frequent irrigations, low heads, and poor water management. Each year since the first crop, average wheat yields have decreased, presumably due to salinity and decreasing soil fertility, and each year more land has gone completely out of production. Also with the advent of irrigation, weeds have become a serious problem.[1]

The _Tudor Report_ therefore recommended that only 18 kilometers of outlet drains and farm drainage on five test areas of approximately 1500 acres should be completed in Phase I.[2] They felt that no further work should be undertaken until it had been established that additional drains would be effective towards making land productive for ordinary crops. Some ICA and HVA technicians felt, however, that without extension of the drainage system _no_ land in Nad-i-Ali could be kept in satisfactory production for any sort of crop, including hay and pasture. Farmers were encouraged to dig their own farm drains, but no funds were available, at the end of 1957, to dig the main collector drains.[3] There was hope, however, that ICA could be persuaded to allocate funds to complete the drainage network.

In actuality, the 20,624 net acres of the Nad-i-Ali tract are now almost completely settled. 1248 families, averaging perhaps 5-8 persons, were on the land in January, 1958, and another 100-150 families were awaiting settlement.[4] Each family had an allotment of 15 acres within a kilometer or so of its village, as well as a small garden plot adjoining

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[1] _Tudor Report_, p. 32.

[2] _Ibid._, pp. 168-169.

[3] Interview with Dr. Abdul Wakil, Vice President of Helmand Valley Authority in Charge of Agriculture, Nad-i-Ali, January 26, 1958.

[4] _Ibid._

the mud-walled, multi-family house. From two to four families in the dwelling unit share the two acre plot around it. Although land abandonment within the tract reached as high as 7000 acres in the 1956-67 period, it apparently has fallen off with the digging of drains and the use of salt-tolerant crops. During 1957, the HVA allowed Nad-i-Ali settlers rent-free use of out-of-project lands if they would dig drains on their own, salinized plots. HVA also allowed some non-settlers to farm on-project lands in exchange for their digging drains on them.

But even if the farm and collector drain problems are solved, the entire cultivation pattern of the Nad-i-Ali tract must be adjusted to its difficult soils. We have mentioned above that the size of holdings was increased from 10 or 12.5 to 15 acres in order to help farmers cope with waterlogging and salinization of portions of their land. The expectation was that larger plots would enable settlers to adopt cultivated pasture and hay crops and a livestock economy. Such has not been the case. Most of the cultivated fields in Nad-i-Ali are still sown to wheat, the Afghan staple. Although the mild climate and the reliable supply of irrigation water permit double-cropping, the practice has not generally been adopted. Sometimes fear of increasing still further the surface accumulation of salts has kept farmers from planting and irrigating a second crop. But most settlers still seem bound by the tradition of fallowing a field after harvest, sometimes for a full year or two if fertility seems low. A few farmers put in corn right after winter wheat, a profitable practice only where fertility is higher than in most of Nad-i-Ali. Still fewer put in alfalfa, one of the recommended semi-salt-tolerant rotation crops. The value of green manure has yet to be learned in an area where grasses are cut off right at the crown, or indeed grubbed up for the sake of the fuel value of the roots, and cattle or sheep turned onto the stubble. It is difficult to convince the farmers to leave anything in the ground, and impossible to persuade them to turn under a crop which could be used for fodder. As in all hand-to-mouth agriculture, this year's actuality looks much better than next year's possibility.

Probably the ideal use for Nad-i-Ali soils, certainly for those in Class IV, is in soil-building pasture crops. If they were sown to hay or alfalfa for four or five years, it would be possible to obtain one really good wheat crop which would also serve as seed-bed preparation for planting more alfalfa or grass. Eventually, after some decades, the soils would be sufficiently improved in structure, organic material and available nitrogen to stand more frequent cropping. The addition of artificial fertilizers, particularly phosphates, would be most advantageous but this is far beyond the financial capacity of the settlers. Indeed, the whole program of handling the problem soils of Nad-i-Ali is one that transcends the ability and resources of the settlers. Ideally, the lands ought to be taken over by the HVA and mechanically tilled for at least twenty years to build the soils up to a point where individualistic agriculture can have some hope of success. The Afghan farmer, even with some financial assistance, cannot postpone his cash crop long enough to make a proper rotation, and he is even less able to take most of his land out of grains and vegetables for an extended period of alfalfa and hay cultivation. At the time of increasing the Nad-i-Ali plots, an HVA Committee discussed making a 20,000 Afghani ($400) loan to each family to enable them to buy sheep and adopt an irrigated pasture-grazing regime. But it was calculated that it would take the farmers 40 years to pay off such a loan from their

15-acre plots and 20 years to pay it off even if the plots were increased still further to 20 acres.[1]

As it is, the 15-acre plots are far from being intensively cultivated. Most of the farmers' efforts go into the small vegetable gardens around their homes; the rest are directed to raising grain wherever the soil is not too saline or badly drained. The alternative of moving Nad-i-Ali settlers over to the Marja tract was dismissed, if it ever was considered, as entailing too much administrative confusion and loss of face. Nor could ICA assistance be expected for large-scale, mechanical cultivation of a project area designed to settle nomads and poor farmers according to traditional, individualistic tenure systems. So even though the 2000-acre "experimental" farm at Nad-i-Ali is largely being used by HVA for machine-cultivated grain and forage crops for the government-owned herds,[2] the continued settlement of almost 1400 families in the tract has committed HVA (and ICA) to make the best of the existing situation.

Undoubtedly, some improvement can be made in Nad-i-Ali cultivation even under the present conditions. If the settlers may continue to use the out-of-project lands as a stop-gap, moving from area to area as salinity rises and fertility drops, some soil-building, salt-tolerant crops can be grown on the debased, in-project lands. Alkali sacaton, salt grass, Nuttall alkali grass, Bermuda grass, Rhodes grass, Rescue grass or Birdsfoot trefoil have been found suitable on similar soils in

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[1] Ibid.

[2] In 1957, however, the farm produced only enough hay for 25 head, and 242 tons had to be purchased to carry the stock of 130 oxen and cattle through the winter. Interview with Mr. P.P. Fitzhugh, ICA Livestock Advisor to HVA, Lashkar Gah, October 17, 1957.

the United States.[1] Canada wild rye, Western wheat grass and barley grown for hay are also good possibilities, though the presence of boron in some soil phases at Nad-i-Ali may diminish yields or fodder-value.[2] As a field crop, barley should do better here than wheat. So would rape, but there is little demand for it.

There has been some discussion of applying counterpart funds, generated by United States wheat grants to Afghanistan under Public Law 480, to assisting Nad-i-Ali farmers in the purchase of sheep and cattle and of the seed for pasture crops. ICA has introduced Columbia sheep for crossbreeding with local Ghilzai strains on the experimental farm. The Columbia wool brings about \$.20 per pound or twice as much as the Ghilzai, and the Columbia sheep yields 15 or 16 pounds of wool compared with 5 or 6 pounds from the Ghilzai. The policy is to release Columbia sheep to the settlers only if they agree to graze them on irrigated pasture within the Nad-i-Ali or Marja tracts. This rule is designed to maintain superior quality and to encourage farmers to plant forage crops. It is hoped to place a Columbia ram in each of the Nad-i-Ali and Marja tract villages for upbreeding purposes. An attempt is also being made to develop an all-white Ghilzai strain from carefully selected (about 1 in 1000) individuals, as white wool, if properly

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[1]U.S. Department of Agriculture, Diagnosis and Improvement of Saline and Alkali Soils, Agriculture Handbook No. 60 (Washington: U.S. Government Printing Office, 1954), p. 67. Based upon his observations in the Gezira area of the Sudan, Prof. William A. Hance of Columbia University has suggested (interview of January 2, 1959) the periodic use of salt-bush (Atriplex) to clear the salt from the salinized soils of the Helmand. While this highly salt-tolerant shrub, apparently native to the Great Basin of the United States, should perform the clearing function quite well, its use would have to be balanced against salt-tolerant crops which have a value as forage or fodder besides.

[2]In contrast to the soils of Florida, which under a humid sub-tropical climate may be deficient in the boron necessary for proper cattle metabolism, the arid soils of Afghanistan may have too much boron, which then acts as a poison in the forage.

segregated, also brings a higher price.[1]

ICA has also introduced Brown Swiss cattle to upbreed local strains and improve their milking qualities. They need careful veterinary attention as several calves have been lost to foot and mouth disease and to faulty inoculation for rinderpest. In June, 1957, the HVA purchased four head each of the Sahiwal and Tharparka strains from India. These cattle are more resistant than Brown Swiss to local diseases and heat, while Sahiwal cows are fairly good milkers. The Brown Swiss cattle will be restricted to irrigated pastures and maintained as a separate breed, while the Indian cattle will be unrestricted as to grazing and breeding.

All imported bullocks have proven superior to native strains in draft capacity. In November, 1956, a herd of mares was acquired by HVA from the Ministry of Defense to cross with Herati jacks to produce mules for draft purposes. The need of stronger bullocks and mules became obvious when ICA introduced a number of wooden plows with simple metal plowshares. Local Afghan bullocks simply could not pull these plows through the heavy, salt-caked soils of Nad-i-Ali, and the farmers reverted to traditional, light "stick" plows with small, metal-shod points.

Another avenue of improvement is through tree cultivation, both for fruit crops and wood. Nurseries have been started in both Nad-i-Ali and Marja, and the village chiefs (<u>maliks</u>) have been supplied with deciduous fruit saplings and encouraged to grow model orchards. Trees are better able to force their roots through the heavy soils than grasses, grains or vegetables, and there is a good demand for fruit along the Helmand. Willows and mulberries have also been distributed, and some trees along the laterals

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[1] Interview with P.P. Fitzhugh on October 17, 1957, and interview with Dr. Abdul Wakil in the Marja area, October 14, 1957.

are now five years old and of fair size. But it will be some time before settlers can use much of this wood for fuel and afford to leave crop roots and animal dung in the soils to increase its organic content and improve its tilth. The ornamental and shade value of trees on the treeless terrace lands is also of considerable psychological importance, but the use of pine seedlings for this purpose along the Shamalan Canal seems less practical than that of the faster-growing willows or mulberries would have been. The thin, high poplar, another fast-growing tree common along roads and in orchards in eastern Afghanistan, is absent along the Helmand, a fact which is reflected in the construction of some houses with arched, mud-brick roofs requiring no horizontal, wooden poles for support. The tamarisk or salt-cedar grows well here, but is reserved for cemeteries or religious shrines. A similar respect for all trees, until they have reached optimum size, would be highly desirable in an area where strong protective measures are necessary to allow anything but a cash crop to reach maturity. The wooded island in the Helmand at Lashkar Gah, to which public access is prohibited, is probably the only example of natural climax vegetation in the area.

The Marja area, in many respects similar to Nad-i-Ali, also lies on old terrace land, from five to ten miles west of the Helmand, opposite and southwest of Lashkar Gah (see Map 7). The average slope is 0.10 per cent to the south and east. The Boghra Canal passes along the northwest margin of the tract, and its East Marja branch extends for some six miles along the western boundary, then turns east through the central portion for five miles. As was true at Nad-i-Ali, there was no cultivation previous to Project development, which began in 1952. Now the tract has been provided with some 92.35 kilometers of laterals, running roughly west-east from the East Marja branch, and 40.85 kilometers of main drains, running north-south. In addition, 140 kilometers of sublaterals and 455 kilometers of farm ditches, constructed by HVA's Afghan Construction Unit (ACU) and the settlers, respectively, have been built. From May to December, 1957, approximately five hundred families were settled on the Marja tract, with another five hundred scheduled to arrive in the following months. Sizes of individual plots vary according to the land classification.

The total size of the East Marja tract is about 27,000 acres. The HVDP of 1953 listed 27,580 potential net irrigable acres, which had been reduced to 27,190 by the time of the Tudor survey, along with some changes in classification. By the time the HVSR draft was prepared, better soil and drainability surveys led to a reduction of the acreage to 24,979 acres, of which 6552 were classified as "non-reclaimable". In other words, if and when the necessary leaching and drainage are accomplished, a total of only 18,427 acres will be in Class IV or above. There is no Class I land. Class II could amount to 3764 acres; Class III, 7524 acres; and Class IV, 7139 acres. In percentage terms, the estimates compare as follows:

TABLE 21

EAST MARJA: ESTIMATED PERCENTAGES IN EACH LAND CLASS

Report	Total Area in Acres	Class I	II	III	IV
HVDP of 1953	27,580	0	36.9	25.5	27.6
TUDOR REPORT, 1956	27,190	0	30.	28.	42.
HVSR draft	18,427	0	20.	41.	39.

The steady decrease, not only in total area, but in the percentage estimated as potentially Class II land seems to reflect growing pessimism with reference to the East Marja tract. In the HVSR draft, MKA reported 236 soil samples from this area, of which 150 were non-saline, 68 saline, 16 saline-alkali, and 2 non-saline but alkali.[1] The Tudor team reported:

> Some of the soils are moderately deep, but most are shallow silt loams and sandy loams, lying over slowly permeable soil material which is underlain by impermeable conglomerate. Loose sand and gravels occur in and near the northeast and the southwest part of the project. These soils are only moderately fertile, and a large proportion of them are saline even before irrigation. The subsoils of the Marja are similar to those of the Nad-i-Ali. Hence, equally difficult problems of canal and ditch leakage, irrigation water management, waterlogging and salinity will arise when these lands are put under cultivation. In addition, wind erosion control is required. On portions of the Marja area, soil and salinity conditions are similar to those described above for the Nad-i-Ali tract and, in some locations drainage costs will prove to be uneconomic.[2]

For administrative purposes, the 27,000-odd acres originally included in the Marja tract were divided into nine sections of roughly 3000 acres each, bounded by laterals and drains. Each section is similarly subdivided into three longitudinal subsections, each one kilometer wide and each having two villages. The villages are designed to accommodate forty families each, and are so located that no field in a subsection is more than one kilometer from the village where its owner lives. In the center of each 3000-acre section will be a mosque, school, metal-working shop for implement making and repair, and various small bazar shops to serve the six villages. Roughly in the center of the whole tract, the new town of "Marja" will be built to serve as the area's principal market and administrative center.

Previous to the arrival of the first settlers in May, 1957, the

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[1]HVSR draft, Table 40, p. 96.

[2]*Tudor Report*, p. 32.

HVA plowed and seeded some of their land to wheat and alfalfa so that the new farmers might have a head start. Some local farmers, non-settlers, were allowed to put in crops on the lands of late arrivals, sharing the crop with the settlers, who kept three-fifths. The settlers had to harvest and thresh the grain in July and August, after which some of them planted corn as a second crop. Non-settlers were also permitted to farm out-of-project lands adjoining the Marja laterals and were supplied with presently excess water. They must pay a rent of 160 pounds of grain per acre, and presumably may use the land for only one year; erection of anything but temporary shelters is forbidden to non-settlers.[1]

The permanent settlers in the Marja tract are provided with one hundred dollars' worth of building material for permanent homes, built of sun-dried brick with some wood for door and window frames and roof support. HVA has been trucking in conglomerate from the Seraj area for use in foundations. HVA has also constructed three model homes and a school building at "Marja" for demonstration purposes. But none of the settlers observed at Marja in the autumn and winter of 1957-58 seemed sufficiently affluent to follow such substantial plans. They are required to build in assigned locations and to keep tents and mud huts out of the permanent dwelling areas. But most of the houses follow very simple, square patterns, with only one or two rooms and a minimum of windows. None of the multiple-family units of the type built by MKA in Nad-i-Ali is to be seen in Marja, although some settlers are temporarily housed in former construction barracks near the Marja area. Fortunately, the winter of 1957-58 was a mild one along the Helmand, for few of the Marja settlers had had time to complete their

[1]Interviews with Dr. Abdul Wakil, October 14, 1957 and January 26, 1958.

homes.

The newly-arrived family is given about ten dollars in cash, 500 pounds of grain for food or seed, some basic farming implements, a yoke and one bullock. The settlers are expected to team up their bullocks for plowing until each family has enough money to buy a second beast. The land they are assigned has an average value of one hundred and fifty dollars, based on its assumed productivity: 10 acres of Class II land, 12.5 of Class III and 15 of Class IV.[1]

According to the latest acreage figures, these farm sizes would permit the settlement of approximately 375 families on Class II lands, 600 on Class III, and 475 on Class IV. Of the total of 1450 farm units, about 1000 were settled by mid-1958. Most of these were in the northeastern and central portions of the Marja tract. They are located, generally speaking, on the Class II and Class III soils, but the soil phases in the Marja area are so minutely interwoven that the better lands appear as islands or peninsulas among Class IV and Class V soils. Along the western and southwestern edges of the tract, these poorer classes predominate. Salt deposits are apparent on the surface along with wind-blown sand from the surrounding desert. Some of this sand, naturally, accumulates in the canals and laterals, but it has not yet become a serious problem. Nor has there yet been any indication of serious leakage from the East Marja branch. The fact that a complete drainage network was incorporated into the Marja area before irrigation began should prevent the rapid rise of the water table which occurred in Nad-i-Ali, even if irrigation practices do not improve. Furthermore, the fact that the percentage of alkali soils in the Marja tract is

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[1] Tudor Report, p. 92.

much lower than in Nad-i-Ali should make cultivation of the former considerably simpler.[1] Nevertheless, cultivation of the Class IV Marja lands, and probably of the Class III as well, should be subject to the same limitations and conditions which have been set forth above for those in Nad-i-Ali.

Stabilized Areas - Kajakai to Girishk and Seraj

We have just considered the principal areas of new land developed in the Helmand Valley Project: the Nad-i-Ali and Marja tracts. Both are located to the west of the Helmand, on old terrace lands some distance above and removed from the river. They had not been used for agriculture for centuries, if ever, due to the difficulty of supplying water to them prior to the construction of the Boghra and East Marja Canals. Perhaps they were used for an occasional, dry-farmed winter grain crop. If agriculturalists ever irrigated these lands, they must have discovered the problems of salinity and drainage and abandoned their attempts. They have, at any rate, left no trace of their success or failure.

On the long, narrow flood plain of the Helmand, however, men have struggled with soil and water problems for centuries. Here was land of low but definite productivity, if water could be supplied to it in sufficient and not excessive quantity. A fall-sown crop might be washed away by the spring floods, which occasionally carried dikes and ditches with them, or parched by the sun in years of low run-off. At least as far back as the legendary, original "Boghra" canal, the Helmand farmers

[1]Salinity can generally be controlled by careful leaching (application of water in slight excess of irrigation requirements after a preliminary flushing to drive salts down and keep them down) while alkalinity requires soil amendment or special cropping practices. Good subsoil drainage is, of course, necessary for successful leaching.

struggled to divert enough of the Helmand's water into their irrigation ditches to allow spring irrigation of crops. Although the climate was eminently suitable, they had no way to store enough water to grow a second crop during the summer and autumn. The most important benefit of the Kajakai storage dam to date has undoubtedly been the insurance of a firm and regulated water supply to these old areas of cultivation. Even if Nad-i-Ali and part of Marja were abandoned, this benefit would remain, although it would hardly justify so large and expensive an undertaking.

When MKA came into the Helmand area in 1947, they estimated that perhaps 20,000 acres were under cultivation along the Helmand between Kajakai and Girishk. Of these, 10,000 acres were in crops, 4000 in orchards, and 6000 in vineyards. In addition, 2500 acres showing signs of previous cultivation had been abandoned, another 2500 were recently idle, possibly as part of the rotation scheme, and some 3500 were completely undeveloped.[1] By 1953, MKA estimated that 28,500 acres were being cultivated, of which 25% consisted of Class I lands, 25% of Class II, 30% of Class III, and 20% of Class IV.[2] The HVSR draft reports about 36,500 acres now being irrigated, and states that of 49 soil samples taken 47 were non-saline and 2 non-saline-alkali.[3] Little detailed surveying has been done since no construction is planned in the area, although HVA indicated that improved intake structures might be provided for the old canals if a real need develops.[4] Flumes and a few turnouts were provided for these

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[1]HVDP of 1953, Table 3B.

[2]Ibid., Table 3.

[3]HVSR draft, Table 40, p. 96; cf. Tudor Report, p. 34.

[4]Interview with Mr. Carl O. Kohler, January 11, 1958.

old canals where they crossed the Boghra between the intake and the Shamalan bifurcation. To the observer, these lands near Girishk, and extending along the west bank above the Boghra intake and along the east bank above Sangin, appear almost as good and intensively cultivated as those near Kandahar.

Mention has already been made of the Seraj area, which was irrigated by the ancient "Sughra" canal and which is now served by a canal built between 1910 and 1914 with its intake at Sangin. As defined in the HVDP of 1953,[1] it extends for 75 kilometers along the Helmand and 45 kilometers along the Arghandab from the confluence at Qala Bist. It includes 70,000 acres of which only 24,000 were in cultivation in 1953 (20,000 in crops, 2000 in orchards, 2000 in vineyards, plus 6000 abandoned and 2000 recently idle).[2] The Tudor Report put the potential net irrigable acreage at 63,000, in five widely separated tracts.

> Two of these tracts, one on the Helmand across from Girishk (7500 acres) and the other north of the Arghandab River and southeast of Lashkar Gah (18,600 acres), are mostly recent river valley soils. They are deep silt loams and silty clay loams, but a third or more are waterlogged and affected by salinity and alkali. The remaining three tracts, about 36,900 acres in all, are located on old river terraces and consist chiefly of shallow to medium depth silt loams and sandy loams, over shallow impervious beds of conglomerate or shale. Serious water-table and saline and alkali problems exist. Some of these tracts were settled as recently as 1927 and already thousands of acres have been abandoned although much of the project does not yet have a firm water supply. . . . Production is low due to salinity, alkali, high water tables and low fertility.[3]

The land classification in the HVDP of 1953 is compared with the estimates

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[1] HVDP of 1953, p. 33.

[2] *Ibid*., Table 3B.

[3] *Tudor Report*, p. 33.

which were furnished by the contractor to the Tudor group in the following table.

TABLE 22

SERAJ: ESTIMATED PERCENTAGES IN EACH LAND CLASS

Report	Area in Acres	Class I	II	III	IV
HVDP of 1953	68,000	10	30	30	30
TUDOR REPORT, 1956	63,000	4	17	27	52

For the HVSR, MKA surveyed 105,908 acres in the Seraj area. 40,864 were eliminated as non-irrigable or not recommended for development. 56,800 acres were found to have no particular salinity or alkalinity, while 8244 would require drainage and leaching. Thus, the 65,044 acres which would justify development represent a reasonable compromise between the two earlier estimates.[1] Soil quality is only fair; 350 out of 619 samples were non-saline while 225 were saline-alkaline,[2] but the low estimated cost of developing 25,000 acres may make the Seraj worthy of improvement in the future. MKA tentatively estimated the cost at $3 million for irrigation and drainage construction plus another $3.7 million for land development, if that is carried out by the contractor.[3] The original plan was to construct a new intake on the Helmand below the old one at Sangin and to excavate a canal with a capacity of 1050 second-feet for 11.5

[1] HVSR draft, Table 41, p. 97.

[2] *Ibid*., Table 40, p. 96.

[3] *Tudor Report*, Table 24, p. 173.

kilometers to intersect the old, 450 second-feet canal, about 30 kilometers below its intake. From that intersection, the old canal was to be enlarged to 1050 second-feet for about 14 kilometers. Then, the new canal would branch off, leaving 400 second-feet in the old canal and carry the remainder south towards the Arghandab River which it would parallel as far as Qala Bist. A complete system of drains was also to be provided.

We have seen that the Seraj proposal had to be dropped when the second Export-Import Bank loan was made. Subsequently, the Tudor Report recommended that the work be postponed to Phase II and then be limited to improving the present intake and canal system and providing drainage outlets. More recently, ICA has considered making funds available for improving the intakes without waiting for Phase II. There is an evident need for some assistance to the farmers in the Seraj, which is one of the few areas in the Helmand experiencing any sort of population pressure. It will be remembered that the Seraj was opened to Uzbek and Turkmen settlers from northern Afghanistan in the 1930's. Where perhaps 1000 families had been expected, about 10,000, including Afghans from other parts of the Helmand-Arghandab, moved in. Some of these farmers have since had to shift their lands, within the Seraj, as they became too saline to yield reasonable crops. Although the assured water supply in the Helmand since the completion of the Kajakai Dam has been helpful, some improvement of the intakes and canals is indicated to take full benefit of this advantage. MKA estimated that the 20,000 acres in cultivation in 1947 expanded to 24,000 in 1953 and to 35,000 in 1957 in response to improved water supply. Although this rise might be expected to reach 40,000 acres by 1960, MKA cautions: "Seraj will slowly expand under private enterprise to the capacity of its present system. Very little 'reclaimable' lands will be reclaimed by that date".[1]

Enlarged Areas - Shamalan and Darweshan

The Shamalan area of the Helmand Valley Project comprises the long, narrow, right-bank floodplain of the Helmand from the Boghra bifurcation at station 31+680.54 to the old settlement of "Shamalan" about forty miles to the south. South of Shamalan village, the left-bank floodplain becomes wider than the right. Here begins the Darweshan area, named for a village near its northern end. It continues along the river in a south-southwesterly direction to the village of Khairabad, whence the Helmand flows predominantly west. Thus, the Shamalan area represents a narrow strip of cultivable land opposite the high bluffs of the edge of the Registan desert, while Darweshan begins where these bluffs subside and where the Dasht-i-Margo or "Desert of Death" comes right down to the Helmand on the opposite, right-hand bank. In these two strips, as in the Garmsel area downstream (see below), farmers have used the Helmand's waters to fight the desert for several centuries. In 1947, MKA estimated, 19,000 acres were under cultivation in the Shamalan and 9500 in the Darweshan, in roughly the following pattern.

TABLE 23

SHAMALAN AND DARWESHAN - LAND USE IN 1947 (IN ACRES)[a]

Area	Orchards	Vineyards	Croplands	Recently Idle	Abandoned	Undeveloped
Shamalan	1,000	1,000	17,000	16,000	15,000	25,320
Darweshan	500	1,000	8,000	5,000	8,000	36,000

[a]HVDP of 1953, Table 3B.

[1]HVSR draft, Supplement 7, Table 14, footnote 3.

The Shamalan Branch of the Boghra Canal was constructed under the first (1950-54) Export-Import Bank loan and the drains under the second. The forty-one mile canal incorporates about 25 miles of pre-existing but improved canals. It commands 66,500 acres, of which the original turnout system was to serve the 19,000 acres already under cultivation. The HVDP of 1953 proposed to rehabilitate 73 kilometers of old, hand-excavated laterals, to level 15,000 additional acres, and to add 121 kilometers of main drains. By the completion of this program, in 1957, the area annually farmed had risen to 35,000 acres, and it was anticipated that fuller use of the irrigation system could expand this to 44,000 acres by 1960.[1] This roughly coincides with the estimate of 42,325 potential net irrigable acres given by MKA to the Tudor team, and incorporated into their report. The HVSR draft reported the surveying of 65,000 acres, from which 20,628 were eliminated as non-reclaimable. The remaining 44,372 acres included 23,352 which had no salinity or alkalinity affecting crops and 10,375 acres with slight to moderate salinity or alkalinity not seriously affecting crops.[2] The remaining 10,645 acres, of moderate to severe salinity and/or alkalinity could feasibly be reclaimed. These figures cannot directly be translated into the classification scheme we have been using, but since the breakdown in the Tudor Report covers the same general area, 42,325 acres, its classification may be of some help: Class I, 32%; Class II, 51%; Class III, 13%; and Class IV, 4%.[3] The important point here is the high percentage

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[1]HVSR draft, Supplement No. 7, Table 14.

[2]*Ibid*., Table 41, p. 97.

[3]*Tudor Report*, p. 33. The classification in the HVDP of 1953 was based on 75,320 acres and is not comparable: Class I, 40%; Class II, 30%; Class III, 21.6%; Class IV, 8.4%.

of land in Class I and Class II as compared with Nad-i-Ali or Marja. In the Shamalan, over 80 per cent of the acreage cited is suitable for irrigation of a majority or all of the climatically adapted crops. Where "one or more easily applied practice in addition to good irrigation farming methods" is required, that practice is drainage, and the necessary drains have been provided for the expansion of agriculture to the 44,000-acre level. What apparently is delaying the settlement of new farmers on the Shamalan tract is the lack of reliable cadastral surveys. One such survey was made recently by apprentice surveyors from Kabul, but so much Class V land was included that the HVA does not yet know where and to what extent new settlers can be introduced.[1]

There will, of course, continue to be problems in the use of Shamalan soils. The HVSR draft reported that of 655 soil samples from the Shamalan, 288 were saline-alkali, though evidently not as seriously affected as those in Nad-i-Ali and Marja. 283 samples were non-saline, 16 saline and 68 alkali.[2] The Tudor Report also foresaw difficulties in utilization.

> The soils are dominantly silts and very fine sandy loams, with stratified silty and sandy deposits indicating past changes in the location of the river channel. . . . The depth to permeable sands and gravels is variable and, where they are deep, irrigation has resulted in waterlogging, the accumulation of soluble salts and alkali, and, in the subsequent abandonment of some of the land. Recent increased irrigation has led to rising water table over much of the area. Closely spaced farm drains will be required to lower the water table in the many areas containing deep silts, and soil amendments in addition to leaching will be required for the reclamation of some areas.[3]

One clear illustration of the problems of Shamalan irrigation was

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[1] Interview with Dr. Abdul Wakil, January 26, 1958.

[2] HVSR draft, Table 40, p. 96.

[3] <u>Tudor Report</u>, p. 33.

provided in the first experimental farm run by the Wyoming University Team under ICA contract. The farm was located in the Shamalan tract, directly opposite Lashkar Gah. The American agronomist in charge put ten acre feet of water through the farm soil without appreciable diminution of salts in the upper horizons.[1] Of course, the location of the farm between the Shamalan Canal and the Helmand River, in contrast to most Shamalan lands which lie on the far side of the canal, contributed to waterlogging and the rise of salts in the soil. (The farm, completely inundated during the spring, 1957, floods has since been relocated on the Marja terrace tract.) But this experience demonstrated the need of a closely-spaced system of farm drains feeding into those built by the contractor and ACU to carry off subsurface water. It also emphasizes the need of training farmers, new and old, in the proper use of irrigation water, i.e., in using a minimum rather than a maximum of water and in performing night irrigation rather than leaving the water running through the laterals and into the subsoil.

It is only in the central or Nawa section of the Shamalan Canal that there is any substantial cultivation east of the canal, i.e., between the canal and the river. Most of the farms are located west of the canal, between it and the 20 to 30-foot bluff marking the edge of the flood-plain and the beginning of the pebble-strewn (probably, desert pavement) terrace on which the Nad-i-Ali and Marja tracts are located. As one might expect, most of the area is sown to grain: winter wheat, sometimes followed by corn, with more intensive horticulture around the villages. Trees of any variety are found only near the villages where

[1] Interview with Richard L. Hughes, Wyoming Team Agronomist, at Lashkar Gah, October 15, 1957.

their owners can protect them. In the widest part of the tract, opposite and below Qala Bist, where cultivation is relatively intense, there are scattered vineyards and some fruit trees.

One must not have the impression of continuous cultivation along the Shamalan; it is far from that. In the wide, south-central section, cultivated fields are almost contiguous, but even here there are patches of land left fallow until fertility returns or salts subside. At the extreme north and south ends of the tract are long stretches which are never cultivated where salts are visible in wide patches on the surface, and the same is true of the narrow section just above and below the Lashkar Gah bridge where canal and river are only a short distance apart. Here the canal was nearly breached in two places during the 1957 floods, and the receding water left sands and salts to impede cultivation. Salt-tolerant camel's thorn and tough grasses are the first to reclaim such lands, and their removal poses yet another problem to the farmer.

Even the banks of the canal become overgrown with reeds and grasses after a few years, and the work of removing them occupies the farmers for a 40-day period when the water is shut off in January-February. The profuse but useless vegetation must be cut and burned and the accumulated silt removed from the bottom of the canal. The latter operation is handicapped by the fact that the HVA Operations and Maintenance Department has only one dragline. During the 1958 cleaning period, this was being used on the Boghra Canal, above the Girishk power drop which was about to come into operation. Clearing of the Shamalan was left to teams of local farmers "recruited" by the sub-governors of the tract. Although canal cleaning is directly related to their profitable use of its waters, it is apparently difficult to keep the farmers at this work. HVA Operations and Maintenance personnel patrol the canals, supervising and encouraging the workers who, armed with only long-handled spades, must dig the silt from the lower parts of the berms and pack it on the higher, trying to keep an angle of sixty degrees with the bottom. They must also try to remove the silt which accumulates behind each drop structure, and to restore the eroded berms just above and below these structures. Undercutting of the concrete structures could become a serious problem if the cuts were not filled in each year and covered or "rip-rapped" with concrete blocks or pieces of conglomerate.

As indicated above, the Darweshan area is very similar to the Shamalan, of which it may be considered a left-bank continuation. The landform, however, includes not only recent floodplain with very sandy and gravelly soils, but remnants of a higher terrace or bench with more silty soils, a feature generally absent in the Shamalan. The total arable area in the Darweshan tract was estimated at 58,500 acres in 1953 and later reduced to around 50,000. For the HVSR, MKA surveyed 73,910 acres in the Darweshan, of which 24,579 were eliminated as non-reclaimable. Of the remaining 49,331 acres, 42,768 had no serious salinity or alkalinity problems, and 6,563 were considered irrigable after feasible reclamation. While there is no way to convert these figures directly into land classifications, the estimates given to the Tudor group relate to approximately the same land area (50,773 acres), and may be considered relevant: Class I, 16%; Class II, 34%; Class III, 49%; Class IV, 1%.[1] As is the case with

[1] The estimates in the HVDP of 1953 were based on a total area of 58,500 acres and on very sketchy reconnaissance surveys or aerial photos: Class I, 30%; Class II, 30%; Class III, 20%; Class IV, 20%. They can be considered of only historical interest.

the Shamalan tract, a relatively high percentage of the land is included in Classes I and II, and almost all of the remainder is in Class III. The situation is not as good as in the Shamalan, where over 80 per cent of the land was in the first two classes, but it is still favorable in comparison to Nad-i-Ali and Marja. Furthermore, although the limited soil surveys conducted in Darweshan (117 samples, of which 79 were saline-alkali, 28 non-saline, 9 saline and 1 non-saline-alkali) are not as promising as those in Shamalan, the experience accumulated on the latter tract, particularly with regard to leaching and drainage, may enable Darweshan farmers to avoid the down-grading which has occurred in some Shamalan soils.

MKA estimated that only 9500 acres of the Darweshan tract were under cultivation in 1947. By the time construction finally got under way in 1956, perhaps twice this area was being cultivated, thanks to the reliable water supply in the Helmand. But it was again cut back, perhaps to 8500 acres, as construction interrupted irrigation by cutting through the old, hand-dug canals and laterals. It is hoped that the new system will bring an increase in the acreage to 35,000 acres under cultivation in 1960.[1]

Here it should be pointed out that only two-thirds of the Darweshan area as above defined are presently scheduled for development. The Tudor Report recommended that the remainder of the area be developed only in Phase II.[2] Actually, the funds from the second Export-Import Bank loan expired before all of the Phase I work could be completed, and a special

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[1]HVSR draft, Supplement No. 7, Table 14.

[2]Tudor Report, pp. 169, 173.

grant of $200,000 was made by ICA to the contractor to finish this work. The principal structures include a diversion dam in the Helmand about 60 miles downstream from Girishk and 5 miles above the village of "Darweshan" (see Map 7). The dam is of novel design for Afghanistan, consisting of a stepped barrage across the greater part of the river so designed as to provide automatic regulation of spillage at certain heights. At the eastern end, three vertical-lift spillways provide additional regulation when flow drops below the lowest step of the barrage, while next to them are the bascules governing canal intake. Water may be admitted at will into three conduits from which it is discharged into the 1000 second-feet capacity canal. The Darweshan Canal is designed for irrigation of the entire tract extending some 50 miles down to Khairabad, but it has as yet been dug only as far as Lakhi village, approximately 38 miles from the intake.

The engineering of the Darweshan Canal and associated drainage network entailed some special problems, for on the complex Darweshan floodplain, as in the Shamalan, the slope of the land in many sections is away from the river. The canal generally rides the highest part of the floodplain, sending laterals to both sides, while the main drains in the northern section, in the vicinity of Darweshan village, make large semicircles around to the depression to the southeast where the floodplain merges with the sands of the Registan desert. At one point in the middle of the canal, a drain from the area between the canal and the river has to pass under the canal itself to reach this depression. Here, as in all sections where the canal is built above the permeable floodplain rather than through the denser terrace remnants, the berms must be lined with silty-clay to prevent leakage. Thus, the lesson of the Boghra Canal has been learned and applied to the Darweshan.

Generally speaking, the engineering of the Darweshan Canal appears to be quite good. It will undoubtedly fulfil its function of supplying a sustained and controlable amount of water to lands previously subject to drought or flood. If the lessons of land management learned in Nad-i-Ali and Shamalan are also applied to the Darweshan, the drainage system incorporated in the project can undoubtedly keep the water table at a safe depth and prevent additional salinization of surface soils. But this will require ACU and the local farmers to complete a dense network of farm and feeder drains to supplement what MKA has built. As the Tudor Report cautioned:

> The important soils of this project [Darweshan] are located on a long silty bench flanked on both sides by lower river benches containing a limited amount of good irrigable land. . . . The soils are chiefly deep silt loams and silty clay loams with some sandy bottom lands and considerable saline and alkali areas. The soils are underlain by sand, coarse gravel and conglomerate rocks at depths of 5 to 15 or 20 feet. High water tables exist in only a portion of the irrigable lands at present, but the drainage problem is becoming more serious as more water is being applied to the land. Extensive waterlogged areas now exist, and the water table is now above the conglomerate layer in many places. Closely spaced and expensive drains will be required in the development program.[1]

A further problem concerning the future of Darweshan lands is one of cost of development. The addition of 21,849 acres to the 12,000 already cultivated in the Upper Darweshan was estimated in the Tudor Report to be costing $266 per acres.[2] The Phase II portion of the project, adding 10,424 acres to the 6500 now under cultivation in Lower Darweshan, was estimated to cost $316 per acre. The first part of this investment has, of course, already been made, and the only question with respect to the

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[1]Tudor Report, p. 33.

[2]Ibid., p. 180.

Upper Darweshan is whether, and in how long a period, the increased production from the irrigated area will repay the allocated cost of development. But the development of the Lower Darweshan will have to compete for capital resources with other areas including the Seraj, whose per acre cost of development through Phase II is estimated at only $205. Meanwhile, the operation of the Darweshan Canal, designed for 50,000 acres, to irrigate only 34,000, may involve some of the problems which have arisen with the Boghra after the exclusion of the West Marja tract (see Chapter III).

Prospective Areas - Garmsel, Chakansur and Dasht-i-Bakwa

The Garmsel area may be regarded as a westward extension of the Darweshan from Khairabad to Chahar Burjak or Upper Mirabad (see Map 6). Here, floodplain soils quite similar to those of Darweshan lie between terraces or bluffs which rise continuously as one travels westward. As in the Darweshan, the floodplain soils have been cultivated for years, but there is no farming on the adjoining desert benches.

> The soils are mostly sandy loams and loams over river gravels and sands. The surface of most of the area is hummocky, and much of the land is now saline or has a high water table, or both. Most of the land is subject to annual flooding. Production is low and uncertain, and only a small percentage of the land is under annual cultivation.[1]

For the HVSR, MKA surveyed 154,827 acres in the Garmsel area, of which 97,612 were eliminated as non-developable. Of the 57,215 acres remaining 17,328 had no particular salinity or alkalinity problems, and 38,392 could

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[1] Tudor Report, p. 35. MKA estimated 24,500 acres under cultivation in 1947.

feasibly be reclaimed.[1] Development would include improvement of present irrigation systems and provision of drainage outlets. However, the Tudor group was not requested by ICA to make recommendations on the areas below Darweshan, and Garmsel figures neither in the Phase II Tudor recommendations nor in any other plans published to date. While its development would serve the purpose of using more Helmand water within Afghanistan, any economic justification for the expenditures involved would have to await results in the Darweshan tract above it.

Downstream from Chahar Burjak, the Helmand swings north, and the distributary system begins. Most of the distributaries flow across the border into Iran, as does the main stream after it has served as the frontier for a short distance. The Helmand has shifted its course to the expense of Iran since the 1872 boundary agreement, so that there are now disputes as to both land and water ownership in this region. The Iranians have dammed one of the distributaries, the "Rud-i-Seistan", for their own irrigation needs, and the barrage sometimes ponds water back onto cultivated lands within Afghanistan. In years of serious floods, in fact, the whole Chakansur marsh becomes inundated and spills over into a series of depressions, which form a huge semicircle to the west, within Iran, and eventually may spill back into the Gaud-i-Zirreh, in Afghanistan (see Map 6). This danger, plus the desire to make all possible use of Helmand water within Afghanistan, has led the RGA to

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[1]HVSR draft, Table 41, p. 97. The classification estimates given to the Tudor group in 1956 were based on an area of 43,475 acres. While not directly comparable to the HVSR figures, they indicate less good land proportionally than in either Shamalan or Darweshan: Class I, 12%; Class II, 32%; Class III, 42%; Class IV, 14%.

consider plans for development of the lower Helmand. One scheme is to develop the Garmsel and Chakansur areas along the lines of the projects upstream. A more vigorous approach is embodied in the plan to construct a dam or barrage on the Helmand below Chahar Burjak and divert excess flow directly into the Gaud-i-Zirreh depression by means of deepening the Rud-i-Kushk. Since at least 35 million acre-feet could be stored in the Gaud-i-Zirreh, such a diversion would give Afghanistan a stranglehold over Iranian irrigation in the Chakansur Basin. A bilateral approach to the problem, with Iran bearing its share of the cost of a project designed to benefit both neighbors, would be the most logical solution. But despite the establishment of a neutral Helmand River Delta Commission in 1950, and its finding that there were 150,000 delta acres irrigated with Helmand water in Iran compared to only 36,000 in Afghanistan, no cooperative planning has been forthcoming.[1] The United States, which urged the establishment of the Commission, has since avoided involvement in the matter, for fear of having to choose one side or another of a political impasse. The Tudor team was specifically instructed to stay out of the Chakansur region, and it does not figure in their recommendations, though it is briefly described in the body of the Report.

> Figures on potential net irrigable acres in the Chakansur have been revised downward a number of times and now stand at 65,000 acres, although preliminary reconnaissance suggests that 250,000 acres may eventually be reclaimed. Land classes have not yet been assigned, but the soils range widely from very sandy river bottom or river terrace soils to heavy saline-alkali soils, only three to six feet above lake basin clays and shales. Salty and alkali areas are extensive, the surface is very irregular, and sand dunes are in active movement over much of the area. Drainage is only fair on about half the area even

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[1]Franck, Obtaining Financial Aid. . ., pp. 41-42.

> though the tilled lands are shifted about each year as floods, high water tables, and salts continually restrict production. Yields are very low, and have decreased markedly since a survey made in 1903-05.[1]

The HVSR draft reports 129 soils sampled from Chakansur, of which 46 were non-saline, 71 saline-alkali, and 6 each saline or alkali alone.[2] For survey purposes, MKA has made a threefold division of the Helmand below Upper Mirabad (Chahar Burjak). Only a very rough reconnaissance survey of these divisions was carried out prior to the HVDP of 1953, which proposed partial development of the Chakansur Basin. The figures are cited here merely as an indication of the relative values of these areas since no other estimates on this basis are available.

TABLE 24

LOWER HELMAND: ESTIMATED PERCENTAGES IN EACH LAND CLASS[a]

Area	Estimated Acreage	Classification of Lands Class I	II	III	IV
		%	%	%	%
Upper Mirabad to the Iranian Diversion	42,750	15	30	30	25
Chakansur Plain	235,600	20	30	30	20
Chakansur Marsh	38,000			20	80

[a]HVDP of 1953.

Of the three divisions, the Chakansur Plain evidently holds the greatest promise, both in extent and in percentage of good lands. This fact is borne

[1]Tudor Report, p. 35.

[2]HVSR draft, Table 40, p. 96.

out by the distribution of settlement and cultivation. In 1947, MKA reports, the 316,350 acres classified above resolved into the following breakdown. (Garmsel is included for comparative purposes).

TABLE 25

LOWER HELMAND LAND USE IN 1947[a]

Area	Crop-land	Orchards	Vine-yards	Recently Idle	Abandoned	Undeveloped
	I N	A	C R	E S		
Upper Mirabad to the Iranian Diversion	11,000	500	1000	10,000	12,500	7,750
Chakansur Plain	25,000	1000	2500	25,000	100,000	82,000
Chakansur Marsh	-	-	-	-	8,000	30,000
Garmsel (93,100 surveyed)	20,000	2000	2500	10,000	15,000	43,600

[a] HVDP of 1953, Table 3B.

Thus the Garmsel floodplain, amounting in this survey to about 40 per cent of the Ghakansur Plain area surveyed, had over 80 per cent as much area under cultivation and proportionally much less land abandoned. While no firm conclusions can be drawn from figures of this nature, there does seem to be at least the indication that settlers prefer the poorest of the floodplain lands to the best of those in the delta. Actually, though the proportion of recently abandoned land to total area is the same for both Chakansur Plain and Garmsel, there are indications that the acreage annually farmed in the delta must be rotated over approximately 100,000 acres due to shifts in river channels, alluvial deposits, and wind-blown sand. Any future development program would face the problems of water, soil and sand stabilization to a much greater degree than has yet been encountered in the Helmand Valley Project.

For the HVSR, MKA surveyed a total of 554,335 acres in the three Chakansur or delta divisions. 408,910 were eliminated as impracticable for development. Of the 145,425 acres remaining, far less than the 316,350 estimated in 1953 (above), 110,447 have no particular reclamation needs, and 36,978 would require drainage and leaching. MKA states, however: "Chakansur potential may be as low as 65,000 acres with no major development program to as high as 250,000 maximum".[1] Far more intensive surveying is apparently necessary before sound recommendations can be forthcoming and again, as in the case of the Garmsel tract, the success or failure of the upstream areas will go far to condition RGA attitudes towards the Chakansur, despite the desire to limit the benefits of the Kajakai storage dam which redound to Iranian farmers.

The Bakwa plains area, surrounded by deserts, lies within and north of the great bend of the Helmand on the road from Girishk to Farah. Physiographically, it is a part of the Helmand Valley only in that it lies between the Khash Rud and the Khuspas Rud, both of which drain into the Chakansur Basin. Both of these rivers feed small amounts of irrigated agriculture, and ACU has built new bridges improving communications from the area north to Farah and Herat and east to Girishk and Kandahar. MKA has been authorized by the HVA to survey the Bakwa plains with a view to future development. The HVSR draft reports that of 147 soil samples, 128 were non-saline and only 15 saline-alkaline.[2] This compares quite well with the other areas reported, and indicates that Bakwa may have considerable

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[1] HVSR draft, Supplement No. 7, Table 14, footnote 4.

[2] *Ibid.*, Table 40, p. 96.

potential. Of some 200,000 acres originally considered, however, it is unlikely that the completed surveys will justify development on even one-half from a land classification standpoint.[1]

If and when it is decided that the advantages of development justify the costs, and the funds are available, it will be necessary to design an irrigation system for Bakwa based on the Khash Rud or Khuspas Rud or both. It is conceivable that water could be brought from the Helmand below Kajakai, but this would be an extremely extensive and costly undertaking. Utilization of the Khash Rud or Khuspas Rud would, of course, increase the amount of control which can now be exercised over water flowing into the Chakansur Basin, with all the advantages and problems that entails for the RGA and the people who live in the Basin.

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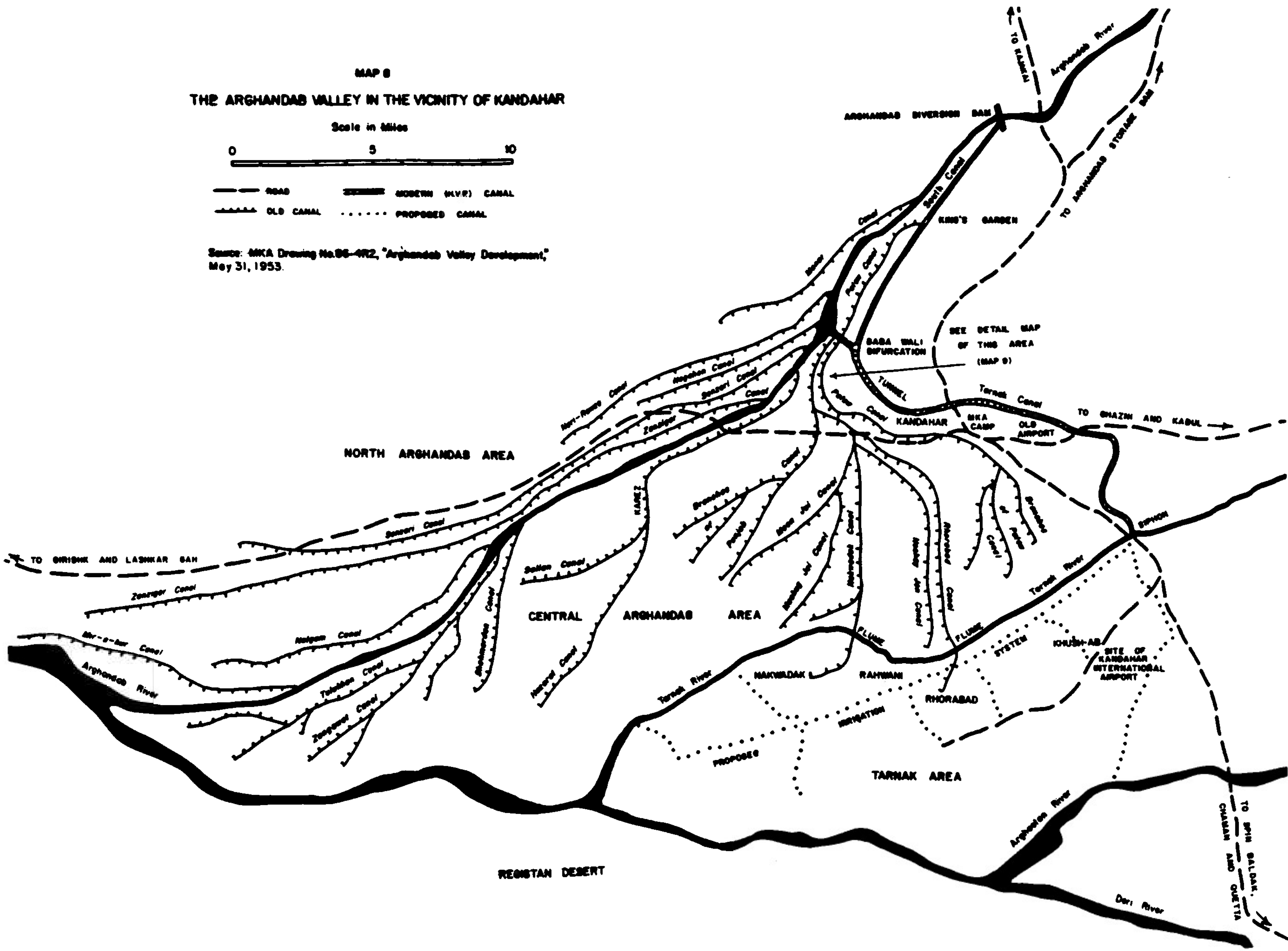
[1]Comment of Dale R. Shockley, Chief of the Engineering Department, Morrison-Knudsen, Afghanistan, Kandahar, upon this manuscript when it was submitted to him in February, 1958.

MAP 8

THE ARGHANDAB VALLEY IN THE VICINITY OF KANDAHAR



Source: MKA Drawing No.86-4R2, "Arghandab Valley Development," May 31, 1953.

V. THE HELMAND VALLEY
THE PROJECT AREAS ALONG THE ARGHANDAB

Reinforced Areas - North and Central Arghandab

We must now shift our attention eastward to consider the areas around Kandahar which have been or can be benefitted by development of the Arghandab River. The Arghandab storage dam,[1] completed at the end of 1952, is located about 18 miles north-northeast of Kandahar at a point where the reservoir capacity of the valley could substantially be increased by a series of six small dikes built in the saddles of the ridge to the west. Storage capacity is 388,000 acre feet, but the reservoir has been filled completely only two or three times since construction of the dam. Two uncontrolled spillways are cut through the rock ridge west of the reservoir at a level five meters below the crest of the dam and dikes. These spillways were under water during the period from April 4 to July 19, 1957. Through the western rock abutment, a 264 meter tunnel, 5.4 meters in diameter, is the ordinary outlet for reservoir discharge, which is regulated by two valves in the control house below the dam. Each of these valves can discharge up to 1000 second-feet at full reservoir capacity. The discharge tunnel which feeds them will serve as the manifold for turbine penstocks when four 3200 kw generators are installed. ICA has allocated one million dollars in special Fiscal Year 1958 assistance for preliminary work on the Arghandab

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[1] The storage dam on the Arghandab River is usually referred to merely as the "Arghandab Dam". We shall follow this usage, indicating "Diversion Dam" whenever we refer to the barrage downstream at the South Canal intake.

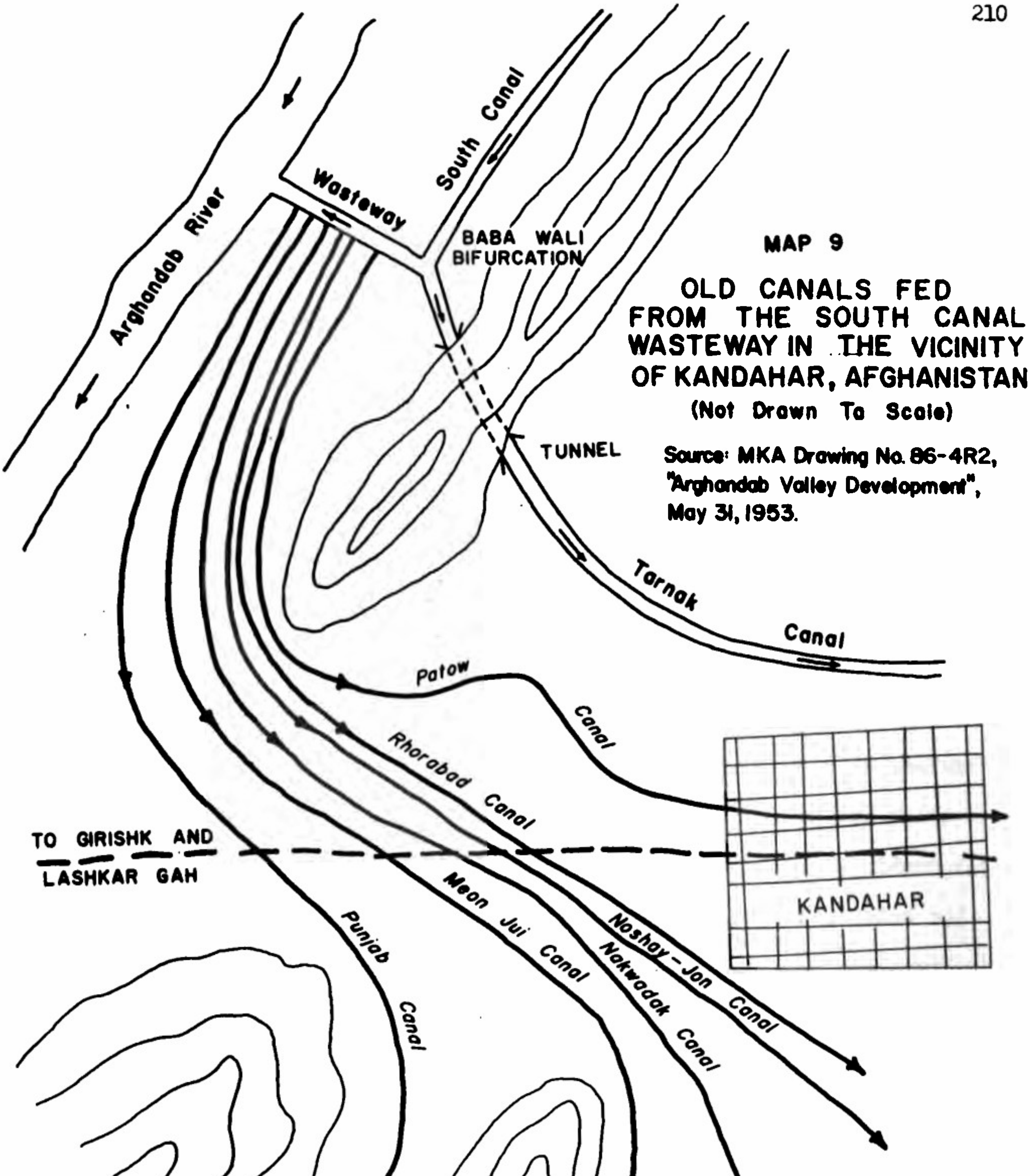
power house, which will be located between the dam and the present irrigation valve control house.

Water discharged at Arghandab Dam for irrigation purposes flows down the bed of the Arghandab River to the Diversion Dam about 12 miles north of Kandahar. Here begins the "South Canal", which is the source of irrigation water for the lands on the left bank of the Arghandab as far as the Baba Wali Wasteway (see Map 8), at which point the "Tarnak Canal" branches off to the south and east. As we have seen, it was originally planned to construct a "North Arghandab Canal" along the right bank of the river. When that plan was abandoned in favor of carrying water from the "South Arghandab Canal" as far as the Tarnak area, the name "South Canal" came to denote only that portion which paralleled the river; the extension was called the "Tarnak Canal". Similarly, the name "South Arghandab", which implied a contradistinction from "North Arghandab", was abandoned in favor of "Central Arghandab" to denote the lands watered from the "South Canal", but none of those to be watered from the Tarnak Canal. We shall, in general, adhere to this usage, but wherever "South Arghandab" appears in the text, as it may for references prior to 1955, it may be taken to mean "Central Arghandab", i.e., those lands watered from the "South Canal".

The South Canal has replaced the old Patow Canal on the left bank of the Arghandab. In fact, for about one-half of its length, the South Canal occupies the much-improved bed of its predecessor. Below the King's Garden (see Map 8), the Patow Canal diverges towards the river, while the South Canal continues to hug the feet of the dry hills and alluvial fans to the east, maintaining its elevation as much as possible. Between the King's Garden and the Baba Wali bifurcation, the South Canal feeds four or five other pre-existing canals in addition to the Patow (see Map 9). At the bifurcation, the South Canal turns towards the river in a wasteway which cuts across and feeds the Patow, Rhorabad, Jui Shah,[1] Noshay Jon, Meon Jui and Punjab Canals before spilling any excess into the Arghandab River. This function of the South Canal is extremely important, as can be seen from Map 9. The Arghandab near Kandahar has supplied water for centuries to a score or more of hand-dug and -maintained canals which feed the comparatively rich orchards and croplands. The Kandahar oasis, shifting slightly from century to century in response to the availability of better water and soils or to defense requirements, is one of the most ancient sites of urban civilization in Afghanistan. Its canals are its veins, carrying the life-giving water of the Arghandab River to the relatively fertile and well-tilled fields of the oasis. Maps 8 and 9, which show how these old canals ramify throughout the oasis, as well as how they are incorporated into the Helmand Valley Project, indicate the skill of the Afghan agriculturalist in bringing water to the better soils of this area. The Patow Canal, for example, flows right through present-day Kandahar and then subdivides into three canals flowing south, towards the Tarnak River. A branch of the Noshay Jon Canal, the Nakwadak, actually crosses the Tarnak on a flume to bring water to Nakwadak village. Further east, the Rhorabad Canal also crosses the Tarnak to water one of the principal vineyards of the Tarnak area. The Punjab, as its name implies, divides into five smaller canals which water the region southwest of Kandahar.

There are still other canals of considerable importance which have their intakes on the south bank of the Arghandab below the Baba Wali

[1] Or Nakwadak.



MAP 9

OLD CANALS FED FROM THE SOUTH CANAL WASTEWAY IN THE VICINITY OF KANDAHAR, AFGHANISTAN

(Not Drawn To Scale)

Source: MKA Drawing No. 86-4R2, "Arghandab Valley Development", May 31, 1953.

Wasteway outlet. One of them, the Salian, is carried in a karez right through the ridge south of the Kandahar-Girishk highway in an effective anticipation of the tunneling of the new Tarnak Canal through the same general formation north of the highway. As we have seen in Chapters I and II, there is apparently little to desire in the Afghan's ability to locate the best soils of a region and to design methods of bringing water to them. Conversely, where lands within feasible reach of a source of irrigation water have been left alone or abandoned, there is generally a sound reason for the Afghan's disinterest.

To the north of the Arghandab, a similar network of old canals now enjoys the benefits of a regulated discharge of water for two-season agriculture. Some of these canals are of exceptional length, as Map 8 indicates. The longest, the Zanzigar, has a total length of over twenty miles. Although some of the intakes may be improved under the Helmand Valley Project, the major scheme to reinforce them by constructing a 58 kilometer, 900 second-feet "North Arghandab Canal" from the Diversion Dam to water 54,000 acres north of the river was abandoned during the negotiations over the second Export-Import Bank loan. MKA sources state that the project was not dropped due to a lack of funds,[1] but because it turned out to be unfeasible.

> All of the land in North Arghandab is being cultivated now which can be cultivated without extensive reclamation. As a matter of fact, over 4,000 acres now being farmed are in very poor condition, because of salts and high water tables. To reach the goal of allocated water use for 40,200 net acres will require the reclamation of approximately 8,500 acres from a condition so saline and wet that only salt grasses and occasional scanty crops are harvested, together with the reclamation of another 5,300 acres that is so salty it is now barren. Thus there can be no expansion in the North Arghandab tract. On the

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[1]Comments of Dale R. Shockley, Chief of the Engineering Department, MKA, Kandahar, on a draft of the present paper, February, 1958.

other hand, in the Tarnak area there are 58,500 acres now suitable for irrigation. This is mostly in classes I to III inclusive with about 3,500 acres of IV included. Including the Class IV lands, only 6,800 acres would be needed to be reclaimed from wet or salty conditions to reach a goal of 64,330 acres. There are, approximately, 20,000 acres now being annually cropped which leaves 38,500 acres suitable for cropping now and open to cropping. Most of this land does not belong to the farmers but is open desert land available for development. This is in contrast to North Arghandab where practically all of the land, even that which is in poor condition, is privately owned.[1]

At any rate the Tarnak area, with its larger engineering aspects and greater possibilities for new settlement, at least in terms of uncultivated lands, was chosen, rather than North Arghandab, to use any excess irrigation water made available by the Arghandab Storage Dam. Of the total of 172,630 acres to which the HVDP of 1953 proposed to supply Arghandab water, about 98,000 had been under cultivation in the North and South Arghandab areas before the Project began, but only 12,500 were being cultivated in the Tarnak.

TABLE 26

LAND USE AT BEGINNING OF HELMAND VALLEY PROJECT (1947)[a]

Area	A Crop-land	C Orchards	Vine-yards	R Recently Idle	E Abandoned	S Unde-veloped
North and South Arghandab	54,000	10,500	33,000	11,300	19,000	-
Tarnak	10,500	-	2,000	10,000	10,500	11,330

[a]HVDP of 1953, Table 3B.

In other words, the Tarnak area, with an agricultural base only one-eighth

[1]Letter to author from Claude L. Fly, Agro-Engineer, International Engineering Company, Inc., San Francisco, California, dated August 18, 1958. (The International Engineering Company is an Affiliate of Morrison-Knudsen.)

as large as North and South Arghandab combined, had almost as much land "recently idle" (perhaps due to lack of water as well as to the rotation pattern) and more than half as much land "abandoned" before the Project began. Apparently, Tarnak land was far less desirable to the local farmer than land in North or South Arghandab. As a reflection of this fact, Tarnak offered 11,330 undeveloped acres; Arghandab areas offered none. We shall analyze the possibilities and problems of the Tarnak at the end of this section.

The HVDP of 1953 listed 54,000 acres of potentially irrigable land in the North Arghandab area, half of which was not then irrigated or irrigated only occasionally.[1] By the time of the Tudor survey, this had been reduced to 40,235 potential net irrigable acres. Unfortunately, we have no breakdown by land classes between the two Arghandab sections in the HVDP of 1953, but the overall classification is included along with the 1956 Tudor Report breakdowns. Please note that the term "Central Arghandab" had superseded "South Arghandab".

TABLE 27

ARGHANDAB AREAS: ESTIMATED PERCENTAGES IN EACH LAND CLASS

Report	Total Area in Acres	P E R C E N T A G E S Class I	II	III	IV
HVDP of 1953	128,300	41.6	49.2	14.6	14.6
TUDOR REPORT,1956[a]					
North Arghandab	40,235	50.	2.	39.	9.
Central Arghandab	80,475	32.	21.	47.	0.

[a]The total acreage for North and Central Arghandab in the Tudor Report is 120,710 acres.

[1]HVDP of 1953, p. 4.

For the HVSR, MKA surveyed 67,685 acres in North Arghandab, from which the HVSR draft eliminated 23,951 as "non-irrigable or not recommended" for development.[1] Of the 43,734 acres remaining, 35,443 (or 81.1 per cent) had no serious salinity or alkalinity problems and 8291 (or 18.9 per cent) would be irrigable after feasible reclamation. According to the information received from Mr. Claude L. Fly of the International Engineering Company and quoted above, the net acreage has been reduced to 40,200, of which 13,500 (or 33.6 per cent) would require reclamation.

By comparison, in Central Arghandab, where 132,220 acres were surveyed and 44,795 eliminated, the remaining 87,425 usable acres (over twice the amount in North Arghandab) break down into better categories: 78,085 (or 89.3 per cent) with no serious alkalinity or salinity and 9340 (or 10.7 per cent) irrigable after feasible reclamation. The soil survey report in the HVSR does not distinguish between North and Central (or South) Arghandab. Of 217 samples taken in the entire Arghandab area, 150 were non-saline, 11 saline, 36 saline-alkali, and 20 non-saline but alkali.[2] The Tudor Report describes the soil complex of the North Arghandab area as follows:

> It is composed chiefly of deep silt loams and silty clay loams on sloping valley fills and along the margins of old river terraces. Moderately deep to shallow silt loams over moderately deep gravel and conglomerate rock lie along the upper part of the area adjoining the desert. Highly saline and alkali soils and waterlogged areas are found in a number of places, due primarily to a lack of drainage facilities. The soils are moderately fertile and production is fair to good. About 26,800 acres are farmed regularly, and the remainder lacks a water supply or is abandoned because of saline-alkali or high water-table conditions.[3]

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[1]HVSR draft, Table 41, p. 97.

[2]<u>Ibid</u>., Table 40, p. 96.

[3]<u>Tudor Report</u>, p. 34.

As for Central Arghandab:

> The soils are mostly deep silt loams and silty clay loams on recent and fairly recent river terraces. However, there are some shallow to moderately deep soils on older river terraces in the upper end, some fine-textured soils difficult to drain in the south-central portion of the area, and severe salinity, alkali, and waterlogged conditions in the southern part of the area. Most of the upper end and the portions along the river are now being farmed to fruit and truck crops, and wheat is the principal crop in the lower areas. Production is poor to good varying with fertility, water supply, salinity, alkali and water-table levels.[1]

There cannot be much doubt about the productivity of most of the Arghandab soils, which have supported Kandahar for generations. According to MKA, the areas which received reasonably firm water supply before the Project included lands adjacent to the Patow Canal, about one-third of the deep alluvial soils north of the Arghandab opposite the old Patow diversion (about three miles above the present Diversion Dam) and extending westward along the river, and the irrigable river-bottom lands extending less than half the distance to the confluence of the Helmand and Arghandab Rivers.[2] This area was planted to deciduous fruit trees (apples, apricots, peaches, pears, pomegranates, quinces) and horticultural crops and vineyards. It comprises the leading fruit-producing and -exporting region of Afghanistan and is the basis for the Pushtun Industries and other fruit drying and packaging operations in Kandahar. The orchards are concentrated along the old Patow and Punjab Canal routes, including their branches, while the vineyards stretch west and southwest from Kandahar, especially along the northern side of the Arghandab. In the area to the south of Kandahar, where canal and

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[1] Ibid.

[2] HVDP of 1953, p. 21.

karez irrigation are combined, grapes, fruit trees and melon cultivation is concentrated in a number of disparate nodes. The remainder of the cultivated land, of course, is generally planted to winter wheat, perhaps followed by corn in summer.

Thus, the effect of the Helmand Valley Project in the Kandahar area has been largely to confirm and reinforce the existing water distribution pattern, making possible the intensification of cultivation, i.e., two grain crops per year, and possibly some diversification, i.e., orchards, vineyards or horticulture in areas previously devoted solely to winter grain.

Doubtful Potential - The Tarnak Area

The principal exception to the foregoing statement is the Tarnak area, bounded by the Tarnak, Arghastan and Dori Rivers (see Map 8), where the plan is to bring new acreage into production and settle additional farmers. In the HVDP of 1953, it was proposed to add 31,850 acres to the 12,500 then under cultivation. By the time of the Tudor survey, the goal was raised to 63,350 out of 90,000 "potential net irrigable acres".[1] These two estimates were classified as follows in the HVDP of 1953 and the Tudor Report.

TABLE 28

TARNAK: ESTIMATED PERCENTAGES IN EACH LAND CLASS

Report	Total Area (Acres)	%Class I	%II	%III	%IV
HVDP of 1953	44,330	23.4	23.4	29.8	23.4
TUDOR REPORT('56)	63,350	11.	39.	50.	-

[1] *Tudor Report*, p. 34.

For the HVSR, MKA surveyed 110,656 acres, of which 40,711 were eliminated as non-irrigable or not recommended for development. The 69,945 acres remaining were not broken down into land classes, but it was tentatively stated that 60,227 of them have no serious salinity or alkalinity problems, and that the 10,168 which require drainage and leaching include 9065 potential Class I or II land and 1103 potential Class III.[1] According to more recent information received from Mr. Claude L. Fly (see above) the total has been reset at "58,500 acres now suitable for irrigation" of which 3500 acres are in Class IV and the remainder in Classes I to III. Mr. Fly also states that by reclaiming 6800 acres, including the Class IV lands, a goal of 64,330 acres could be reached. If we take this last figure as the basis for calculation, the per-acre cost of development through Phase II would be about $274 per acre or somewhat more than that of Upper Darweshan ($266) and considerably more than that of Seraj ($205).[2] Work on the project through Phase I was to include "temporary and partial water service to upper portion of Tarnak area by (1) constructing a lateral to a point southeasterly of the Kandahar International Airport, (2) constructing a lateral to the village of Khush-Ab, and (3) cleaning out the lower 10 kilometers of the Nakwadak and Rhorabad Canals and constructing siphon extensions [to replace existing flumes] across the Tarnak River into the Tarnak Area."[3] This work has had to be postponed due to lack of funds. At

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[1]HVSR draft, Table 41, p. 97, including footnote 2.

[2]Cf. Tudor Report, p. 180. The cost on the basis of the acreage included in the Tudor estimate (63,350 acres) would have been $279 per acre.

[3]Tudor Report, p. 169.

last report, ICA was considering additional assistance to complete enough of the Tarnak water distribution system to irrigate from 15,000 to 18,000 acres. Meanwhile, the Tarnak Canal has been completed from the Baba Wali bifurcation to and under the Tarnak River (see Map 8), at a cost of about $3 million. The canal is sealed at the end of the siphon and, at present, provides no water to the Tarnak tract.

There has been considerable discussion of the feasibility of providing Arghandab water to the Tarnak area on a sustained basis while still meeting previous commitments to the North and Central Arghandab areas. The Tudor group strongly recommended that a survey of water distribution and use in the Arghandab Valley be undertaken before further construction was accomplished on the Tarnak Canal and distribution system.[1] This survey was originally recommended by ICA and MKA engineers to the HVA in August, 1955, and the proposed survey procedure was outlined to HVA by MKA in March, 1956. Tables 18 and 19 of the HVSR draft indicate that an "Arghandab-Tarnak Water Allocations Study" was made by MKA in 1956 and revised to June 2, 1957. The study indicates that using only Arghandab River water there would be a sufficient supply in seven years out of ten to irrigate 185,000 acres in North and Central Arghandab and Tarnak. This would mean supplying the 116,728 presently irrigable acres in North and Central Arghandab, as well as up to 68,272 acres in Tarnak, or approximately 4000 more acres than are proposed for irrigation in the Tarnak area. If additional water from the Tarnak, Arghastan and Dori Rivers (see Map 8) was applied, a total of 193,000 net irrigable acres

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[1] *Ibid.*, p. 24.

could be secured. Mr. Fly states:

> There is adequate water for 70% or better of the years. The dry years can be anticipated soon enough to cut back all summer crops and reserve the storage in the reservoir for the permanent orchard and vineyard crops. A rather complete set of recommendations were made by American-Afghan groups to the Helmand Valley Authority as to the methods, the construction work and other measures which should be undertaken in the Arghandab-Tarnak area to obtain efficient use and distribution of the water supply.[1]

Debate on the wisdom of enlarging Tarnak irrigation has continued among the interested parties. The Tudor experts have been called upon for further analysis. In the latest development known to the author, Mr. Clifford E. Plummer, the team's irrigation expert and currently a Chief Engineer at the Modesto Irrigation District in California, has stated that he would not consider extension of the Project into the Tarnak reckless on the basis of what has been done in some American irrigation experience.[2]

In the opinion of the author, however, comparisons of the situation in the Tarnak area with American experience are of limited value. The resources of the RGA, which have already been severely strained by the Helmand Valley Project, cannot be compared with those of the United States Federal Government or of our southwestern States. If, as Mr. Fly suggests, Arghandab-Tarnak summer crops could be cut back in those years in which runoff measurements indicate that there will not be sufficient water to service all developed acres, then it might be feasible to administer this section of the Project in such a fashion that the gains obtained in good years by extension of irrigation in the Tarnak would not be offset

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[1]Letter to the author, dated August 18, 1958.

[2]Interview with Mr. Ralph G. Wadsworth, Assistant Team Leader, Tudor Engineering Company, Washington, D.C., on June 16, 1958.

by losses in poor years and thus make a net contribution to agricultural production. But how are the farmers to be compensated for their losses in poor years? And how is such a system of crop and/or acreage restrictions to be administered without arousing farmer resentment and charges of discrimination? There is nothing in HVA's experience along the Helmand to suggest that such a system can be administered efficiently and fairly, especially when the apparatus must be put into action over a period of a few weeks or months at the most.

In the light of HVA experience with settled nomads and relocated farmers on the Nad-i-Ali and Marja tracts, it would appear almost impossible to administer such a system in the Arghandab-Tarnak area, at least in the foreseeable future. Extension of Tarnak irrigation may appear desirable because it would make additional lands available for settlement. But the HVA would then be faced not only with most of the problems incident to such settlement in Nad-i-Ali and Marja, but with those of recurrent water shortages as well, problems which have not and probably will not arise along the Helmand.

Of course, it may be said that the Tarnak soils selected for development are better than those of East Marja and much better than those of Nad-i-Ali, especially if adequate drains are provided and they are handled correctly from the beginning. However, out of 146 soil samples reported in the HVSR draft, MKA found 30 non-saline, 38 saline, 73 saline-alkali and 5 non-saline-alkali,[1] and the Tudor Report states:

> the lands are primarily deep silt loams and silty clay loams in a fairly recent river terrace, with some sandier soils along river bottoms and moderately deep to shallow loams and sandy loams over desert outwash in the northeasterly end. There are numerous wet areas, one large fine-textured slowly drainable area, and numerous

[1] HVSR draft, Table 40, p. 96.

> fairly large severely-affected saline-alkali areas. . . . These soils appear to be moderately fertile. Production is uncertain, depending on availability of water.[1]

There is apparently very little production in the Tarnak at present. A visit to the area in January, 1958, confirmed by a close analysis of an aerial mosaic, indicates that production during the winter season may be closer to 5000 acres than to 12,500 (see Table 26). Perhaps the latter figure was arrived at by including double cropping on some of the old, irrigated lands. At any rate, there seems to be little agriculture of any importance along the Arghastan and Dori Rivers to the south of the tract. The three principal villages are located in the north-central portion of the area: Rhorabad, Rahwani and Nakwadak. The first and third are furnished with Arghandab water by flumes built over the low-lying Tarnak; Rahwani receives its water from a small diversion dam built in the Tarnak. A considerable reliance is placed on <u>karezes</u> in the central and west-central portions of the tract. To the southwest, there is an increasing occurrence of surface salts and of <u>jaru</u> grass which is said to indicate wet and salty conditions. <u>Nye</u> grass, also salt-tolerant, is in evidence on drier ground. Along the lower Tarnak, where it flows into the Dori River, a number of villages are being abandoned due to increasing salinity. It is extremely difficult to estimate population in an area such as this; there are always more people living there than one would believe possible. But probably no more than 2000 persons live in the thirty-odd, small, mud-and-straw Tarnak villages. The most prosperous of these are the ones along the northern

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[1] <u>Tudor Report</u>, p. 34.

edge of the tract. There, one can find large vineyards and the high, mud-walled raisin houses, surrounded by fields of winter wheat. Carrots, turnips, potatoes, etc., help the villagers through the winter, as melons do in the summer, but the level of cultivation and of living in the Tarnak seems considerably below that closer to Kandahar.

To locate additional farmers, whether untrained nomads or marginal farmers relocated from other areas, would probably depress its present low average living standard. Nothing in the experience of Nad-i-Ali or Marja has indicated that the HVA is equipped to provide new settlers in Tarnak with adequate extension service and training for them to make a successful adaptation even to somewhat better soils and a prearranged drainage system. Despite the political attractiveness of opening 50,000 or 60,000 acres to settlement, the RGA will be well-advised to postpone Tarnak development until HVA extension service and community development personnel in sufficient numbers and quality are available. Even then, the RGA should carefully analyze the question of whether it would not prefer an assured return in produce and tax-revenue from the well-established Arghandab lands to an uncertain return from a larger area, along with the political, social and economic problems inherent in such uncertainty.

VI. HYDROELECTRIC, INDUSTRIAL AND COMMERCIAL FEATURES OF THE HELMAND VALLEY PROJECT

In addition to the agricultural improvement of the areas just discussed, the Helmand Valley Project embodies hydroelectric aspects upon which certain industrial and commercial developments can be based. As is customary with such river development schemes, the Project was presented, costed and justified as a multi-purpose approach embodying flood control, irrigation and hydroelectric power generation.[1]

Topography and elevation have given Afghanistan an enormous hydroelectric potential which is well represented in its largest river system. The combined runoff of the Helmand and Arghandab, though highly variable from year to year, is probably sufficient to generate over one billion kilowatt hours of electricity annually. By taking advantage of unusually good site features at Kajakai, MKA was able to design and construct a dam that now stores 1.5 million acre feet of water and which can later be enlarged to hold over 2.5 million. If and when a market is developed for it, a 120,000 kva capacity can be installed at the mouth of the power tunnel which was built in the eastern abutment of the dam and then sealed. According to estimates in the HVDP of 1953,[2] based on records up to that time, the following amounts of the installed capacity would be available for the indicated percentages of the time:

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[1] _Tudor Report_, p. 56.

[2] HVDP of 1953, p. 43.

66,000 kw and over. . . . 100%
77,000 kw and over. . . . 75%
87,600 kw and over. . . . 50%

Assuming a load factor of 50%, a connected load of at least 132,000 kw could be served at all times, and one of 175,000 kw at least 50% of the time.[1] The cost of such an installation at Kajakai is now estimated at $12 million.[2] The only apparent present use for the power would be in a fixed nitrogen fertilizer plant, using air and water as raw materials and supplying much-needed fertilizer to the Valley and perhaps for export. But until thoroughgoing analysis demonstrates a sizeable market it is not possible to justify the installation.

Meanwhile, power needs along the Helmand are to be met by diesel units and by the installation of two 1500 kva generators in the Boghra Canal drop structures two kilometers above Girishk. This installation was completed early in 1958 at a cost of $1.6 millions, but indications were that operation would be retarded until leakage through the canal berms had been repaired. The Westinghouse turbo-generators are specially designed to operate at the low, 17-feet, head available. Since the demand along the Helmand is still very small, it is planned to use only one of the generators in alternation.[3] Provision is made for the addition of a third 1500 kva unit if and when required. 3500 kw would be firm power available at all times.[4]

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[1] Ibid., p. 44.

[2] United States Operations Mission to Afghanistan (ICA), Mission's Monthly Reports for February, March and April, 1958 (TOICA A-986, May, 1958) (Kabul, 1958), (Hektographed.), p. 12.

[3] Visit to station and interviews with Mr. O'Connor, MKA turbine engineer, and Mr. Short, Westinghouse electrical engineer supervising installation, January 20, 1958.

[4] HVDP of 1953, p. 42.

Girishk, with a population of about 5000, has previously depended upon two 50 kva diesel generators, but might now absorb three or four times this amount. Lashkar Gah, connected to Girishk via a 50-kilometer transmission line, has been relying on 350 kva diesel power. Since this new city, the present headquarters of the HVA, will eventually replace Girishk as the capital of the province, demand will expand as facilities are added. The ACU depot at Chah-i-Anjirs, and the HVA camps at Nad-i-Ali and Marja have been put down for 200, 400 and 400 kw, respectively,[1] but this appears to be overly optimistic. If and when rural electrification is brought to the Nad-i-Ali and Marja settlers, demand will rise, but it is more than likely that the 3000 kva capacity now installed will be adequate for years to come. The only drastic increase in power consumption in the Girishk-Lashkar Gah area would result from the establishment of a cotton gin or sugar beet processing plant (see Chapter IX). In that unlikely event, the third 1500 kva unit could easily be installed.

At Kandahar, on the other hand, there has been a shortage of electric power for some time. The Kandahar Electric Company, a branch of the nationalized General Electric Company of Kabul, has an installed capacity of 264 kva at a hydroelectric plant on the Patow Canal and 256 kva from a diesel unit. The hydroelectric unit, built by German engineers in 1934, operates at only 160-170 kw, however, and much of its output, along with that of the diesel unit, is taken by the Kandahar Woolen Mill. The Mill has a 220 kw diesel unit, in poor condition, serving only as standby capacity. Pushtoon Industries, the fruit processing plant,

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[1]Tudor Report, p. 124.

owns a 200 kw diesel unit, and sells much of its output to the Electric Company. Thus, in summer daytime, the load on the Kandahar system may be only 150 or 200 kw, of which 80 to 100 kw are taken by the Woolen Mill. But on a winter evening, the load rises to about 850 kw, producing a severe drain on the system. Since power is sold to some 2000 residential users at a subsidized rate of six cents per kwh, it is apparently capacity rather than expense which restricts use in Kandahar. In fact, it is estimated that present demand would easily absorb the output of a 2000 kw system at this rate.[1]

A number of surveys have been conducted on present and future power needs in the Kandahar area. All agree that the ultimate solution lies in the installation of the 12,800 kva capacity planned for the Arghandab Dam (3000+ kw 100% of the time; 4000+ kw 67% of the time; 5000+ kw 54% of the time).[2] The Tudor Report[3] recommended in November, 1956, that the construction of the Arghandab power plant with two of the four projected 3200 kva units be undertaken without further delay at an estimated cost of $2.4 million, including transmission facilities. As an interim measure, the Report called for the immediate installation at Kandahar of two 500 kva diesel units, costing $100,000 each. These units would serve as supplementary power after the hydroelectric installation was completed. Inasmuch as the period of construction of the Arghandab facilities and transmission lines is estimated at two years,

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[1]HVDP of 1953, p. 45, and Tudor Report, pp. 122-123. The subsidized industrial rate is three cents per kwh. Kabul rates are about one-third those in Kandahar.

[2]HVDP of 1953, p. 42.

[3]Tudor Report, pp. 126, 129.

it is difficult to understand why this recommendation was not carried out forthwith. Had it been, Arghandab power would have been available to Kandahar by the fall of 1958.

In comparison to the areas to be supplied by the $1.6 million Boghra power plant, the demand for electricity in Kandahar was clearly established as far back as 1953. Yet, despite the Tudor recommendations, not even the two 500 kva diesel units were provided. In the spring of 1958, yet another survey was made by the Siemens Electric Company. They estimated that a 1500 kva hydroelectric unit might be built at a 20 meter head in one of the canals south of Kandahar. This would cost $535,000 plus $140,000 in Afghanis, and would require 18 months to construct. In view of this estimate and of the fact that constant flow in the canal could not be assumed, the ICA field recommendation was to proceed with Arghandab power installation.[1]

ICA's reluctance to tackle the Kandahar power shortage is even more difficult to understand when one considers the proposals for the Kandahar Industrial District and the Kandahar International Airport, both of which will have sizeable power requirements. In fact, the ICA Mission in Kabul has estimated that the combined needs of these two programs and of the Kandahar factories will amount to 1500 kw for the next three years and then rise to 4000 kw for the following seven years.[2] Lack of additional electric power for work at the Kandahar International Airport has already forced the contractor to order diesel units, requiring eight months to install, at an estimated cost of $550,000. Had

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[1]United States Operations Mission to Afghanistan (ICA), Mission's Monthly Reports for February, March and April, 1958, pp. 10 and 12.

[2]Ibid., p. 12.

the Arghandab development been undertaken at the time of the Tudor recommendation, with or without the interim procurement of diesel-electric capacity, hydroelectric power would have been available for the Kandahar International Airport in the autumn of 1958.

The Airport project is of only incidental importance to our study. It envisages the creation, in the Tarnak area, of a modern, concrete runway airfield capable of handling jet passenger planes. The genesis of the idea may be traced to the old International Civil Aviation Organization program attached to the United Nations Technical Assistance Mission in Kabul. The supposed advantage of the project resides in the fact that use of the Kandahar field would shave about 600 air-miles off the route from Teheran to New Delhi via Karachi. Its disadvantages lie in the facts: (1) that savings are proportionally less for aircraft using other routes between the Middle East and New Delhi; (2) that the huge supplies of jet aviation fuel required can presumably be brought in only via Pakistan or from the U.S.S.R. via Herat if the Russians can be persuaded to provide fuel for Kandahar rather than for a jet field of their own construction, e.g., that near Kabul; (3) that the untold physical and political difficulties of moving large quantities of any material through the overcrowded port of Karachi, up the Northwest Railway to Quetta, and then by truck to Kandahar have as yet been solved only on paper in the Afghanistan-Pakistan transit agreement of June, 1958; and (4) that the Pakistan government can cut this "pipeline" to Kandahar at will should the competitive effects be felt too severely at Karachi's own international airport or should new political difficulties arise over Pushtunistan. Nevertheless, the United States Government has extended a grant of $3.6 million and a loan of $1.8 million for the construction of the Kandahar International Airport, and made other grants and loans for communications, navigation aids, organization and training of the Afghan Department of Civil Aviation, and providing equipment and assistance for Ariana Afghan Airlines under an Air Transportation Development Project signed with RGA in June, 1956. Teams from the U. S. Civil Aeronautics Authority and Pan American Airlines, which has accepted Ariana as a subsidiary, have been in the field for over a year working on the project in cooperation with the ICA mission. Basic construction work on the airfield is scheduled for completion by Morrison-Knudsen International in the fall of 1958, and a contract has been signed with Pacific Architects to design and engineer the buildings and supporting systems at the airport. For better or for worse, and for reasons best left to the reader's imagination, there will probably be a fully-equipped, up-to-date landing field for jet airliners at Kandahar sometime in 1959 or early 1960. Whether it will contribute anything to the economy of Afghanistan, which is spending $1 million in Afghanis towards construction alone, is certainly open to question. At any rate, it may seriously be doubted that the airport will contribute substantially to the economy of Kandahar or the Helmand Valley. There is little in the area to attract tourists, and almost nothing in the way of local souvenirs to be sold to transients at the airport. The RGA might set up a customs-free shop selling Afghan rugs and karakul caps, or high-class imports, but income from such an arrangement plus that from operating the field under the supply handicaps indicated above can hardly offset investment costs so long as Karachi stays in operation. The very range of jet liners and the possibilities of improved air-refueling may make it unnecessary for flights from the Middle East to New Delhi to put down anywhere in between. Cargo planes will continue to use the present Kandahar airport which is being expanded, under the same US-RGA agreement, to handle DC-4's on a 2000-meter runway. So, aside from providing employment to a few hundred Kandaharis, and adding to the already-excessive demand for available power, the potential material effects of the International Airport on Kandahar would appear to be very slight.

A much better case can be made for the Kandahar Industrial District, which is still in the survey stage although the initial project agreement was signed between ICA and RGA on April 30, 1957. It provided for an initial expenditure of $95,000 from Fiscal Year 1958 funds, plus $1000 in RGA funds to survey and design a series of small shops or plants in adjoining buildings to be constructed at Kandahar. A total investment of $1.5 million is envisaged when local Afghan capital can be mobilized to build, equip and operate the shops on a private enterprise basis. The Minister of Mines and Industries has repeatedly stated that Afghan entrepreneurs are seriously interested and have directed repeated inquiries at his Ministry regarding the project. If the shops, which presumably would include a glass-making and blowing plant, a small forge and foundry, a metal-working shop, a woodworking mill, a tannery, an automotive repair shop, and a shop for manufacture and repair of simple electrical fixtures, can be effectively set up and operated, they will supply many needs which at present can be met only by crude work in the bazar or by imports via Kabul or Pakistan. Here is an example of an instance in which the ICA program, with a modest outlay of US and RGA funds, can both stimulate private investment and help to fill immediate and urgent needs of the Kandahar population. Again, it is difficult to understand why at least the surveying had not been accomplished more than one year after the signing of the preliminary agreement.

In addition to its many small bazar crafts shops and "cottage industries", Kandahar boasts two real factories. One of these is the Pushtoon Industries plant which packages fruits, either dried or in cans and bottles, and manufactures syrups, conserves and candy. It has equipment for forming tin cans from imported tin-plate, but most of the fruits go into imported Mason-type jars with gasketed tops. The canning operations are served by two fairly new steam kettles and can produce something like 15,000 jars of fruits or juices in the usual two-month canning season.[1] In recent years, however, a shortage of sugar has curtailed these operations and at times eliminated the making of candy. When sugar is available, over 20,000 kilos of hard candy, wrapped individually in cellophane imported from India, can be produced in the off-season. Fruit-drying operations, using sun-drying exclusively, produced the following quantities in 1950:

TABLE 29

DRIED FRUIT PRODUCTION AT PUSHTOON INDUSTRIES, KANDAHAR, 1950[a]

Fruit	Quality	Production in kgs.	Fruit	Quality	Production in kgs.
Currants	1st	194,302	Apricots	-	148,643
Currants	2nd	98,080	Prunes	-	7,122
Currants	3rd	42,837	Almonds	1st	71,768
Raisins	-	59,768	Almonds	2nd	71,766

[a]Sobeir Said, "Die Wirtschaftliche Bedeutung Afghanistans unter Geographischen Aspekten" (unpublished seminar paper, Professor F. Marbach, Bern University, Switzerland, 1952), p. 61. The plant was visited on October 12, 1957 by the present author, but no production figures could be obtained.

[1] Said, p. 61.

Dried fruits are packed in half- and one-pound preprinted cardboard boxes or in larger wooden crates for export. But by far the greater part of the Kandahar area's dried fruit exports, and almost all of the area's fresh fruit exports are handled by small operators or by the newly-formed fruit-export corporation.[1]

Mention has been made of the Pushtoon Industries' 200 kva diesel generator. In winter, most of the power is sold to the Kandahar Electric Company at 5.2 cents per kwh. In summer, the power is used to run the company's ice-plant from which about 16,000 10-kilogram blocks are sold to the populace each year instead of being used to refrigerate fresh fruit exports to Quetta.

The Kandahar Woolen Mill, established before World War II by Kandahar investors and the Bank-i-Millie, could produce over 135,000 square meters of coarse wool cloth per year, but usually produces far less due to the poor condition of its equipment. In 1954, it produced 70,000 square meters; in 1955, 52,500 square meters; and in 1956, only 48,000 square meters, chiefly due to a lack of spare parts.[2] Excess yarn is sold as such or woven into shawls, mufflers or blankets. Raw wool, received in lorries, is weighed, mechanically washed in a series of tanks and spread in the sun to dry. Since most of the plant's output is of mixed, natural color goods, and since it has its own bleaching and dye works, there is apparently no attempt to sort wool by color or to grade it. The scouring capacity is sufficient to handle wool for export, but there is no baling press, so that the bales occupy far more space than is

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[1] Tudor Report, p. 132.

[2] Wilber, Afghanistan, p. 263 and Tudor Report, p. 134. Only 25,000 square meters were produced in 1950 when 32,000 kg. of yarn, 8000 shawls or mufflers and 1500 blankets were also made. Said, p. 61.

necessary for their weight.

The wool which is used in the plant's operations is first centrifuged to free it from the dust of the drying yard. It is then processed on standard carding, spinning and weaving machines of a more recent vintage than those in the RGA woolen mill at Kabul, including 2160 spindles and 20 large and 15 small looms. 75 per cent of the present production, however, is devoted to the same, heavy, dun-colored material made of unsorted wool which the Kabul plant turns out for military use. The Kandahar plant is equipped to weave tweeds with material bleached and colored in its own dyeing plant, and some fairly substantial green, blue and gray material of this sort is manufactured. The blankets, shawls and mufflers mentioned above are made on a piecework basis on special looms.[1]

As has been mentioned, the Woolen Mill takes about 80-100 kw from the Kandahar grid during daytime hours. Its own 220 kw diesel unit is in unsatisfactory condition and serves only as a stand-by. The management of this privately-owned enterprise is known to be interested in expanding their productive capacity, but no investment in additional machinery can be justified until the power to run it is available. The first step, at any rate, would be to obtain enough spare parts to reactivate and maintain in operation the installed capacity of the mill.

The remaining industries of the Kandahar area are limited to those of the bazar and cottage. As is true at Kabul, the Kandahar bazar includes several dozen handicraft shops making shoes from local and imported leathers, sheet or bar metal products (pails, stove pipes, grills, rough hardware and tools) from scrap or imported stock, ceramic bowls and

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[1]Visit to the Kandahar Woolen Mill of October 12, 1957.

water-pipes, and simple wooden and metal utensils. Cottage industries of the area include the weaving of woolen and cotton cloth, the making of coarse rugs, principally of cotton, and the embroidery of skull-caps which is a regional and highly-developed artistic specialty. As is generally true of all Afghan handicraft industry, the workshops of Kandahar and its region have reached that stage beyond which the individual entrepreneur or farmer cannot go without sizeable capital investment. Hence the logic and necessity of the Kandahar Industrial District, and of a sufficient power source to supply it, are compelling.

VII. EVALUATION OF THE HELMAND VALLEY PROJECT WITHIN ITS OWN REGION

In Chapters IV and V we have made a survey of the areas presently included or scheduled for development under the Helmand Valley Project. We have seen that of the two "virgin land" areas Nad-i-Ali is almost completely settled with 1400 families and Marja about two-thirds settled with 1000 out of a possible 1450 families. We have questioned the wisdom of leaving the cultivation of Nad-i-Ali up to the individual farmer whose experience has taught him to farm for today and leave tomorrow to itself, but we have also seen the physical, psychological and political obstacles in the way of a more rational handling of Nad-i-Ali lands. We have noted that the experience of Nad-i-Ali, combined with more thorough after-knowledge of soil conditions and problems, led to the abandonment of the West Marja tract proposal and to the allotment of acreage in East Marja according to the supposed carrying capacity in the different soil classes.

In the case of Seraj, we have seen that the area offers comparatively inexpensive development possibilities through the improvement and extension of the present irrigation system, but that it is already overcrowded in terms of its productive capacity and presumably would not offer to the RGA the basis for additional settlement except at the continued expense of the present population. We have discussed the floodplain Shamalan area, with its drainage problems, and observed that its capacity for additional settlement can be determined only after a better cadastral survey has been conducted. We have compared the Darweshan area to the Shamalan, hoping that the experience in the latter could be applied to the Darweshan. The lower third of Darweshan will presumably be in line for development before the Garmsel area, about which comparatively little is yet known. Opportunities for development in the Chakansur Basin run afoul of political complications which the United States has no desire to aggravate, while the apparently more promising Bakwa plains would require elaborate construction not now within the means of RGA or ICA.

In the Kandahar area, we have described the productivity of the long-cultivated North and Central (South) Arghandab areas and compared them with the largely vacant Tarnak tract, expansion of which would compete in some years for the water available in the Arghandab. The shortage of HVA and ICA extension and advisory services to assist farmers in adjusting to cultivation of new lands argues against development in the near future of an area that might become, in many respects, another Nad-i-Ali. But here, again, economic and social considerations come up against business and political interests. The contractor is eager to complete the job and reduce, for RGA's sake as well as its own, the high proportion of overhead to operating costs. RGA seems primarily interested in developing more acres for nomads and tenant farmers, whether or not they can make an early success of them, and secondarily interested in making the utmost use of the Helmand-Arghandab waters on its side of the frontier. Neither MKA nor RGA can be expected to admit that the project is already overextended and that a great deal of slow, unostentatious, and perhaps even unpopular training and education must be performed before even those farmers and ex-nomads now living in the project areas can begin to reap the benefits which were originally held out to them.

As described in the HVDP of 1953, the Project was designed to irrigate some 820,000 acres, including 248,000 acres then in cultivation or being prepared for crops.[1] On the new lands made available by the Project, 700,000 nomads were to be settled. By 1956, the Tudor group, using estimates furnished by MKA at that time and applying the Marja farm allotments[2] throughout, calculated that only some 117,146 new acres, providing farms for 10,314 additional families, could be developed through Phase II on the following tracts:

TABLE 30

APPROXIMATE ESTIMATE OF NUMBER OF NEW FARMS IN ULTIMATE DEVELOPMENT OF UPPER HELMAND VALLEY[a]

Name of Project	Number of Acres	New Farms
Marja	21,190	1,651
Shamalan	12,325	1,219
Darweshan	15,846	1,488
Seraj	21,500	1,668
North Arghandab	10,325	1,028
Central Arghandab	11,375	1,029
Tarnak	24,675	2,231
Totals	117,146	10,314

[a]<u>Tudor Report</u>, Table No. 29, p. 182.

These estimates include lower Darweshan but exclude Nad-i-Ali. Since we know that 1400 families have been settled on Nad-i-Ali, we can add these to the total. Since we also know that only 1450 families can be settled in

[1]Letter from Claude L. Fly to author, August 18, 1958. See Wilber, <u>Afghanistan</u>, p. 224.

[2]7.5 acres of Class I; 10 of Class II; 12.5 of Class III and 15 of Class IV land.

Marja, we can reduce the total by the difference between that and the 1651 postulated by Tudor. While we seriously doubt that Seraj or Tarnak can take anything like the settlement postulated, we shall give them the benefit of the doubt for this estimate. The result, liberally biased, is 11,513 families, or, at most, 92,104 persons.[1]

It is, of course, true that these Tudor figures relate only to the Upper Helmand and Arghandab project areas. If we add the HVSR draft's Nad-i-Ali acreage (20,624) and the estimated 137,140 developable acres not now under cultivation in Garmsel and Chakansur, we more than double the acreage figure computed by Tudor and arrive at 274,910 acres. We can also add the 14,054 acres by which the developable land estimates in the HVSR exceed those given above for the seven tracts listed. This brings the total to 288,964 acres. Thus, with the greatest leeway, we could not estimate more than 300,000 newly developable acres in an area once thought to contain over 572,000. The Bakwa plains area, with at most 100,000 developable acres, was not originally part of the Project, was not so considered by Tudor, and could only with great expense and difficulty be irrigated with Helmand water. Even if we now include it, we are left with slightly over one half of the original estimate.

To convert these acreage estimates into terms of new farms is difficult since we lack reliable estimates of land classification in Garmsel and Chakansur (see Chapter IV). If we take the estimates given to Tudor in 1956 for Garmsel and apply them to the HVSR draft acreage estimate, admitting all the errors such a calculation may entail, they

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[1]Tudor Report, p. 86, reckons on a basis of from 5 to 7 persons per family. After our experience of the Afghan joint family system, and to avoid being accused of niggardly estimation, we prefer to use 8 persons as the average.

indicate that 2966 new families might be settled in Garmsel. Chakansur is more of a problem, since the HVSR draft cut the developable acreage estimate from 316,350 to 145,425. But presumably 104,425 of these acres are already under cultivation, hence not available for new settlement. Even if the remaining 41,000 acres are potentially half Class I and half Class II lands, a liberal assumption, they could accommodate only 4782 families. Thus, at the most, we can increase our potential total for settlement in the Helmand Valley Project lands (Bakwa being excluded for the reasons listed above) by 7748 families or some 61,984 persons. This addition brings the total contribution to the settlement problem to some 154,088 people out of the projected 700,000, with an average of less than two acres per person on a basis of an eight-person family.

The preceding calculations have been made on the basis of the information contained in the Helmand Valley Development Program of 1953, the Tudor Report of 1956 and the draft of the Helmand Valley Survey Report consulted by the author when in Kandahar, in 1957. They are subject to all the limitations of these sources, as explained at the end of Chapter III, and to subsequent revision of the Helmand Valley Survey Report. They are also subject, as such calculations usually are, to differences of opinion and evaluation. As a result, they are sharply at variance with the calculations made by Mr. Claude L. Fly of the International Engineering Company, a subsidiary of Morrison-Knudsen. In order to be scrupulously fair to Mr. Fly and to the contractor, the following quotations from his letter of August 18, 1958 to the author are included:

> There are still 1,200,000 net acres of irrigable and reclaimable land on the books which are reachable by the Helmand and Arghandab waters. There are over one million net acres still in the area which was included in the 1953 Development Program Study. About 715,000 acres are feasible for present project studies and 600,000 acres are nearly certain for some development. So, you see, there is not a really drastic reduction in

> acreage. As stated above, there have been some changes in certain project recommendations based on the country's financial situation and the extreme difficulties of development of certain lands. For instance the Chakansur area has been cut to about 44% of its original acreage as far as the present recommended studies are concerned. The Nad-i-Ali was cut to about 60% but other areas such as the Darweshan have increased as much as 82%, the Seraj has increased 66% and the Tarnak has increased 78% over the original figures. So, while there have been changes caused by the data accumulated from surveys and laboratory examinations and field studies carried on throughout the six year period, there has been no drastic change in the total acreage of land which is available for consideration in the Helmand Valley Development Program.
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> . . . In the gross area of the Helmand Valley there were about 340,000 cultivated acres in 1953 out of a total of 1,160,000 potential. This was prior to the development. In 1957, the acreage increased by 133,000. This is a 45% increase within the Helmand Valley proper and is due mostly to the influence of the two regulation reservoirs. However, only 20,000 "new" acres can be attributed directly to the government of Afghanistan projects, Marja and Nad-i-Ali. Most of the development has been by private enterprise.

Mr. Fly is certainly correct in pointing out that the major benefits of the Helmand Valley Project have been those contributed to and utilized by private enterprise. Indeed, as has been stated in this study, the most outstanding benefit of the Project has undoubtedly been the provision of a firm and controllable water supply along both rivers allowing cultivators to produce two or more crops per year without fear of water shortage or, in most years, of inundation. For the very reason that much of the better agricultural land was in cultivation or at least under private ownership with some memory or prospect of cultivation, it is impossible to assay the worth of the Project with reference solely to the RGA-owned lands or settlement thereon. In fact, until proper cadastral surveys have been carried out in all of the Project areas, it is impossible to determine how much of the land is available for Government-sponsored new settlement. And it is clear that the RGA-sponsored settlement programs have been, and will be, paralleled by an entirely unofficial and hence unrecorded influx of farmers who are acquiring lands benefited by the Project or entering into tenancy arrangements with the owners of these lands.

For all of these reasons, it is most difficult to arrive at any single, conclusive evaluation of the cultivation and settlement aspects of the Project. We have presented two evaluations, the author's and Mr. Fly's. Experience will indicate which is closer to reality.[1] We have already indicated in Chapter III that MKA was reluctant in 1948 to count on more than 400,000 acres for irrigation and settlement in a comprehensive project. If the author has adopted an overly-conservative approach to this very difficult problem, it is because he firmly believes that a hard look at the realities of development to date and the prospects for the future is an essential first step for analyzing and evaluating the Helmand Valley Project with a view to future improvement.

The second step, it would seem, is the prevention of any further deterioration in present project lands, and the delay of further development until it is certain that it will contribute to, rather than detract from, the living standards of the people concerned. In other words, the interval of several years prescribed by the Tudor group between their Phase I and Phase II[2] should be observed, and the Tarnak development should be entirely shifted to Phase II. This will allow time for ACU to complete land development work in Marja, Shamalan and Darweshan, for cadastral surveys in the latter two areas, and for settlement of new farmers in accordance with the results of these surveys. It will give HVA an opportunity to train those cadres of extension and community development workers so essential to the success of new settlement projects. And it should provide enough time for the RGA to reconsider one of the most basic questions in-

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[1]Part of the difference between the estimations appears to be due to the fact that Mr. Fly has included areas in the Bakwa plains and along the upper tributaries of the Arghandab River which are excluded from the author's calculations.

[2]<u>Tudor Report</u>, pp. 168 ff.

volved in the Project, namely, whether the RGA is primarily interested in increasing production and living standards in the Valley or whether the primary aim is to settle nomads and relocate tenant farmers. The equation of these two aims in thinking relative to the project is probably one of the main causes of the problems which have arisen. It has been assumed that the settled nomad or the tenant farmer who is given land of his own will ipso facto be in an improved position. Not only is this a specious assumption, but experience in Nad-i-Ali and Marja has indicated that just the reverse is true.[1] Let us look at the two cases, nomad and tenant farmer, separately.

The nomad is a part-time citizen. It is estimated that two million people make an annual migration from the warm and winter-watered plains of Pakistan to the rich summer pastures of Afghanistan's central mountains. They cross the frontier at innumerable points between Torkham (Khyber Pass) and Spin Baldak (Chaman route). Their routes and places of encampment are fixed by tradition and enforced, if necessary, by the tribesmen's own rifles. As recently as 1929, they have played a decisive role in changing the character of the central government in Kabul. They may be persuaded to settle, particularly if a profitable example can be shown, but the prospects of forcible settlement in the Iranian fashion are militarily and politically impossible in Afghanistan.

Naturally, the central government would like to have as many of the nomads settled as is possible. They could then be claimed and taxed as full-time citizens, and it is assumed that their living standard and the gross national produce would both be increased thereby. Undoubtedly,

[1]The Tudor Report, p. 87, estimates that grain yields on a 13.5 acre farm at Nad-i-Ali had fallen from 8100 pounds in the first year of settlement to 3700 pounds by 1956.

a great deal of what legalistically could be termed "smuggling" is carried on by the nomads. But inasmuch as they have carried small manufactured items into Afghanistan and wool, woven goods and dairy products out of Afghanistan for centuries, it is both more charitable and more realistic to look upon this traffic as legitimate commerce, contributing to the Afghan and Pakistan economies as well as to the nomads. In fact, by taxing each tribe as it crosses the border, on the basis of a value declared by the chief, the RGA recognizes the place of such commerce. It also recognizes the practical impossibility of inspecting the baggage of each caravan with its hundreds of households and beasts of burden. The central government lacks both the power to compel the tribes to submit to such inspection and the personnel to carry it out. Adequate customs control would require the policing of the entire border, might result in a continued state of warfare as the tribes sought to evade or resist inspection, and would surely cost more than it would save. And, even if trucks can carry goods more cheaply than caravans, it will be some time before the road network and vehicle fleet are adequate to assume the transportation of all goods now moved by caravan.

From its own point of view, the RGA's desire to settle the nomads is perfectly understandable. But the outside observer may well ask: 1) is not the present contribution of the nomads, in terms of goods brought into Afghanistan for sale in the bazars, and in terms of the milk, butter, yogurt, meat, sheep's fat, wool and woven products sold before they recross the frontier, far more than these people can contribute when settled on lands they do not know how to till and which, to date, have baffled the efforts of even experienced agriculturalists? 2) are not the taxes they now pay for transit privileges a net gain compared to the 18-year delay before they would begin to pay taxes on the allocated lands, if they remain as settlers that long, particularly in view of the fact that RGA must make outlays[1] to settle and feed the nomads until their crops begin coming in? 3) how can RGA continue the program of settlement, without recourse to force, if all it has to offer are the problem soils of Marja and perhaps Tarnak or the somewhat better soils of Shamalan and Darweshan which nevertheless require very careful management to avoid over-irrigation and salinization?

Of course, there are no objective answers to these questions since we have no reliable estimates of the amount and value of nomad commerce nor even of the exact amount of their present tax contributions. But that the questions are legitimate ones, worthy of careful considerations in Kabul, is demonstrated by the fact that of the 2500 families now settled on Nad-i-Ali and Marja only about one-half represent ex-nomads and that the proportion of nomads among new settlers has steadily decreased since Nad-i-Ali settlement began.

On the other hand, if the ideal land use patterns for Nad-i-Ali and Marja were adopted and the poorer soils were devoted to cultivated pasture then the RGA might secure an augmented economic contribution from the nomads' livestock, either by convincing the nomads to settle or by making some arrangement whereby they could graze their animals on irrigated pastures mechanically plowed and reseeded in rotation with some grain. Some of the nomads could probably be persuaded to pay for the use of such lands either instead of or on the way to and from their traditional summer grazing areas. Such an arrangement seems far more logical

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[1]Estimated at $320 per family in Nad-i-Ali and from $100 to $120 per family in Marja. Tudor Report, p. 181.

than a sudden shift to sedentary agriculture though it might actually lead to a voluntary transition by some nomads to a settled life based on livestock raising on irrigated pastures. Yet another possible alternative resides in offering the nomads the rental of Project lands, on a proper rotational basis, for planting grain crops in the spring and harvesting them in the fall, with HVA responsible for irrigating them during the summer while the nomads are in their traditional summer grazing areas.

Turning now to the problem of the resettled tenant farmers, the situation is not much brighter. These people represent formerly landless farmers, principally from the upper Tarnak and Ghazni areas but with something of a national representation. Under the traditional tenancy system in Afghanistan, they used to provide labor and perhaps oxen and implements and received, accordingly, one- or two-fifths of the grain crops and somewhat more of the fruits and vegetables they tilled. Either the landlord or the traditional use pattern determined what crops were to be planted on what land, and there was a rough idea of what yields could be expected in a normal year. Now these farmers must make their own decisions with respect to land that has not previously been cultivated and which poses problems of drainage and salinity they have not previously encountered. They have always applied every bit of water they could get for fear of later shortages; if they do that now their lands become waterlogged and saline or alkaline. They are told that alfalfa and grass crops will restore these soils and build up their fertility, but they have always lived hand-to-mouth and they cannot eat grass at the end of the season. They are told that manure must be applied to the soil and stubble plowed under, but if they do this they will have no fuel. They are advised that irrigated pasture and sheep-grazing or dairying is the ideal use for their lands, but they have no money to purchase animals or the food they will need until the meat and milk are ready. Although they have been furnished with some grain, building materials, one ox, a yoke and some implements upon arrival, they are on their own after the first year. The advisory service, though it got off to a good beginning, is woefully inadequate. It is no wonder that some of these families have left in despair, although it is impossible to get accurate figures on the number involved.

The need most apparent to one who has been in the Helmand Valley Project areas is for a vastly improved and <u>sustained</u> program of agricultural extension service among the new farmers. This does not mean extension service in the American sense, i.e., the availability of agents to whom specific problems may be submitted on the initiative of the farmer. It means a thorough-going program of farmer education and assistance similar to that which has been developed in India. The technician must go out to the farmer, awaken his interest, ask him his needs, and guide him in the solution of his most pressing problems. The expert must both conduct demonstrations himself and make arrangements with progressive farmers to follow improved methods on their own plots where their neighbors can easily observe the results. If such demonstration plots could be provided among the new settlers in the Project, it would not be long before even the established farmers of the region learned of these efforts and emulated those that proved superior to traditional methods.

Unfortunately, Afghanistan simply does not have enough trained personnel for this sort of program. From 1952 to 1955 the Vocational Agricultural ("Vo-Ag") School in Kabul, an ICA project, supplied thirty-five graduates for work in the Helmand Valley. These were mostly boys with the equivalent of a U.S. vocational high-school education. Because of their youth, all but ten had to enter the Army by the end of 1957. Meanwhile, replacement had fallen to the rate of two Vo-Ag graduates per year. Apparently, young men with even this much education can obtain better jobs with private businesses or with other government agencies than in the HVA. The social value of agriculture or any form of manual labor is so low in Afghan eyes that Vo-Ag graduates cannot be attracted to the Helmand for idealistic reasons alone. Even the attempt to establish a branch of the Vo-Ag school at Kandahar failed because it was apparent that the student body would be composed of urban youths who would not put their knowledge to work in either the established villages or the new ones in the Project.

In another attempt to meet this problem, HVA established an Agricultural Extension Training Center at Nad-i-Ali in 1956. The Center has to rely on men with only a six-year elementary education, but because many of these had completed their military service they have provided a relatively stable core for the program. In 1956, 22 students completed the six-month course; in 1957, 33; in early 1958, 48 were under training, though some presumably would not be graduated from the program.[1] An attempt is made to recruit only men from local villages who will remain with the Project, or at least will go back to farming communities where their knowledge can be put to use. Of course, the literacy rate was very low, but these "village level workers" could compensate for it by their familiarity with local dialects and village conditions. On the other hand, the problem of communication between American technicians or instructors was more complex than with Vo-Ag graduates, who have studied English. A few of the Afghan

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[1]Interviews with Mr. Mabub, HVA Officer in Charge of Extension Training, October 17, 1957 and January 23, 1958.

instructors have studied abroad, either at the American University in Beirut or in the United States.

As far as the ICA technical assistance program is concerned, it has practically come to a standstill. The last American agricultural technician in the Valley was scheduled to leave in the autumn of 1958. Then only the ICA Area Director and the Public Health Service doctor, both dedicated men, would remain. Job turnover among the Americans has been extremely high, and one technician recruited in 1958 for community development work in the Helmand refused to go beyond Kabul. The ICA program in the Valley will have to be rebuilt from scratch if anything further is to be done to make a success of lands already under cultivation and those scheduled for settlement.

This need to reconstruct the program, however, can have positive value if some of the previous errors are now avoided. U.S. technical assistance in the Helmand Valley has been devoted to service and experimental projects. It has provided hydrological, operation and maintenance, and public health advisory services on a more or less sustained basis. At various times, the ICA agricultural program in the Helmand has included experts in animal husbandry, forestry, horticulture, agronomy, soil management and irrigation.[1] But these experts have tended to regard themselves as acting in a purely advisory capacity, and ICA policy has tended to reinforce this conception. It is, of course, a difficult matter to tread the path between advice and direction in a country sensitive to political encroachment. Furthermore, the early difficulties encountered

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[1]The University of Wyoming, under contract with ICA, supplied an agronomist to supervise work on the experimental farm in Shamalan, later moved to Marja, but aside from incidental instruction of the actual workers on the farm no Afghans were being treated as trainees under this project.

by RGA and MKA in Valley development led ICA to avoid becoming involved to the extent of recommending large-scale measures and programs. The result has been that the various experts have limited themselves to suggesting certain useful, but very partial, attacks upon the basic and serious problems in the area. Cattle, sheep and hens have been imported to upbreed local stock. One agronomist apparently sought a solution to the soil problem in the cultivation of tolerant sweet-potatoes, and devoted much of his time to devising means of storing them and of persuading the Afghans to eat them. Still other crops foreign to local cultivation or consumption habits have been introduced and grown for seed increase with little assurance that they will be accepted. The forestry project has been concerned with cultivating seedlings for eventual fuel and lumber production, and a number of useful windbreaks have been planted. But the use of ornamental pines rather than faster-growing willows or mulberries in some areas is a dubious application of nursery management.

In short, despite five years of technical assistance to the Helmand Valley Project, during which time personnel have come and gone, the ICA program has made little progress in getting across to the farmer the basic information and techniques he needs to make use of his problem soils and to improve his production. For these reasons, the following suggestions are put forth for consideration if and when the ICA program is reactivated:

1) With RGA-HVA concurrence, technical assistance to the Helmand Valley Project must take the form of agricultural education and extension work, either directly with the farmers or through direct participation in the HVA Agricultural Extension Training Center. Interpreters will be needed in either case, but, if carefully selected, they can profit by the experience and later serve as counterparts or instructors themselves.

2) The RGA should be urged to consider Afghan extension workers in the same category as school teachers. This means that such personnel should be draft-exempt on the understanding that they will spend a certain number of years in the profession. The exemption, plus a raise in pay which could be supported by ICA directly or through P.L. 480 counterpart funds generated by the wheat loans, may encourage more Vo-Ag graduates to serve in the Helmand. In addition, a number of scholarships could be made available from such funds to students at Vo-Ag with the understanding that they will be required to serve for a number of years in the Valley.

3) American personnel hired for work in the Helmand should be fully briefed on the nature of their work and living conditions before contracts are signed. The emphasis must be put on selecting persons capable of teaching through interpreters and motivated by the desire to pull this specific project out of its present state of torpidity.

4) In addition to agricultural extension personnel, a number of experts in community development should be provided. Such persons should serve both as <u>field</u> supervisors for Afghan village level workers and as instructors to train these workers and their own Afghan counterparts. If such personnel cannot be secured in the United States, where we have not had much experience with this sort of work, third-country procurement, e.g., of Indians who are politically highly acceptable to Afghanistan, should be undertaken.

5) Future settlers, whether ex-nomads or tenant farmers, should be given verbal and audio-visual orientation during the period when they are awaiting land allotments. This should pose no particular problem inasmuch as such settlers usually spend a number of weeks in the old construction

camps or on the margins of the Marja tract before they can be put onto the land. This period should, of course, be reduced, but it can also be put to far better use in instructing settlers as to the problems they will face and as to what means are available to solve them.

6) In the specific case of settlers on lands which are best cultivated in irrigated pasture, financial assistance in grant or loan form should be extended to enable them to purchase animals and to feed themselves and their flocks until crops and animals are mature. The cost of this procedure might be reduced by an agreement whereby HVA would mechanically cultivate grain and hay on its own lands or on unused project and out-of-project lands and make food and fodder available to the settlers concerned. Such mechanical cultivation of grains and legumes, in proper rotation, might also serve to upgrade these lands for future settlement. Public Law 480 counterpart funds would appear eminently suitable for use in supporting the irrigated pasture, animal purchase, and mechanical cultivation programs.

The foregoing suggestions do not imply that in the writer's opinion the Helmand Valley Project is a failure. Rather, it is believed that the Project is now in one of its most critical stages, and that what is done by ICA and HVA in the ensuing months can radically affect its future one way or another. In 1958, ICA transferred a grant of $1.5 million, originally scheduled for Kabul University, to complete the Upper Darweshan project, to begin work on Arghandab power, to enable ACU to build a permanent bridge across the Helmand at Lashkar Gah, and presumably to repair the Boghra Canal leakage. There is no doubt that all of these projects are well-justified. Allocation of another $1.5 million from unassigned Fiscal Year 1958 funds was being considered to finance construction of intakes for the Seraj area, to build an irrigation network to serve 15,000 to 18,000 acres in the Tarnak, and to provide $350,000 worth of supervisory services and equipment for the Afghan Construction Unit to use in land development. Of these projects, only Tarnak irrigation appears inadvisable, for the reasons set forth above. An RGA request[1] for planning of "irrigation, engineering and drainage in the Central and North Arghandab area to improve efficiency of use of irrigation water through allocation, measurement, control, conveyance and management of available water supply" and for "construction of intake structures at five [North Arghandab] inlets to existing irrigation canals to permit control and regulation of diversion of irrigation water" seems more sensible in view of what is known of the relative values of North Arghandab and Tarnak for intensive agriculture, rather than mere allocation of acreage to settlers. Nor should it be forgotten that when proper cadastral surveys are carried out in the Arghandab areas, as well as in Shamalan and Darweshan, it may be entirely feasible to locate the 2057 families postulated by the <u>Tudor Report</u> on these two areas. ICA technical assistance for Fiscal Year 1958 was also to include furnishing of a surveyor and engineer to aid HVA in cadastral work in either Shamalan or Darweshan, with concurrent training of Afghan apprentices. Such surveys should be made for all areas presently developed, and could well be extended to Seraj, although, as has been indicated, the present crowding in that area would not allow the provision of 1668 new farms envisaged by Tudor without the perpetuation of present unsatisfactory conditions.

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[1]Set forth in Letter of Agreement between RGA and MKA, October, 1958.

While there is as yet no way to estimate how many new families have moved onto privately-owned lands benefitted by the Project, it is apparent that most of the previously-settled areas are enjoying an economic revival. In North and Central Arghandab, in Shamalan and Darweshan, farmers have been able to water lands previously usable in only one out of two or three seasons. Much land now bears two crops a year where previously water was available for only one, and that without assurance. Where excessive irrigation had harmed Shamalan soils, the new drainage network combined with farmer education may be able to reclaim and upgrade them. In Darweshan, it is hoped to avoid the mistakes of Shamalan and prevent water-logging and resultant salinization from the start.

The area from Kajakai to Girishk, and the Seraj, although not yet included in the Project, have also profited from firm and reliable water supplies. The same can be said of the downstream areas of Garmsel and Chakansur. The Tudor Report estimated increases in crop values achieved since the beginning of the project at 107,900,000 Afghanis ($2,158,000 at free market rates) for the Arghandab-Tarnak areas, at 97,300,000 Afghanis ($1,946,000) for the Middle Helmand areas as we have defined them, and at 32,800,000 ($656,000) for the Garmsel and Chakansur areas.[1] While such estimates must be taken _cum grano salis_, no one can deny that substantial benefits have accrued from the water supply and flood control features of the Project.

We have also indicated that there is much to be gained from the hydroelectric features of the Project. Indeed, more prompt action on the Arghandab power plant could have made such benefits available to Kandahar

[1] _Tudor Report_, p. 186.

consumers, including the International Airport, the Woolen Mill, and Pushtoon Industries, by the fall of 1958. The Kandahar Industrial District, if and when it is constructed, will also profit by this source of power, which may well become a magnet for further economic development.

In conclusion, then, we may repeat that the benefits inherent in the Helmand Valley Project are still within reach. On the basis of the author's estimates given above one may reasonably expect that an eventual area of over 288,900 acres may be added onto the cultivable acreage of Afghanistan, an increase of some 5%. On the basis of Mr. Fly's estimates, 600,000 to 715,000 acres may be added:

> The principal point which we have to consider in respect to Afghanistan is that we have here in the southwest area over one million acres of usable land and we have also over ten million acre-feet of usable water. This is about twice the amount of necessary water for the proper irrigation of the lands that are potentially available. A very conservative estimate of the worth of these land and water resources, when properly developed, would be about $120 per acre in annual gross income.[1]

Considering only the areas for which development is now assured, i.e., eliminating Tarnak, Seraj, and the lower third of Darweshan, Garmsel and Chakansur,[2] irrigable acreage will have been increased by some 131,000 acres (author's estimates) without allowance for double cropping. If,

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[1]Letter from Claude L. Fly, August 18, 1958.

[2]The Tudor Report, p. 185, estimated that over the whole Helmand Valley, including the areas here excluded, the area annually irrigated had increased by 1956 by some 122,000 acres, an increase of 60%. The author's estimate, which relates only to the areas where development work has actually been undertaken and which can provide land for new settlers if cadastral surveys are undertaken, is based on the HVSR draft estimates of total potential irrigable acreage and of changes in acres annually farmed. HVSR draft, Supplement No. 7, Table No. 14. In the absence of clear data relevant to the two Arghandab areas, we have assumed that about 8000 additional acres will be ascertained to be the property of private owners and the remaining 28,000 acres as available for settlement.

thanks to careful reclamation and cultivation practices, the 65,000 still vacant of these acres can be brought up to their potential land classification, they would support some 6000 additional families, or 48,000 more people than are now settled in the Valley. Even if few of these future settlers come from nomad tribes, the use of these lands will be a net gain in production. For the resettled tenant farmers, the chance to cultivate their own lands is an opportunity to raise their own production, their standard of living and their self-esteem. The important thing is to assure either nomads or tenants that the promise of the Helmand Valley Project can be fulfilled. If the proposed agricultural extension and community development program can be implemented in the making of good farmers and healthy citizens, then the Project will be as much of a success as its inherent geographic limitations allow. In view of the continuing paucity of factual data, no more objective statement can yet be made.

PART II

INTERREGIONAL ANALYSIS

VIII. THE DIRECTION OF AFGHAN ECONOMIC DEVELOPMENT

The survey of the three regions which appear to hold the key to Afghanistan's future economic development has now been completed. Only the Kabul, Kunduz and Helmand Valleys offer the necessary combination of soils, water, population, location with respect to foreign markets and sources of supply, plus some existing industrial base upon which to build. At any rate, only these three areas are under active consideration by the RGA and private interests for large-scale investment of Afghanistan's limited capital resources. Given these facts, it is the next task of this study to analyze according to type and location the proposed investments which can produce optimum results, measured in terms of a higher standard of living for the Afghan people. In the author's opinion, such a standard of living must include qualities of self-sustenance and security in order to be acceptable to the Government and the leading entrepreneurs of Afghanistan. That is, the economy must not be one based primarily upon external economic assistance, liable to collapse if such assistance is withdrawn, and it must not be one purchased at the cost of incurring enmities which might lead to the termination of the Afghan way of life, as distinct from that of other nations. In short, the economy which is ultimately developed in Afghanistan must be designed to sustain traditional Afghan independence and neutrality among power blocs. With these qualifications in mind, and the preceding regional studies upon which to draw, we may now proceed with an economic-geographic analysis of the most advantageous directions of development.

Disadvantages of Mineral Development at the Present Time

In the preceding chapters, we have written very little concerning the mineral resources of Afghanistan. The principal reason for this hiatus is the general lack of information on Afghan geology and mineralogy. A Geological Survey Department was established under the Ministry of Mines and Industries only in 1955, and very few sections of Afghanistan have as yet been geologically mapped.[1] Naturally enough, the RGA is more interested in exploration designed to locate precious metals or minerals commanding a high price on the world market than in the tedious and less immediately rewarding plotting of stratigraphic formations and petrography. Yet, except for the element of chance, sometimes guided by local hearsay, it is only such pedestrian work that can lay a sound foundation for the discovery and commercial exploitation of mineral wealth. Credit for recognition of this fact is due both to the Ministry and to the United Nations Technical Assistance Mission (UNTAM henceforth) which continues to provide expert geological and topographical assistance. The United States ICA Mission has also assisted by paying most of the cost of an extensive aerial photography survey carried out by Fairchild in the autumn of 1957. This photogrammetric survey, from which a basic reconnaissance map at a 1:250,000 scale and partial studies at 1:50,000, both with 100-meter contours, are now being furnished to the RGA, represents the first step towards obtaining reliable topographical sheets from which structural interpretation and ground surveys can proceed. But restriction to these scales and contour interval, combined with the "strategic" exclusion of a 50-mile wide zone in northern Afghanistan, will limit the usefulness

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[1] Marcel Schwob, "The Economic Challenge in Afghanistan," United Nations Review, II (July, 1955), pp. 25-27.

of even this reconnaissance mapping.[1] In particular, the Sar-i-Pul area of petroleum seepages and test drillings is not included. It has been reported that an East European concern will map the excluded portions on a comparable scale, but no such work has yet begun.

We shall discuss the petroleum situation further in Chapter X, but for the present it may be said that no indication of the extent of the deposits is yet available. Nor is it apparent how substantial deposits, even *if* located, could be developed. Presumably, Afghan crude oil could be piped from Sar-i-Pul to the Amu Darya and then taken by barge and railroad for processing in Soviet Central Asia or on the Caspian. But by the time the products were returned to Afghanistan the cost would probably be almost as high as that of the Soviet gasoline and kerosene now being imported. Perhaps the Afghans could exchange crude oil for Soviet refinery products or persuade the Soviets to help them build a simple thermal process plant for the refining of diesel fuel, gasoline and kerosene. The preparation of aviation fuel in quantities sufficient for the Kandahar International Airport is far beyond prospective abilities, even if lighter grades of crude than those yet sampled are found at Sar-i-Pul (see Chapter X). At best, Afghanistan might eventually reduce its import requirements for some petroleum products or develop a market for crude oil to offset some of the foreign exchange costs, but

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[1]Interview with Mr. Russell, ICA photomapping expert, at Kandahar, October 10, 1957.

[2]Interview with Mr. Massa, petroleum engineer, Ministry of Mines and Industries, Kabul, February 13, 1958.

this is likely to be both far in the future and on a comparatively small scale.

The situation with respect to coal is somewhat similar, and will also be discussed in detail in Chapter X. The most that can be hoped for in this direction is an increased supply for domestic needs resulting in less reliance upon imported diesel fuel. No coal is presently imported or exported, and transportation difficulties seem to rule out any such traffic in the foreseeable future.

The domestic demand for coal will increase as domestic cement-producing capacity grows. We have seen in Chapter I that the first Afghan cement mill, with a capacity of 100 tons per day, went into operation at Jabal Seraj in 1958. A site at Pul-i-Khumri, north of the mountains, appears to be even more promising, and may get a 200 ton per day cement plant in the near future. While it is unreasonable to expect Afghanistan ever to become an exporter of cement to the U.S.S.R. or to Pakistan, the nation should eventually be able to meet its own needs, thus conserving the foreign exchange previously devoted to imports. In fact, of the possibilities for mineral development, coal and cement are the most promising yet known and may represent the only areas where such development can make an immediate and considerable contribution to the Afghan economy.

> For years, the high cost of imported cement has been burdening construction projects, especially those of Morrison-Knudsen Afghanistan in the Helmand Valley. At an estimated annual consumption rate of 20,000 tons, price savings would be in the neighborhood of $200,000 a year since the delivered cost of foreign cement in Kabul has been running as high as $40 per ton, while local cement is expected to sell for $30.[1]

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[1]Wilber, Afghanistan, p. 246.

In the realm of semi-precious minerals, Afghanistan has been noted for centuries for the high quality of its lapis lazuli. Most of this gem stone comes from the mountainous province of Badakhshan and can be exploited only because of its high value with respect to weight. Much of the lapis lazuli is processed in the privately-owned Hajari Najari plant adjoining the Ministry of Mines and Industries in Kabul and sold at prices fixed by the RGA. The Ministry is keenly interested in increasing extraction and export of this mineral and employs some of its best talent for prospecting work, to which geological mapping is often subordinated.[1] But neither the lapis lazuli nor the sporadic appearance of rubies and precious metals can be regarded as a serious contribution to the economy at present. Nor can much be expected from the scattered known deposits of copper, lead, zinc and other base metals, although systematic exploration of the complex stratigraphy of central Afghanistan may, of course, produce unforeseeable developments.[2]

Two attempts at mining known ore deposits have both fallen short of expectations. West of Mohammed Aga in the Logar Valley, eleven surface occurrences of chromite were surveyed and plotted for the RGA by M. E. Volin of the United States Department of the Interior, who prepared a thorough report on his explorations in 1950.[3] Mr. Volin esti-

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[1]Interview with Mr. Nicholas Galakhoff, UNTAM geologist, at Taliqan, September 23, 1957.

[2]See International Engineering Company, Helmand Valley Industrial Survey, Phase I Report, prepared for Morrison-Knudsen Afghanistan, Inc. (San Francisco, 1955).

[3]M. E. Volin, Chromite Deposits in Logar Valley, Kabul Province, Afghanistan, prepared for the Government of Afghanistan (Washington, U. S. Dept. of the Interior, 1950).

mated the total reserves as 181,200 tons with a Cr_2O_3 content ranging from 35.8 per cent to 57.5 per cent, but only 27,760 tons meet or exceed the current 50 per cent Cr_2O_3 minimum specification for metallurgical chromite. The cost of mining this ore and shipping it to the Eastern Coast of the United States was estimated at $36 per ton, and a profit of $12 per ton was anticipated. However, no further steps have been taken to realise even this $325,000, and it is apparent that either a considerably higher world market price or closer markets will be necessary before mining of the remaining lower-grade ore, amounting to over 84 per cent of the deposit, can even be considered. Reduction of the extremely high transport costs by improvement of the roads connecting the Logar Valley and the railhead at Peshawar in Pakistan would be of some assistance, but there remains the problem of improving mining operations and obtaining timber from the Gardez region, another 80 miles beyond the deposits. Perhaps the Afghans themselves consider the base too small for expansion in the light of Mr. Volin's investigations.

At Darra Noor in Eastern Province, about 40 miles northeast of Jalalabad, is a deposit of perhaps 1000 tons of beryl which has been mined since 1954 at a rate of 30 or 40 tons per year for export. In 1957, an engineer of the Ministry of Mines and Industries personally supervised the mining and packing of 60 tons of beryl for sale to the United States firm of C. Tennant Sons and Company. This promising arrangement, made with ICA encouragement, turned sour when it was found, after shipment was completed, that the ore contained less than the 10 per cent of beryllium commercially acceptable. But since it also contained 2.5 per cent lithium, efforts were made to save some of RGA's money by selling it for lithium extraction in the United States.[1]

On the northern slopes of the Safed Kuh range in Eastern Province are many outcrops of talc. These are exploited in crude fashion by the Shinwari tribesmen who carry the talc over the passes for sale in Pakistan, but the RGA does not gain any revenue from this traffic.

During MKA operations in the Helmand Valley, several deposits of iron ore were located and analyzed.[2] The best of these apparently is the estimated two to three million tons of magnetite ore at Haji Alam, about 30 miles east of Kajakai Dam and off the old Kajakai to Kandahar road. A sample of this ore showed 64.17 per cent iron content with low (0.01 per cent) sulfur and (0.016 per cent) phosphorus inclusions.[3] But the total amount of this ore is not considered to justify smelting under present conditions, especially in view of the lack of satisfactory coking coal in the region. Proposals to utilize Kajakai power for an electric furnace operation are presently, if not permanently, out of the question, the meager needs of Kandahar being satisfied by scrap and by imports of perhaps 125 tons of primary iron and steel products per year.[4] Nor would this amount and quality of ore suffice for profitable export. Of more interest might be the unusual combination of ferro-manganese and rare earth elements in the Koh-i-Khan Nashin Ridge, about 18 miles south of Khairabad at the lower end of the Darweshan area. A

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[1]United States Operations Mission to Afghanistan (ICA), <u>Mission's Monthly Report</u> (TOICA A-629, January, 1958) (Kabul, 1958), pp. 4-5. (Hektographed.)

[2]International Engineering Company, <u>Helmand Valley Industrial Survey . . .</u>, Section B-IV.

[3]<u>Ibid</u>., p. 25.

[4]<u>Ibid</u>., Section VII, p. 12.

sample of this ore assayed as follows:

TABLE 31

KOH-I-KHAN NASHIN IRON ORE ASSAY[a]

Compound	Percentage	Compound	Percentage
CaO	30	MgO	10
Fe_2O_3	16.52	BaO	10
MnO_2	11.12	Rare Earth Oxides	2.5

[a]International Engineering Company, Helmand Valley Industrial Survey . . ., Section B-IV, p. 9.

Farther south, near the Pakistan border, are the Malik Dokand deposits of "Oriental Alabaster" (essentially, marble rather than gypsum or "New World Alabaster"). This material is much favored for ornamental stonework and is easily quarried. Transportation across the desert pavement here would be easier than in most parts of Afghanistan, but this factor is offset by the comparatively low value of the material. In fact, the absence of any known bulk commodity in sufficient quantity and value to justify export was one of the principal reasons for recent recommendations that the railroad not be extended from Spin Baldak to Kandahar in the foreseeable future.[1]

The fact that the need to provide bulk transport for mineral products of any sort did not enter into the 1957 transit study of southern and eastern Afghanistan (to be discussed in Chapter XI) is another in-

[1]Koebig and Koebig, Consulting Engineers, Report on Transportation Facilities of Afghanistan and Pakistan, prepared for International Cooperation Administration (Los Angeles, 1957), pp. v and 111, 117. This document will henceforth be referred to as Koebig and Koebig Report.

dication of the fallacy of looking to mineral development, aside from fuels (see Chapter X) as a primary basis of Afghan economic development. As far as Afghanistan's mineral resources are now known--and it must be emphasized that this is not very far indeed--it is apparent that transportation obstacles would represent only a secondary problem. The primary problem at present is the lack of knowledge of any large quantities of high quality minerals in demand at home or on the world market. Even in the cases of chromite and beryl, where serious efforts at exploitation have been made, the results have been discouraging. Petroleum and coal extraction, which could help meet domestic needs and perhaps replace some fuel imports, are in the early stages of development. Afghanistan lacks the cadre of trained engineers properly to survey the nation and adequately to develop known or discovered deposits. The nation lacks the capital to hire outside technicians for this work or to make the initial, usually high-cost, investments in extractive facilities. While some of these services have been provided as technical assistance by the United States and the United Nations, it is unlikely that any capitalist country or company would make substantial investments in extractive industries of a neutral area bordering the Iron Curtain. Presumably, some of the technical assistance and development capital needed will be forthcoming from the Soviet Union, under the $100 million credit line extended in December, 1955, or from other nations in the Soviet Bloc. But such assistance can probably be called forth only by adequately-demonstrated opportunities for economic or political gain, which the RGA may be reluctant to offer.

At any rate, until the RGA can provide or obtain the personnel and equipment necessary for thorough exploration, sampling and testing, the problems of extraction, transportation and processing of non-fuel minerals, serious as they are, remain somewhat academic. In the meantime, it is obvious that Afghanistan must look elsewhere for the means of improving its living standards and its bargaining position vis-a-vis the outside world. It is one of the principal themes of this study that those means can be obtained most readily by a concentration of available capital and technical services in the agricultural sector of the Afghan economy, and more particularly upon certain key crops or products in that sector. These possibilities will now be discussed in a general fashion, and then, in Chapter IX, related to the three regions which we have studied in detail in Chapters I through VII.

Advantages of Increased Domestic Production and Processing of Agricultural and Pastoral Commodities

One fairly reliable guide to the productive capacities of a nation lies in its import-export data. Those goods which a country cannot produce it must do without or import. Those products in which it enjoys a comparative productive advantage it can usually export profitably. While such considerations as weight, bulk, perishability and distance to market will influence the flow of trade, the presence of certain commodities high on a nation's foreign trade list year after year is a reliable index to its needs and capacities. Thus, if we consider Afghanistan's exports for the six-year period 1951-52 through 1956-57, we find that no mineral raw materials or products even appear among the major categories as they are officially listed:

TABLE 32

AFGHAN EXPORTS 1951-52 THROUGH 1956-57 IN MILLIONS OF AFGHANIS[a]

Category	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	Last 3 Total	Years Average
Carpets	32.6	22.1	30.6	47.2	76.1	50.6	173.9	58.0
Gut Casings	6.9	3.1	9.4	14.1	22.6	39.0	75.7	25.2
Raw Cotton	64.6	287.3	167.1	247.3	141.4	188.7	577.4	192.5
Dried Fruits	198.3	223.5	242.0	431.6	419.7	330.9	1182.2	394.1
Fresh Fruits	67.9	65.0	55.7	115.5	117.6	174.6	407.7	135.9
Broadtail Pelts	5.6	10.1	14.8	2.1	3.1	20.8	26.0	8.7
Karakul Pelts	158.9	158.2	166.3	307.9	292.4	375.4	975.7	325.2
Sheep and Goat Skins	12.8	9.2	65.2	24.0	29.5	52.2	105.7	35.2
Sesame	39.0	16.2	8.3	24.6	30.0	37.8	92.4	30.8
Raw Wool	124.2	178.2	149.0	187.8	147.8	152.0	487.6	162.5
Other Exports	22.0	15.7	41.4	37.7	71.4	77.9	187.0	62.3
Total	732.8	988.6	949.8	1439.8	1351.6	1499.9	4291.3	1430.4

[a]Data compiled by Ministries of Planning and Commerce of the RGA from figures of the Central Customs Clearing House, Kabul; made available to the author by the Ministry of Planning in December, 1957.

A distinct series of data on exports by quantity from 1953-54 through 1955-56 bears out the absence of mineralogical items among Afghanistan's principal exports:

TABLE 33

AFGHAN EXPORTS 1953-54 THROUGH 1955-56 BY QUANTITY[a]

Category	Unit	1953-54	1954-55	1955-56	Average
Carpets	'000 m^2	180.0	228.0	153.0	187.0
Gut Casings	'000 loops	769.5	1046.9	1451.0	1089.1
Raw Cotton	'000 m.t.	10.68	12.55	6.15	9.79
Dried Fruits	'000 m.t.	17.05	42.84	22.75	27.55
Fresh Fruits	'000 m.t.	18.63	28.46	18.47	21.85
Hides and Skins	'000 pieces	1137.6	1217.5	1642.0	1332.4
Karakul Pelts	'000 pieces	1251.7	1846.6	1743.1	1613.8
Oil Seeds	'000 m.t.	2.84	4.12	3.56	3.51
Raw Wool	'000 m.t.	5.09	5.26	7.77	6.04

[a]International Monetary Fund, Report on 1956 Consultations - Afghanistan, Part II, Appendix I (Washington: November 28, 1956), p. 39.

Of the two series of export data, that relating to exports by value is probably the more accurate as well as the more recent, inasmuch as it resulted from a careful reappraisal of the records at the Central Customs House in Kabul under the supervision of personnel from the Ministries of Planning and Commerce aided by their UNTAM advisor. Work is continuing on an equivalent series of data by quantity, but for the present the series of export data by value will serve our purposes.

While these value data could be meaningfully expressed in dollars only by adjusting them in terms of the constantly depreciating value of the Afghani over the six-year period covered, they are quite adequate in the form given to indicate the relations among the principal items of Afghan export trade. From these figures, it is apparent that four or five agricultural commodities clearly dominate Afghanistan's export trade. The combined values for dried and fresh fruits would exceed those of any single commodity in each of the six years reported. Dried fruits alone held first place in four of the years, but yielded to raw cotton in 1952-53 and to karakul skins in 1956-57. Karakul has been in second place more often than raw cotton, but fell even below wool in 1952-53. Wool displaced raw cotton in 1951-52 and in 1955-56, while fresh fruits have shown increasing strength over the last three years and displaced wool in 1956-57. Perhaps the only safe generalization regarding Afghanistan's leading exports is to say that dried fruits, karakul and raw cotton are the leading commodities, with year-to-year variations in production and/or sales determining the exact rank. Fluctuations in exports of all five leading commodities have been both wide and erratic over the six year period, partly due to the frontier dispute with Pakistan, but they have been more stable in the last three years during which the North West Frontier was generally open and by which time outlets by air and through the U.S.S.R. had been developed.

It may also be said that while the absence of known sources of mineral wealth forces some countries to rely exclusively upon their agricultural products, it seems that in Afghanistan the agricultural sector will continue to enjoy certain particular advantages even if future minerological exploration is highly successful. For example, it is generally conceded by buyers of karakul skins, known in the United States as "Persian lamb", that the best grades of Afghan skins are superior to any exported by the Soviet Union or the Union of South Africa, Afghanistan's principal competitors in this market.[1] Of course, this advantage can be lost if Afghanistan falls behind in upbreeding and care of flocks (see Chapter IX), but for the time-being at least Afghanistan is in a superior competitive position quality-wise.

As a second example, it is highly probable that both West Pakistan and India will continue to be deficient in deciduous fruit production, while Afghanistan, by maintaining her surplus, can continue to enjoy the advantages of her proximate location to this large market. Afghan meat, dairy products and sheep and goats likewise will continue to find a ready outlet in West Pakistan, while surplus wool and woven products are likely to remain in high demand not only in Pakistan and India but, in the better qualities, in the U.S.S.R., West Germany and the United States. The cotton grown in the Kunduz Valley, though subject to poor cultivation and mixing of varieties, is nevertheless able to compete with long-staple varieties in Europe when it is properly graded and marketed. It is also being accepted by West Germany and the U.S.S.R. in repayment for development loans to Afghanistan. These examples are given not to suggest that Afghanistan possesses any absolute and eternal advantages along the lines enumerated, but rather to indicate some of the preferable directions for agricultural development and exports. We shall return to this theme after a review of Afghanistan's imports.

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[1] Wilber, Afghanistan, p. 289.

TABLE 34

AFGHAN IMPORTS 1951-52 THROUGH 1956-57 IN MILLIONS OF AFGHANIS[a]

Category	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	Last 3 Total	Years Average
Cars and Trucks	21.0	15.8	17.0	95.9	13.6	80.5	190.0	63.3
Gasoline and Kerosene	39.0	46.5	43.9	28.7	28.8	55.4	112.9	37.6
Building Materials	14.1	9.5	20.0	15.1	17.8	43.9	76.8	25.6
Ironware	17.7	6.6	16.7	21.0	42.8	24.1	87.9	29.3
Cotton piece goods	263.4	193.5	405.0	357.6	415.1	357.3	1130.0	376.7
Artificial Silk piece goods	31.8	67.9	88.4	133.2	200.0	298.2	631.4	210.5
Sugar	11.0	54.9	75.9	34.2	53.9	168.4	256.5	85.5
Tea	52.5	50.5	44.1	101.6	169.5	135.3	406.4	135.5
Leather and leather goods	68.4	41.9	11.6	15.9	23.5	19.5	58.9	19.6
Notions	36.0	75.0	91.9	38.6	63.3	112.7	214.6	71.5
Other Imports	91.1	164.8	221.6	184.8	226.8	328.3	739.9	246.7
Total	646.0	726.9	1,036.1	1,026.6	1,255.1	1,623.6	3,905.3	1,301.8

[a]Data compiled by Ministries of Planning and Commerce of the RGA from figures of the Central Customs Clearing House, Kabul; made available to the author by the Ministry of Planning in December, 1957.

TABLE 35

AFGHAN IMPORTS 1954-55 THROUGH 1956-57 BY QUANTITY[a]

Category	Unit	1954-55	1955-56	1956-57	Total	Average
Cars and Trucks	units	390	193	832	1415	472
Gasoline and Kerosene	'000 m.t.	3487.8	16,844.4	17,696.6	38,028.8	12,676.3
Building Materials	'000 m.t.	4161.6	5,008.0	5,074.8	14,245.4	4,748.5
Ironware	m.t.	2864.2	6,793.3	2,292.2	11,949.7	3,983.2
Cotton piece goods	m.t.	6029.4	11,696.4	3,512 1	21,237.9	7,079.3
Artificial Silk piece goods	m.t.	1879.4	2,045.2	2,227.3	6,151.9	2,050.6
Sugar	m.t.	5844.3	9,658.7	19,925.7	35,428.7	11,809.6
Tea	m.t.	2022.3	3,084.7	3,700 4	8,807.4	2,935.8
Leather	'000 m.t.	312.5	338.9	325.5	976.9	325.6
"	pieces	1066	-	-	1,066	-
Leather goods	'000 m.t.	not available	4.1	136.4	140.5	-
" "	pairs		125,659	-	125,659	-
Notions	m.t.	633.7	816.9	1,284.5	2,735.1	911.7
	units	7139	-	-	7,139	-

[a] Data compiled by Ministries of Planning and Commerce of the RGA from figures of the Central Customs Clearing House, Kabul; made available to the author by the Ministry of Planning in December, 1957.

If we exclude "notions" which cannot be considered as a single commodity, the salient features of the import pattern appear to be:

1) the relatively minor place taken by durable goods and fuel relative to processed or even sémi-processed (sugar, tea) consumption goods which are agricultural in origin;

2) the predominance of cotton piece goods among imports over the entire six-year period;

3) the steadily increasing challenge by artificial silk piece goods to the predominance of cotton piece goods; and

4) a general alternation between sugar and tea for third and fourth place, except for 1954-55 when cars and trucks ranked fourth and sugar fifth.

These import data are even more significant when projected against the domestic economic background set forth in Chapters I through VII and when compared with the leading categories of exports. Afghanistan not only imports, in manufactured or processed form, commodities which it produces domestically, but actually exports some of the raw materials which are used to make these commodities. For example, cotton piece goods are the principal import; raw cotton is among the leading exports. Afghanistan produces approximately 20,000 metric tons of ginned cotton per year of which only 9400 metric tons can be processed in domestic textile mills if operated at full capacity. Yet the country must import an average of over 7000 metric tons of cotton piece goods[1] at an average annual cost of over 375 million Afghanis ($7.5 million at today's free market rate).

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[1]Average for the years 1954-55 through 1956-57 based on quantity import data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources same as those of value import data.

Even with allowances for loss of weight in processing, it is apparent that Afghanistan's raw cotton production would be sufficient to meet her cotton piece goods requirements in an average year providing: a) sufficient processing capacity were available, and b) there were no requirement to export raw cotton to meet prior commitments. Even though we cannot assume b) to be true, the savings in foreign exchange over the past three years would have amounted to 110.3, 273.7 and 168.6 million Afghanis, respectively, or an average of 184.2 million Afghanis ($3.7 million) which could have been devoted to direct payment of foreign indebtedness or to procurement of industrial goods which Afghanistan cannot make for herself.

Of course, one must not forget that it costs Afghanistan something to make her own cotton textiles, and these costs partially offset those of imports. While RGA controls over profit rates and wholesale prices of the Textile Company (see Chapter II), combined with minimum resale prices on some imported textiles,[1] obscure the actual cost-price relationships, one may conclude from the eagerness of the Textile Company to expand its production at both Pul-i-Khumri and Gulbahar that domestically-produced cloth can still be sold at a considerable advantage over imported. The same reasoning applies to the Baghlan Sugar Company, which would like to double its processing capacity if a sufficient supply of beets were assured. And, although operations have only recently begun at the Jabal Seraj cement plant, one may safely assume that domestically-produced cement will undersell the imported product, at least south of the Hindu Kush. It will be rewarding to observe the de-

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[1]See Wilber, Afghanistan, p. 280.

velopment of both the sugar and cement markets as the impact of the RGA-owned cane sugar plant at Jalalabad and cement mill at Jabal Seraj is felt upon the domestic economy.[1]

It should also be pointed out that the Afghan tariff system affords a measure of protection to domestic producers of certain goods, and may do so to an even greater extent if it is increased as was proposed in the Five Year Plan. The existing and proposed tariff rates on each of the major import categories listed above are given in Table 36. The Five Year Plan explicitly described the tariff policy of Afghanistan as one "which serves a double purpose, namely protection and provision of revenue in Afghanistan, /however,/ its revenue character is of greater importance due to the fact that industry has not developed much. Therefore such fiscal and protective policies are proposed that on the one hand the customs duty will be coordinated with the economic and financial conditions of the country, and on the other will encourage export and industrialization."[2] Thus, it may be argued that protectionism has played some part in the development of domestic industries since 1934 when the

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[1]See Wilber, Afghanistan, p. 243: "As regards further investments, the cotton textile market, after the completion of the current projects under way /Pul-i-Khumri and Gulbahar/, theoretically leaves a balance of prospective imports of about 30 to 45 million meters. However, much of this constitutes rayon and high count cotton cloth which the Afghan mills do not make and in which foreign mills would perhaps retain a quality advantage even if Afghan mills did. There is doubt that much inroad can be made into this part of the textile market. In cement and sugar there definitely seems to be a future, but expansion in both fields depends on the expansion of complementary productive capacity, i.e., coal and beets."

While the general tenor of this extract is undoubtedly correct, it is believed to be overly pessimistic as regards cotton textile prospects. On the basis of an estimated 120 million square meters annually consumed in Afghanistan (see Chapter II), the gap which will remain after the new capacity is fully utilized apparently is of the order of 57 million square meters of cotton piece goods alone. Provision of additional capacity to fill this gap will be discussed in Chapter IX.

[2]<u>The Five Year Plan of Afghanistan</u>, p. 222.

present tariff schedule was inaugurated, and would play a greater role if the proposed increases were adopted:

TABLE 36

EXISTING AND PROPOSED IMPORT TARIFF RATES[a]

Commodity	Existing Rate in Per Cent	Proposed Rate in Per Cent	Proposed Increase As A Percentage of Existing Rate
Passenger Vehicles	30	30	0
Kerosene	34	35	3
Building Materials	various	various	various
Ironware	various	various	various
Cotton piece goods	35	40	14
Artificial Silk piece goods	35	50	42
Sugar	35	35	0
Tea	35	35	0
Leather	30	30	0
Leather goods	30	60	100
Notions	35	60	71

[a]Afghanistan Mission to the United Nations, The Five Year Plan of Afghanistan, pp. 223-224. Note that trucks and gasoline, both imported only by Government Monopolies, are not taxed as are passenger vehicles and kerosene which are imported on private account. Why sugar, another Government Monopolies item, is taxed is not clear; since the duty is passed along to the consumer it cannot be considered a tax on Government Monopolies, but may serve to raise the price of imported sugar to that of the domestic.

It is apparent from the preceding schedules that the RGA does not consider additional tariff protection necessary to stimulate further domestic production of either sugar or leather. The proposed additional five per cent tariff on cotton piece goods and the additional 15 and 30 per cent tariffs on rayon and leather goods, respectively, may result either in higher revenues to the RGA or in stimulation of domestic industry.

One might, of course, inquire how domestic industry would fare if all of the above tariffs were reduced or abolished. It is conceivable, for example, that in the case of sugar the imported product could undersell the domestic in some parts of Afghanistan. This is probably true for cane sugar at Jalalabad, within easy reach of a cane sugar refinery at Peshawar. By extension, it would be true for either imported or domestic cane sugar transported from Jalalabad to Kabul so long as the refinery there is handicapped by obsolete equipment and a capacity so small as to be, perforce, inefficient. Even with respect to the beet sugar operations at Baghlan, it is not possible for Government Monopolies to calculate the true costs of production until the scale of operations comes closer to the capacity of the plant. But at least the operations at Baghlan are considered technically efficient in comparison with foreign standards, making allowances for the fact that distillation of the molasses is prohibited. Similarly, the new cotton textile mill at Gulbahar, if properly operated, should be able to compete with any in Asia. And both Gulbahar and the recently improved mill at Pul-i-Khumri would have to be operated rather inefficiently before it was possible for other nations to undersell Afghan cotton piece goods manufactured within sight of the cotton fields (Pul-i-Khumri) or on the road between the gins and the main market (Gulbahar). The same argument would apply to leather if the tannery at Kabul were operated as efficiently as the Textile Company and Sugar Company plants. Whether it applies to leather goods and rayon, however, may be questioned.

Let us assume, for the purposes of discussion, that the tariffs on cotton and rayon piece goods, leather and leather goods and sugar are all protectionist in effect. Insofar as this is true, they act as taxes upon the Afghan consumer, just as do the prices established by Government Monopolies for domestic sugar or imported tobacco products. If the RGA were to abolish these tariffs, it would seriously reduce a source of revenue which brought in 41 per cent of the Government's income in 1954-55.[1] These revenues would have to be replaced by increasing duties on other imports, or by additional land, property or income taxes. To what extent the net position of the Afghan consumer would or would not be improved by such changes cannot be considered in this study, but we certainly may assume that it is highly unlikely that the RGA, which has adopted the philosophy of the "guided economy", would abolish tariffs on the enumerated items in the near future. For although one reads no chauvinistic demands for autarky in the Government-controlled Afghan press, nor claims that Afghanistan is being exploited by its trading partners, nor even expressions of resentment at the fact that the nation remains dependent upon imports of many items, it is unrealistic to expect the Afghan Government, in this mid-Twentieth Century world, to throw open its frontiers to free trade imports. While the RGA has avoided the temptation which often besets underdeveloped nations to embark upon large scale industrial construction for which neither the raw material base nor a developed market are available, it has indicated time and again that it expects to achieve some measure of self-sufficiency in the products for

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[1]The Five Year Plan of Afghanistan, p. 222.

which Afghanistan does produce the necessary raw materials. Not only did such expectations underlie the entire Five Year Plan, but the RGA has demonstrated its determination by actions in the fields of cement production and cane sugar refining as well as in its irrigation and agricultural programs. The RGA has undertaken hydroelectric developments partly to supply power to such processing industries as that at Gulbahar. Over a period of increasing strain on foreign exchange reserves, the Government has continued to allow the Bank-i-Millie to allocate hard currencies to imports of materials and equipment for the Afghan (Baghlan) Sugar Company and the Textile Company. Having gone this far, and especially in view of Afghanistan's recently-demonstrated susceptibility to economic blockade, we must assume that tariffs on the above-listed items will remain as they are or actually be increased in the future.

Returning, then, to the example of cotton, it is particularly interesting to note that some of the countries which lead in the sale of cotton piece goods to Afghanistan are also those which buy most of Afghanistan's raw cotton exports:

TABLE 37

AFGHAN TRADE IN COTTON AND COTTON PIECE GOODS, 1954-55 THROUGH 1956-57[a]

EXPORTS OF GINNED COTTON		IMPORTS OF COTTON PIECE GOODS	
Country of Destination	Total Value in Afghanis	Country of Origin	Total Value in Afghanis
U.S.S.R.	377,061,869	U.S.S.R.	621,057,299
West Germany	67,888,793	India	385,727,419
Japan	65,848,742	Japan	82,080,234
Czechoslovakia	16,829,731	Pakistan	37,032,212
United Kingdom	13,695,094		
Netherlands	11,432,547		

[a]Data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources same as those of import data given above

It would appear that the chief offender in this "colonial" type of transaction is the Soviet Union. It should, however, be pointed out that the U.S.S.R., Czechoslovakia and West Germany all have bilateral commodity exchange agreements with Afghanistan, which account for their high rank among recipients of raw cotton imports.

The only way for Afghanistan to break out of this vicious circle is to increase her domestic cotton textile capacity, so that she can reduce her imports of piece goods while maintaining her exports of raw cotton. Of course, increased exports and improved marketing of wool and karakul, which bring in primarily hard currencies, would also serve to enable Afghanistan to meet her obligations under these commodity exchange agreements, all of which allow balancing in dollars or sterling. We shall discuss the possibilities for expanded cotton, wool and karakul production in Chapter IX.

The second largest import category, artificial silk piece goods, is also one manufactured from agricultural raw materials. At least, we may assume that almost all of this category represents rayon rather than nylon which is more expensive and is poorly adapted for traditional Afghan apparel needs. Domestic manufacture of rayon from cotton linters or other sources of cellulose would obviate a substantial portion of the cost of the rapidly growing imports, providing that a sizeable and efficient plant could be established. As a matter of fact, the first step in this direction is already under consideration. The President of the Shaker Ceramic Factory in Kabul has begun inquiries in Japan regarding the establishment of a 5000-spindle, 60-loom rayon piece goods plant which would utilize imported yarn.[1] The plant would cost over $300,000, but would represent a start towards saving some of the almost 300 million Afghanis ($6 million) spent on rayon imports in the last reported year. By later expansion to include a synthetic fiber manufacturing plant, using imported chemicals but local cellulose (cotton linters, hemp, bagasse or reeds from poorly-drained sections), or by locating this chemical-processing stage in Jalalabad with its excess swamp vegetation, the savings on imports might be further increased. At any rate, no special agricultural development would be needed to support a domestic rayon industry, but only more efficient utilization of existing sources of cellulose, including wood.[2] For this reason, no locational analysis or cultivation recommendations will be made in the following chapter, but the possibilities of reducing rayon imports may be kept in mind for the economic analysis in Chapter XII.

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[1]Interview of November 3, 1957, with Mr. Abdul Hadishakur, who has spent several years in Japan in the export-import trade. Mr. Hadishakur indicated that the textile equipment would probably be secured from the Tsudakoma Company, which would also be asked to supply advisory engineers. This procedure was followed very successfully by Mr. Hadishakur in establishing the Shaker Ceramic Factory, an outstanding example of what can be done to replace imports by domestic manufactures (see Chapter I). The factory was built in ten months during 1957, at a cost of about $240,000, of which $150,000 went to Japanese firms for equipment, materials and advisory services. In 1956-57, Afghanistan imported a total of 785,777 kilos of glass and chinaware from Japan, the U.S.S.R., Pakistan and India at a total cost of about $356,000. When the Shaker plant reaches full production, it will turn out some three million teapots, cups and plates per year. Estimating 10 pieces to the kilo, this would represent a saving of some 300,000 kilos or about $136,000 per year. While Shaker price policy is not yet final, an indication of the savings anticipated is found in the fact that in February, 1958, the plant was able to export some of its own merchandise and to sell it in West Pakistan.

[2]For example, at the Jangalak lumber mill, which adjoins the Shaker factory, sawdust and wood scraps are burned in the power plant because of the high cost of such alternate fuels as coal, coal briquets or fuel oil.

With regard to sugar, Afghan imports from 1954-55 through 1956-57 averaged 11,810 metric tons at an average yearly cost of about $1.7 million. Production at the Baghlan Sugar Factory averaged about 5400 tons annually in these three years (see Chapter II). The sugar cane mill at Jalalabad was not yet in operation. We have estimated that if enough sugar beets were grown in the Baghlan area so that the plant could be operated at full capacity, it might produce as much as 2,000 additional tons per year, resulting in a saving of some 14.5 million Afghanis or $290,000 of the amount now spent on imports. Furthermore, if the production of sugar beets could be increased to 100,000 tons per year by more intensive cultivation and the addition of new irrigated lands such as those available in the Dasht-i-Khwaja Alwan area (see Map 4), and if the Sugar Company could fulfill its desire to double present processing capacity, reasonably estimated at 55,000 tons per year, then the domestic sugar production could be raised to between 14,000 and 15,000 tons per year and sugar imports practically eliminated. A discussion of the possibilities at Baghlan, Jalalabad and in the Helmand Valley, which is now entirely dependent upon imports, follows in Chapter IX.

Most Afghan sugar is consumed in tea, the usual practice being to pour half an inch or more of sugar into the bottom of the cup or bowl before adding the tea, which can be replenished several times before more sugar is needed. Unfortunately, we have no figures on the number of cups of tea consumed per person per annum, but field observations combine with the high place of tea on the import list to indicate the popularity of this drink among all who can afford it. Over the years

1954-55 through 1956-57, tea imports averaged 2,935,781 kilos, which represents about .29 kilos or .64 pounds per person in the settled population. The average annual consumption for an adult living in a city or village is undoubtedly much greater. Tea is the urban Afghan drink par excellence and no meal is considered complete without it. It is often consumed between meals in the place of soft drinks or the forbidden alcoholic beverages. But there appears to be very little Afghanistan can do to avoid the average annual expenditure (over the last three years) of some $2.65 million for importing tea from Pakistan, India and Japan. Even the Jalalabad oasis is far too dry for tea cultivation and lacks the large amount of cheap, skilled labor necessary for successful tea cultivation. However, the fact that most of the imported tea comes from India and Pakistan, nearby soft-currency trading partners, and is relatively easy to transport, argues that the Afghan economy does not suffer seriously in this respect.

Consideration of the import figures on leather and leather goods, however, does give one pause. These items, coming predominantly from Pakistan with small increments of unfinished leather from India, were seriously curtailed during the height of the Pushtunistan dispute and have not yet regained their former position. But the real question is, why should Afghanistan, with an estimated 2 to 2.5 million head of cattle, have to import leather and leather goods in any substantial quantities at all? The answer lies in the failure to organize or utilize domestic tanning capacity of sufficient size and quality to provide the raw materials needed for leather products. We have already seen that there does exist, on the outskirts of Kabul, a modern tannery and shoe factory with an estimated daily tanning capacity of 2000 square feet of chrome cow leather, 1600 pounds of ox leather and about 200 sheep and goat skins.[1] Despite its annual capacity of 120,000 cattle hides, this plant handles only some 10,000 to 12,000, and, indeed, only about 40,000 cattle hides are estimated to reach the market from domestic herds each year.[2] The rest are either used for cottage industry needs or wasted through careless flaying and a lack of any appreciation of their value on the part of the farmers, a factor which indicates the almost complete absence of proper marketing channels and transportation facilities. Thus Afghanistan is forced to import an average of 325.6 metric tons of chrome leather each year, according to the Ministry of Planning.

In addition to tanning ten or more times the present number of skins, the Kabul plant could manufacture between 120,000 and 180,000 pairs of boots and shoes each year on its assembly line. But the lack of two machines and damage to others through faulty use paralyzes the entire operation. No shoes have been manufactured by machinery in Afghanistan since 1954 when this plant turned out 4000 pairs of shoes for general consumption and 6000 pairs of military boots.[3] Meanwhile, the nation is importing an average of $235,000 worth of tanned leather per year, from which local artisans produce about 375,000 pairs of

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[1]Marcel Croisier, Industrial Development of Afghanistan, Memorandum in files of UNTAM, Kabul, Afghanistan (Kabul: n.d.), pp. 1-9, passim. (Typed.)

[2]Marcel Croisier, Le Developpement Industriel de l'Afghanistan, prepared for the Government of Afghanistan under the Technical Assistance Program, United Nations (Dossier No. TAA 173/1/08; Report No. TAA/AFG/1) (New York: May 6, 1955), Annex V, p. 137.

[3]Kimler, p. 28 and author's visit of February 20, 1958.

shoes, and also imports some $158,000 worth of finished leather goods, most of which represent shoes manufactured abroad. If, as Croisier estimates, about two-thirds of the Afghan population wear either Western-type shoes or the local leather sandals (paizars), then the domestic market could absorb all that the Kabul shoe factory can turn out and considerably more. At the present time, many of the Afghans in towns and cities are wearing imported rubber overshoes or second-hand shoes because the price of new leather shoes, whether imported or made of imported leather, is prohibitive. Yet the three foreign experts who have investigated the Afghan leather industry, Marcel Croisier of the UNTAM, Courtney Kimler of the United States ICA Mission, and Heinz Heckhoff of the West German technical assistance group, all agree that managerial initiative in the improvement and utilization of existing processing capacity and in the organization of a better hide-collecting system is all that is lacking to establish one or more profitable domestic leather enterprises.

So here is yet another opportunity of replacing imports with domestic products and realizing considerable savings in foreign exchange. It seems likely that the heavier grades of leather for use in soles will have to be imported for some time, but there is no logical reason why the Kabul tannery should not receive and process three times the 40,000 hides now reaching the market instead of one-quarter or one-third this number. With this end in view, Mr. Heinz Heckhoff, a West German tanning expert, was sent to Kabul as part of Bonn's "Point Four" program in the winter of 1957-58. It was his hope to persuade the management of the Kabul tannery to adopt chrome-tanning processes throughout their plant, with the aid of German chemicals and, perhaps, credit assistance. Mr. Heckhoff is not concerned with the rehabilitation of the shoe assembly line, about half of which he estimates would require replacement or repair before use. But he indicated that the successful completion of his own mission might well lead to the assignment of a second expert to advise on manufacturing operations.[1]

The primary requisite for increasing leather and leather goods output, of course, is an increase in the number and quality of hides entering the market. This is a matter which we shall discuss in the next chapter. But we must first return to the export side of Afghanistan's trade ledger in order to complete our discussion of the directions in which the present terms of trade may be improved.

For example, we find that in the last three reported years, Afghanistan exported an average of 35.2 million Afghanis ($704,000 at free market rates) worth of sheep and goat skins, chiefly to the following countries:

TABLE 38

AFGHAN EXPORTS OF SHEEP AND GOAT SKINS, 1954-55 THROUGH 1956-57[a]

Country of Destination	Total Value in Afghanis
India	57,558,814
U.S.S.R.	31,554,106
West Germany	6,298,112
Pakistan	2,572,276

[a]Data from Ministry of Planning; ultimate sources same as preceding data on exports.

[1]Interview with Mr. Heinz Heckhoff in Kabul, February 20, 1958.

According to our quantitative data, these exports averaged 1,333,700 skins over the three years 1953-54 through 1955-56. Yet the Ministry of Finance estimates that there are at least 20 million sheep and goats in Afghanistan. On this basis, if Afghanistan comes up to the world average of 33 per cent annual slaughterings of such animals, there would be 6.6 million skins available each year.[1] Indeed, inasmuch as the Afghan diet prefers sheep and goat meat to beef, it is likely that at least this many animals are killed and flayed each year. Why, then, do only 20 per cent of the available hides reach the export market? The fact that some of them are shipped as far as West Germany, Great Britain and Singapore indicates that there is a good demand for them on the world market, as does the value of the exports to India and the U.S.S.R. Apparently sheep and goat skin exports are the victims of the same lack of organized marketing channels which appears to afflict the leather industry, though with the difference that here there is a good external market waiting to be served.

As is true of Afghan cow and steer leather, sheep and goat skins also suffer from poor processing. Most of the merchants who purchase sheep and goat skins from farmers and herdsmen perform a simple drying or salting operation rather than incur the expense of having the skins properly tanned or at least "pickled" with acid. According to Croisier, the Iqbal Tannery processed only 30,000 of the 1,265,000 skins exported in 1950-51, and the production does not seem to have picked up much since.[2] The result is an unnecessarily high amount of spoilage and consequently a lowering of the price for Afghan sheep and goat skins on the world market. While it would probably not pay to complete the tanning process in Afghanistan, since importers have their own par-

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[1] Croisier, _Le Developpement Industriel . . ._, Annex V, pp. 136-137.

[2] _Ibid._, p. 138 and visit by the author of February 20, 1958.

ticular requirements with regard to preparation, the foreign exchange earned by this category of exports would be increased if both quality and quantity of production could be improved. We shall consider this subject further in Chapter IX.

In addition to the export of depilated sheep and goat skins, there is a sizeable export of broadtail sheep pelts complete with the wool:

TABLE 39

AFGHAN BROADTAIL SKIN EXPORTS, 1954-55 THROUGH 1956-57[a]

Country of Destination	Total Value in Afghanis
U.S.S.R.	17,988,722
United Kingdom	7,576,519
United States	441,060

[a]Data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources are the same as those of import data given above.

The problems involved in increasing this trade are similar to those of sheep and goat skins which will be discussed in Chapter IX.

Of far greater significance than broadtail skins, gut casings, or live sheep and goats is the category of exported wool, which has ranked in third or fourth place in recent years. Afghan wool marketing is beset with problems very similar to those of cotton, namely, a lack of quality control, standardization and grading. The two wool-processing plants in the country, at Kabul and Kandahar, do almost nothing in the preparation of wool for export, although the latter has excess scouring capacity specifically designed for cleaning export wool on a fee basis. As is the case with skins, which we have described above, merchants prefer inexpensive techniques. Wool is washed by hand in streams or pools where it often picks up as much dirt (and weight) as it loses. But the fact that Afghan wool is exported on a greasy, unscoured basis and weighs at least twice as much as it will after cleaning is taken into account by the buyers, who lower their bids accordingly. Failure to establish standards or to conform to international grading systems also reduces the price which Afghan wool merchants can obtain abroad, as does the lack of simple separation by color. All Afghan wool is of the carpet variety, and is exported principally to the following nations:

TABLE 40

AFGHAN WOOL EXPORTS, 1954-55 THROUGH 1956-57[a]

Country of Destination	Total Value in Afghanis
U.S.S.R.	255,008,372
United States . . .	212,322,998
Czechoslovakia . . .	6,006,000
United Kingdom . . .	5,967,904

[a]Data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources same as those of import data given above.

The Afghan Five Year Plan, published at the end of 1956, called for improvements in cleaning, grading and marketing of wool, and stated that the product offered to the world market by Afghan exporters often contained 27 to 30 per cent dust and other impurities, forcing buyers to inspect every bale separately before purchase. It also decried the tendency of Afghan exporters to dump their wool at low prices in nearby countries rather than ship it to the large markets where, presumably, better prices prevailed.[1]

[1]The Five Year Plan of Afghanistan, p. 178.

Until December, 1957, the United Nations Technical Assistance Mission in Kabul provided an expert in wool marketing to advise Afghan merchants in the grading and preparation of wool for market. This expert was instrumental in aiding the Ministry of National Economy to organize the Wool Exporting Syndicate in 1955, while the UN FAO agricultural cooperative expert has assisted in the formation of flock-owners cooperatives. These cooperatives are eligible for credit from the RGA-sponsored Agriculture and Cottage Industries Bank established in 1954. The aim of the UN-RGA program is to increase both the quantity and quality of wool exports, and to ensure that all exported wool complies with standards established by the Syndicate. UN veterinarians have made contributions towards improved stock-raising techniques and animal health in northern Afghanistan, where karakul flocks predominate, while the ICA-sponsored Wyoming University team has done work in the Helmand region with imported Columbia and local Ghilzai sheep (see Chapter IV). The last director of the Wyoming team, Dr. Robert H. Burns, is an authority on wool grading and marketing, and attempted while in Afghanistan to make his wide experience available to Afghan herders and merchants. We shall discuss the range, feed, water, shelter and veterinary requirements of Afghan sheep in general, and of the karakul flocks in particular, in reference to the major areas of sheep-grazing in Chapter IX.

It is roughly estimated that of the wool produced in Afghanistan each year, 6,000 tons are exported and 2,000 tons used domestically for the weaving of carpets, felts and rough cloth.[1] The export of carpets,

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[1] <u>Ibid</u>., p. 179.

a fluctuating and less important item than wool, may be treated adequately in this chapter. Woolen carpets, of characteristic Afghan as opposed to Persian design, are produced principally in the northwestern region from Aq Chah to Herat, and represent almost entirely a cottage-industry product though there are two or three rug "factories" in the latter city. The main collecting points are Herat and Andkhui, which serve also as the principal markets for internal and export trade. While some carpets are offered for sale in Kabul, at prices 150 to 200 per cent those of Herat, many of the finer ones are shipped right through the capital for export, principally to West Germany, Switzerland, Great Britain, Saudi Arabia, Iran, India and Singapore. It is surprising that the United States buys only a small number of these beautiful and extremely well-made carpets, which offer geometrical patterns quite distinct from the floral types made in Iran. The so-called Mowri variety, which is produced in a limited region along the upper Murghab River, is especially delicate in workmanship and restrained in color. These and the other exported varieties are definitely in the realm of luxury goods, whose quality and variety depend upon the fact that they are handmade by skillful artisans trained from early youth. An attempt to increase the quantity marketed, as by mechanization, would serve only to diminish their value. As far as quality improvement is concerned, the author does not presume to suggest any changes in what amounts to the folk art *par excellence* of Afghanistan. In order to preserve the present market, however, the laws requiring the use of color-fast, imported dyes exclusively should be more vigorously enforced, since it is still possible to buy a beautiful carpet and have it ruined when its dyes begin to fade or run. The value of the product would also be enhanced if more care were taken by the middlemen to keep carpets clean while they are being stretched to shape and transported to market. The fact that many of these carpets are now being exported by air is an indication both of their high intrinsic value and of a fairly competent marketing system.

The carpets, prayer rugs and saddle-bags woven south of the Hindu Kush are of much poorer quality, being made of coarse wool or cotton and generally dyed with inferior, vegetable colors. Many of these are made by nomads in their summer encampments, and while some are carried out for sale in Pakistan or India they do not figure in the export ledger.

Karakul fur, on the other hand, is a most important export item, sometimes taking first place on the list. Indeed, through the period of World War II, karakul was by far Afghanistan's most important foreign exchange earner. During the war, New York replaced London as the principal world market and storage center for karakul, and the Afghan American Trading Company acquired storage space for up to one million pelts in order to avoid flooding the market at any given time. But in the postwar years, a change of style resulted in a serious drop in the price of karakul, which has only recently begun to be reversed. Although Afghan karakul is generally conceded to be the finest in the world, competition from the Soviet Union and the Union of South Africa is increasingly being felt, and was among the reasons for the continued low value of the skins even in 1947 and 1948 when serious droughts reduced the number of Afghan skins available. A further handicap lies, again, in the failure to grade the skins, the Afghan preference being to market karakul in lots which contain some prime pelts, some poor ones, and a majority of mediocre to good skins. Buyers are naturally reluctant to purchase such lots when the Russians or South Africans will offer them a quantity of skins of a certain grade for a certain price. The difficulties of breeding and herding karakul are of considerable importance to the Afghan economy. They have received attention from the UNTAM and other sources, and will be analyzed in Chapter IX. Karakul remains Afghanistan's major source of hard foreign exchange, dollars, sterling and marks, as may be judged from the following list of leading importers.

TABLE 41

AFGHAN KARAKUL EXPORTS, 1954-55 THROUGH 1956-57[a]

Country of Destination	Total Value in Afghanis
U.S.A.	778,915,428
United Kingdom	195,143,171
West Germany	612,200

[a]Data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources same as those of import data given above.

The major source of soft foreign exchange, and in recent years Afghanistan's single most important export, is dried fruit. Fortunately the greatest share by far of this trade is with India, whose rupee is fairly stable and from which Afghanistan imports large amounts of cotton textiles and other manufactures, rather than with Pakistan or the U.S.S.R.

whose currencies are worth far less than their official valuations.

TABLE 42

AFGHAN DRIED FRUIT EXPORTS, 1954-55 THROUGH 1956-57[a]

Country of Destination	Total Value in Afghanis
India	1,000,815,846
Pakistan	160,410,942
U.S.S.R.	98,038,601
U.S.A.	11,164,245
Singapore	8,626,736
United Kingdom	1,800,364

[a]Data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources same as those of import data given above.

With respect to fresh fruits, India again takes the largest share of a market which she and Pakistan practically dominate:

TABLE 43

AFGHAN FRESH FRUIT EXPORTS, 1954-55 THROUGH 1956-57[a]

Country of Destination	Total Value in Afghanis
India	299,575,465
Pakistan	108,749,959

[a]Data made available to the author by the Ministry of Planning in December, 1957. Ultimate sources same as those of import data given above.

Proximity to the markets of India and Pakistan has been cited as a permanent advantage to Afghanistan in the export of fruit. It also serves as an advantage in securing certain imports. Even if Afghan hopes for reducing imports of cotton and rayon piece goods, leather and sugar can be realized through increased domestic production, there will remain many Indian and Pakistani products complementary to the Afghan economy: rubber tires, bicycles, horse-drawn carriages (gadis), building materials, electrical fittings, copperware, stationery, medicines, tea and notions. While Afghanistan seems to have only fruits and cotton as major offerings to India and Pakistan, the market in the Subcontinent for the former can probably be increased several fold. It may also be possible to market more of the dried fruit produced in northern Afghanistan in the Soviet Union, though very little information is available on this traffic. However, the problems of increasing domestic production in the Kabul and Kandahar regions, and of improving transportation and marketing to India and Pakistan, will be carefully analyzed in Chapters IX and XI with parts of the discussion applicable to production in the North and sale to the U.S.S.R.

The final item in our table of Afghan exports, sesame seed, is of interest only because of its wide distribution pattern. It is exported to West Germany, Netherlands, United Kingdom, Iran, India, Pakistan and the U.S.S.R. Produced chiefly in northern Afghanistan, sesame is not sufficiently important for further consideration in this study.

There is one other item, however, which does not appear in the tables but which must be mentioned both because of its universal competition with cash crops in Afghanistan and because it has recently been necessary to make imports of what had always been considered an item in which Afghanistan was self-sufficient. The reference is to wheat, the

Afghan staff of life. Most writers on Afghan agriculture stress the nation's self-sufficiency in food, and particularly in food grains. While it is probably correct that famines, as they are known in India and Pakistan, have seldom if ever occurred in Afghanistan, this seems to be due to the comparatively low density of population of this mountainous country even in relation to its relatively low proportion of arable land. But it is a disturbing fact that in five of the past twelve years the Afghan wheat crop proved insufficient for what RGA considered the normal level of consumption to be maintained. In 1947, 1953, 1954, 1957 and 1958, the United States supplemented the Afghan food supply with sales, grants or loans of wheat. The recent loans have been made under Public Law 480 which allows repayment for surplus wheat to be made in local currency and devoted to developmental expenses approved by United States agencies. Furthermore, it may be recalled that in 1947 and 1948 no sugar beets were grown in Baghlan because RGA decided that the land was needed for wheat. This recurrence of wheat shortages is a factor that must be kept in mind in any analysis of the possibilities of expanding production of cash or industrial crops. No improvement in the living standard of the average Afghan can be expected if lowered costs of cotton piece goods, leather and sugar are offset by higher costs of wheat flour and the unleavened bread which is the mainstay of his diet.

We have seen that there already exists competition between wheat, on the one hand, and sugar beets or cotton, on the other, in the Kunduz Valley, and between wheat and forage or cash crops in the Helmand. But in the chapter which follows, we shall endeavor to demonstrate that not only is such a competition resolvable but that Afghanistan can, in time, increase both its domestic food production, including wheat, and its output and consumption of the key agricultural and pastoral commodities, cotton, sugar, fruits, wool, hides and karakul. We shall attempt to show that a concentrated emphasis upon such production, combined with the processing of agricultural and pastoral raw materials to a much greater extent than at present, can improve the Afghan standard of living in two ways:

1) directly, by making more food and clothing available to the population and by increasing the amounts of fruits, wool, hides and karakul available for export, and

2) indirectly, by saving foreign exchange presently devoted to imports of cotton and rayon piece goods, sugar and leather, and by making it possible to reallocate this foreign exchange to increased imports of commodities which the Afghan economy cannot provide for itself, such as tea, rubber goods, vehicles, fuel, lubricants, metal products and notions.

Included in these benefits will be savings in transportation, particularly on such two-way items as raw cotton exports and cotton and rayon piece goods imports, hide exports and leather imports and on sugar which can be brought to the consumer much more cheaply from domestic factories than from abroad once a reasonable scale of production is obtained.

In all probability, of course, developing Afghanistan can never be freed from dependence upon imports and the transportation costs such dependence entails. Indeed, the directions of economic development suggested in this chapter are not to be interpreted as proposals for autarky and increased isolation in Afghanistan. On the contrary, they are designed to enable the Afghan economy to develop along the lines of its own greatest comparative advantages so that its continuing commerce with the world will be of more benefit not only to Afghanistan but to its trading partners as well. Hand in hand with an improved living standard will come an increased demand for, and capacity to acquire, those foreign products which Afghanistan cannot advantageously produce for herself. To maintain the present system, whereby Afghanistan produces certain raw materials and imports products manufactured from those very raw materials, or others which she could easily provide for herself, ultimately harms all partners to the transactions. But by a more rational use of the nation's known resources, including the improvements in production, processing, assembly and marketing which are discussed in the following chapters, both the internal economy and the external bargaining position of Afghanistan can considerably be enhanced. If such improvements require readjustments within or among Afghanistan's trading partners, then these adjustments must be put down to the price of progress. In view of the material we have presented and analyzed in this study, no other lines of development appear as promising as those just suggested.

There is nothing novel in the use of a nation's import-export data as indications of the directions in which its economic development ought logically to proceed. But such an analysis must be carefully related to the actual human and physical resources of the nation lest it lead to unfounded judgments and unrealistic courses of action. We have attempted to provide this geographical orientation in Part One of this study which was devoted to description and analysis of the three most important regions of Afghanistan. On the basis of these regional studies, and some additional comments at the start of ths present chapter, we have determined that the mineral industries, with the possible exception of coal and cement, cannot yet provide the basis for Afghan economic development. Indeed, even coal and cement are to be regarded as permissive factors rather than as active agents of that development. Thus we are left with the conclusion that the agricultural and pastoral sectors of the economy must provide the raw material basis for processing industry in Afghanistan at least for the foreseeable future. This conclusion led us to try to isolate those agricultural and pastoral commodities whose production and processing would be most beneficial to the Afghan economy through directly increased consumption or through elimination of exchange-consuming imports and enhancement of exchange-earning exports.

In Chapter IX we shall discuss the production of these commodities against the regional background of Part One in the effort to determine where and how they can best be produced. In Chapter X we shall consider fuel and power resources as supplementary locational factors, and in Chapter XI we shall try to ascertain how the Afghan transportation system will tend to favor one region or another by making it possible to bring power, in the form of transportable fuel, to raw materials, or vice versa, and by facilitating inter-regional or international trade.

IX. THE LOCATION OF AFGHAN ECONOMIC DEVELOPMENT

Every agricultural product has its own particular requirements with respect to growing season, water, soils and cultivation practices. Pastoral animals, too, require certain types of forage or fodder, drinking water, shelter in winter, and a certain amount of space in which to move about. Both crops and animals require the care of skilled and interested persons who recognize the interrelations among these factors as well as their own personal dependence upon them. In the regional surveys of the Kabul, Kunduz and Helmand Valleys of Afghanistan, we have indicated the general similarities or contrasts with respect to climate, present or potential availability of water and arable or grazing land, existing vegetative cover, soil types and problems, and present or potential population. Against this background we must now project the specific requirements of the crops and pastoral products which we have singled out as of key importance for the development of the Afghan economy. Such a projection will indicate which areas are best suited for <u>production</u> of the key commodities.

But production alone is not enough. In the last chapter, we have stressed the need for the Afghan economy to advance in the direction of <u>processing</u> these key commodities either to reduce import requirements or to enhance export potential. For processing industries, other requirements must be met. There must be either some existing processing capacity, or the financial and technical ability to create it. There must be an actual or potential labor force and the prospect of sufficient power to carry out the processing. Lastly, there must be a market, local or remote, and the means for bringing the processed commodities to that market. In our regional surveys, we have also discussed these factors in general terms. Now we must analyze more closely the physical and human factors involved in producing each of the key agricultural commodities singled out in the preceding chapter, and those involved in processing and marketing them.

Cotton

The cotton plant requires about seven frost-free months, and is generally conceded to yield best towards the northern limit (approximately 40°N) of its cultivation. Its moisture requirements can ideally be supplied by irrigation, since too much moisture in the seedbed may cause the seed to rot, while rainfall during the ripening period may produce disease or excess vegetative growth at the expense of the bolls. Desirable soils vary from sandy loams to silt loams, but too much of the clay component will cause the plant to put its energy into stalk rather than fruit and may also produce water-logging and consequent fungus growth.[1] Cotton requires considerable labor both for thinning and weeding in the early part of the season and for harvesting at the end.

We have seen in Chapter II that the Kunduz node offers excellent climatic and soil conditions for cotton, as is indicated by its predominance in cotton production within Afghanistan. The average reported yield of 308 pounds of ginned cotton (925 lbs. unginned) per acre compares fairly well with the overall U.S. national average of 317 pounds of ginned cotton per acre and with the 1957 national average of 388 pounds per acre, though not with the 1958 all-time record of 469 pounds or the 1957 California yield

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[1]Howard C. Rather and Carter M. Harrison, <u>Field Crops</u> (New York: McGraw-Hill, 1951), p. 395.

of 1035 pounds per acre for irrigated cotton.[1] In comparison with Egypt, where 418.3 pounds of ginned cotton per acre were obtained by irrigation in 1956, the Kunduz yield is low, although it far surpasses Pakistan's 1956 yield of 196 pounds of ginned cotton per acre and India's 1956 yield of only 89 pounds per acre.[2] The fact that the Kunduz yield of raw cotton almost equals the Soviet yield of 930 pounds (310 lbs. ginned) per acre is an indication of the analogous nature of northern Afghanistan to the Central Asian areas where perhaps 85 per cent of Soviet cotton is produced, if not of analogous cultivation practices. The principal factors which keep yield per acre at a low level in the Kunduz node are an undependable water supply and poor cultivation practices. Those factors inhibiting a larger total crop for domestic and export needs include the limited amount of presently irrigable land, competition of grain crops, and a potential shortage of labor, in addition to the preceding factors.

We have discussed in Chapter II the proposals for improving the amount and reliability of water available for irrigation in the Kunduz region. Unfortunately, the integrated development of the lower Kunduz Valley, even without storage and power facilities higher up on the river, appears to be now far beyond the means of the RGA. In acknowledgement of its strained financial position, the RGA announced at the end of 1957 that it would accept no more foreign loan assistance. Since it is most unlikely that any nation will come forward with a grant to develop the Kunduz, the only apparent means of financing such a project would be to allocate a large

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[1] U.S. Department of Agriculture, Agricultural Marketing Service, Crop Reporting Board, Crop Production, 1958 Annual Summary, CR Pr 2-1(58) (Washington, D.C.: December 17, 1958), pp. 19 and 92.

[2] FAO of UN, Yearbook of Food and Agriculture Statistics, 1957, pp. 66-67.

part of the $100 million Soviet credit line to Kunduz Valley development. Since it is not known just what part of that loan remains uncommited, and since there has been no known official suggestion that the Kunduz might be financed thereby, it would be foolhardy to predict any full-scale attempt to harness Kunduz water resources in the foreseeable future. Many regrets have been expressed that the Helmand Project was carried to such lengths at the expense of the Kunduz, but such hindsight is of no value at this date. Obviously, it would have been almost a political impossibility to bring an American engineering firm into this area at any time after 1950. Equally improbable would have been the securing of Export-Import Bank loans to support Kunduz development.

Thus, economic and political reasons compel RGA to defer any fundamental effort to increase and regulate water supply and thus to extend irrigable acreage in the Kunduz region. Some gains may still be realized from improved intake structures and canal berms capable of resisting the inroads of heavy spring runoff. Such comparatively inexpensive projects should receive careful attention from the Ministries of Agriculture and Public Works. Other benefits would accrue from the use of tested and carefully segregated cotton seed, as discussed in Chapter II, and from any increased use of fertilizers. Standardization upon the best-adapted varieties and considerably improved grading practices, also discussed in Chapter II, would serve both to increase yields and to raise the price which Afghan cotton commands on the world market. UN and West German technical assistance is available for these tasks. While rotation with alfalfa would do much to improve yield per acre and to retard soil exhaustion, it would not help increase the total amount of cotton available in any one year or lessen the competition of cotton with grains and vegetables for the scarce land in the Kunduz region. For a solution to this problem, as well as to that of a potential shortage of agricultural labor in parts of the Kunduz region, one is presently compelled to look beyond the region.

Most of the Kabul Valley is too high and cool for successful cotton cultivation, although a certain amount is grown in the low Jalalabad oasis for local use. Undoubtedly, cotton acreage around Jalalabad could be expanded, but this expansion would have to be made at the expense of other crops such as citrus fruits and rice which bring a much higher return per acre. Under present conditions at Jalalabad, cotton would have to compete, disadvantageously, for water as well as for land. Furthermore, there would be limits upon the amount of land which could be devoted to cotton even if the Darunta storage dam is built and 41,000 acres added to the oasis (see Chapter I).

In the Helmand, on the other hand, we have to date the definite addition of at least 131,000 firmly-watered acres of which 65,000 or so are still vacant. In the Nad-i-Ali and Marja tracts, we have a total of 39,051 acres, mostly settled, on which farmers are apparently earning less than the low average national farm income. What they need is a cash crop, and, while irrigated pasture cattle- or sheep-raising may be the ultimate answer for at least the Class IV lands, we have seen the difficulties inherent in its adoption. Many of the resettled tenant farmers, however, have had some experience with cotton culture, since this crop is grown to a small extent in many of the low-lying areas of Afghanistan. Furthermore, it is grown by the old settlers along the Helmand and Arghandab, and a small, antiquated cotton gin has already been furnished by the Cotton Company to Lashkar Gah, at HVA request. The Company has occasionally furnished seed and purchased the ginned cotton produced in the vicinity of Lashkar Gah.

For Helmand soils, cotton has the important advantage of being salt-tolerant.[1] Not only is the Helmand water supply far more secure now than that in the Kunduz, but the two-season agriculture of the Helmand region gives it an absolute advantage over northern Afghanistan. Cotton need not be grown at the expense of a green manure, but alternately with alfalfa, root crops, or even as a late crop following winter wheat. An excellent rotation pattern, designed to improve both farm income and soil fertility, would alternate cotton and alfalfa as summer crops, with winter wheat in between.

In tests conducted on five test plots in the Marja area in 1955, cotton yields averaged 732.6 pounds per acre of unginned cotton. Where 100 pounds of nitrogenous fertilizer per acre were applied, the yield rose to 854.0 pounds; with 100 pounds of phosphatic fertilizer, to 800; and with 100 pounds of each type, to 1130 pounds.[2] The tests indicated, however, that variations in soil types may have even more to do with results than the amounts and types of fertilizer applied, since the average yield on two plots of fairly high and uniform natural fertility rose to 1587.7 pounds per acre with 100 pounds of each type of fertilizer.[3]

In an attempt to estimate potential cotton-producing capacity of the Helmand-Arghandab region, the ICA agronomist C.C. Brookshier drew up the following summary in 1956.

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[1]U.S. Department of Agriculture, Diagnosis and Improvement of Saline and Alkali Soils, p. 67, comparing relative yield on a saline soil as compared with yield on a non-saline soil under similar growing conditions.

[2]"Notes of Fertilizer Tests on Cotton at Marja for 1955", typed memorandum in files of HVA Agricultural Office, Lashkar Gah, Afghanistan.

[3]Ibid.

TABLE 44

POTENTIAL COTTON GROWING AREAS IN THE HELMAND VALLEY (in acres)[a]

Area	Irrigated from Permanent Project Structures							Irrigated from Farmer-made Structures	
	1956	1957	1958	1959	1960	1961			
Kajakai to Girishk								2500	
Seraj					1000	2500		1000	
Girishk to Nawa (Central Shamalan)	1500				1000	3000			
Nawa (Central Shamalan)	3000	3000	3000	5000	5000	5000			
Marja	500	3000	4000	4000	4000	4000			
Darweshan			2000	4000	5000	5000			
Below Darweshan								2000	
North Arghandab				1000	1500	1500		2000	
Central Arghandab		2000	2000	3000	3000	3000			
Tarnak			3000	3000	3000	3000			
Total	5000	8000	14000	20000	23500	27000	+	7500	= 34,500

[a]"Potential Cotton Growing Areas in Helmand Valley", memorandum from C.C. Brookshier to Dr. Abdul Wakil, December 19, 1956, in ICA files at Lashkar Gah, Afghanistan.

These estimates were based on the assumption that the Rural Development program of farmer education and guidance would begin in 1957 for the Nawa (Central Shamalan) area, in 1958 for the Darweshan and Central Arghandab, in 1959 for the Tarnak and North Arghandab, in 1960 for the area from Girishk to Nawa and for Seraj, and in 1961 for the area from Kajakai to Girishk. The fact that this program has failed to develop as planned postpones but does not vitiate the estimated cotton-producing potential. On the other hand, the need to materialize some of this potential, for both local and national purposes, re-emphasizes what has been said in Chapter VII about the urgency of extension and community development work in the Helmand.

Excluding the Tarnak potential from these estimates, for reasons given in Chapter V, we have 24,000 acres of land irrigated by the Project and 7500 acres of land irrigated from the less reliable farmer-made diversions in the old areas of cultivation. As we have seen, there is a fair possibility of providing Seraj lands with a reliable supply of water. The same is true of North Arghandab. While no Nad-i-Ali acreage is included in the above estimates, the devotion of some 34,500 acres in the tracts listed to cotton for one season of the year could add 11,488 metric tons of raw cotton to Afghanistan's annual domestic production assuming yields equal to those of the average, unfertilized fields at Marja.

Varietal tests conducted at Marja in 1955 indicate that there may be advantages in using imported seed rather than that obtained from the Kunduz region, although the shortness of the testing period and the small number of varieties tested would indicate that further testing is needed before deciding:

TABLE 45

COTTON VARIETAL TESTS AT MARJA IN 1955[a]
(Average of 25 Sample Plantings in pounds)

Variety	Yields Per Acre
Acala 44	1080.94
Koker	995.44
Delta Pine	954.45
Paymaster	934.36
Acala Afghanistan	816.6

[a]Memorandum in files of Wyoming University Team Research Office, Lashkar Gah, Afghanistan.

Varietal tests at Nad-i-Ali indicated that the Acala and Uka varieties were best adapted.[1] But even more significant than varietal differences are the gains to be had from improved cultural practices. A test on comparative planting methods made at Marja in 1955 gave the following results:

TABLE 46

PLANTING METHODS FOR COTTON AT MARJA IN 1955[a]
(Average of 25 Sample Plantings in pounds)

Method of Planting	Yield Per Acre
Side of row	1499.0
Center of bed	1354.3
Broadcast	892.0
Flat in Rows	870.0
Dry in Furrows	864.0

[a]Memorandum in files of Wyoming University Team Research Office, Lashkar Gah, Afghanistan.

If these figures are representative, a two-thirds increase in yield may be expected if the present Afghan method of planting cotton broadcast

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[1]Robert G. Moncure, Suggestions and Comments on Agricultural Production in the Helmand Valley, TCA/A-1 of Technical Cooperation Administration in files of International Cooperation Administration, Lashkar Gah, Afghanistan (Girishk: April 13, 1953), pp. 9-10. (Mimeographed.)

can be replaced by planting the seed in the sides of the irrigation furrows. Thus, by a combination of improved seed selection, better planting and cultivation methods and fertilization, the yields of unginned cotton in the Helmand might almost be made to compare with those attained in California. Doubling the present yield of 732.6 pounds through these methods does not seem impracticable, and the contribution of over 20,000 tons of unginned cotton would go a long way towards meeting Afghanistan's domestic and export needs.

On a ginned basis, this Helmand contribution would add 6000 or 7000 tons to the present annual production of approximately 20,000 tons. This would provide 16,000 or 17,000 tons over the ultimate requirements of the Gulbahar and Pul-i-Khumri plants, enabling Afghanistan not only to maintain her present export level of 10,000 to 15,000 tons per year, but to increase it. Perhaps more desirable would be the expansion of domestic cotton processing facilities so that Afghanistan might satisfy a larger share of her own annual cotton piece goods needs. These are estimated at approximately 120 million square meters, of which the existing facilities will provide only 63 million square meters, even with Gulbahar operating at full capacity. Thus, the development of an agricultural base for cotton in the Helmand could provide the foundation for another processing plant on the order of that of Gulbahar, utilizing another 5,200 metric tons of ginned cotton to produce 35,000,000 square meters of piece goods per year. Such a plant would cost approximately $30,000,000 at today's prices, and could certainly not be undertaken by the Textile Company until Gulbahar begins to pay off. The first goal is to ensure a sufficient raw material supply to allow existing mills to be used to full capacity. Only when that stage has been reached can valid judgments be reached concerning the effect of the 35 or 40 per cent import tariff on cotton piece goods and the political-economic desirability of further domestic processing capacity.

At the same time, the savings in foreign exchange now devoted to cotton piece goods imports will rise as Gulbahar production increases, and can be channeled by RGA exchange control into Helmand Valley cotton production and the first stage of processing, namely, a modern, large-capacity gin similar to that at Kunduz. Such a facility, whether operated by the RGA-controlled Consolidated Cotton Company, as seems preferable, or directly by the HVA, would have the immediate effect of making more cotton available for export. Whether these exports go to repay West German, Czech or Soviet credits, or are sold on the world market, their effect will also be a net gain in the amount of foreign exchange which RGA has at its disposal.

Sugar Beets

None of the 5400 tons of sugar produced at Baghlan is sold south of Kabul, the southern and western portions of Afghanistan being supplied by imports which average almost 12,000 metric tons per year. The Sugar Company at Baghlan would like to double its present capacity, variously estimated from 55,000 to 70,000 tons of beets (7700 to 9800 tons of sugar at 14 per cent recovery). It has never succeeded in obtaining more than 45,000 tons from the farmers who prefer to grow better-paying crops such as wheat or cotton. Until it is possible to operate the sugar factory at capacity for a number of years, the true costs of producing sugar at Baghlan will not be known, even to the Sugar Company or the Government Monopolies through which all sugar, domestic and imported, is sold at approximately $.10 per pound, hardly an excessive price in comparison with that in the U.S.A. The eagerness of the Sugar Company to expand capacity, however, indicates that they are satisfied with the profitableness of the undertaking.

Completion of the new bridge to the Dasht-i-Khwaja Alwan area will improve accessibility to additional lands suitable for beet growing. The proposed extension of the Gumarek Canal into this region could add from 5000 to 10,000 acres of irrigated land. But even if all of this new land were devoted to sugar beets, an unlikely assumption, the available supply would be increased by only 20,000 to 40,000 tons, and still fall short by an equal amount of the 115,000 tons necessary for domestic self-sufficiency at present levels of consumption.

This calculation is based on the average of the sugar imports for the last three years (see Table 35) and the average of the yield per acre for sugar beets in these three years. The average yield for the period 1954-55 through 1956-57 was 4.3 metric tons per acre (See Table 8), a considerable improvement over the 2.7 tons per acre in the preceding three years, but still far below the average for Europe in 1956 (10.1 metric tons per acre) or the United States (15.0), and somewhat below that for Iran (5.6).[1] Increased use of waste from the mill and of some artificial fertilizers are to be credited with this improvement, though the experimental yields obtained by the Sugar Company in 1952 (Table 9) indicate that much better results could be obtained even with the local variety, and a substantial further increase if Danish seed were imported.

But despite the possibilities of increased acreage and improved cultural techniques, it is apparent that it will be difficult to satisfy

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[1] FAO of UN, Yearbook of Food and Agriculture Statistics, 1957, p. 68.

Afghanistan's sugar requirements from the Kunduz region alone since competition for labor and land will continue. In recognition of this fact, the RGA has recently completed the assembly of an obsolete sugar cane mill at Jalalabad. The mill was put into operation in 1957-58 on an experimental and admittedly uneconomical basis with a rated capacity of only 50 tons of sugar per day. Actual output seems to have averaged only 25 tons of sugar per day![1] Funds have been allocated for increasing the processing capacity to 100 tons per day but the plant may still face supply difficulties since the local farmers have the alternative of producing ghur from their cane if prices offered by the plant are unattractive. Furthermore, there exist serious problems of a short growing season with frost danger, inferior cane, and two diseases lowering sugar content (see Chapter I). Under these handicaps it is paradoxically true that the higher the capacity the greater is the problem of obtaining sufficient cane to operate for more than one month out of the year. One month's operation at 100 tons per day would contribute some 3000 tons which, when added to the 5400 tons produced in recent years at Kunduz would total only 8400 tons. This would be 3000 tons short of the average imports over the last three years, and almost 11,000 tons short of the 19,925 metric tons imported in 1956-57. Therefore, even though we do not know the costs of production at Jalalabad, it is safe to say that any decision to expand sugar cane capacity there must be carefully balanced against possibilities for expansion of production from beets not only in the Kunduz but in the Helmand as well.

The sugar beet prefers at least a five and one-half month growing

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[1] Letter from Arnold J. Krochmal to the author, November, 1958.

season with warm but not excessively hot temperatures and a good deal of sunshine as it ripens. Dry conditions and moderate temperatures at the end of the growing period tend to produce the highest sugar content. The plant is fairly resistant to frost at either end of the growing season, however, and is salt tolerant except in the very early period of growth. The pH factor is more critical, one of 7 to 8 being preferable while acid soils are completely unfit for sugar beets. Fertile, heavy loams with high silt or even clay content appear best adapted, although the plant will do well even in fine sandy loam provided it is deep and fertile enough. Soil drainage must be good; where the beets are grown over hardpan or in muck, the size of the beet or its sugar content, or both, suffer greatly. Labor requirements are also high for thinning the young plants and for pulling the mature beets from the ground and "topping" them, i.e., cutting off the leaves and crown which are low in sugar content. Irrigation is a highly desirable means of cultivation as the water supply can be reduced towards the end of the season, forcing the plant to devote its energy to sugar production.[1]

Comparing these requirements with our descriptions of the various Helmand-Arghandab areas, we see that the recent alluvial soils of the Shamalan, Darweshan, Seraj and North and Central Arghandab tracts should be sufficiently heavy and deep, while those of the older terraces in Nad-i-Ali and Marja appear too sandy and shallow for successful cultivation of sugar beets (see the respective soil descriptions in Chapters IV and V). While moderate alkalinity appears to be a benefit rather than a detriment, it

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[1]Rather and Harrison, pp. 379-380 and U.S. Department of Agriculture, Diagnosis and Improvement of Saline and Alkali Soils, pp. 66-67.

would be necessary to keep down the salts from the time of planting until the young plants are established. This can be accomplished in the course of the pre-planting irrigation, providing good drainage is achieved both for flushing and to maintain the low water table required for successful growth. Along with moderate alkalinity, the sugar beet's main chemical requirement is for potash, the one element that is generally not deficient in Afghan soils. Thus the Helmand appears suitable for sugar beet cultivation. While its high daily maximum summer temperatures are undesirable, they are partly offset by the rapid night cooling in this arid region. Furthermore, it would be possible to plant the frost-tolerant beets early in the spring or late in the summer since winter frosts occur only occasionally in December or January. Sugar beets fit well into a rotation including alfalfa, barley and corn or field beans, all of which are eminently desirable crops in the Helmand-Arghandab region:

TABLE 47

SOME SUGGESTED ROTATIONS FOR SUGAR BEETS[a]

Crop	Period of Growth
1.Sugar beets	late summer, autumn - late winter, spring
2.Barley, seeded to alfalfa	winter - summer
3.Alfalfa	summer - winter
4.Alfalfa	winter - spring
5.Corn or field beans	summer - summer, autumn

[a]Adapted from Rather and Harrison, p. 380.

The inclusion of corn in the rotation prevents the transmission of the fungi which cause the Black-root disease from the alfalfa to the sugar beets, while the inclusion of barley deters the reverse process. As far as Helmand agriculture is concerned, such a pattern would have the advantage of including consumption crops (barley, corn, field beans), a cash crop (sugar beets), and the legumes (alfalfa, field beans) so necessary to improve soil structure and available nitrogen content as well as to provide forage for animals. In fact, the sugar beets themselves leave the soil in excellent condition for the following grain crop, while "the harvested tops from an acre of beets, plus the sugar [remaining] after the extraction, equal the stock feeding value of the entire product from an average acre of corn".[1] Hence, the value of sugar beets as a crop to agriculture in the Helmand Region should be considered along with the value of the extracted sugar to the Afghan economy.

In sugar beet tests conducted in the Helmand by MKA and ICA agronomists, an average yield of 10 tons per acre was obtained, while on Class II lands exclusively this average rose to 12 tons per acre, and on Class I lands to 15 tons per acre.[2] While these tests must be regarded with the same reservations as those conducted by the Sugar Company at Baghlan (see Chapter II), the agronomists estimated "conservatively" that the following yields might be obtained by the farmers themselves making full use of green manures, legumes and farm manures, but without commercial fertilizers: 12 tons per acre on Class I lands; 10 tons per acre on Class II lands; 8 tons per acre on Class III lands; and 6 tons per acre on Class IV lands.[3] Also assumed was an agricultural extension and education program to secure better cultivation methods and the use of improved seed and crop rotations.[4] As late

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[1] W.S. Woytinsky and E.S. Woytinsky, World Population and Production (New York: The Twentieth Century Fund, 1953), p. 569.

[2] HVDP of 1953, Worksheet No. 1.

[3] Ibid., Worksheet No. 4.

[4] Ibid., p. 60.

as 1956, F.O. Youngs, who had worked in the Valley for both MKA and ICA, concluded: "sugar beets have given very good yields in trial plantings in the Helmand Valley. They might easily be grown on sufficient scale to support a sugar factory, and could become an important cash crop."[1]

Several HVA officials, interviewed by the author in 1957-58, expressed the desire to move ahead with the sugar beet program and to establish, either at Lashkar Gah or Kandahar, a small processing plant. For the reasons stated above, however, this is a decision that must be made in Kabul by the Ministry of Mines and Industries or at a higher level. It must be based in part upon information regarding cost of sugar produced at Baghlan and Jalalabad and of imported sugar, available only to Government Monopolies. But the Helmand does appear to have three absolute advantages over the other two areas for sugar beet production: 1) a firm supply of irrigation water, 2) excess available land at present, 3) potential savings in transportation costs if an area now totally dependent upon imports can be provided with its own local sugar supply. A fourth advantage, in the availability of hydroelectric power at either Lashkar Gah or Kandahar, is partially offset by the lack of local coal for the steam boilers.[2] Yet these comparative advantages of the Helmand, plus the need for developing new agricultural patterns to upgrade soils and provide cash income for settlers, should figure heavily in the locational decisions of the RGA. While labor is short in the Kunduz and at Jalalabad has the profitable alternatives of rice and citrus cultivation, there will be an increasing surplus in the Helmand, as the settlement programs continue, which could be devoted to sugar

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[1]Memorandum of May 7, 1956, in Wyoming University Research Team files, Lashkar Gah, Afghanistan.

[2]Baghlan uses coal from nearby Kar Kar, while the Jalalabad plant burns bagasse for generation of steam and electricity. Electrical heating for steam generation may prove to be more economical than importing either coal or diesel fuel from Pakistan, though coal is available in the Quetta region.

beet as well as to cotton cultivation.

Citrus Fruits

Of the two regions in Afghanistan which are climatically suited for citrus fruits, only the Jalalabad oasis has developed a production of commercial significance. This may well be the result primarily of cultural factors since the Jalalabad region is within easy access of the Peshawar area of Pakistan, where citrus groves abound, while the Helmand-Arghandab region is further removed from a source of seedlings and grafts. The only competent authority to survey citrus production in recent years, Dr. Arnold Krochmal, Research Director of the Wyoming University Team, has been quoted at some length in Chapter I on citrus cultivation at Jalalabad. His conclusions point to the need of greatly improved techniques, disease prevention, and the introduction of improved varieties. If sugar production is expanded at Jalalabad, it might eventually provide the basis for the production of citrus preserves, but there is little likelihood that Afghanistan would enter the export market with such commodities any more than it now does with citrus fruits. The oranges, grapefruit, limes and lemons grown in the Jalalabad oasis are either locally consumed or transported to Kabul where they command good prices in the winter season. Improvement of packing methods and of the Gorge Road would go far to raise the quality of the fruit as it arrives in the capital as well as the price it commands. Unfortunately, no figures are available regarding the quantity of this internal commerce. There would appear to be room for expansion of citrus production at Jalalabad if the schemes for reclamation and irrigation enumerated in Chapter I are put into effect, and there is apparently no shortage of labor, at least for orchard crops with their limited seasonal demands.

In early 1958, Dr. Krochmal and Mr. Abdul Hakim, Assistant Director of Agriculture for the HVA, made a trip to Greece to purchase citrus and olive trees for planting in the Helmand region. This venture, which is being financed by the HVA, is one of the most promising in Afghan agriculture. It will, of course, require from five to ten years before the results can be ascertained, but there is apparently no reason why citrus cultivation should not flourish in the Helmand-Arghandab region providing an additional source of income to both old and new settlers. Here, again, the need of increased sugar supplies is evident if any of this potential production is to be processed for export, e.g., to the Quetta region.

Introduction of olive trees is more dubious, however, since utilization will depend upon a change in the consumption patterns of the population. Although wild olive trees abound in Eastern and Southern Provinces, the olive and its oil have no place in the Afghan diet. While olive oil is easy to produce and has a high value for its weight, there is no existing market in Afghanistan, Pakistan or India and farther transportation is likely to prove inordinately expensive.

Also questionable are the proposals to introduce date palm cultivation into the Helmand. Although the trees are grown to some extent in the Jalalabad oasis, they are far more sensitive to cold than citrus trees. A few seedlings have been planted at Nad-i-Ali to determine whether they will withstand the winters, and there were plans to make additional trials in the almost frost-free Shamalan and Chakansur areas. But it requires five or six years before an offshoot can be planted in its permanent area and another eight to ten years before it begins to bear.[1] Date palms are found

[1] Moncure, pp. 13-15.

in ornamental plantings in the Bakwa area, but there is no reported use of the fruit. The trees are very high in their water consumption, requiring about nine acre feet each per year. Thus they would compete with other, probably more valuable, produce along the Helmand.

Deciduous Fruits and Nuts

Of greater present and potential importance than citrus fruits are those deciduous varieties which provide one of Afghanistan's leading sources of export revenue. Both the Kandahar and Kabul regions figure largely in this trade, while northern Afghanistan and Herat export dried fruits to the U.S.S.R. In terms of production, the Kabul and Parwan Provinces are most important in pomegranates. While grapes are important in all parts of Afghanistan suitable for their growth, Kandahar predominates in grape production, most of which goes into raisins, and also in plums and perhaps in peaches. Apricot production is about evenly divided among Kabul-Parwan, Kandahar and the Kunduz Valley, with a considerable output in Mazar-i-Sharif and Herat as well. Apples are also important in Mazar-i-Sharif, while quinces are a specialty there. In addition to citrus, the Jalalabad oasis specializes in figs, which are also important in Kandahar and Maimana. Eastern Province is second to Kabul-Parwan in pomegranates. Melons, as we have indicated, are to be found all over Afghanistan, and there is some inter-regional trade in different varieties, as well as some exportation from Kabul. The following tables, though somewhat out of date, indicate the pattern of fruit exports from Kabul and Kandahar as established by Mr. Sabin in 1947:

TABLE 48

AVERAGE FRUIT EXPORTS FROM KABUL AREA, 1943-44 THROUGH 1945-46 [a]
in metric tons

Fresh Fruits	Tonnage	Dried Fruits	Tonnage
Grapes	3317	Green raisins	3789
Melons	442	Red raisins	941
Apples	128	"Gholadin" raisins	201
Apricots	10	Dried apricots	16
Pomegranates	4287	Prunes	308
Quinces	1		
Others	8		
Total	8193		5255

[a]Sabin Report, passim.

TABLE 49

AVERAGE FRUIT EXPORTS FROM KANDAHAR AREA, 1943-44 THROUGH 1945-46[a]
in metric tons

Fresh Fruits	Tonnage	Dried Fruits	Tonnage
Grapes	4991	Green raisins	4423
Apples	1048	Red raisins	1471
Apricots	343	Black raisins	946
Pomegranates	2080	"Manuka" raisins	11
Quinces	12	Abjosh raisins	2483
Peaches	87	Slaka Parah raisins	3675
Plums	7	Dried figs	450
Pears	5		
Total . . .	8573		13,459

[a]Sabin Report, passim.

Nuts are of primarily domestic importance, with the pistachios of northern Afghanistan brought to market in Kabul as are the "pine nuts" (Pinus Gerardiana Wall) of eastern Afghanistan. The upper Kabul Valley leads in production of walnuts, but almonds are more important at Kandahar and in the northern provinces. The fruit of the mulberry tree (shah tut) is commonly consumed in the Kabul Valley, including Jalalabad, and throughout northern Afghanistan with the greatest production in the Herat area.[1]

In most respects, fruit and nut production in the north of Afghanistan is more similar to that in Kandahar than either region's production is to that of Kabul. This fact is largely explained by the considerably higher elevations of the Kabul-Parwan region, just as Jalalabad, lower and protected by mountains, has its own distinctive fruit production. Thus, internal trade in fruit and nuts is characterized by some interchange between Kabul and Jalalabad (raisins and almonds for citrus fruit) while northern Afghanistan supplies its distinctive crop of pistachios to the Kabul and Jalalabad markets. There is a small exchange of fruit and nut varieties between Kabul and Kandahar, but none between Kandahar and the North. Not only distance but similarity of local types of production rule out such an exchange. Kandahar, on the other hand, is well-placed to export to Pakistan, as is the North with respect to the U.S.S.R.

For these reasons, our enquiry need not be directed towards de-

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[1]Discussion based on Vavilov and Bukinich, and on Frumkin, Synopsis of Afghan Agricultural Statistics, passim. The latter, as Dr. Frumkin is quick to point out, can hardly be presented as true "statistics" but do serve to indicate the relative importance of agricultural production in different areas.

termining which region of Afghanistan is best suited for production of deciduous fruits and nuts. We have just seen that each of the major regions has its own specialties and that none is without the benefits of several varieties which may, indeed, be grown extensively in the others as well. Nor do we yet have to concern ourselves with the problem of increasing production of the different varieties since there is no apparent shortage of seasonal fruits either for domestic consumption or for sale abroad. Rather, the observer is likely to conclude that a great deal of deciduous fruit is wasted in Afghanistan through damage by insects or diseases or else in improper handling and transportation. In contrast to the situation in cotton and sugar, the major problem of the Afghan deciduous fruit industry is not one of production but of quality control and marketing. Care of the fruit before and after picking so that it can command a good price on the domestic or foreign market is much more urgent than the planting of additional trees or the making of new grafts. Of course, this is not to say that the introduction at least for test purposes of new varieties of deciduous fruits may not be as beneficial as in the case of the citrus industry, especially if new varieties prove more disease-resistant. Nor could one state that the bearing stock will not require replacement and enlargement to satisfy a growing demand. When this time arrives, it is likely that the orchard lands along the Arghandab, now receiving ample water, will be able to expand before those in Kabul-Parwan or in the North. But it does appear that the greatest immediate gain is to be had by a much better use of the resources on hand, in other words, by vastly improving fruit processing.

We have discussed in Chapters I and VI the existing situation with respect to the processing of deciduous fruits in Kabul and Kandahar, the only locations where it has been put on an industrial basis. Few sections of the Afghan economy stand in such dire need of reorganization and revitalization. In further contrast to cotton and sugar, processing of which is in the hands of a few relatively large private firms or RGA-controlled plants, the processing of fruits and nuts for the domestic and export markets is fractionalized among scores of small operatives who pay little attention to standards of grading, cleaning or packaging. While there are two sizeable concerns in this field, the Itehadia Company in Kabul and Pushtoon Industries in Kandahar, they control only relatively small shares of the market, and their own performance in the above respects is far from outstanding. Indeed, the failure of Pushtoon Industries to add to the export of fruit products led to the formation of a new company in Kandahar designed specifically for this purpose. However, the long delay in the establishment of the ICA-sponsored Kandahar Industrial District (see Chapter VI) and the failure to increase the available power supply in the city have delayed activation of this enterprise. Meanwhile, RGA has neglected to implement the 10-year old Sabin Report on the Afghan Fruit Industry, which called for:

> 1) the establishment of an experimental project at Kandahar which would a) operate the Pushtoon Industries on a businesslike basis, keeping formal records of throughput and costs, heretofore lacking, b) operate an experimental sun-drying yard at Kandahar, and c) operate an experimental dehydrator;
>
> 2) hire a qualified experimental project manager to supervise the preceding;
>
> 3) conduct similar experiments at Kabul in cooperation with Abdul Rashid Khan, President of the Itehadia Company; and
>
> 4) pursuing the following research project in the Ministry of Agriculture and other governmental agencies:
>
> > a) improvement of quality of yields of fruit trees and vines, b) study of local boxwood and pulpwood trees to determine location and quantity of suitable varieties for container manufacture,

c) importing foreign trees, shrubs and vines which show possibilities of better production,
d) investigating local production of sufficient sugar to supply local needs and canning and preserving requirements,
e) investigating methods for mining and transport of Ishpushta coal to cut costs and insure delivery of 1500 to 2000 tons per year.[1]

Further recommendations called for the preparation of cost estimates for processing machinery to clean, stem and process 5 tons of raisins per hour, to dehydrate 5 tons of raisins or other fruits in a 24-hour period, and to wash, sort and pack 5 tons of fresh fruits per hour. Sabin also envisaged setting up a new canning plant with an hourly capacity of one ton of apricots, peaches or pears, and including tin can fabricating equipment and a machine shop. He foresaw the need of washing, dipping and handling equipment for dry yard operations where the cost of mechanical dehydration could not be justified (see Chapter I). He wanted plans and estimates drawn for providing 30-kilo wood and fibreboard boxes, and for supplying clean water and ice to the processing plants and to refrigerated trucks which would haul their produce to market.

In short, the Sabin Report set forth a complete program for the modernization and partial mechanization of the Afghan fruit industry in Kandahar and Kabul. Yet, over the past ten years, next to nothing has been done to implement his suggestions. As a matter of fact, the only concrete examples of action along this line are in the grape-dusting efforts of Mr. Gattani and the recent trip of Dr. Krochmal, made at the request of the Ministry of Agriculture, to Quetta to purchase 133 improved varieties of apple, peach, pear and plum trees from the Pakistan Government Fruit Experiment Station for transfer to the Ministry's experimental orchard at

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[1] Sabin Report, pp. 2-3.

Bene Hissar near Kabul. The efforts of Kandahar businessmen to provide refrigerated storage space[1] languish. The 1260 cubic meter fruit storage room at the Kabul slaughterhouse remains unused and nothing has been done to procure or equip refrigerated trucks though the Kandahar-Spin Baldak route is certainly adequate for their operation and the Kabul-Torkham route soon will be.

Here is another area to which RGA attention should be invited by the possibilities of increasing foreign exchange earnings. The encouraging rise in fresh fruit exports in recent years is a clear invitation to increase supplies and quality to meet demand. In fact, the falling off in the last two years in dried fruit exports may well be an indication of increased competition from cleaner and better prepared products, since the demand for fresh fruit in India and Pakistan has continued to grow.

Cattle Hides and Leather

While the major problem in deciduous fruits is the processing bottleneck, that in hides and leather lies in both processing and supply. We have discussed in Chapters I and VIII the processing difficulties at the Iqbal Tannery and Shoe Factory in Kabul. We have also mentioned in Chapter I that the modern slaughterhouse in Kabul handles only some 75,000 animals per year, mainly sheep, while the Iqbal Tannery processes only some 10,000 out of the estimated 40,000 cowhides available in the country each year. The only apparent reason for this gross under-utilization of existing facilities lies in the seeming indifference of farmers and merchants to the higher prices which may be obtained for better quality

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[1] Cf. Tudor Report, p. 132.

offerings.

Probably the best estimates of the animal population of Afghanistan are those made available by the Ministry of Finance from tax collection operations in 1953-54 and 1954-55:

TABLE 50

AFGHANISTAN: LIVESTOCK POPULATION

Animal	1953-54	1954-55
Cattle	2,500,000	2,000,000
Broadtail sheep	13,800,000	14,000,000
Goats	5,900,000	6,000,000
Karakul sheep	3,700,000	4,000,000

If these estimates are seriously in error, they are probably on the low side, due to concealment of taxable beasts. Hence, any calculations made therefrom will tend to be conservative, as is desirable for present purposes. The sharp decline in the cattle herd between the two years reported was due to a severe outbreak of rinderpest and other diseases. It has probably been largely restored by now, and we can reasonably take 2.3 million as an estimate of present cattle population.

According the Marcel Croisier, the UNTAM Industrial Economist who worked in Afghanistan in 1954, only about 100,000 out of 2,000,000 cattle were being slaughtered annually, while deaths from disease ranged anywhere from 1000 to 200,000 in different years.[1] If we take Croisier's average of

[1]Croisier, Le Developpement Industriel de l'Afghanistan, Annex V, pp. 136-137.

200,000 to 270,000 annual cattle deaths from all causes, and increase it by 7 per cent to correspond with our 2.3 million estimate for the total herd, we arrive at 214,000 to 289,000 annual deaths from all causes. That this is still far below the world average annual slaughterings of 15 to 20 per cent of cattle herds is largely due to the low demand for beef in the Afghan diet since no cattle are killed for the sake of their hides alone. Nor would it make much sense to try to change the Afghan diet or to convince the farmer that he ought to slaughter a draft bullock or a milch cow for the sake of its hide. But that fact that of a potential 214,000 to 289,000 hides per year only 40,000 become available for the market must be set down to indifference on the part of the herders and, by extension, to poor organization and low price offerings on the part of the middlemen. Even within the limits set by the Afghan diet, at least five times the present number of cattle hides could be supplied to the domestic market. The Iqbal Tannery, operated at capacity, could take 120,000 of these, leaving 80,000 for processing in local tanning facilities or at the proposed Kandahar Industrial District. This would not make Afghanistan self-sufficient in leather since heavier grades of sole leather would still have to be imported, but it would effectively reduce the amounts of lighter grades which have to be purchased abroad.

The requirements for this improvement, however, are considerable. First of all, the middlemen will have to establish a grading system for hides with price gradients to match. Presumably, these will have to be significantly higher than the present prices in order to interest herders and farmers in proper care of animals, careful flaying and satisfactory drying and preserving methods. Since no additional tariff protection is contemplated the middlemen will have to be persuaded to operate on smaller margins and larger volumes than at present. Transportation problems will need to be solved, particularly in the northern provinces. In this area, UN FAO experts in animal husbandry, veterinary medicine and cooperative marketing can be expected to help, but the major impetus must come from the many private dealers in hides and skins, stimulated perhaps by the Ministry of Agriculture and the Commercial Bank established in 1954 by the RGA to make loans to small traders at lower interest than the Bank-i-Millie.

Only in the Helmand could the RGA itself afford a major program of cattle products improvement by tying it in with HVA extension and education work. Since a small privately-owned tannery is supposed to be provided in the Kandahar Industrial District, the HVA could hold out to the farmers an additional source of income by the sale of their cattle hides. To the extent that an irrigated pasture economy can be developed in the Nad-i-Ali and Marja areas, and we have seen the obstacles which it faces, superior cattle properly nourished and properly slaughtered could provide a source of high-quality hides that would command superior prices. By processing these in a modern tannery at Kandahar, local supply could probably replace much of the imported leather which is now used in the Kandahar shoe bazar even though it is not proposed to increase the existing 30 per cent tariff on such imports. Actually, leather produced in Afghanistan should not require any sort of tariff protection in order to be able to compete with imports of all but the heavy grades of sole leather. Given a well-organized collection system bringing in a sufficient quantity of hides, the processing of chrome leather is simple enough to allow both the Iqbal Tannery and the proposed tannery at Kandahar to compete for the domestic market. Such, at least, was the logic of Heinz Heckhoff's mission to Kabul (see Chapter VIII).

Such reasoning may not, however, be applicable to the shoe industry. The fact that scores of cobblers in Kabul and Kandahar engage in working up primarily imported leathers into shoes while the mechanized shoe-assembly line at the Iqbal plant stands idle is an indication that it might not pay to rehabilitate the plant. We have seen that it is proposed to double the existing 30 per cent tariff on imported leather goods. While this would advantage the Iqbal factory over imported shoes it would also advantage the handicraft shoe industry just as much. Here we see the contrast between an industry in which machinery must remain in competition with hand-labor and one, such as sugar refining, which cannot be performed by hand. Here is also a contrast between an industry which must compete with hand-labor within the domestic market and one such as chrome tanning which would be performed by similar methods whether in Afghanistan or abroad.

Sheep and Goat Skins

Afghanistan exported an average of 1.3 million sheep and goat skins over the years 1953-54 through 1955-56, with the total rising rapidly through the period. The sharp contrast of sheep and goat skins exports with cowhide leather imports is to be explained not only by the general lack of interest in beef and cowhides, but by the fact that Afghanistan has herds of approximately 14 million sheep, excluding karakul, and 6 million goats. If slaughterings here come up to the world average of 33 per cent, there should be a potential of 4.6 million broadtail sheepskins and 2 million goatskins available for sale. Actually, the demand for both mutton and goat meat being what it is, at least 6.6 million skins are probably flayed each year, though only slightly over one million come onto the market.[1] Of course, the treating and working of sheepskin and goatskin is considerably easier than cowhide, and so we may assume that there is a significant "cottage industry" production of leather and leather goods, which is not the case with cowhide. But it would seem that between 2 and 3 million additional skins could be brought onto the market if collection and processing systems were improved. At present, of over 1.3 million sheep and goat skins exported only about 30,000 have been processed through the Kabul tannery, capable of handling two or three times that number.[2] Northern Afghanistan is dotted with local tanneries which process small batches of skins in crude vats set in the ground or made of cow or horse-hides sewn together and suspended from a wooden frame. Vegetable tanning solutions made from local plants or solutions of common salt and barley are employed. Other skins are simply spread to dry in the sun. In either case, quality control is absent and skins are actually apt to pick up dirt, rather than lose it, in the processing.

In Maimana Province, in the heart of the karakul sheep district (see Map 1 and Chapter II), an energetic Governor has closed all but four tanneries in an effort to enforce better processing techniques, and to

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[1]Croisier, Le Developpement Industriel de l'Afghanistan, pp. 136-137 and 140, estimates that 7 to 8 million out of 30 million sheep and goats die or are slaughtered each year. These figures, based on 1948 data, appear too high, at least for today's conditions.

[2]The daily capacity is estimated at 200 such skins. But, as Croisier points out, an additional 20,000 skins are usually processed for the home market.

reduce smuggling, but this example has little effect elsewhere. The sheep and goat skin industry is entirely in the hands of small, private operators who usually find sun-drying or salting more economical than even the crude operations just described or the transportation of the skins to Kabul for true tanning. They are correct insofar as sun-drying reduces weight by about 70 per cent while the dehydration inherent in salting or pickling reduces it by only 20 per cent. But rapid drying in the hot summer sun is apt to make the fleshy surface hard, while leaving the interior soft, liable to rot, and subject to insect attack.

Improvements in the quality of marketed sheep and goat skins need not entail centralization of the industry, although use of the Kabul tannery to its 60,000 or 70,000 skin yearly capacity is certainly indicated. Similarly, the inclusion of a modern tannery in the Kandahar Industrial District would enable exports from the southern region to command far higher prices on the world market. But for northern and western Afghanistan, and for skins from other areas which cannot make use of tanneries in Kabul or Kandahar, considerable improvement could be had by the adoption of simple chemical techniques. Croisier recommends that the buyers supply arsenate of soda and naphthaline to the herders and farmers in these regions. Dipping of skins in a 4 per cent solution of the former will safeguard them from insect attack, while coating the insides with a solution of salt and naphthaline will dry them properly throughout the fleshy portion. Supply of such chemicals would cost less than one cent per skin and would more than pay its way in reduced spoilage.

In 1954, when Croisier made his study, buyers were paying from $.35 to $.45 per skin according to quality, and making a profit of at least $.15

per skin on sale to exporters.[1] If the average of 1.3 million skins exported over the last three years could be increased by even half of the two or three million skins which apparently are wasted each year, profits to the middlemen would be increased by from $150,000 to $225,000 annually. Of course, some improvements in the system of collection and in depots and storage facilities would have to be made, but these would hardly negate the advantages to be gained by the individual buyers, especially if they combined their efforts in such cooperative organizations as are now being formed by wool growers. It is difficult to blame anything but a lack of initiative for this foregone opportunity, since even the present transportation system is adequate to handle larger quantities of the comparatively small, light-weight and unbreakable skins, several thousand of which can be loaded into the typical Afghan lorry.

The forage, shelter, water and veterinary requirements of the Afghan sheep and goat industry, which are the most important factors in the number and quality of animals, skins and wool, will be discussed in the following section on karakul production where these factors are most crucial and where most attention is being directed to them. The export of broadtail sheep pelts is dependent upon these factors as well as those above, and need not be separately discussed.

Karakul

The export of karakul pelts, for many years Afghanistan's outstanding foreign exchange earner, is the most highly organized commercial operation in the country. Since World War II, the Afghan-American Trading Com-

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[1] Croisier, <u>Le Developpement Industriel de l'Afghanistan</u>, p. 140.

pany in New York has maintained huge stocks of pelts and has served as the principal foreign outlet for karakul. Until the establishment of an RGA-sponsored exporting agency in 1954, karakul exports had always been financed exclusively by the Bank-i-Millie, which thus controls the Afghan-American Trading Company and the half dozen private purchasing agencies within Afghanistan. Of the latter, the "Karakul Shirkat" is the largest with about 50 per cent of the total business. It maintains a large warehouse in Kabul and several others in the major cities of the northern karakul region. Its plant at Mazar-i-Sharif handles about 400,000 skins per year and that in Andkhui from 100,000 to 150,000. A second plant in Andkhui, owned by a different agency, has a capacity of 100,000 skins.[1] All karakul moves through Kabul and is cleared at the Kabul Customs House. In recent years, increasing numbers of skins have been flown to their overseas destimation, usually via Teheran and Beirut. This fact alone testifies to the value of the pelts which sell in New York at prices from $7 to $15 apiece depending upon quality and seasonal fluctuations in supply and demand.

An interesting feature of the karakul trade is the fact that no skins for export are tanned in Afghanistan. Manufacturers of "Persian lamb" garments find it impossible to reprocess skins tanned by inferior Afghan methods and so prefer to import "fresh" skins. So the skins are just fleshed, dried, baled and shipped. It might also be noted that karakul lambs must be killed at birth or within a few days thereof in order to ob-

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[1]Kimler, p. 17.

tain the tightly-curled pelts desired by fashion-conscious Western ladies, from whom the ungentle consequences of their tastes in fur are usually concealed.

L.C. Jain, former UN Economic Adviser to the RGA, estimated that the karakul industry employs over one million persons in northern Afghanistan at one time or another during the year. Concentrations of the flocks were estimated by Jain as follows (see Map 1):

TABLE 51

DISTRIBUTION OF KARAKUL SHEEP[a]

District	Number of Sheep
Maimana	500,000
Andkhui	120,000
Aqchah	500,000
Shirbarghan	300,000
Mazar-i-Sharif	500,000
Tashkurghan	100,000
Kunduz	500,000
Total	2,520,000

[a]Jain, p. 12.

Another 2,500,000 sheep are usually spread throughout other districts of the North, but except for the northeastern part of Herat Province, they are all to be found within Maimana, Mazar-i-Sharif or Kataghan Provinces. There are no karakul flocks in southwestern, southeastern or extreme northeastern Afghanistan. A combination of cultural and biotic factors seems to explain this distinct regionalization. The karakul sheep as a distinct breed probably developed in the Bukhara region of Turkestan, and was brought south of the Amu Darya by Turkic (i.e., Uzbek and Turkmen) pastoralists. Here they found the plains and foothills covered with sedge-meadowgrass vegetation upon which the flocks could thrive. It was possible to develop a short range nomadism between the foothills and mountainsides in summer and the low plains bordering the Amu Darya and other streams in winter. South of the Hindu Kush the sedge-meadowgrass vegetative community does not exist,[1] and the Pushtun and Ghilzai nomads developed a longer range migration from the Indus Valley to the southern flanks of the Hindu Kush utilizing breeds such as the Ghilzai, Kandahari and Baluchi sheep which can subsist on the wormwood-tragacanth vegetative community of this region and withstand the longer annual journeys. Karakul grazing, with its emphasis on production of many and high-quality lambs, is much more dependent upon type and quantity of feed for the ewes and upon short range operations.

Within northern Afghanistan the locational pattern shifts with the seasons, the karakul flocks moving northwards to lower areas in the winter and southwards into the central mountain pastures in the summer. Similarly, the numbers of sheep will fluctuate from season to season (an estimated 30 per cent of the flocks was lost in the hard winter of 1947-48), but as has just been explained they will never include the ordinary numbers of young male lambs. Some female lambs are also killed when prices are high, but generally they are saved to maintain and enlarge the flock. About six lambs can be expected over the life of the normal ewe, multiple births being uncommon.

According to some rather elaborate calculations made by Gregory Frumkin, the UN Statistical Adviser in Kabul in 1952, one can estimate the total size of the karakul herd for a given year by multiplying the number of skins marketed by 2.85. The difficulty with this estimate, as Frumkin

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[1]See I.A. Linchevsky and A.V. Prozorovsky, "The Basic Principles of the Distribution of the Vegetation of Afghanistan," Kew Bulletin, No. 2 (1949), pp. 179-214 and map.

points out, is that figures are reported only for skins exported, while a fairly large number are used within the country, principally in making hats. Furthermore, the skins are not necessarily exported in the same year as they are produced, large stocks sometimes being maintained in Kabul warehouses. Since the karakul processing season extends from mid-March to mid-June, however, we may assume that none of the current year's production is exported before the Afghan year begins on March 21, but may be exported up to the following March 20. For a rough estimation, therefore, here are the export figures as reported by Frumkin and by the Five Year Plan, with the numbers of range animals they would represent according to Frumkin's 2.85 factor:

TABLE 52

KARAKUL EXPORTS AND FLOCKS[a]

Year	Karakul Skins Exported	Presumed Size of Range Flocks	Year	Karakul Skins Exported	Presumed Size of Range Flocks
1945	3,340,000	9,519,000	1950	2,451,000	6,985,350
1946	1,537,000	4,380,450	1951	1,423,156	4,055,550
1947	2,396,000	6,868,600	1952	1,005,041	2,864,250
1948	2,075,000	4,573,375	1953	1,336,277	3,984,390
1949	1,633,000	4,654,050	1954	1,846,611	5,263,950

[a]Frumkin, Report on Journey to the Northern Provinces, p. 53, and The Five Year Plan of Afghanistan, p. 176.

These figures do not tally too well with those given in Tables 32 and 33 and require further elucidation.

The estimate for 1945-46 is greatly exaggerated by the surge in exports which occured when transportation facilities became available at the end of the war; there were never 9.5 million karakul sheep in Afghanistan. Kimler[1] estimates a production of 2,400,000 skins in 1945 which would correspond to a range flock of 6,840,000 animals. The sharp drops between 1945 and 1946, and between 1947 and 1948 correspond to severe winters. The decline in exports following 1952 is due to increased competition from Soviet and South African sources of karakul but was apparently offset by rising world prices for karakul.

The problems facing Afghanistan's karakul industry, therefore, do not lie so much in increased production as in enhanced ability to compete on the New York and London markets. Sales by graded lots would be far more advantageous than the mixed lots now employed and the elimination of unsaleable skins at the source, or at least at Kabul, would result in savings in transportation and storage. Such grading would also take full advantage of the market preference for Afghan karakul. However, the inherent advantages of the Afghan flocks may not always give them an advantage since it is possible to improve quality and tightness of curl by selective breeding. It is necessary, therefore, to safeguard and even improve the already high quality of Afghan karakul, and particularly to keep animals in good health so that fewer miscarriages or inferior lambs result.

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[1]Kimler, p. 17.

To aid the karakul industry, the UN Technical Assistance Mission had a karakul expert on its staff until December, 1957. His task was to advise both the karakul companies and the herders in matters of pelt grading, processing and marketing. The UN FAO adviser on agricultural cooperatives is still at work on a program to enable the associated karakul agencies to finance such improvements. Since prices paid to farmers for pelts vary from one-third to two-thirds of the New York value of the skins, there would seem to be some margin for cooperative improvement. Since 1955, however, the RGA has forced the agencies to pay higher minimums to the breeders so that there may have to be some measure of agreement reached among Government, karakul agencies and breeders' cooperatives to pay the increased costs.

A further item of well-justified expenditure would be to provide the breeders with instructions and materials for the animal health program recognized by FAO and ICA experts as essential both for karakul and for other types of sheep in the country. Infestation with liver fluke is common among sheep watered both along the Amu Darya and along the streams of the Helmand-Arghandab system. This parasite is spread through the intermediate host of fresh water snails which may also thrive in watering holes. Addition of as little as one part of copper sulphate per million parts of drinking water will kill the snail hosts without injuring the sheep or edible grasses adjoining watering places. For treatment of sheep already infected, carbon tetrachloride may be administered in liquid paraffin or raw linseed oil, but care is necessary with this form of treatment. The copper sulphate treatment of water supplies is also effective against some forms of roundworms, probably the second most prevalent disease of sheep in Afghanistan. For other types, phenothiazine added to salt-licks is highly efficacious. Anthrax, the scourge of Western sheep before the days of Pasteur, is not a common malady among Asiatic breeds.

The complicated nature of these and other sheep diseases is a further argument for the rapid expansion of animal husbandry and veterinarian services within the Afghan Ministry of Agriculture. This program, still in its infancy, will receive impetus from the newly established faculty of Agriculture and Engineering in Kabul University, which is staffed in large part by Americans on the University of Wyoming ICA contract team. The system of agricultural research stations must also be expanded, particularly in the northern karakul region where there is no station between Mazar-i-Sharif and Herat. The Governor of Maimana Province has attempted to fill this gap by establishing an experimental farm of his own at the provincial capital. However, he must look to Kabul to supply veterinarian assistance, and he hopes to see the establishment of veterinary centers in Maimana, Mazar-i-Sharif and Kataghan Provinces where special attention can be directed to the needs of the karakul industry.[1]

Governor Gholam Haider Adalat of Maimana is deeply concerned with the problems of karakul raising which supplies the major share of income for his province. In addition to the control which he has established over local tanneries he is devoting attention to the problems of winter feed and water for the flocks. He stated that in the dry winter of 1956-57 lack of water and moisture-containing fodder produced a 50 per

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[1]Interviews with Gholam Haider Adalat, Governor of Maimana Province, October 3-4 at Maimana.

cent proportion of stillbirths among the ewes of Maimana Province. In recent years of below-average precipitation sheep have had to be driven over long distances to reach the Amu Darya when local water holes gave out. This results in quick denudation along the drive routes, so that late-comers find no forage along the way and may go for two or three days without food. While sheep can withstand short periods of hunger and thirst, they should have about 1.5 gallons of water daily and they should not be driven over three or four miles to get it, especially if they are pregnant. Governor Haider has applied to the Ministries of Agriculture and of Mines and Industries for pumps to bring up water and establish a number of perennial watering depots along the routes of the sheep migrations. He is also considering the suggestion made by Dr. Burns of the Wyoming Team to dig deep wells and provide reservoirs if mechanical pumps cannot be obtained. And he has urged the Ministry of Agriculture to provide storage facilities for salt, grain and food concentrates for the sheep of the North which generally have to rely upon the sparse, but evidently nourishing and well-adapted, local sedges and grasses and on a very few areas of irrigated pasture along the rivers. It should be said to the credit of the sheep herders, however, that the northern Afghan foothills are dotted in autumn with small enclosures made of piled and bundled fodder, painstakingly cut and stored to carry the sheep through the winter. The enclosures also serve to provide them with some shelter from the cold winds, at least until the fodder is consumed.

The preceding lines of action are applicable, of course, not only to karakul but to all types of Afghan sheep in the South as well as in the North. Their implementation, whether under the direction of the karakul cooperatives, the Ministry of Agriculture, or the HVA, can do much to improve the quality and quantity of animals, pelts, hides and wool throughout Afghanistan. But before passing to a discussion of the Afghan wool industry, one further avenue of development, open only to the karakul breeders, should be discussed.

We have stated above that the problem of karakul production, in view of the present state of demand on the world market and of competition from Soviet and South African sources of supply, is not one of quantity but of quality production. Constant upbreeding may be essential if Afghanistan is to maintain its present lead in smooth, glossy and tightly curled karakul pelts. Another possibility also exists in the creation of new types and colors of karakul by selective breeding. In Maimana Province a small flock of golden or honey-colored karakul sheep is now being developed. At present, it produces only some 5000 pelts a year, or less than enough for a dozen coats produced according to the exacting matching requirements of the New York "Persian lamb" trade. But if this color catches the fancy of the American, British, or West European fur-buying public, it could result in a partial rejuvenation of the karakul trade and a confirmation of Afghanistan's advantage in that market.

It would be foolish, of course, to suggest that the Afghan karakul industry rely upon rapidly-changing tastes for its economic salvation. Enforcement of quality control and grading at the source can do far more to improve sales and prices in New York. But at the same time the Company might accept the suggestion of Governor Haider that it make a serious effort to interest fur fashioners in this "mutation karakul" and see how matters develop. There is no necessary reason for "Persian lamb" to remain almost exclusively a sober, middle-aged fashion.

Wool

With the exception of certain remarks on cow hides and karakul, all that has been said in the preceding sections is relevant to a discussion of the Afghan wool industry. Even the adult karakul sheep are shorn and make their contribution to Afghan wool production, while the sheep and goat skins discussed above are shorn of their fleece before salting or tanning. Afghanistan produced some 8,400 tons of wool in 1956-57, of which only 2000 tons were used domestically by the Kabul and Kandahar factories and cottage industry, including carpetmaking.[1] Average exports for the three years 1953-54 through 1955-56 came to 6,040 tons per year. These exports represent almost entirely carpet wool rather than apparel wool, and came principally from collecting depots in Kabul, Kandahar, and Herat. While mechanical facilities are available for scouring wool at both the Kabul and Kandahar factories, we have seen that little use is made of them by exporters, with the result that the wool, washed in cold and sometimes stagnant water, retains most of its natural grease and picks up considerable quantities of dirt. While grease retention may be an advantage, preventing felting in shipment, up to 30 per cent of dirt accumulation serves to increase transport costs and reduce its price on the world market. In order to remedy this situation, the Ministry of National Economy in 1955 instigated the formation of a Wool Exporting Syndicate financed through the new Afghan Commercial Bank. This company purchased over 6000 tons of wool in 1956 for export in accordance with new sorting and baling rules. Private merchants were left free to export any remaining wool, provided they complied with the standards established by the

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[1] <u>The Five Year Plan of Afghanistan</u>, p. 179.

Syndicate. At the same time, the Flock Owners Cooperative for Wool, established with the assistance of the UN FAO experts, was directing its attention to improved methods of shearing and of washing wool either before shearing with chemicals or after shearing with warm water. Washing of shorn wool with chemicals to remove all of the grease, however, is not recommended because of the felting problem in transportation. But it would seem logical for the Flock Owners Cooperative to work towards the establishment of one or more modern wool cleaning plants in northern Afghanistan which would have the immediate effect of increasing income from exported wool and which might eventually provide the basis for a wool textile plant similar to those in Kabul or Kandahar but presumably of modern design.

The greatest improvement which might be made in the wool industry would be to take advantage of the large amounts of wool which are wasted within the country. Improper shearing, failure to shear the estimated 14 million sheep as often as is possible, and failure to provide adequate forage and fodder to allow the sheep to grow wool and meat at full capacity all result in considerable annual losses. While wool yields per animal differ widely among various sheep breeds, we may take the Ghilzai and Kandahari breeds as representative of most fat-tailed Afghan sheep. Their yield is estimated at 5 to 6 pounds per animal. On this basis, and making allowance for the lambs in the population, there should still be an annual clip of over 25,000 metric tons of wool, <u>with only one shearing per year</u>, and at prevailing standards of nourishment and care. The fact that apparently only one-third of this amount reaches the marketed sector indicates the need for considerable improvements not only in collection, grading and marketing, but in the rural extension and education field which we have emphasized time and again throughout this study. At present, such activity is under way only in the Helmand, where the use of irrigated pasture and imported Columbia Sheep is being pushed by the HVA and ICA. Until the Ministry of Agriculture's system of research stations is considerably expanded and provided with animal husbandry experts and experimental flocks, we must expect that livestock efforts will remain restricted to the Helmand, except for the early attention which may be forthcoming for karakul flocks in the North. While more could be desired, the handicaps are obvious, and it is more practical to concentrate on the Helmand area where the organizational framework is available and where distinct possibilities exist both for upbreeding the strains and for introducing a system of irrigated pasture far superior to anything now known in the country. Furthermore, sheep raising on the problem tracts of Nad-i-Ali and Marja is probably the most desirable economic use for their lower class soils, and can be more easily adopted by former nomads than the foreign cattle-dairy culture represented by the introduction of Brown Swiss cattle.

The recommendation to concentrate efforts for improvement of sheep raising and wool production in the Helmand, for the present, is not based on any particular preference for development in that region, inasmuch as other parts of Afghanistan have as good or better climate and natural vegetation patterns for flock maintenance. But the Helmand, because it has been the locale of the Project, now has a better water distribution system for both irrigation of pasture land and flock watering. Equally important, it has the rudiments of an agricultural extension and education system which can provide the assistance in sheep breeding, care and shearing necessary to produce a substantial increase in available wool supplies. Finally, while the Woolen Mill at Kandahar is in definitely unsatisfactory condition, it is at least more modern in its equipment and outlook than that at Kabul, and improvement and expansion of its facilities can be envisaged when the power requirements can be met.

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We have now completed our analysis of the physical and human resource base for production and processing of Afghanistan's key crops and pastoral products. In the case of cotton and sugar beets, we have seen that while the Kunduz has the advantages of experience and establishment, it will be restricted in terms of land, irrigation water and perhaps labor until the RGA is able to embark on a Kunduz Valley development program similar in scope, if not in size, to that in the Helmand. We have indicated the advantages of embarking upon cotton and sugar beet growing and processing programs in the Helmand, which needs cash crops fitting both the limitations of the local soils and the needs of the local population.

As for citrus fruits, we have determined that while the Helmand may come into the industry at some time in the future, for the present the Jalalabad oasis holds the advantages of an eminently suitable climate, established production and access to the Kabul winter market. For deciduous fruits and nuts, the production of well-established areas around Kandahar and Kabul and in the North appears to be ample for the present, while the Kandahar (Arghandab) region has the best possibilities for future expansion thanks to the Helmand Valley Project. This industry's immediate prospects, however, depend very heavily upon improved collection, processing and marketing activities, and we have considered the most essential measures to be taken along those lines, especially with a view to increasing exports of this important foreign exchange earner.

Leather, sheep and goat skins and wool have been analyzed in terms of the present organization of collecting and processing activities and, by reference to karakul herding, in regard to natural resource bases in grazing land, forage, fodder and water and to the human base in experience in care of flocks. Shortcomings in both stock-raising and marketing have been listed along with corrective measures to be taken. While the Helmand area appears to have the best potential for cattle and sheep expansion, there does not appear to be any reason for a major relocation of this industry, especially of its karakul section long-established in the northern part of the country. The needs for improvement of collection and processing facilities, particularly of the wool factories in Kabul and Kandahar, have been stressed.

While the foregoing analysis, as summarized in the table on the next page, is indicative of the relative advantages of each of our regions for production of the crops and commodities discussed, an examination of the prospects for future expansion must also include analysis of the relative regional potentials in each of two "permissive" factors, namely, power and transportation. Therefore, the tentative summation in the following table will serve only for purposes of summation and reference, and must be modified in accordance with power and transportation considerations in the following chapters.

COMMODITY	K A B U L	R E G I O N	K U N D U Z	R E G I O N	H E L M A N D	R E G I O N
	Upper Basin	Jalalabad	Valley Proper	Mazar-Maimana	Arghandab Area	Helmand Area
COTTON	Large-scale cultivation climatically excluded.	Large-scale cultivation excluded by competition of other crops such as rice and sugar cane for land and water.	Excellent conditions make this the principal present growing area, but insufficient capital and labor for any large-scale expansion.	Second most important cotton growing area at present, but little prospect for expansion due to shortage of capital and also water.	Test plantings indicate climate and some of better-drained soils in Marja, Shamalan, Darweshan, Seraj and Arghandab areas are excellent for cotton growing, especially if proper rotation, fertilizers and carefully-selected seed are used and proper extension and education guidance extended. Region has land and water available and needs a cash crop.	
SUGAR	Cane growing excluded by climate, beets by competition of food crops.	Growing season is too short for proper ripening of cane as now sown. Two serious diseases. Small mill in operation.	Excellent conditions for beet growing but must compete with both wheat and cotton for land, water and labor.	No present cultivation as area can be supplied from Baghlan or U.S.S.R. Irrigable land is restricted in this area.	Plantings and requirements of beets indicate that they would do well in Shamalan, Darweshan, Seraj and Arghandab alluvial soils. Climate good; land, water and labor are available for large-scale growth, and area needs cash crops. Processing mill required.	
CITRUS FRUITS	Climatically excluded.	Only present producing area. Expansion contingent upon disease and quality control.	Climatically excluded by low winter temperatures.		Climatically favorable in southern areas. Experimental plantings have been made. Land, water and labor available for expansion of production if experiments are successful. Helmand area has best possibilities.	
DECIDUOUS FRUITS AND NUTS	Present areas appear well-suited for production of the varieties indicated below. Problem is not one of increased production at present but of improving the quality of the fruit now grown by means of disease control and better handling and transportation methods. Use of refrigeration facilities at Kabul and Kandahar is desirable, as is some greater degree of RGA supervision over the various processors and exporters to ensure higher quality standards.					
	Pomegranates, grapes, apricots, mulberries, almonds, walnuts.	Citrus (see above), figs, pomegranates, mulberries, pine nuts.	Apricots, mulberries, pistachios, almonds.	Apricots, apples, quinces, mulberries, pistachios.	Grapes, plums, peaches, apricots, almonds.	No large production at present – hence, best prospects for expansion.
CATTLE HIDES AND LEATHER	120,000 hides per year capacity of existing tannery largely unused due to inefficient collecting system and lack of incentives.	Local hides are largely wasted while leather and leather goods are imported from Pakistan.	Present demands met by small, local tanneries using vegetable tanning agents or by imports of chrome leather and leather goods from U.S.S.R. This region probably has greatest supply of unused cattle hides at present time, but needs cooperative marketing and credit system.		Establishment of a modern tannery in the Kandahar Industrial District, plus an improved collection system, can go far to reduce present dependence upon imports of leather. Adoption of irrigated pasture system for Helmand lands would improve supply of good hides, especially if supported by HVA extension program.	
SHEEP AND GOAT SKINS	70,000 skins annual capacity only 2/3 utilized. Need to reduce costs to compete with drying and salting processes.	Local hides used in cottage industry or exported via Pakistan after crude drying, salting, or vegetable tanning.	Cooperative organization, higher prices offered to herders, use of chemical tanning and preservative agents, and profit in volume rather than margin could greatly increase the marketed number of skins in this area. No modern tannery, but no need for a highly centralized operation.		The modern tannery in the Kandahar Industrial District could make this region self-sufficient and a net exporter of tanned skins, especially if operated in conjunction with irrigated pasture system proposed for Helmand areas. Prevalence of nomadism makes this region greatest potential supplier of skins.	
KARAKUL	No local production, but Kabul serves as collecting, financing and exporting center. RGA has broken Bank-i-Millie's monopoly of these functions, but adoption of graded marketing needed.	Of no present or potential importance here.	Region's vegetation and experience of its Turkic herders give it monopoly of karakul production. Forage and water requirements need attention, especially in winter. Veterinary requirements of females also important. Quality control and perhaps development of new strains needed to compete with U.S.S.R. and South Africa. Much improvement needed if area is to tan its own skins.		Of no present importance in karakul production and probably cannot enter this industry because the regional vegetative communities are not suited to karakul grazing.	
WOOL	Supply is good, but quality of exports was poor prior to establishment of Syndicate in 1954. RGA-owned factory is obsolete. Better cleaning, grading and baling facilities are needed.	Not much information available on wool production of this area, but far less important than Upper Kabul Basin.	Because of predominance of karakul pelts, wool production is secondary. But adult karakul sheep are shorn, and enough wool is produced to support the cottage carpet industry. Region could probably support modern cleaning plants for exports to U.S.S.R. as well as home use, and might eventually support a wool textile mill.		Because of prevalence of nomads, this Region is probably first in wool production, but allows much of this to "walk away" with the nomads into Pakistan because of lack of collecting, cleaning and baling facilities. Woolen mill at Kandahar could be modernized and expanded both for textile production and to serve needs of exporters and of cottage industry. Adoption of irrigated pasture economy along Helmand would greatly increase carrying capacity and quality of animals, as will the introduction of new breeds by ICA and HVA.	

X. POWER RESOURCES AND REQUIREMENTS OF INDUSTRIAL DEVELOPMENT

A nation can often achieve savings of foreign exchange by replacing imported products with products made at home either from domestic or imported raw materials. Import controls and tariffs are commonly used to achieve this replacement. Such measures, which often result in substantially higher prices to the consumer, should not be taken unless these prices can legitimately be justified as temporary expedients designed to enable domestic industry to achieve a volume of production at which it will become competitive with imports or unless the nation is particularly vulnerable to economic blockade in time of war or political unrest. We have seen that the economic policy of the RGA, especially in the light of the deprivations suffered during World War II and the Pakistan blockades, is more likely to move towards increased protectionism rather than away from it, at least with respect to the commodities listed in Table 36. While it is not proposed to increase the tariff rates for imports of sugar and leather, we have seen that it is a shortage of raw materials (sugar beets and hides) rather than incentive which prevents full utilization of existing domestic productive capacity for both of these commodities. The proposed increase in the tariff on imported cotton piece goods would provide some additional incentive to the newly-increased domestic capacity, while the much larger increase proposed for rayon might stimulate creation of such an industry (see Chapter VIII). The proposed increase on leather goods imports, however, would probably benefit bazar cobblers as much as the inoperative Kabul shoe factory.

But we have not been concerned merely with the imports. A nation may also increase its foreign exchange by exporting larger quantities of raw materials or by exporting them in a more valuable, processed form, in better qualities and grades, and/or in a superior state of freshness and cleanliness. Our analysis of Afghanistan's export commodities has included ginned cotton, fruits and nuts, karakul pelts, sheep and goat skins and raw wool. If we combine the processing requirements of these exports with those of the above import commodities, we arrive at the following list of activities which would appear, under existing conditions, to be most advantageous for the developing Afghan industrial economy:

1) improved grading and ginning of cotton for both export and domestic use, combined with increased domestic spinning and weaving of cotton piece goods as opposed to imports thereof;

2) increased domestic production of sugar, both to reduce present imports of refined sugar and to facilitate development of a fruit-processing industry;

3) improved cleaning, processing and packaging of fruits and nuts for domestic use and export as opposed to shipment of unclean, poorly-packaged products liable to spoilage and commanding only inferior prices;

4) increased domestic manufacture of leather in all available grades, perhaps followed by rehabilitation of existing shoe-manufacturing capacity, as opposed to importation of leather and leather goods;

5) improved collection, grading and domestic processing of sheep and goat skins, broadtail pelts, and possibly of karakul, as opposed to the waste of skins and inferior processing methods now employed;

6) improved collection, grading and cleaning and baling of raw wool as opposed to the export of dirty, mixed and bulky wool, and improved processing of what domestic wool is machine-woven within the country.

Each of the preceding activities will have its transportation requirements, a subject discussed in Chapter XI. They will also have their power requirements, whether for electricity to run cotton gins, spindles and looms, or for steam to operate dye works, tanneries, pressure kettles for canning, and retorts for sugar purification. In Afghanistan, only three sources of such energy are now available: hydroelectricity, coal and imported fuel oil. Wood is extremely scarce and expensive and no long range or heavy fuel demands can be predicated upon the meagre supply. Instead, attention is being devoted to means for increasing the amounts of coal mined and at the same time to means of exploiting the promising petroleum deposits in northern Afghanistan. We shall now briefly consider each of these energy sources, so as to be able to superimpose regional power resources upon the comparative scheme of physical and human factors which we have just presented.

Hydroelectricity[1]

In the presumed absence of an integrated development of the Kunduz Valley, only the Kabul and Helmand regions are in a position to offer substantial amounts of hydroelectricity to processing industries. In the Kabul Valley, the Sarobi Dam is now in operation with a maximum theoretical output[2]

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[1]The very considerable area for expansion is indicated by the following figures on total electricity generation (hydroelectric and thermal) before the Sarobi plant began operation in May, 1957:

	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57
Electrical Energy (Million KWH)	8.3	8.8	7.9	20.8	22.7	24.3	29.3

The source for these figures is: Ministry of Mines and Industries and ICA Minerals Adviser, estimates in files of United States Operations Mission (ICA), Kabul, Afghanistan.

[2]That is, running both generators simultaneously, an unsound procedure from the maintenance standpoint and one which allows no "standby" capacity.

of 22,000 kva from two 11,000 kva units, and can be raised to 33,000 kva by the addition of a third generator without additional heavy construction. Provision of a fourth 11,000 kva unit is also possible, but would entail building a new intake, tunnel and powerhouse. Of more immediate significance, however, is the Soviet-engineered plan for a storage and power-dam at Naghlu for which surveys have been completed. This project, which may require five years for construction, will provide between 30,000 and 40,000 kw presumably without detriment to the storage and generating capacities at Sarobi, five miles downstream. If we can count, therefore, on a minimum of 50,000 kw, firm power, on the Kabul River after five years' time, there should be an ample supply for wool, fruit and leather processing, the three major industries which we have indicated as most advantageous to expand in Kabul City. The bottleneck, if any, will occur in the intervening period, or if Naghlu is not constructed as planned. We have stated in our discussion of the Gulbahar cotton textile plant (Chapter II) that it will require 14,000 kw when in full operation. A shortage of cotton, or of trained operatives, may delay the attainment of full production for several years, perhaps until Naghlu power is available. But if Gulbahar reaches capacity before additional electric power is available, then there will be a shortage of at least 4000 kw in the Sarobi-Kabul-Gulbahar grid in fall and winter months when runoff water is low and when the demands of the capital are highest. Under these conditions, while Kabul City requires about 7000 to 8000 kw, Sarobi output is limited to 14-15,000 kw. Sarobi could provide the additional 2000-3000 kw for new industrial demand only at the further expense of Gulbahar and, hence, of the cotton textile industry which we have singled out as of particular importance. Therefore, it would seem advisable for the Textile Company to undertake the hydroelectric development of the nearby

Panjshir River at an early date to ensure its own hydroelectric needs. Meanwhile, the RGA through its Ministries of Public Works and Mines and Industries must determine how soon it can expect to have Naghlu power available, and on this basis decide whether or not to install the additional unit at Sarobi. If it appears that Gulbahar demand will rise slowly, and that Naghlu can be counted upon within five years as envisaged in the Five Year Plan,[1] then it probably is not justifiable to add a third unit to Sarobi at this time, since needs for Kabul City, including the expanded woolen, leather and fruit processing operations, may not go above 10,000 to 11,000 kw within this period.

In the Helmand, though the present situation is poorer than that at Kabul, the outlook is brighter. Completion of the Arghandab power installation even after two years will provide 5400 kva for Kandahar's present consumers, the Kandahar International Airport and the proposed Kandahar Industrial District. Since it is estimated that the demand will exceed 6000 kw only after ten years time, and since it will be possible to increase the Arghandab capacity by two successive additions of 3200 kva apiece, there would appear to be no problem, in the long run, for the increased processing of fruits, wool, leather, and perhaps of cotton and sugar which we have postulated for this area. Power will continue to be a severe limitation until Arghandab generation begins, of course, since the existing facilities cannot meet even present demand, but since it will require at least a year to make the recommended improvements in processing capacity, as well as to construct the Kandahar Industrial District, diesel generators can probably fill the few

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[1]The Five Year Plan of Afghanistan, p. 165.

months' gap remaining until Arghandab generation and transmission begin.

Once the canal leakage is repaired the Boghra power station, with a theoretical capacity of 3000 kva and a potential of 4500 kva, should produce ample power for present and prospective needs, even if rural electrification is undertaken and if the recommended cotton and sugar beet processing plants are located there rather than in Kandahar. Thus, in the Helmand at least, hydroelectric power is no limitation on the location and expansion of processing industry, and is even an attracting influence for that industry in the case of sugar beets and cotton, compared with the Kunduz Valley. Probably the most logical locational decision would be to place cotton gins in both Lashkar Gah and Kandahar, with the textile plant in Kandahar, where more skilled labor is available. The proposed sugar factory could be located near either Kandahar or Lashkar Gah, depending upon whether beets are grown more successfully along the Arghandab or in the Shamalan-Darweshan; probably, they will compete more strongly for land along the Helmand than in the horticultural areas near Kandahar. As for wool processing, it would be preferable to improve the Kandahar plant before the one at Kabul, not only because its facilities are basically better but because the additional drain on Kabul power could thus be postponed until Naghlu is in operation.

Coal

Afghanistan has two operating coal mines, a score or so of locally-exploited surface occurrences, and one really promising but undeveloped coal deposit. The two mines are located at Ishpushta, about 160 road miles northwest of Kabul in the Bamian-Surkhab gorge near Doab, and at Kar Kar, about 15 miles northeast of Pul-i-Khumri. The Kar Kar mine, with an estimated 300,000 to 400,000 tons of reserves in seams from 9-20" thick, is strategically placed for supplying the lower Kunduz Valley, and the Baghlan Sugar Factory in particular. The bituminous coal it produces is of fair quality, giving 5000 to 6000 calories per pound, though it is not suitable for coking.[1] The estimated 100,000 tons of coal at Ishpushta is friable, at best, and is often reduced to a powder by the time it reaches Kabul. There it is usually mixed with molasses, from Baghlan, and pressed into briquets for use in the RGA arms factory, the Woolen Mill, the Shaker Ceramic Factory, the "Silo" flour mill and bakery or for heating offices and the more opulent homes in the capital.

A serious shortage of coal is certain to develop as the new Czech-built cement plant at Jabal Seraj goes into operation. To operate at its 100 metric ton daily capacity, this plant will consume between 24 and 30 metric tons of coal per day, or approximately 8000 metric tons per year. The mill had built up a four months supply prior to commencing operations in early 1958.[2] Fortunately, the fuel injector for the rotary cement kiln is adapted to use powdered coal or fuel oil. The delivery of 100 International Harvester coal trucks under Special Fiscal Year 1957 Assistance extended by the Richards Mission was expected to improve the transportation situation, but the crucial problem remains production at the mines. The following table analyzes this production for the past 7 years.(See Table 54 on the next page.

This slow but steady improvement is principally due to the fact that the ICA had project agreements with RGA since 1953 under which a highly-competent Minerals Adviser, borrowed from the U.S. Bureau of Mines, advised on operations and on the installation of some mechanical equipment, also provided by ICA. ICA Project No. 06-21-003 entitled "Mineral Resources and Coal Pro-

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[1]All estimates from interview with Paul Hamer, ICA Minerals Adviser, Kabul, Afghanistan on February 27, 1958.

[2]Visit to Jabal Seraj cement plant and interview with Mr. Pucek, Chief Engineer, on February 8, 1958.

duction" has included exploration and appraisal of new sources of coal as well as improvement of extraction methods and lowering of costs at the existing mines. These costs amount to about $1 per ton at the mine, and, due to transportation difficulties, about $5 per ton at Kabul.

TABLE 54

AFGHANISTAN: COAL PRODUCTION 1950-51 TO 1956-57, IN SHORT TONS[a]

Mines	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57
Kar Kar					6,500	11,200	13,100
Ishpushta	breakdown not available				10,912	10,292	14,650
Darra-i-Suf						1,500	
Total . . .	10,100	14,100	14,500	16,800	17,412	22,992	27,750

[a]Ministry of Mines and Industries and ICA Minerals Adviser, Report to the Royal Government of Afghanistan, March, 1957, in files of USOM (ICA), Kabul, Afghanistan. As of March 21, 1957 (end of Afghan year 1335), 16,000 short tons of coal remained untransported at Kar Kar and Ishpushta.

The adviser, Paul Hamer, has visited outcrops throughout northern and eastern Afghanistan, including the almost inaccessible deposits of Obeh, 55 miles east of Herat, which were found to be insufficient to justify the high costs of development.[1] In Mr. Hamer's opinion, the Darra-i-Suf deposits alone offer a semi-permanent solution to Afghanistan's growing coal needs. Located

[1]At Masjh-i-Ghobi, 108 km. NE of Herat (34°37'N, 63°09'E), a single seam 0.9 to 1.0 meters thick is estimated to contain 210,000 metric tons of measured and indicated coal and 1,050,000 metric tons of inferred coal within 200-300 meters of the surface. A seam 52 meters down now is being worked with 5 shafts and drifts at 9 meters intervals - recovery may be only 20 per cent with present methods. Ministry of Mines and Industries and ICA Minerals Adviser, Report to the Royal Government of Afghanistan, March, 1957.

about 85 miles south of Mazar-i-Sharif, the several outcrops indicate probable reserves of about 5 million tons of good quality (8000 calories per pound), non-friable coal which could withstand the transportation involved. The possible reserves here are much larger but can be estimated only by driving shafts, as has been done at Kar Kar. To date, they have been mined only on an experimental basis (see Table 54) and cannot be commercially exploited until access roads are provided.

Two alternative routes exist to the Darra-i-Suf coal deposits. The trail leading south from Mazar-i-Sharif along the Balkh Ab could be improved and extended along the Darra-i-Suf to the mines (see Map 3) This would be the simplest method, involving a minimum of expensive construction work, but would require a journey of some 210 miles to Pul-i-Khumri, followed by another 235 miles to Kabul. The alternative is to put a more difficult but far shorter route over the mountains into the Surkhab Valley, and join it with the Great North Road at Doab. This would bring the Darra-i-Suf mines 75 miles closer to Kabul than those at Kar Kar. While the very difficult construction of a road over the Salang Pass (see Chapter 11) would return the advantage to Kar Kar, the future needs of the Kunduz Valley will probably continue to demand a large share of the Kar Kar output as they do at present, especially if a new cement plant is built at Pul-i-Khumri.

The importance, particularly to Kabul, Jabal Seraj and Gulbahar, of developing coal mining at Darra-i-Suf has repeatedly been emphasized by Mr. Hamer to the Ministry of Mines and Industries. The Ministry has even had the route surveyed for the shorter road to Doab, via the upper Surkhab Valley, and obtained an estimate of $120,000 from the German firm of Kochs. The main difficulty apparently lies in the fact that it is the responsibility of the Ministry of Public Works to undertake construction, and that Ministry has its hands full. It is also possible that, after its experience in the Kabul Gorge, the Ministry would prefer to construct the easier route from Darra-i-Suf to Mazar-i-Sharif. A further difficulty, perhaps, resides in the failure of Afghan officials to realize that production of 100 tons per day, the present average, could easily be doubled without further investment.[1] There is too great a tendency to regard the improvements over the last five years as substantial gains rather than as merely an indication of what could be done. The provision of electrically operated hoists at Kar Kar and of ventilators at Kar Kar and Ishpushta was not an end in itself but a means to greatly increased production, which, in Mr. Hamer's opinion, could easily reach 50,000 tons per year. This would, however, exhaust the known reserves within ten years unless further seams were discovered in the course of mining, as is not unlikely. Since even now when coal sells at 265 Afghanis ($5.30) per ton the estimated national demand is for 97,000 tons per year (of which at least 30,000 tons could be sold in Kabul),[2] it is obvious that the basic need remains that of exploiting the much larger reserves available at Darra-i-Suf.

One problem which requires immediate attention if the Kar Kar output is to be raised and Darra-i-Suf brought into production is the provision of pit-props. The coal mines of northeastern Afghanistan are in an even poorer position with reference to mine timber than the chromite deposits of the Logar Valley since there are no natural forests in Kataghan Province

[1]Interview with Mr. Paul Hamer, Kabul, Afghanistan on February 27, 1958.

[2]G.V Ganeshan, Field Evaluation of ICA Project No. 06-21-003, Evaluation Report No. TA-1, in ICA files, Kabul, Afghanistan (Kabul: June 22, 1957).

and irrigated stands of poplars are both scarce and expensive. Some metal props have been imported from Germany at almost prohibitive cost, but the logical solution lies in the immediate establishment of poplar nurseries along the Kunduz and Darra-i-Suf Rivers.

As a locational factor for the industries we have stressed, coal is less important than hydroelectricity. Insofar as steam-generated power may be substituted for hydroelectricity, however, coal certainly gives an advantage to the Kunduz Valley first, and to the Kabul Valley second, leaving the Helmand region a very poor third. In fact, the Minister of Mines and Industries has indicated that he has no hope of locating developable coal sources in southern Afghanistan, and that in future planning reliance will be placed solely upon hydroelectric power in the South with coal reserved for use in the North and around Kabul.[1] In line with our conclusions regarding the financial obstacles to early large-scale harnessing of water resources in the Kunduz, it is probably wise to rely upon coal and steam-generated electricity for expansion of industrial needs in the near future. However, one is forced to ask whether official optimism with regard to production of coal at Kar Kar and Ishpushta has not already led to overexpansion and overplanning of the industries which require coal as a raw material or as a fuel. For example, the Jabal Seraj cement plant will require 4000 tons of coal per year for capacity operation, while the thermal station at nearby Gulbahar Textile Factory will need between 5000 and 6000 tons for supplemental electric generation and to supply steam to the finishing and dye works. Add this 9000 or 10,000 tons to the 4000 used in the short operating season at the Baghlan Sugar Factory, and one arrives at the total annual output attained

[1]Reported in a memorandum from G.V. Ganeshan to the Acting Director, USOM, dated July 11, 1957, in files of ICA, Kabul, Afghanistan.

at either Kar Kar or Ishpushta, leaving less than one-half of the 30,000 tons estimated demand for Kabul itself. Thus, any expansion of operations at Baghlan would be precluded until Kar Kar and Ishpushta are raised to the 50,000 ton annual output envisioned by Mr. Hamer, who has certainly done all an outsider can do to realize such a production. Furthermore, the scheme to erect a second cement mill at Pul-i-Khumri, with a daily capacity of 150 tons, would certainly have to be postponed until the Darra-i-Suf deposits can be tapped to supply the additional 12,000 tons of coal per year which such a plant would require.

Thus, we have a situation in coal production not unlike that in the Kabul hydroelectric grid, since in both instances large-scale construction will have to be undertaken before utilization of energy resources can be brought into line with immediate or near-future requirements. In both instances, also, diesel fuel generation may have to be employed as a stop-gap measure until capacity catches up with demand. In the longer run, however, the development of an efficient coal-extraction industry can provide Afghanistan with a fuel base for all presently foreseeable thermal needs, whether or not the petroleum indications at Sar-i-Pul measure up to Afghan expectations. By tapping the Darra-i-Suf coal deposits in addition to those at Kar Kar and Ishpushta, Afghanistan can assure itself of sufficient fuel for an expanding cement and kiln-brick industry and simultaneously reduce the use of the nation's limited wood supplies for fuel and construction purposes. Increasing utilization of the hydroelectric potential of Afghanistan's major streams will further aid in the conservation of trees, scrub growth and stubble now consumed as fuel. In this way, rational utilization of known coal and hydroelectric resources can compensate for two major known deficiencies: low timber reserves and the resultant removal of most of the combustible plant cellulose which otherwise would be left to contribute organic material to the soil.[1]

Petroleum

The history of petroleum exploration in Afghanistan provides an excellent illustration of the political overtones of economic development in that country. Preliminary investigations had been made by American engineers prior to World War II, resulting in the specification of certain areas of seepage and of structural formation as likely locations for test-drilling. When the Afghan Government, after the War, determined to conduct exploratory drilling in the most promising of these locations, at Sar-i-Pul, 70 miles southwest of Mazar-i-Sharif, political considerations ruled out the choice of American teams for the work. At the request of the RGA, the UNTAM departed from its usual sphere of activity to supply a Dutch geologist in 1950 and a Dutch oil drilling specialist in 1951. But the agreement with a French petroleum concern to conduct the drilling, worked out under UNTAM auspices, was vetoed in August, 1953, by the Soviet Union as involving nationals of a power allied with the United States.

It was not until 1956-57 that Swedish technicians and equipment could be obtained by the Ministry of Mines and Industries for exploratory work at Sar-i-Pul. Exploration was carried out under the direction of Mr. Massa, an Afghan petroleum engineer with degrees from Louisiana State University and the University of Houston and experience in the southwestern U.S. After mapping the anticline on a scale of 1:10,000, stratigraphic drilling was begun. In the spring of 1957, the first coring was driven to a depth of 817 meters before

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[1] This may be regarded as a negative contribution, merely leaving to the soil what is its due. A further, positive, contribution to Afghan agriculture may later be realized by utilizing coal and hydroelectric power for the production of nitrogenous and phosphatic fertilizers. The latter requires the location and exploitation of phosphatic minerals, as well as the use of sulphuric acid derivable from sulphur deposits in Maimana.

deviation of the bore required a halt to activities. The core samples showed 12 horizons with some oil content, and those from the 590 meter level yielded samples of a heavy petroleum with a specific gravity of 1.28. Other sandstone samples showed air bubbles escaping, while there was enough pressure at some depths to blow mud out of the well.

A second coring passed the 850 meter depth and showed high pressure gas and petroleum below it, but due to a lack of the heavy barite mud used to maintain pressure in the well this operation had to be stopped in October, 1957.[1] The second well gave indications of sufficient pressure to produce a natural flow of petroleum if lined and capped. Early in 1958, drilling on the second well was resumed after a supply of barite had been obtained from India.[2] Proposals were also made for aerial surveying and photo-mapping of the entire Sar-i-Pul region on a scale of 1:60,000 as a preliminary to further exploration.

In short, while the ultimate potential for petroleum occurrence in northern Afghanistan is possibly great, we simply do not have sufficient factual data on which to base any estimates. While it is extremely hazardous to generalize from one sample, the high specific gravity of the crude oil recovered and its asphaltic base do not bode well for future production of gasoline or other light petroleum fractions. Perhaps the most that can be hoped for is some eventual contribution to the diesel fuel needs of the country, with refining performed by simple thermal distillation or fraction-

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[1]Interview with Mr. Massa and inspection of samples at Ministry of Mines and Industries, Kabul, Afghanistan on November 13, 1957.

[2]Interview with Mr. Massa on February 13, 1958.

ating.[1] While even this may involve some sort of exchange agreement with the Soviet Union, it could save Afghanistan part of the foreign currency which now goes into purchases of diesel fuel. A gradual shift from gasoline to diesel units in the Afghan truck fleet could further increase the savings, while use of the heavier fractions in road surfacing would provide a further boon to local transportation. As has been indicated in Chapter VIII, however, the political and economic obstacles to any commercial petroleum development are considerable, and it is difficult to see how even a sizeable discovery of petroleum could be put to use of the local economy within the next five years, the period in which the energy needs of Afghanistan will reach a critical level in relation to available resources.

Regional power resources are summarized in the following table for comparison with the production resources summarized in Table 53.

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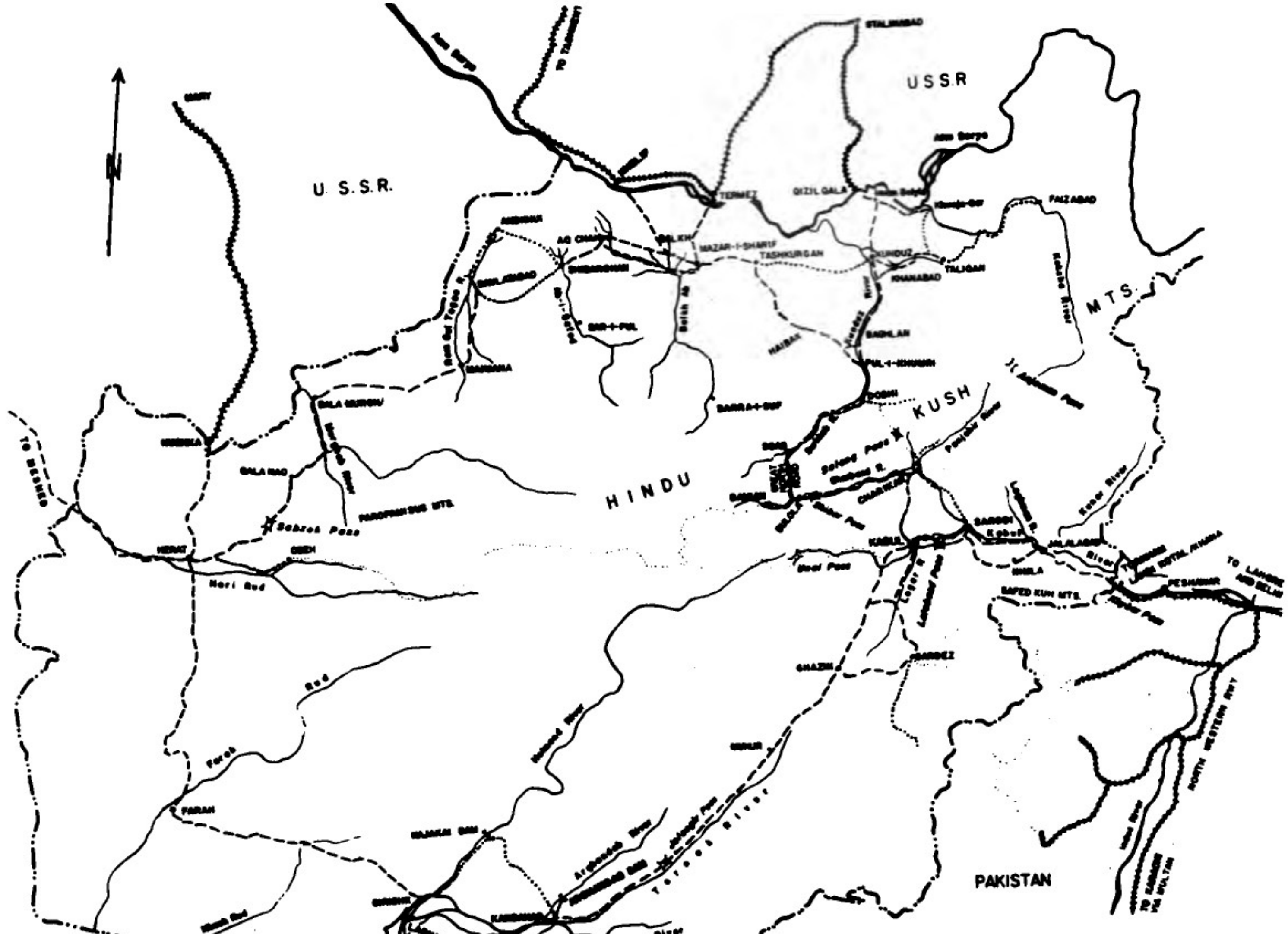
[1]However, the Dutch geologist supplied by the UN in 1950 predicted that any petroleum found would be not only heavy and asphaltic but high in sulfur and low in volatile components, necessitating the use of a cracking process. Peter G. Franck, Technical Assistance Through the United Nations, The UN Mission in Afghanistan, 1950-53 ("Hands Across Frontiers, Case Studies in Technical Cooperation," Publications of the Netherlands Universities Foundation for International Cooperation; Leyden, Netherlands: A.W. Sijthoff, n.d.) p. 32.

TABLE 55

COMPARATIVE REGIONAL ADVANTAGES IN POWER FOR PROCESSING INDUSTRIES

	KABUL REGION: Upper Basin	KABUL REGION: Jalalabad	KUNDUZ REGION: Valley Proper	KUNDUZ REGION: Mazar-Maimana	HELMAND REGION: Arghandab Area	HELMAND REGION: Helmand Area
Hydro-electricity	May face a bottleneck in near future, but ultimate outlook is excellent.	Poor at present pending construction of Darunta dam.	Excellent potential, but no funds allocated for early development.	Potential unknown and development prospects are remote.	Sufficient power for all foreseeable needs will be available within two years.	Sufficient power available now from Boghra Power drop.
Coal	Disadvantaged by location - must depend on shipments from north of Hindu Kush.	Must depend on imports from Pakistan.	Well located with respect to Kar Kar. Needs assured for at least ten years unless Kabul area preempts supply.	Potential in Darra-i-Suf deposits very good; should receive high priority in development.	No known deposits of workable quantity or quality, but Region can import coal from Quetta area of Pakistan.	
Petroleum	Domestic potential cannot be estimated on basis of explorations to date.					
	Disadvantaged by location for imports from either U.S.S.R. or Pakistan.	Convenient for imports from Pakistan.	Convenient for imports from U.S.S.R. and for any development of the Sar-i-Pul field providing refining problems can be solved.		Convenient for imports via Pakistan, but needs will mushroom with completion of Kandahar International Airport.	



MAP 10

ROAD NETWORK OF AFGHANISTAN AND EXTERNAL RAIL CONNECTIONS

Scale in Miles

0 50 100 150

- FIRST CLASS ROAD (FIT FOR SUSTAINED OPERATION AT SPEEDS UP TO 30 M.P.H.)
- IMPROVED ROAD (FIT FOR OPERATION AT SPEEDS UP TO 20 M.P.H.)
- ROAD WHICH CAN BE USED BY MOTOR VEHICLES ONLY WITH GREAT DIFFICULTY
- TRAIL
- RAILROAD
- RIVER
- PASS

Source: United Nations Map No. 275, Rev. 2, January 1964. Provisional Edition. (Road Classifications Based on Personal Observations and Travelers' Reports.

XI. TRANSPORTATION RESOURCES AND REQUIREMENTS OF DEVELOPMENT

Throughout this study, we have made references to the existing road network of Afghanistan and its generally unsatisfactory condition for the convenient and rapid movement of persons and goods which is essential to an integrated economy. In a country which has no railroads, and where air transportation has topographic, climatic, and economic limitations, the highway assumes primary importance as the means of assembling and marketing local products, of distributing imports from beyond the regional or the national frontiers, and of moving persons in response to social or economic needs and desires. This statement was true a thousand years ago, when two of the major "Silk Routes" passed through Afghanistan, converging at Balkh, and it will remain true for some time into the future, even if trucks and busses entirely replace the camel and the donkey as carriers, and even if a greatly expanded air fleet and all-weather airports are provided. Judging by the amount of over-crowded bus traffic today the Afghan has lost none of his love of movement, and even when population distribution attains a greater degree of coincidence with economic resources it can be expected that social as well as trading propensities will maintain a high degree of mobility among the people. Furthermore, as Prof. Jean Gottmann points out,[1] there is every reason to expect that improved transportation facilities will serve to generate increased travel and traffic just as they did after Lyautey's work in Morocco.

[1]Private communication to the author, December, 1957.

With these considerations in mind, let us briefly review what we have set forth in the regional chapters with respect to road patterns and conditions, and then discuss the prospects for improvement and extension of the road network and for improvements in the size and state of maintenance of transportation and road-construction equipment.

Road Patterns and General Conditions

The existing road network of Afghanistan may most readily be described as a huge circle around the central mountainous mass, which is pierced only where the Great North Road was cut through the Bamian-Surkhab gorge in the 1930's (see Map 10). This circle connects Kabul with the major cities of the North, Pul-i-Khumri, Baghlan, Kunduz, Tashkurghan, Mazar-i-Sharif, Andkhui, Maimana, Qala Nao and Herat, in the northwest. In the opposite direction it links the capital with Ghazni, Kandahar, Girishk, Farah, and, again, Herat. Traffic between Kabul and Herat, therefore, may choose between the northern and the southern route, with the choice largely dependent upon season and type of load. In winter, when the Hindu Kush passes may be blocked by snow, and the northern route covered by drifts, preference is given to the southern route which encounters high elevations only in the stretch from Kabul to Ghazni. Heavy equipment, entering Afghanistan from the Soviet railhead at Kushka, north of Herat, will follow the easier southern route in any season.[1]

Branching out from this huge circle are the northern feeder routes from Herat to Meshed or to Kushka, from Mazar-i-Sharif to Khelif or Termez, and from Kunduz to Qizil Qala and Faizabad. South of the mountains, the two feeders from Kabul through Jalalabad and the Khyber Pass to Peshawar and from Kandahar through Chaman to Quetta have historically been of the greatest im-

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[1]This was demonstrated by the shipments destined for the Textile Factory at Gulbahar, 50 miles north of Kabul and at the foot of the Hindu Kush. Shipped from West Germany across the Soviet Union during the Pakistan blockade, the materials took the longer but easier route from Herat through Kandahar rather than empt to cross the Hindu Kush passes.

portance for trade as well as for military movement. Recent governmental efforts at road construction have been almost exclusively concerned with these feeders, a fact which underscores the importance attached to foreign trade in the economic life of Afghanistan. Morrison-Knudsen was originally brought into Afghanistan to improve the roads from Torkham (Khyber Pass) to Kabul, from Kabul to Kandahar, and from Kandahar to Girishk (see Chapter III). When cost estimates proved too high, the contractor was left with the stretch from Kandahar to Chaman and with interproject roads in the Helmand Valley Project. The Ministry of Public Works, employing a series of German, Czechoslovakian and Japanese engineers, assumed responsibility for the Torkham-Kabul stretch. When Soviet assistance became available it was devoted to improving the feeders from Khelif to Mazar-i-Sharif and from Qizil Qala to Kunduz, and, by extension, to sections of the long road from Kunduz to Kabul so that Soviet imports could more easily be brought to the capital. Except for reconstruction of a few culverts and bridges, the long stretches from Mazar-i-Sharif to Herat, from Herat to Girishk, and from Kandahar to Kabul have been left untouched. Thus we find in the locational pattern of recent road construction another confirmation of our premise that the most likely areas for development are the Kabul, Kunduz and Helmand Valleys.

A few generalizations regarding Afghan roads may serve to give the reader a fairly accurate notion of the present condition of at least 95 per cent of the trunk roads of the country. The Afghan road network is thin, poorly maintained and inadequate even to the needs of the 3500-odd non-military trucks and 500-odd private or public automobiles which operate upon it. Generally speaking, however, the roads do serve to connect the principal cities in the most direct fashion possible, given the resources which have heretofore been available for constructing them. The pattern is logical, and while such a project as the Salang Pass tunnel would considerably shorten the route from Kabul to the Kunduz Region, the existing road, via the Shibar Pass and the Bamian Gorge, might be improved at considerably less cost.

Counting approximately 2500 miles of "all-weather" but unpaved roads and 1500 miles of "seasonal" roads,[1] the road density in Afghanistan is about .016 linear miles per square mile, or .0004 linear miles per person of the settled population. Iran in 1956 had only .008 linear miles per square mile of roads of all types, but this represented .0007 linear miles per person. Pakistan in 1957 had about ten times the linear road mileage per square mile found in Afghanistan, but only the same small fraction of a linear mile per person as found in Iran. India in 1956 had .252 linear miles of road per square mile, but only .0008 linear miles per person. For what the comparison is worth, the United States had 1.15 linear miles of road per square mile and .2 linear miles per person in 1957.[2] Afghanistan's 4000-odd motor vehicles may be contrasted with 60,000 in Iran, 54,000 in Pakistan, 380,000 in India, and 66 million in the United States.[3]

Of the 4000-odd miles of road in Afghanistan which are fit at one season or another for motor vehicles, less than 400 are fit for operation at an average speed of 20 miles per hour or more. These would include the 65-mile stretch from Spin Baldak to Kandahar, the 90-mile road from Kandahar

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[1]Based on estimates of 3845 km. of all-weather roads and 2266 km. of seasonal roads in 1955. Afghanistan, Ministry of Finance, Afghanistan: Basic Economic Statistics (Kabul: December 31, 1955) (Mimeographed.)

[2]All data except Afghanistan's from The Statesman's Year-Book, 1958 (London: Macmillan & Co., Ltd., 1958).

[3]Ibid.

to Lashkar Gah with a branch to Girishk, and the various inter-project roads, some of them located on canal berms, connecting Girishk through Nad-i-Ali and Marja or Shamalan to Darweshan. It would also include 50-odd miles of paved roads in and around Kabul and the sections improved with Soviet assistance in the Charikar Valley and in the Kunduz Valley. Conditions of alignment, grade and surface which render the remaining 90 per cent of Afghanistan's roads unfit for rapid or comfortable motor vehicle operation will be discussed in detail in the following paragraphs.

Incongruous as it may appear in this arid land, water is the worst enemy of road construction. Winter and spring rains falling upon barren and rocky soils are not absorbed to any great extent but run off rapidly and unpredictably. A wash which carries a flood in one season may carry only a trickle for several succeeding years. Hence it is almost impossible to determine safe minimum sizes for bridge openings and culverts without running into impracticable expenses. A flood of large proportions has rock-moving capacities almost unimagineable to one who has not observed the piles of alluvial debris left in the dry wash beds. Rocks up to three feet in diameter may be moved by flash floods with sufficient force to demolish almost any type of bridge pier. Furthermore, the shifting runoff of an alluvial fan may gouge an entirely new channel, ripping out a road where no need for preventative barrages or culverts could reasonably have been foreseen. Since most of Afghanistan's roads have to be built across alluvial fans to avoid the rough topography above and the shifting sands below them, the only practical outlook is to expect to have washouts and the ensuing delays from time to time. In fact, both MKA and Soviet engineers have adopted the practice of constructing concrete dips to carry roads across washes rather than build expensive bridges which may be wrecked by the load content of flash floods. These dips can be forded at low water and can be cleared of rubble within a few hours after serious floods have subsided.

Perhaps as a result of years of trial-and-error experience with floods and washouts, the alignment and grade of most Afghan roads is surprisingly good. Especially in the high passes such as the Lataband (near Kabul), the Shibar (near Bamian) and the Sabzak (over the Paropamisus between Qala Nao and Herat), the engineering is more or less competent for the present stage of traffic development. However, considerable improvement in road width, in eliminating blind corners, and in providing room for passing on turns is essential if these roads are to carry heavier traffic without serious increases in the accident rate. It is not only on the high passes that such improvements are indicated, for some of the most dangerous blind curves in Afghanistan occur where the roads run around fairly low terraces or foothills. Only the present low frequency and low speed of traffic prevents more deaths than now occur at such points.

Drainage and surfacing of Afghan roads are extremely poor or even non-existent. Since there is very little rainfall, it is hard to justify humped roads with parallel drainage ditches. But banking of curves will have to be introduced as surface conditions improve to the point where high speeds are possible. At present, 20 miles per hour is considered good speed for a truck or bus on almost all Afghan roads, due to the constantly varying but constantly inferior surface condition. In one sense, most of the relatively flat surfaces of Afghanistan - alluvial fans, foothills, terraces, desert pavement - consist of the raw materials for road construction, which frequently has taken the form of simply laying out a right of way, cutting it through any sharp rises and scooping up rocks, sand and silt to fill in the low spots. Indeed, in many areas it is preferable to drive cross-country parallel to a road rather than on the road, while in the Dasht-i-Margo the desert pavement serves as a limitless roadbed for any-one who has a compass.

What is lacking is not road-building material but equipment and supervised labor to screen it into proper aggregate sizes laid in diminishing sequence above a properly constructed, heavy-duty foundation. While a hard surface may ultimately be desirable, it is not necessary if proper construction and maintenance procedures are followed. As it is now, traffic over a newly built or newly repaired road very soon scatters the smaller pebbles, sand and silt, leaving only the boulders to bruise vehicle tires and passengers. The typically overladen Afghan truck or lorry is the worst offender. Jerry-built roads simply cannot withstand the heavy traffic which soon reduces them to washboards, at which point the road crews merely shovel in some handy rocks and dirt and the process begins all over again. When rain falls, or snow melts, such roads become either quagmires of mud or patchworks of bung holes which are apt to wreck the springs, if not the axles, of the vehicles attempting to use them. Nor is mechanical scraping any answer, for the blades merely reveal more of the same, potentially hazardous, rock and earth mixture.

Passing from the general to the particular, we can assess the possibilities for reconstruction and extension of the road system by a review of the regions chosen for analysis in this study and for improvement by the RGA.

Regional Road Conditions and Prospects for Extension and Maintenance

We have described some of the features of the Torkham-Kabul road in Chapter I on the Kabul Valley. Between the border station at Torkham and Jalalabad (52 miles), this road is in good condition with respect to alignment and grade. The Ministry of Public Works has devoted considerable effort to improving this stretch in recent years, and is completing several brick and masonry culverts in sections where small streams and washes cross from the Safed Kuh foothills on the south to the Kabul River north of the road. However, the surface will have to be completely rebuilt with proper aggregates before this section can be paved, as is now proposed under an ICA development grant.

Beyond Jalalabad, after passing through the Darunta Gorge (see Map 2), the road continues around terraces on the southern bank of the river or across alluvial fans at some distance from it. Here, little work has been done, and surface conditions are deplorable, with the road degenerating to a mere trace across the rubble in several washes. While grade is still no problem, it will be necessary to realign some sections of this stretch and to construct culverts or, preferably, dips across the washes before proper surfacing and paving can even be considered.

Approximately 30 miles west of Jalalabad the road and the Kabul River both pass into the 20 mile Lower Gorge section leading to Sarobi. Here work is still in progress to widen the road and shore it up above the rushing stream. Alignment and width are being improved with the aid of dynamite and Soviet drills, compressors, bulldozers and trucks. The gradient is gradual though the road passes several sections of river rapids. At Sarobi, the valley widens, and the truck route branches off along the Tezin Darra toward the Lataband Pass. This truck route has some difficult sections in washes, but will become an alternate when the Uppper Gorge section has been widened sufficiently to accomodate trucks and busses. The Lataband Pass route may continue to be used by heavy trucks to avoid the steep grades of the Upper Gorge route.

The Gorge Route, above Sarobi, passes through the Naghlu section, where some 11 miles of it will have to be rerouted to allow construction of the Naghlu Dam by the Russians. This rerouting may prove to be a difficult problem because of the rugged terrain and mica schist transverse ridges, but presumably it will also eliminate the floodplain and alluvial fan sections which are also in wretched condition. Fortunately, the 15-mile Upper Gorge section, where most of the difficult work required to raise the road some 2000 feet past the Kabul falls and rapids section has been completed, will not be affected by the Naghlu construction.

The final section of the road, where it crosses the floor of the Kabul Basin for some 18 miles from the top of the Gorge to the start of the city pavement, requires only a proper foundation and surfacing. It seems likely that work under the ICA proposal will begin with this section, since Kabul has an asphalt plant, and be extended downstream, while a traveling asphalt unit based on Jalalabad works on the section from that city to Torkham and then starts upstream towards Sarobi. Since no contract has yet been awarded for the work, which may be done by the Ministry with ICA supplying only materials and technicians, it is impossible to state how soon one can expect to see it completed. Costs of resurfacing and paving were estimated at $5,080,000 in all currencies by the ICA-sponsored Koebig and Koebig survey team, which also recommended postponement of this work until the Spin Baldak-Kabul road had been improved. But the RGA has insisted that the Kabul-Torkham route be given priority, and so it will probably be paved under a special agreement with ICA and separate from the other work recommended by Koebig and Koebig.[1]

[1]Letter to the author from R.D. Spencer, Vice-President of Koebig and Koebig, October 27, 1958.

The estimated construction costs are as follows:

TABLE 56

AFGHAN HIGHWAY CONSTRUCTION COST ESTIMATES[a]

Kabul to Torkham	U.S. Dollars	Pakistan Rupees	Afghanis
Plans and Specifications	35,000		
Paving Aggregate	1,901,000	1,457,000	3,802,000
Asphalt	1,010,000	1,010,000	909,000
Aggregate Base Course	1,002,000	1,336,000	2,672,000
Inspection	100,000		
Totals	4,048,000	3,803,000	7,383,000
Dollar Equivalent (Official Rates)		801,000	231,000
Total Cost Expressed in Dollars	5,080,000		

[a]Koebig and Koebig Report, pp. 53-54. The total dollar cost would be reduced to $4,716,000 if conversion of the Pakistan Rupee and Afghani costs were made at free market rates of 7.3 and 50 respectively, rather than at the official rates of 4.75 and 32, respectively, used by Koebig and Koebig.

Prior to embarking on any large-scale assistance to transportation facilities in Afghanistan and Pakistan, the ICA signed a contract with Koebig and Koebig, a Los Angeles firm of consulting engineers, in May, 1957, to make a field engineering and economic reconnaissance of the transportation systems of Afghanistan and West Pakistan. The Afghanistan portion of the field work was carried out between June 11 and July 23, 1957. Since most of this time, perforce, was consumed in surveying the Kabul to Kandahar and Kandahar to Spin Baldak routes, little attention could be given to the Kabul-Torkham road, and no survey at all was made of the roads to the north of Kabul, this being beyond the competence of the mission. Inasmuch as the present author covered the area from Kabul to Kandahar by air, he will rely upon the Koebig and Koebig study for a description of the southern routes, and return to his own experiences for a description of the roads to the north.

> From Spin Baldak to Kandahar is approximately 65 miles (103 kilometers). Spin Baldak is the first town in Afghanistan after crossing the Pakistan Border near Chaman. The road from here to Kandahar has served as the main supply line for the Helmand Valley Project for the last 10 years, and in 1948 an American contracting firm completed its reconstruction. It has a grade and alignment according to good engineering practice in the United States, and consists of a smooth gravel surface over a waterbound macadam base. . . . a speed of 50 miles (80 kilometers) per hour can readily be maintained over almost the entire length without damage to vehicles. . . . This 65 miles of road is by far the best and most modern highway in Afghanistan. With the prospective growth of Kandahar and the Helmand Valley, it will undoubtedly continue to be one of the most important.
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> From Kandahar to Kabul is a distance of 305 miles or 488 kilometers. . . . Generally, this road is in poor condition. Over most of its length gravel has been applied in an attempt to make it passable during the wet season and to reduce dust during the dry season. This treatment would have been much more beneficial if the larger stones had been rejected. As it is, the large stones make the surface very rough and eliminate any possibility of performing effective maintenance. Over most of this road, a speed of 20 miles (32 kilometers) per hour is definitely abusive to vehicles. Eighteen hours driving time for the 305 miles is about a normal trip, but under these conditions trucks and buses do not enjoy a long life. For the most part the grade and alignment of this road is satisfactory.
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> Going northeasterly, from Kandahar, the route follows the westerly bank of the Tarnak River for 160 miles, or halfway to Kabul. With minor exceptions, grades on this section are extremely flat, averaging less than one half percent. From here to a point seven miles north of Ghazni the road follows a broad, flat valley with easy grades and good alignment. Then there is a climb for six miles to an elevation of just over 8,200 feet (2500 meters). Even here grades are not excessive, the maximum being about five percent, and the alignment is fair, but some relocation would be desirable when improvements are made. . . . Proceeding northerly the road next follows a wide, high valley through some arid and some cultivated land. This is the area where some difficulty is encountered with snow during the winter season. However, a reasonable amount of snow removal equipment operating over an improved roadway should be able to keep traffic moving under all but the most severe conditions. The last 25 miles of this route descends gradually into Kabul at an elevation of 5,900 feet (1800 meters).[1]

The Koebig and Koebig Report recommends that priority be given to paving the Spin Baldak to Kandahar highway with a hard surface 23-feet wide and adequate for two-way traffic, and to reconstructing the Kandahar to Kabul

[1] Koebig and Koebig Report, pp. 31-35.

road. It is proposed to provide the latter with one 12-foot paved lane on a 32-foot roadbed, with the shoulders to be used in passing for the time being. No work other than surfacing would be necessary on the MKA-built road from the frontier to Kandahar. The Kandahar to Kabul road, however, would require some relocation in the Jalaogir Pass section, 53 miles from Kandahar, and for about 5 miles in the section north of Ghazni.[1] The Report suggests that reinforced concrete pipe made in Afghanistan could be used to carry irrigation ditch (jui) crossings at safe levels under the road, but since a plant to manufacture this pipe would cost at least $25,000 the estimates are based on the use of imported corrugated metal, locally fashioned into pipes.[2] Use of a travelling asphalt-mixing plant employing aggregate up to one inch in size and capable of paving one mile per day is recommended. Presumably, asphalt would be brought up from Karachi in drums, and work would proceed from Kandahar towards Kabul. The Report divides the Kandahar-Kabul road into six sections, each roughly 50 miles in length, and estimates that the entire job could be done in less than 3 years after survey and design work has begun. The cost estimates are as described in Table 57 on the following page.

The Koebig and Koebig team recommended that the Spin Baldak to Kandahar and Kandahar to Kabul roads be improved as the first Afghan contribution to a proposed Afghanistan-Pakistan joint transportation program. The dollar costs of this program, which includes substantial improvements of Pakistan's North Western Railway and the Port of Karachi, were to be met by an ICA loan under the relatively new Development Loan Fund, which has easier

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[1] Ibid., p. 38.

[2] Ibid.

TABLE 57

AFGHAN HIGHWAY CONSTRUCTION COST ESTIMATES[a]

Spin Baldak to Kandahar	U.S. Dollars	Pakistan Rupees	Afghanis
Plans and Specifications	15,000	-	-
Paving			
Aggregate	396,000	744,000	1,188,000
Asphalt	440,000		
Inspection	20,000	-	-
Totals	871,000		
Dollar Equivalents (Official Rates)		157,000	37,000
Total Cost Expenditure in Dollars: 1,065,000			

Kandahar to Kabul	U.S. Dollars	Pakistan Rupees	Afghanis
Design Survey	475,000	-	-
Plans and Specifications	850,000	-	-
Construction Survey	290,000	-	-
Construction			
Pipe Culverts & Juis	432,000	62,000	268,000
Masonry Arches	-	-	47,115,000
Concrete Dips	108,000	84,000	5,520,000
Earthwork	4,440,000	4,440,000	8,880,000
Aggregate Base Course	4,011,000	5,348,000	10,696,000
Asphalt	1,190,000	1,190,000	1,067,000
Paving Aggregate	2,196,000	1,683,000	4,392,000
Inspection	362,000		
Totals	14,354,000		
Dollar Equivalents (Official Rates)		12,807,000	77,938,000
Total Cost Expressed in Dollars: 19,486,000			

[a] Koebig and Koebig Report, pp. 53-54.

interest, repayment, and security conditions than those attached to Export-Import Bank loans. However, the decision of the RGA in December, 1957, to accept no more loans has rendered this method of financing rather doubtful. The announcement in July, 1958, of the signing of an Afghan-Pakistan Transit Compact may mark the revival of interest in the plan which envisaged a customs-free zone in Karachi harbor where Afghan imports could be unloaded from ships, reloaded onto railway cars, and sealed for transportation through Quetta to Chaman. At Spin Baldak a railway spur with unloading facilities on the Afghan side of the border was to be built. These steps, plus $13 million worth of improvements to the Chaman branch of the North Western Railway and the highway improvements from Spin Baldak to Kabul, as described above, were to form Phase I of the transit program, at a total cost of $27,884,000, 23,883,000 Pakistan Rupees, and 79,126,000 Afghanis, or $35,322,000 total at official rates, of which over 60 per cent would be devoted to projects within Afghanistan.

Paving the Kabul-Torkham highway, widening the pavement on the Kandahar-Kabul road to two lanes, and further improvements on the Chaman branch of the North Western Railway and to Karachi Port were to be postponed to Phase II, the total cost of which was estimated at $24,771,000, 14,782,500 Pakistan Rupees, and 11,393,000 Afghanis, or a total cost of $28,239,000 at official rates, of which over 70 per cent would be devoted to improvements within Pakistan. We have indicated above that the Kabul-Torkham paving project has since been made the subject of a special, high-priority project.

Improvements on the Indus River route of the North Western Railway, leading to Peshawar (and Landi Khana on the Afghan frontier), and unloading facilities to replace those of Peshawar, though much desired by Pakistan and Afghanistan, respectively, were not recommended, due to high estimated costs. Extension of the railroad from Spin Baldak to Kandahar and later from Kandahar to Kabul, determined to be feasible from the engineering point of view, was ruled out by the fact that it would cost an estimated $116,114,000 for construction and equipment, or five times the cost of improving the highway which would remain in direct competition.[1]

Thus, the logic of the Koebig and Koebig study favors those who have long maintained that Afghanistan can skip the railroad age altogether. Certainly, in the absence of any known bulk minerals to export (see Chapter VIII) it would be impossible to provide sufficient payloads for return trips to Pakistan, and truck traffic can be improved to handle all foreseeable imports. But the Koebig and Koebig study does far more than justify future dependence upon road transportation in Afghanistan. It proposes a program of development whereby Pakistan harbor and railroad facilities would be improved to support a single main artery of trade for Afghanistan: the route by rail through Quetta and Chaman to Spin Baldak, and then by road to Kandahar and on to Kabul. The alternate and presently much more important route via Peshawar is not to be improved under this program. The major reason given for this choice is the present and prospective congestion of rail traffic on the "main line" of the North Western Railway, which leads from Karachi to Multan and then divides, with one branch going to Lahore and the other to Peshawar.

While it is perfectly correct that concentration of Afghan traffic on the Quetta line (628 miles from Karachi to Chaman) would save about 25 per cent in the freight costs compared with use of the route via Peshawar (971 miles from Karachi to Landi Khana),[2] the total burden now placed upon the North Western Railway by Afghan trade amounts to only some 107,574

[1] *Ibid.*, p. 113.

[2] *Ibid.*, p. 74.

tons per year of imports and 37,656 tons per year of exports.[1] Even if all of this traffic were carried for the fulllength of the longer route, it would still represent only 4.7 per cent of the 3 billion ton-miles of freight moved by the North Western Railway in 1957.[2]

The Koebig and Koebig Report estimates that if the necessary bilateral agreements and rail and highway construction programs are effectuated, 430,000 tons of traffic into Afghanistan and 150,000 tons of traffic out of Afghanistan will be handled by the North Western Railway in 1967,[3] by which time the total traffic on the line (as extrapolated by the author) may reasonably have reached 4.5 billion ton-miles. Thus, even if all went according to plan, Afghan traffic would still comprise only 12.5 per cent of the North Western Railway's business ten years from now, figured on the basis of the longer route, or 8.1 per cent if it all moved over the shorter route as Koebig and Koebig propose. Unfortunately, the data which would allow comparison of present Afghan traffic on the Peshawar branch with that on the Quetta branch are not available.[4]

The Koebig and Koebig Report quotes data from the Ministry of Planning indicating that freight traffic in 1956-57 was several times as great

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[1]*Ibid*., Tables 17 and 18. Very little if any of this rail traffic involves India or the route from Lahore to Peshawar (p. 76). On the other hand, it is estimated that about 75,000 tons of exports per year are shipped by truck, primarily through Peshawar and intended for India (p. 79).

[2]*Ibid*., Plate VI.

[3]*Ibid*., Plate VI and p. 79.

[4]Letter to author from R. D. Spencer, October 27, 1958.

between Kabul and Torkham as between Kandahar and Spin Baldak, even excluding internal shipments:

TABLE 58

AFGHANISTAN HIGHWAYS - FREIGHT TRAFFIC - 1956-1957[a]

Item	Kandahar - Spin Baldak	Kabul - Kandahar	Kabul - Torkham	Total
Exports, tons	15,000	2,000	60,000	77,000
Imports, tons	18,850	2,000	56,000	76,850
Internal, tons	-	56,000	15,000	71,000
Total . . .	33,850	60,000	131,000	224,850

[a] Koebig and Koebig Report, Table 1, based on Letter from Ministry of Planning, September, 1957.

According to these estimates, the export-import volume through Torkham (116,000 tons) is almost 3.5 times that through Spin Baldak. One must realize, however, that most of Afghanistan's exports via Torkham are bound for India, and that most of these travel by truck across northern Pakistan. Hence, the bulk of the 60,000 tons exported via Torkham never reached Karachi and never traveled on the North Western Railway. Therefore it would seem that the available traffic data reinforce the RGA's insistence on giving priority to improvement of the Kabul-Torkham road as a trade artery while the Koebig and Koebig arguments for the Spin Baldak - Kandahar - Kabul route are based upon the present and assumed potential total traffic on both branches of the North Western Railway.

The Koebig and Koebig Report also indicates that 45 per cent of the present cost can be saved by using the proposed route via Quetta, Spin Baldak and the Kandahar-Kabul highway rather than the route via Peshawar:

TABLE 59

COMPARATIVE COSTS AND TRANSIT TIME [IN RS] SHIPMENT OF 2000 LBS. MERCHANDISE KARACHI TO KABUL[a]

Item	Present Cost Through Unbonded Shipment via Peshawar	Estimated Cost Through Transit Facilities via Spin Baldak
Port of Karachi		
Handling, Inspection, etc.	56/8	30/0
Port Trust Dues (estimate)	50/0	50/0
Railway Charges		
To Peshawar	146/8	
To Spin Baldak		100/0
Lorry - Peshawar to Kabul at Rs.700 for 4 tons or $.20 per ton-mile	175/0	
Lorry - Spin Baldak to Kabul at $.04 per ton-mile		71/0
Border transfer		
Handling, Cooliage	45/0	20/0
Storage, Sealing, etc.	25/0	10/0
Clearing and Forwarding (estimate)	25/0	10/0
Totals:		
In Pakistan Rupees	523/10	291/0
In U.S. Dollars	$110.00	$61.00

[a]Koebig and Koebig Report, Table 7, p. 25 and p. 11.

Several questions arise from examination of this table. Could not the estimated savings at the Port of Karachi Transit Facility apply whether the freight moves forward via either Chaman or Peshawar? Although the North Western Railway is apparently reluctant to furnish service beyond Peshawar,[1] establishment of a

[1]Letter to author from R.D. Spencer, October 27, 1958.

bonded transfer facility there or at Landi Kotal or Torkham would seem to offer the same savings estimated to accrue from such a facility at Spin Baldak. Applying the estimated port and transfer facility savings to the cost of shipment via Peshawar would reduce it by 81/8 rupees or $17.16 at the official rate used in Table 59. Thus the ratio of costs between the two routes would be reduced to $92.84 to $61.00

The major part of the remaining difference is accounted for by the actual freight charges. With respect to the railway freight, it is clear that the advantage lies with the shorter route to Spin Baldak. But trucking charges from Peshawar to Kabul (185 miles) will probably not remain so high as $.20 per mile. With the Gorge Road improved and the entire Kabul-Torkham road paved, trucking rates may be reduced almost as much as those on the Kabul-Spin Baldak route. While the arduous nature of the Upper Gorge section of the Kabul-Torkham route may mean that costs per ton-mile will always remain higher than on the Kabul-Spin Baldak route, where lower gradients will permit the use of larger trucks, the fact that the Kabul-Torkham route is less than one-half as long as the Kabul-Spin Baldak route is a permanent advantage to the former. And it has been estimated that, despite the use of smaller trucks, costs on the Kabul-Torkham route may be brought as low as $.07 and even $.06 per mile.[1] At these rates, and making equal allowances for port and transfer facility savings, shipment via Torkham would cost only $68.79 or $66.94 per ton in comparison with $61.00 for shipment via Spin Baldak.

If the cost of truck transportation on the Kabul-Spin Baldak route

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[1] Ibid.

can be brought as low as $.04 per ton-mile, then it will be cheaper to use that route. In fact, even if both truck rates fell below $.0526 per ton-mile it would pay to use the longer-road, shorter-rail haul (total 1003 miles) via Spin Baldak rather than the longer-rail, shorter-road (total 1156 miles) haul via Peshawar, rail rates remaining unchanged. But the estimated Phase I cost of improving the Kabul-Spin Baldak road as proposed in the Koebig and Koebig Report (see Table 57) would amount to $20,551,000, or an amount equal to $.988 for each ton-mile driven over this road in 1956-57 (see Table 58). The estimated $5,080,000 (see Table 56) cost of paving the Kabul-Torkham road would represent only $.258 for each ton-mile driven in 1956-57. Finally, the Phase II widening of the Kabul-Kandahar road would cost an additional $8,121,000, making the eventual cost $1.379 for each ton-mile driven in 1956-57.

On this basis, it would take about 37 years for the savings involved in using the Spin Baldak route (assuming $.04 per ton-mile there as against $.07 on the Kabul-Torkham route) to repay the costs of improving it rather than the route from Kabul to Torkham. Of course, such comparisons are vitiated by the fact that traffic will undoubtedly increase on both routes in the future, and more rapidly on the one which is first improved.

The Koebig and Koebig Report also states that 80 per cent of the present transit time could be saved by using the Spin Baldak route with the proposed facilities.[1] It is quite true that freight shipped from Karachi to Kabul via Peshawar may take from 7 to 17 weeks,[2] but most of the delay is incurred in Karachi Port or in trans-shipping to trucks at Peshawar. Since

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[1] Koebig and Koebig Report, Table 7.

[2] Ibid., p. 11.

almost no freight is presently moved from Karachi to Kabul over the Spin Baldak route, we have no figures for comparison purposes, but it would seem that the time savings which might be realized will depend more upon the transit facilities established and the relations prevailing between Afghanistan and Pakistan than upon which route is selected. The same applies to losses through spoilage, damage, loss and theft.

Economic considerations such as the preceding may account for the RGA insistence that completion of the Kabul to Torkham highway be given preference. Certainly, in the present condition of the Afghan economy and of national finances, it must appear preferable to spend 7,383,000 Afghanis and 3,803,000 Pakistan Rupees, while incurring a debt of only $4,048,000 to spending 79,126,000 Afghanis and 13,551,000 Pakistan Rupees and incurring a debt of $15,225,000.[1]

Furthermore, we have seen that the Kabul Region is economically dependent upon the Kunduz rather than upon the Helmand for many of its raw material needs. While the Helmand's economy is more similar to that of the Kunduz rather than either of these is to that of Kabul, the Helmand is as yet too undeveloped to supplant the Kunduz Region as Kabul's supplier of such commodities as cotton and sugar, and is unlikely ever to be able to supply it with coal or karakul. Therefore, it stands to reason that Kabul can more easily allow the Helmand to develop its own economy in comparative isolation, while seeking to strengthen its ties with the North, which has always been, and continues to be, politically more vulnerable than the South.

Reasons of prestige tend to reinforce this political reasoning with regard to transportation development. The Kabul-Torkham route, and partic-

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[1] If ICA decides to make a grant for either part of this work, the cost to RGA will be reduced accordingly.

ularly its Gorge section, is identified as an Afghan Government project. Not only the Ministry of Public Works but the entire Government must be anxious to see this road completed and in regular use as evidence of what they can accomplish on their own. Furthermore, since most of the visitors who enter Afghanistan by land do so at Torkham, the propaganda value of a proper continuation of the paved highway which ends at the Pakistan border is evident.

Finally, and we shall want to consider this factor further in Chapter XII, the system proposed by Koebig and Koebig would have the result of making Kabul dependent upon transit through Kandahar, a position which would be rejected by many Kabulese on historical grounds as well as those of internal politics. The founder of the Afghan State, Ahmad Shah Durrani, established its capital at Kandahar in 1747. His son moved it to Kabul for strategic reasons, and at Kabul it has remained except for comparatively brief periods. The feeling among the more influential Afghans in government and business is that Kabul must remain the center of control in every possible respect or run the danger of losing the North, either to Soviet subversion or to a renascence of separatist tendencies all too evident in the past and reinforced by ethnic differences. If the Kabul-Torkham route were allowed to deteriorate, even relatively, to the advantage of the southern route, there would be protests not only in the capital but in the Kunduz, Mazar-i-Sharif, Maimana and Herat regions to the effect that the central government was showing additional favoritism to the Helmand Region and allowing itself to become an economic dependency of Kandahar.

So we may conclude that while the program of road development proposed by Koebig and Koebig would advantage the Helmand Region, and perhaps the Upper Kabul Valley as well, its chances of adoption by the Afghan Government at this time are slim indeed. It is far more likely that the RGA will pick out the parts which appeal to its own desires, such as the transit arrangements with Pakistan, the transit facilities at Karachi and Spin Baldak, and perhaps the paving of the road from Spin Baldak to Kandahar, and let the rest die on the vine. If this analysis is correct, then we may expect Kabul to retain and enhance its function as the major entrepôt for imports and exports, with Kandahar developing as a secondary center of regional rather than national importance.

In commodity terms, the Peshawar-Torkham-Kabul route will presumably continue to be used for the bulk of Afghan imports as well as for exports of fresh and dried fruits, nuts, skins and raw wool from the Upper Kabul Valley and of truck transported karakul pelts. In addition, ginned cotton destined for Japan or countries of Western Europe will presumably continue to use this route, while that intended for West Germany will choose between this route and that via the U.S.S.R. in accordance with prevailing political conditions.

The Helmand Region is already feeling the effects of its superior road network and connection with Chaman. Presumably these highways will continue to aid the Region in importing building materials, coal and fuel oil, and in exporting fresh and dried fruits, hides and skins and raw wool. As we have seen, it is hoped to reduce the imports of sugar and leather and to begin the export of ginned cotton and perhaps of citrus fruits from this Region. The Helmand may eventually be able to add ginned cotton and processed beet sugar to its present shipments of fruits and grain to the Kabul Region, but unless some considerable improvements of the Kandahar-Kabul road are made the South will have no great transportation advantage over the North except in winter.

. . .

In the meantime, and regardless of the final decision on implementing the Koebig and Koebig proposals, ICA has put into effect a program for improving construction and maintenance work on the roads of southern and eastern Afghanistan. Utilizing funds provided by the Richards Mission to the Middle East in early 1957, ICA promulgated Project Agreement 06-31-009,[1] signed on June 6, 1957, with the Afghan Ministry of Public Works. Under this agreement, ICA promised to provide a grant of $1 million for technical support and $1 million as a loan for equipment and supplies, including local costs, to secure the following objectives:

a) to provide the services of four road construction and maintenance technicians to advise the Ministry in establishing a modern road organization;

b) introducing modern methods of surveying, design and specification;

c) establishing and operating a training program for engineers, equipment operators, mechanics and administrators;

d) improving construction and maintenance activities on the Kabul to Torkham and Kabul to Kandahar roads, later including other main roads;

e) providing the necessary supplies and equipment for the preceding.

To implement this program, ICA promptly signed a contract with the E.B. Steele Company whereby three highway engineers arrived in Kabul at the end of August. After initial orientation and establishment of working relationships with the Ministry of Public Works, the team was able to proceed with its program for training young men in practical aspects of highway construction, including operation of equipment.[2] A Technicians Training Course was

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[1]In files of United States Operations Mission (ICA), Kabul, Afghanistan. In addition to the $2 million from Richards Funds, $132,000 had previously been provided for the project.

[2]United States Operations Mission to Afghanistan (ICA), Mission's Monthly Report, (TOICA A-455) (Kabul: November, 1957), pp. 4-5. (Hektographed.)

conducted from December 16, 1957 through February 27, 1958. A project implementation order for $1,468,881 of road construction equipment was prepared and forwarded to Washington in November, 1957.[1] Subsequently, Washington was requested to include a traveling asphalt plant to be used, initially, to pave the 65 miles of road from Torkham to Jalalabad in accordance with RGA desires,[2] for which surveys and estimates continued through the month of January. Initial RGA disappointment that the Steele Company engineers were not to be used as construction supervisors had apparently been overcome by April, 1958, though difficulties with respect to the establishment of a materials testing laboratory were still being encountered.[3] The team was called upon to help survey the rerouting of the Gorge Road around the Naghlu dam-site, as it began to appear the wishes of RGA in giving priority to the Kabul-Torkham section would be implemented by ICA. With good reason in the author's opinion, ICA is stressing not only construction of new roads but the maintenance of existing arteries in order to prevent the rapid deterioration of both roads and vehicles (see below) under present operating conditions.

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To this summary of prospects for improvement on the eastern and southern sections of the road network, serving the Kabul and Helmand Valleys, we must now add one relating to the northern sections, the Charikar and Kunduz Valleys and the Mazar-i-Sharif - Maimana extension, as defined for

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[1]*Ibid.*, and United States Operations Mission to Afghanistan (ICA), *Mission's Monthly Reports for February, March and April, 1958*, p. 13.

[2]United States Operations Mission to Afghanistan (ICA), *Mission's Monthly Report*, (TOICA A-545) (Kabul: December, 1957), p. 5.(Hektographed.)

[3]United States Operations Mission to Afghanistan (ICA), *Mission's Monthly Reports for February, March and April, 1958*, pp. 10, 13-14. (Hektographed.)

purposes of this study. In Chapters I and II we have indicated the locations of the principal routes to the north of Kabul.[1] Leaving the capital over the low Khairkhana Pass, one continues on paved highway for about five miles into the Charikar (Koh-i-Daman) Valley. The remainder of this north-south road is being worked on by Afghan crews under Soviet engineers, who have established an asphalt dump and mechanical aggregate separators in a camp near Khwaja Serai. A large stone-masonry bridge has been built across the treacherous Shakar Darra wash, with smaller culverts over beds of other streams draining from the Paghman Range towards the Panjshir River. North of Charikar, the road turns west along the Ghorband River towards the Shibar Pass. Except for bridge repairs very little recent work has been done on this stretch and there are long sections with extremely bad surface conditions. Alignment and grade could also be improved, especially where the road bends sharply back into washes that could be bridged or where it climbs abruptly onto terraces in order to avoid such curves. If it were possible to locate and maintain some sections of this road on the floodplain its length could be shortened at the same time that a higher speed was rendered possible. As has been remarked, the engineering through the Shibar Pass is quite good, and requires only widening of the road, especially on the hairpin turns, and improvement of the surface.

Once over the pass the road descends more gradually towards the Bamian Gorge. A short section of the road just before Bulola runs right along the bed of a short stream which drains the western side of the pass and is consequently impassable in flood times although a high stone dike has been built to keep rubble off the road. This section must be rerouted or raised above its present level.

After crossing the Bamian River west of Bulola, the road turns north

[1]For the place names which follow see Maps 2-5 in addition to Map 10.

along its left bank and enters the magnificent deep gorge which penetrates the heart of the Hindu Kush. This is the section described as the Great North Road, built on the initiative of King Nadir Shah in the 1930's. The first Afghan motor road designed specifically for motor vehicles, it is a marvelous feat of both engineering and simple hard work, and requires only a better surface and some widening to adapt it for heavier traffic. Improvement even as far as Ishpushta would considerably ease the bottleneck in bringing coal from the mine to Kabul, while the proposed route to the Darra-i-Suf field would branch off at Doab along the valley of the Surkhab.

From Doab to Doshi, the northern road is almost entirely neglected, sometimes plowing through alluvial sands and sometimes twisting over rubble. The road requires considerable re-alignment and, above all else, the rebuilding of the roadbed with properly graded aggregates to support a smooth surface, whether or not this is paved. Indeed, this road is like many others in the country with respect to the many sections which cross alluvial fans and are liable to washouts, and a paved surface would only increase the effort and expense of repairs. Spraying the top aggregate layer with an asphalt binder would, however, probably justify the expense if only by keeping dust out of the travelers' mouths and vehicles' carburetors.

Between Doshi and Pul-i-Khumri in the Qalagai area (see Chapter II) reconstruction of the road is nearing completion. Under the direction of Soviet engineers, and using Soviet materials and equipment, Afghan crews have straightened, widened and resurfaced the road, building many culverts and small bridges provided to carry it across deep washes on the enormous alluvial fan. Whether these structures will prove sufficient for future flash floods remains to be seen, but no one can deny that a serious effort has been made to tackle this serious problem on a highly important section of the northern route. For it is just north of here, at Pul-i-Khumri, that the roads from Mazar-i-Sharif and Kunduz join. Both of these routes are being used for imports from the Soviet Union, and Soviet engineers are also at work between Baghlan and Kunduz, and reportedly, between Kunduz and Imam Saiyid on the Amu Darya. For the greater part of this distance, the road follows the Kunduz River, either on the floodplain or on the low terraces to the east of the stream. There is no need for realignment except in a few sections where the road climbs abruptly over transverse limestone ridges. At one of these points, Sintut, at the northern end of the Baghlan node, the road has already been rerouted alongside the river to connect with the new bridge. But this whole section from Pul-i-Khumri to Kunduz and on to the Amu Darya will have to receive a rebuilt surface before it is fit for high-speed traffic.

The feeder routes out to Khanabad and Taliqan need the same treatment with perhaps some realignment where the Taliqan road skirts the bluffs north of the Khanabad River. The extension from Taliqan to Faizabad is in particularly poor condition in all respects, but is not of sufficient economic importance to justify a high priority in improvement. While the road from Imam Saiyid to Pul-i-Khumri is highly important for Soviet merchandise moving along into Afghanistan, that from Khelif to Mazar-i-Sharif and on to Pul-i-Khumri is the chief route for petroleum imports. Petroleum moves over this road in preference to that from Imam Saiyid because of the superiority of the unloading facilities on the Amu Darya at Khelif and because Mazar-i-Sharif has a Soviet-built tank farm. The route is not particularly difficult although there are two or three low passes between Pul-i-Khumri and Haibak. The remainder of the route lies across semi-arid plains and requires reconstruction rather than realignment or regrading. South of Tashkurghan, this road passes through remarkable east-west sedimentary formations, in a splendid vertical gorge cut by a small, antecedent stream. This gap was used by Alexander the Great and by Genghis Khan in their invasions of Afghanistan, and should be all means be preserved for its historic as well as geomorphic significance.

From Tashkurghan west to Mazar-i-Sharif and beyond towards Khelif and Shibarghan, the road follows the foot of alluvial fans sloping from the hogbacks towards the Amu Darya. Here again, only the surface requires improvement, but that is enough of a job in itself especially as it is complicated by many jui crossings under the road in the region around Mazar-i-Sharif. West of Mazar-i-Sharif, the distributaries of the Balkh-Ab and of the Ishkabad Canal may also require rebridging. It is only in the region between Shibarghan and Maimana that soft desert sands become a real obstacle since up to the former city the road is located on the firmer alluvial fans or foot-hills slopes. But in the Andkhui region the foot-hills give place to sand dunes, and vehicles easily become trapped in them. A short-cut from Shibarghan to Daulatabad avoids most of these traps, but it is poorly marked and in many places amounts only to a trail across the desert. This region will eventually require rerouting, realignment and reconstruction of its roads to fit into a modern highway system. At present, however, the traffic diminishes greatly west of the Khelif turnoff, and, as we have seen, the karakul pelts which form the chief economic product of the Maimana area are fairly light, small in size and sufficiently valuable to be flown out from Maimana to Kabul if need be.

The roads from Maimana to Herat and on the Farah and Girishk need not be described in detail as they lie outside our field of discussion.

Generally speaking the former section compares with that from Kabul to Pul-i-Khumri, with the Sabzak Kotal being a rough equivalent of the Shibar Pass though in a more beautiful setting. Those who have made the journey by road from Herat to Girishk (the present author flew) describe it as similar to that from Kabul to Kandahar, with no steep grades or passes but with considerable difficulties in crossing the Khash and Khuspas Rivers in flood time. New bridges across the rivers are being completed by ACU according to MKA standards and should greatly improve transportation between the Herat region and the Helmand.

In summation, then, the Kunduz Valley and Mazar-i-Sharif - Maimana extension may be regarded as comparatively well-favored for internal transportation and for transit of goods to and from the Soviet Union, but not for connection with the Kabul Valley. We have seen that in terms of commodity flow it is the topographical barrier between Ishpushta, Pul-i-Khumri, Kar Kar, Baghlan and Kunduz, on the one, hand, and Kabul, Jabal Seraj and Charikar on the other, that hampers the southward movement of coal, cotton textiles, ginned cotton and sugar in sufficient amounts to sustain the Kabul area's markets and new industries. The same is true of merchandise imported via Kabul for sale in the North, and of Soviet goods imported for sale in Kabul, of which gasoline, kerosene and fuel oil are the most important. This problem might be solved by construction of the Salang Pass road and tunnel, but it would seem more economical to improve the existing road to the point where good speeds can be maintained by trucks. Snow removal equipment would be necessary to keep either road open through the winter months.

Thus it may be said that the Kunduz Region is separated from Kabul by a topographic barrier more formidable than the somewhat longer distance which separates Kabul from the Helmand Valley. Yet both because Kabul feels, and has long felt, the Russian political challenge in the North, and because the economy of the Kunduz Region is complementary to that of Kabul, both in supplying raw materials and exports which clear through the capital and in utilizing items imported via Kabul, efforts such as that involved in the Great North Road have been made to bind these regions together. Kabul is playing a difficult game these days, trying to employ Soviet technical and economic assistance to bind to it a region which is topographically thrown towards the Amu Darya and which is, even now, being flooded with Soviet goods. To the extent that the ginned cotton and fruits of northern Afghanistan go directly to the U.S.S.R., Kabul is also losing control over the economy of its northern provinces. But so long as the bulk of the ginned cotton comes to Gulbahar, so long as the karakul must clear through Kabul, and so long as the Kunduz Region finds its best market for sugar, cotton textiles and surplus rice and wheat in the capital, the political and economic ties of the North to Kabul will continue.

Selection, Standardization, and Maintenance of Equipment

We have just discussed the generally unsatisfactory condition of Afghanistan's highways, particularly in the regions most promising for development, together with the measures which are being undertaken to improve them. A final aspect of the problem relates to the deleterious effect of these conditions upon vehicles operated over Afghan roads, and to the efforts of the RGA to select and maintain in operation the vehicles best suited for operation under conditions which are certain to continue for several years even in the areas now being improved. Today, it is estimated that the life of a truck in Afghanistan is limited to 60,000 miles, or only a fraction of what its useful life could be under "normal" operating conditions. Wear and tear on axles, springs and frames, abnormally great due to the surface conditions of the roads, are aggravated by the tendency of Afghans severely to overload their vehicles so that the maximum possible payload may be handled on each slow and costly trip. It is a common practice to replace the original springs of a new vehicle with heavy-duty springs to permit this overloading, and the traveler often encounters parked trucks with several hand-jacks set under them to relieve the springs of the load during the non-operating period. Splayed wheels, trucks halted by loss of a wheel or axle and spring failure are other common sights. The effects upon tires are equally disastrous, it being estimated that only 25 per cent of those ultimately discarded could possibly be recapped. New tires, euphemistically recorded as "pneumatic rubber motor covers", figure large on the list of imported manufactured goods, but do not represent the heavy-duty articles which ought to be employed for Afghan conditions.

To simplify repair parts, storage and repair procedures, the RGA in 1954 decided to standardize on International Harvester trucks except for Soviet- and Czech-built vehicles received under Bloc credits and military assistance. International Harvester has conducted an aggressive sales campaign in Afghanistan for a number of years which, together with excellent performance, paid off both in the 1954 standardization decision and in a more recent stipulation by the RGA that 550 trucks supplied under an ICA loan must be "proprietarily procured" from International Harvester.[1] This procedure provoked protests from General Motors, which recently announced that its Chevrolet Division has developed a heavy axle truck especially suited for

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[1] United States Operations Mission to Afghanistan (ICA), Mission's Monthly Report for November, 1957, p. 5.

Afghan conditions.[1] But at present perhaps 70 per cent of the operating fleet in Afghanistan is composed of the 2500 International Harvester trucks imported since 1954,[2] while most of the remaining 1000-odd commercial vehicles consist of Zis, Praha and some old Chevrolet trucks. As has been pointed out in Chapter I, all vehicles imported are handled through Government Monopolies, which has now established a well-stocked warehouse for International Harvester spare parts with the assistance of the present International Harvester resident representative in Kabul.[3]

The Richards Mission also provided funds for the improvement of Afghanistan's truck fleet. Under an agreement signed on June 27, 1957,[4] with the RGA Transportation Department, ICA agreed to grant $50,000 for technical cooperation aspects of a program which embodied a $2.4 million dollar loan to:

a) provide assistance in improving the organization and management of truck transport facilities;

b) purchase trucks and spare parts;

c) purchase imported building supplies, tools, equipment and materials for construction and operation of motor vehicle repair and maintenance shops in Kabul and Kandahar and one truck assembly plant at Kandahar;

d) provide on the same basis battery repair and rebuilding shops and vulcanizing and recapping shops;

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[1]United States Operations Mission to Afghanistan (ICA), Mission's Monthly Reports for February, March and April, 1958, p. 14.

[2]Report of June 13, 1957, in ICA files, Kabul, Afghanistan.

[3]Interview with Mr. Kenneth Milnes, International Harvester representative, at Government Monopolies, February 6, 1958.

[4]Project Agreement 06-39-048 in files of ICA, Kabul, Afghanistan.

e) construct additional repair and service shops in provincial centers as agreed in the future.

Of the $2.4 million loan, Richards Mission Funds comprised $2.2 million. The loan was to be allocated as follows: $1.7 million for vehicles and $700,000 for materials and equipment. It represented an underwriting by the U.S. Government of part of the $5.5 million in orders which RGA had previously placed with International Harvester. These included 100 tank trucks (30x1500 gals., 60x2000 gals., and 10x2500 gals.), 200 10-ton truck chassis and 700 8-ton truck chassis. 550 vehicles, including 30 petroleum tank trucks, have so far been shipped by International Harvester under this project, which assumes that RGA will pay all handling and transportation costs from Karachi to Kabul or Kandahar. The present procedure is to ship knocked-down truck chassis to Peshawar, where they are assembled, and then to drive them up to Kabul where the truck or bus bodies are added in the Jangalak workshop (see Chapter I). Under this ICA-agreement, facilities for chassis-assembly and body construction will be provided at Kandahar to handle components shipped by rail to Chaman and then, presumably, on flat-bed trucks into Kandahar. The agreement also calls for the construction and equipment of two new vehicle repair shops, one in each of the aforementioned cities.

Until the end of 1957, it was hoped by ICA that a section of the Jangalak plant would be made available for a repair shop. However, in January, 1958, the RGA decided to turn over the Jangalak space to the Soviets for construction of a similar facility, while the Americans were relegated to a site on the outskirts of the city where the private Afghan Motor Service has a partially completed motor vehicle repair facility. This move has made it necessary to increase the allocation for the Kabul workshop from

$350,000 to $400,000, while reducing that for Kandahar from $350,000 to $300,000.[1] It is hoped that most of the dollars can be reserved for the purchase of equipment with RGA contributing local materials and labor. ICA is to provide a specialist in motor vehicle maintenance and repair shop management to this project.

Thus we may conclude with the observation that, in sharp contrast to such projects as the Helmand Valley agricultural program, Arghandab power, and the Kandahar Industrial District, ICA has moved with considerable alacrity in the field of surface transportation. Of course, the real impetus to this program came from the Richards Mission which cynical observers might have considered a hasty and ill-advised attempt to "buy" friends in the Middle East in the period following the Suez debacle and the promulgation of the Eisenhower Doctrine. If such motivation figured in the Richards Mission goals, the very definite snub involved in RGA's assignment of the Jangalak facility for the Soviet vehicle repair shop indicates that it did not succeed in Kabul. However, the rapid delivery of 550 new vehicles, including badly needed petroleum trucks, the establishment of the two new vehicle repair facilities, and the rapid furnishing of badly needed technical and advisory services to the Ministry of Public Works may prove in the long run to be well-considered methods of rendering the Afghan economy more viable and hence, presumably, less dependent upon Soviet assistance and less prone to seek violent means of readjustment.

Such speculations will be continued and developed in the following chapter, but it should be emphasized here, at the close of this section on transportation, that the possibilities of constructive contribution to develop-

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[1]United States Operations Mission to Afghanistan (ICA), Mission's Monthly Report for January, 1958 (TOICA A-629, January, 1958) (Kabul, 1958), p. 6 (Hektographed.) and United States Operations Mission to Afghanistan, Mission's Monthly Reports for February, March and April, 1958, p. 10.

ment are particularly great in this field where comparatively small investments may have inordinate effects upon the nature and direction of trade. This fact is illustrated by the Koebig and Koebig proposal which would, if carried into effect, substantially advantage the Helmand-Kandahar region over that of Kabul and, by extension, over northern Afghanistan. However, the proposal might ultimately defeat its own implicit ends, for by weakening Kabul at the expense of Kandahar it would weaken Kabul's control over the North, and throw the northern provinces even more heavily into dependence upon Soviet imports and Soviet markets. So long as some goods from Kabul, whether manufactured in Gulbahar, e.g., or imported from Peshawar, reach the northern bazars, the hold of Soviet goods will not become exclusive. But if the hold of the capital is weakened to the point where Kabul, itself, becomes dependent upon Kandahar, then the traditional balance will be broken and the North, perforce, left to direct its trade across the Amu frontier.

In Table 60 regional conditions in road transportation are compared, and in Table 61 these advantages and disadvantages along with those in power (Table 55) are superimposed upon those listed in Table 60 for production of each of the key commodities in this study.

TABLE 60

COMPARATIVE REGIONAL ADVANTAGES IN ROAD TRANSPORTATION

	KABUL REGION: Upper Basin	KABUL REGION: Jalalabad	KUNDUZ-MAZAR REGION: Valley Proper	KUNDUZ-MAZAR REGION: Mazar-Maimana	HELMAND REGION: Arghandab and Helmand Areas	EXTERNAL: To U.S.S.R.	EXTERNAL: To Pakistan
KABUL REGION Upper Basin	Local transport in Kabul City and north to Charikar is improving rapidly with Soviet assistance.	Connections improving rapidly with completion and scheduled surfacing of Gorge Road.	Connections will remain poor until Shibar Pass route improved and/or Salang Pass road and tunnel built.	Connections will remain poor until Darra-i-Suf road is built and Shibar Pass route is improved.	Connections are poor to fair but may be improved by ICA if program outlined in Koebig & Koebig study is accepted. No serious topographical obstacles, but present surface is extremely hard on vehicles and limits driving speed.	See under "Kunduz Valley Proper" in the left-hand column.	See under "Jalalabad" and "Arghandab" in the left-hand column.
Jalalabad	Gorge Route is rapidly improving. Nimla Road a poor alternate. Lataband Road useful for heavy trucks.	Local transport fair except for roads across Kabul River to Laghman and Kunar Valleys.	Connections good between Jalalabad and Kabul. North of Kabul conditions are as described above.	Connections good between Jalalabad and Kabul. North of Kabul conditions are as described above.	Connections good between Jalalabad and Kabul. From Kabul to Kandahar, conditions are as described above. But present and potential traffic is small because regions are somewhat similar economically and both have easy road access to Pakistan.	Of no present or potential importance.	Connections good with Peshawar area and will improve when road has been paved.
KUNDUZ-MAZAR REGION Valley Proper	Connections will remain poor until Shibar Pass road is improved or Salang Pass road and tunnel are built. Surface conditions on section between Doshi and Charikar are very hard on vehicles.	Connections will remain poor until Shibar Pass road is improved or Salang Pass road and tunnel are built. Surface conditions on section between Doshi and Charikar are very hard on vehicles.	Conditions on road Imam-Saiyid-Kunduz-Doshi are improving with Soviet aid. Kunduz-Khanabad-Taliqan road fair. Taliqan-Faizabad road quite poor.	Connections are fair between Pul-i-Khumri and Mazar, poor between Kunduz and Mazar and between Mazar and either Maimana or Aq Chah.	See under "Kabul Upper Basin" in left-hand column. There is no significant interregional traffic at present, nor is much likely to develop because regions are economically similar. If Helmand cannot import Pakistan coal, it might tap Darra-i-Suf. Soviet gasoline for Helmand would move via Herat.	Conditions on Imam-Saiyid - Kunduz road are improving rapidly with Soviet assistance.	Of no present or potential importance.
Mazar-Maimana	Connections will remain poor until Darra-i-Suf road is built and Shibar Pass route is improved. Alternative is to improve present route via Pul-i-Khumri, perhaps in conjunction with Salang Pass road.	Connections will remain poor until Darra-i-Suf road is built and Shibar Pass route is improved. Alternative is to improve present route via Pul-i-Khumri, perhaps in conjunction with Salang Pass road.	Connections are fair between Mazar and Pul-i-Khumri, but poor between Mazar and Kunduz.	Connections poor between Mazar and Maimana or Andkhui with no early prospects for improvement.	Connections are very poor and a great distance is involved, but present and potential traffic is insignificant.	Connections good from Mazar to Khelif but poor from Andkhui.	Of no present or potential importance.
HELMAND REGION Arghandab and Helmand Areas	Connections are poor to fair but may be improved by ICA if program outlined in Koebig & Koebig study is accepted. No serious topographical obstacles exist, but present surface is extremely hard on vehicles and seriously limits speed.	Connections are poor to fair but may be improved by ICA if program outlined in Koebig & Koebig study is accepted. No serious topographical obstacles exist, but present surface is extremely hard on vehicles and seriously limits speed.	Probably of no considerable potential importance due to economic similarity of regions and great distance involved.	Probably of no considerable potential importance due to economic similarity of regions and great distance involved.	Internal communications are probably the best in Afghanistan thanks to interproject roads. But this advantage may be lost unless maintenance and extension of these roads receives a high priority and early attention.	Of no present or potential importance.	Excellent road connections with Chaman but need better transfer and customs facilities.

TABLE 61

COMPARATIVE REGIONAL ADVANTAGES FOR PRODUCTION OF KEY COMMODITIES INCLUDING POWER AND TRANSPORTATION CONSIDERATIONS

COMMODITY	K A B U L	R E G I O N	K U N D U Z	R E G I O N	H E L M A N D	R E G I O N
	Upper Basin	Jalalabad	Valley Proper	Mazar-Maimana	Arghandab Area	Helmand Area
COTTON	Large-scale cultivation excluded by climate and by competition of food crops for land. Ginned cotton can be brought to new Gulbahar mill from Kunduz Region although route needs improvement. Short-run power shortage possible.	Large-scale cultivation excluded by competition of other crops such as rice and sugar cane. Area can easily be supplied with imported cotton piece goods from West Pakistan, and later with goods manufactured at Gulbahar.	Excellent conditions for growth but no large expansion of irrigated area likely due to high capital costs. Best located area with respect to existing processing facilities and for exports to or via the Soviet Union.	Expansion of irrigated area is inhibited by a lack of capital and probably by a lack of water as well. Area will continue to supply its ginned cotton to Pul-i-Khumri and for export to or via the Soviet Union.	Best potential area for cotton cultivation. Water, land and labor are available. Test plantings indicate suitability of region for growth of cotton. Region needs cash crops. Sufficient hydroelectricity available in near future for gins, later for mill. Region is well-situated for exports via Pakistan and could also supply part of Gulbahar's needs, especially if transport between Kandahar and Kabul is improved as proposed by Koebig & Koebig.	
SUGAR	Sugar cane is excluded by climate, sugar beets by competition of food crops for land. Area will continue to import its sugar needs from other regions or from Pakistan.	Short growing season and two diseases make large-scale cane supply problematical. Factory now in experimental operation is obsolete. Area would have to compete with sugar imported from Peshawar with no great transportational advantages towards Kabul.	Excellent conditions for sugar beet growth, but crop must compete with wheat and cotton for land, water, labor. Baghlan factory could double its 55,000-ton capacity if assured of supply. Kar Kar coal is ample for refinery but transport to Kabul poor.	No present production since there is no processing plant and no demand for beets. Area can be supplied either from Baghlan or by imports from U.S.S.R. No serious transport obstacles and little prospect of local sugar production developing in future.	Barring a large-scale development of the Kunduz Valley, this Region has the best potential for sugar beet cultivation. Water, land and labor are available. Trials indicate that sugar beets do well, and they fit into a desirable rotation pattern. Region needs cash crops, is too remote to be supplied from Kunduz, now imports sugar. Power potential for refinery is good, but fuel would have to be brought in unless process were completely electrified. Region's fruit-processing industry ensures local expanding market.	
CITRUS FRUITS	Climatically excluded, but paving of Gorge Road should facilitate import of well-packed fruit from Jalalabad.	Only present area of production but expansion is hampered by disease and competition of other crops.	Climatically excluded by low winter temperatures. Considerable improvement in internal transportation will be necessary before this Region can afford to import citrus from Jalalabad Oasis.		Climatically favorable, with sufficient land, water and labor available. Experimental plantings have been made and should be successful at least in Shamalan, Darweshan and Chakansur areas.	
DECIDUOUS FRUITS AND NUTS	Problem is not one of increased production but of disease and quality control with better handling and packing. Area ahead in exports to Pakistan and India. Paving of Gorge Road will facilitate transportation, reduce damage to fruit in shipment.	Problems are similar to those of Upper Basin. Area not as important in deciduous production as in citrus, but its deciduous fruits and nuts are more conveniently located for export to Pakistan, India, than are those of Upper Kabul Basin.	Insufficient information is available on status of this industry in the North. Presumably could improve quality of its exports to U.S.S.R. Ships only nuts to Kabul Region and these present no great problems of packaging and transport.		First-ranking fruit exporting region with excellent market in Pakistan. Needs include disease and quality control, better packing and perhaps refrigeration. Local industry has lagged in taking advantage of domestic and foreign markets. Power, roads excellent.	Summer temperatures may be excessive for some varieties, but if experimental plantings are successful area offers greatest potential for expansion of deciduous fruit production. Electric power assured for processing needs. Road system excellent if properly maintained.
CATTLE HIDES AND LEATHER	Only area with a modern tannery capable of large-scale production. Capacity of 120,000 hides per year is only 1/10 to 1/8 utilized due to poor collecting system and lack of incentive for farmers to preserve and sell hides.	Improvement of transport links with Kabul should permit sale of area's hides for processing there, but proximity to Pakistan may result in continued reliance upon imported leather and leather goods unless Kabul prices are reduced.	Present demands met by small, local tanneries using crude techniques and vegetable reagents, and by imports of chrome leather and leather goods. Region could support one or more large-scale modern tanneries if incentive and collection problems are solved. Kunduz Valley would have sufficient electricity and coal to support such a tannery, using chemicals imported from the U.S.S.R. or West Germany. Region undoubtedly has large but untapped hide resources.		Present demands met largely by imports of chrome leather and leather goods from Pakistan. Kandahar bazar has large cobbler and harness section. Kandahar Industrial District will include a modern tannery. Electric power will soon be assured, and if pasture-economy is adopted in some of Helmand areas the supply of superior hides can probably be greatly improved. Transportation system is adequate to facilitate collection of hides through improved organization.	
SHEEP AND GOAT SKINS	Kabul tannery could process 50% more skins for both domestic use and export of a higher-quality product. Supply problems similar to those of cattle hides but potential even greater once organized.	Improvement of transport should allow better collection and export of superior skins. Shipment to Kabul for tanning hardly economic, but a central tannery could be established in Jalalabad.	Extension of the cooperative organizations now handling karakul could improve quality and quantity of skins collected for processing in central tanneries or in local tanneries with improved methods and materials. Problems of animal health and nourishment similar to those of karakul (below). Transport no serious problem as skins are compact and unbreakable, but incentive and quality control problems must be solved first.		Several factors combine to give Region excellent prospects in skins: irrigated pastures on the new Project lands, plus intensified use of these lands by nomads with their large flocks could greatly increase supplies; proposed Kandahar tannery would process skins; good roads offer easy collection and export of hides, preferably after tanning at Kandahar or in local but modernized tanneries.	
KARAKUL	No local production. Kabul serves as the collecting and clearing center for exports. RGA has broken Bank-i-Millie monopoly on export financing by establishment of the Karakul Cooperative.	No local production. Improvement of the Kabul-Torkham road will make it easier to transport karakul from the warehouses in Kabul to the railhead at Peshawar, but some skins may continue to be flown abroad.	This is the traditional and well-established region of karakul production, and it is unlikely to be displaced by any other in Afghanistan. But in order to meet foreign competition the karakul industry, with the help of newly-established cooperatives must devote increasing attention to its range feed and water requirements as well as to veterinary care and improved breeding practices. Development of new color strains is promising. Skin tanning and grading needs attention. No particular transportation problems involved.		No present production nor real likelihood of future development of karakul breeding because Region lacks proper grazing vegetation as well as herdsmen familiar with karakul raising. But the local breeds of broadtail sheep, providing pelts for export, as well as wool, need the same attention to feed, water, health and breeding as do the karakul. HVA and ICA extension programs are essential to assist herders and settlers in providing such attention.	
WOOL	Kabul is the center of a good "woolshed" extending back into the surrounding mountains. As usual, collecting facilities need improvement, and the Wool Exporting Company has been established to promote it. The RGA woolen mill is very obsolete and needs replacement of its equipment and wool cleaning facilities.	Not much information is available on wool production in the Jalalabad Oasis. Presumably climate is not conducive to heavy fleece. The Kabul-Torkham road provides a good export route, but any local wool exported is probably not cleaned, sorted or baled very satisfactorily	Because of the predominance of karakul sheep in this Region, there is comparatively little production of wool as such, although the mature karakul females are shorn. Most of the production goes into cottage industry for weaving of coarse cloth and fine carpets. There is no woolen mill in the North and prospects for establishing one cannot be evaluated on the basis of the limited information available.		This region probably produces and markets more wool than any of the others, but a large part of it is exported, on the hoof or otherwise, by nomadic herders. With the adoption of an irrigated pasture economy in the Helmand, production could be increased and organized so that more of the clip comes onto the domestic market. Cleaning and grading facilities need much improvement and this should be done in conjunction with enlargement of the woolen mill at Kandahar. Sufficient electric power will be available and roads for collection and export are good.	

XII. THE THREE REGIONS AND THE NATIONAL ECONOMY OF AFGHANISTAN

The National Economic Situation

The regional description in Chapters I through VII and the economic-geographic analysis of Chapters VIII through XI have served, it is hoped, to indicate to the reader the lines along which the Afghan economy may reasonably be expected to develop. It should also be clear that certain lines of development are pretty well foreclosed, at least in the present state of knowledge of Afghanistan's resources. Thus, mineralogical development will be limited to coal mining and perhaps petroleum extraction pending the discovery of ores in sufficient quantity and quality to overcome transportation handicaps and claim a place on the world market. At present, the world market is not sufficiently interested in the quantity and types of ores and gems which remote Afghanistan offers for any great reliance to be placed thereon. Indeed, there are only a handful of Afghan products which do seriously interest the world market, and these are all either agricultural or pastoral products such as cotton, wool, fresh and dried fruits, karakul furs and carpets made from wool. We have pointed out that these products can continue to command foreign markets only if their quality is raised and grading and marketing practices improved. Thus, for Afghanistan to be able to finance any of her own development, she must concentrate on improving exports in order to maintain and enlarge their foreign exchange earning capacity in the face of competition, and at the same time reduce non-essential imports.

For several years following World War II, Afghanistan was able to finance capital development by means of dollar earnings built up principally from karakul marketing. Those reserves are now practically exhausted, while Afghanistan has borrowed, or agreed to borrow, foreign capital as is shown in Table 62 following to continue her developmental efforts.

While Afghanistan's net foreign exchange holdings fell to minus $571,700 for fiscal year 1953-54, and were only plus $291,300 at the end of fiscal year 1955-56, the nation's precious metal reserves remained constant at $49,686,100[1] over this period and have not yet been touched. By Afghan law the sum of foreign exchange holdings plus precious metal reserves must constitute 30 per cent of the value of bank notes issued, and since the State Bank (Da Afghanistan Bank) calculates its reserves at the gold parity rate of 16.8 Afghanis to the dollar, the lowest and hence the most conservative of several official exchange rates, there was, in August, 1956, room for a 40 per cent expansion of the 1,993 million Afghani notes in circulation. The sizeable inflation of the Afghani which has accompanied note issue in recent years, however, was reflected in the declining purchasing power of the Afghani and had a considerable influence upon the RGA decision, at the end of 1957, to accept no more foreign loans. In this respect, see Table 63.

[1]Tudor Report, p. 163.

TABLE 62

POSSIBLE FUTURE EXTERNAL DEBT OF AFGHANISTAN[a]

Source	Amount in Millions of $	Terms	Date of First Payment	Annual Interest in Millions of $
U.S. Export-Import Bank (1950)	21.0	$3\frac{1}{2}$% in 18 equal instalments;annually.	October, 1958	.735
U.S. Export-Import Bank (1954)	18.5	$4\frac{1}{2}$% in 18 equal annual instalments (staggered).	October, 1958	.8325
U.S. Food Loan (1953)	1.5	$2\frac{1}{2}$%, repayable in local currency in 30 annual instalments after 3 years.	Interest, Jan.15, 1957 Principal, Jan., 1959	.0375
International Airport Loan (U.S. - ICA)	5	3% repayable at RGA request over 37 year period.	4 years after first disbursement made	.150
U.S.S.R.	6	2% in 8 equal annual instalments after 5 years.	Not available	.120
U.S.S.R.	100	2% over 30-year period; 8 year grace on principal.	Not available	2.000
Czechoslovakia	5	2% in 5 equal annual instalments after 3 years.	1959 on 1.3 million for cement plant	.100
Total	157.0			3.975

[a]*Tudor Report*, p. 165.

TABLE 63

CURRENCY ISSUED AND IN CIRCULATION, AND FREE MARKET VALUE OF THE AFGHANI[a]

Fiscal Year (March 20–March 21)	Currency Issued During Year	Currency in Circulation at End of Fiscal Year	Free Market Value of Afghani at Given Dates	
1952/53	1,173 mil. Afs.	996.8 mil. Afs.	Jan. 17, 1953	$1 = 36.5 Afs.
			Oct. 17, 1953	$1 = 34.0 Afs.
1953/54	1,219 mil. Afs.	1,113.2 mil. Afs.	Jan. 16, 1954	$1 = 37.0 Afs.
1954/55	1,667.6 mil. Afs.	1,370.4 mil Afs.	Nov. 22, 1955	$1 = 43.5 Afs.
1955/56	650 mil. Afs.	1,799.8 mil. Afs.	Feb. 29, 1956	$1 = 54.5 Afs.
Period from March through August, 1956	275 mil. Afs.	1,993 mil. Afs.	Aug. 15, 1956	$1 = 56.0 Afs.
			Oct. 23, 1956	$1 = 52.0 Afs.
			Feb. 20, 1957	$1 = 53.0 Afs.
			Oct. 15, 1957	$1 = 52.0 Afs.
			Feb. 28, 1958	$1 = 55.0 Afs.

[a]From information provided by Da Afghanistan Bank to the Economic Attache, U.S. Embassy, Kabul, Afghanistan. See also Tudor Report, p. 156.

A further indication of the inflationary trend in recent years is provided by the cost of living indices prepared by the Economic Attache Office of the United States Embassy in Kabul.

TABLE 64

COST OF LIVING IN KABUL
(Indices from 1955-57)

Item	12/15/55	5/7/56	11/1/56	2/16/57	4/20/57	6/5/57
Flour	100.0	104.5	159.1	154.5	140.9	163.6
Roghan (Sheep Fat)	100.0	94.0	102.7	106.4	145.7	150.2
Mutton	100.0	150.0	137.5	187.5	200.0	175.0
Rice	100.0	100.0	145.0	137.5	137.5	130.0
Sugar	100.0	100.0	124.1	124.1	111.1	111.1
Fruit[a]	100.0	152.0	63.5	110.5	279.4	300.0[a]
Vegetables[a]	100.0	100.0	90.0	115.8	241.2	176.4[a]
Eggs	100.0	68.6	125.0	125.0	125.0	125.0
Tea	100.0	91.7	91.7	91.7	100.0	91.7
Spices	100.0	91.5	243.7	111.5	114.1	129.6
Nan[b]	n.a.	n.a.	n.a.	n.a.	100.0	100.0[b]
Wood	100.0	111.1	122.2	155.5	155.6	155.5
Charcoal	100.0	100.0	120.0	130.0	129.0	120.0
Electricity[b]	100.0	100.0	100.0	100.0	100.0	100.0
Clothes	100.0	102.3	90.1	83.8	73.1	76.3
Rent	100.0	100.0	168.8	239.9	320.0	320.0
Miscellaneous	100.0	100.0	100.0	100.0	100.0	100.0
Combined Index weighted according to middle class spending habits	100.0	104.2	130.8	153.6	184.3	182.6

[a]Seasonal variations present.

[b]Fixed price.

While this index is compiled for the purpose of calculating cost-of-living allowances for Foreign Service personnel, and is therefore weighted according to middle class or white-collar spending habits, it does serve to indicate the rapid rise in the cost of such basic commodities as flour, mutton, roghan, eggs, fruit and vegetables. Increases in rent, wood and charcoal, on the other hand, have far less influence upon the general population whose standards of housing and fuel consumption are far below those of the middle class or foreign community.

The inflationary effect is, of course, characteristic of the early stages of economic development, wherein incomes of laborers rise before additional consumption goods, made possible by capital investment in industry or agriculture, come into being. For example, the construction of the cotton textile factory at Gulbahar has contributed to employment and wage-income since 1953, but its cotton piece goods began to become available only in 1958. The presence of an increasingly large foreign community in Kabul may also have something to do with this rise in prices to the extent that this higher-income group is bidding against the local populace for some items. However, one suspects that most Kabuli merchants fit their prices, except on controlled items, to their customer's presumed ability to pay, another factor tending to exaggerate the implications of the above indices. But when these indices, for all their limitations, are considered in conjunction with the currency and valuation data in Table 63, little doubt remains that a considerable inflation has occurred.

In the Helmand Region, where the irrigation projects should eventually increase the output and hence lower the price of grains, fruit and vegetables, the immediate effect of the added employment of construction workers, drivers and auxiliary services was similar to that around Kabul. The building of the Kandahar International Airport, the Kandahar Industrial District and the installation of Arghandab power are likely to keep incomes and demand ahead of supply for several years. In the Kunduz Region, on the other hand, only comparatively small projects have been undertaken, and the influx of Soviet goods - cloth, notions, sugar - has probably offset inflationary tendencies to some degree.

It is undoubtedly to the advantage of the Afghan Government to limit the import of consumer goods. Otherwise, much of the increased income will be dissipated in consumption instead of finding its way into the banks, where it can be borrowed by RGA, or directly into local capital investment. Import control is facilitated by the fact that Government Monopolies handle all transactions in trucks, fuel, spare parts, tobacco and sugar and by the establishment of maximum resale prices for some textile goods and some notions. We have considered in Chapters VIII and IX the effects of the existing and proposed tariff systems as deterrents to imports. Another major control resides in the additional ad valorem duties collected on certain imports by the Customs Administration of the Ministry of Commerce. Since these duties are passed along by the importers to purchasers, they act in effect as a sales tax, inhibiting the propensity to buy imported "luxury" consumer items.

TABLE 65

AD VALOREM DUTIES ON CERTAIN IMPORTED GOODS[a]

Article	Duty-%	Article	Duty-%
Automobiles	3	Jewelry, except imitation	30
Cigarettes	5	Jewelry, imitation	10
Cigarette cases & lighters	20	Perfume and cosmetics	20
		Playing cards	10
Firearms	5	Silk piece goods	15
Foodstuffs	10	Silverware	15
Goldware	20	Typewriters	20
Gold lace piece goods	25		

[a]Note on "Import Tariff System of Afghanistan," prepared by the Acting Economic Attache, United States Embassy, Kabul, Afghanistan, June 20, 1957.

The inhibiting effect of regular tariffs and special ad valorem duties upon imports of consumer goods is augmented by the policy of valuing the goods at three different exchange rates according to their ultimate destination. Goods intended for RGA use are valued at a rate of 20.25 Afghanis to the dollar; those for developmental purposes at 32 Afghanis per dollar; and those for ordinary consumers at the free market rate which in 1958 was approximately 55 Afghanis to the dollar.

The use of a multiple exchange rate for currency transactions serves as a third mechanism for controlling imports on non-essential goods and for assuring to the RGA a certain share of all foreign exchange received in payment for Afghan exports. For example, karakul exporters are required to sell all of their foreign exchange receipts to the State Bank as follows: 80 per cent at the rate of 20 Afghanis per dollar and 20 per cent at the rate of 28 Afghanis per dollar. For exporters of cotton and wool, the ratio is reversed: 20 per cent of foreign exchange receipts are bought at 20 Afghanis per dollar and 80 per cent at 28 Afghanis per dollar, evidently on the premise that more stimulation is needed here than for karakul exports.

The RGA buys all foreign exchange received by its diplomatic representatives abroad at the 21 Afghani per dollar rate, and requires foreigners working in Afghanistan on RGA contract to accept 30 per cent of their salaries at the 16.8 Afghani per dollar rate. Foreign exchange received for other exports, for services of Afghans abroad or from the foreign community and tourists in Afghanistan may be sold on the free market or used by its holders to buy additional imports. But since the bulk of hard foreign exchange (dollars, sterling, marks, Swiss francs) is obtained from karakul, wool and cotton exports, the RGA is in a good position to control the nature and quantity of most imports. This control is effectuated by the use of two different rates in State Bank <u>sales</u> of foreign currency to would-be importers. Thus, dollars are made available at 20.25 Afghanis for imports of sugar, petroleum and lubricating oils, of equipment for Government development projects and budgetary items, for buying gold, or for expenses of Afghan students abroad, while importers of vehicles and parts (including Government Monopolies), of industrial and textile goods, and local government agencies and Afghans going abroad for medical care can buy dollars at 32.35 Afghanis each. Importers of other goods, considered non-essential, are left to buy their dollars at the free market rate, somewhat higher than the 55 Afghanis paid for dollars.

Controls over foreign exchange and imports form a major and necessary part of the RGA's efforts not to be cheated by inflation and profiteering out of the gains it has a right to expect from its investment and borrowing programs. At the same time, it must increasingly be realized in Kabul that the principal benefits to be achieved by planned development will come from a re-oriented national economy with its emphasis upon production and export of those commodities in which Afghanistan has and can maintain a comparative advantage combined with a progressive reduction in imports of goods which Afghanistan can provide for herself. A large portion of this study has been devoted to demonstrating that these comparative advantages lie in agricultural and pastoral commodities and in increased domestic processing thereof, utilizing known resources of coal and hydroelectric power. Before proceeding to an analysis of the non-economic factors involved in a decision to move along the lines indicated, it is well to note that the estimated <u>foreign exchange</u> savings on imports of cotton piece goods and sugar alone could amount to almost eight times the foreign exchange reserves of Afghanistan in 1954-55, the best of recent years, which were 26,475,120 Afghanis or $1,575,900[1] at

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[1]<u>Tudor Report</u>, p. 163. There would, of course, be some foreign exchange expenditures for the capital goods, fuel and incidental raw materials needed to raise and maintain domestic production capacity at the level of demand.

the most conservative rate (16.8) used by the State Bank. Calculated at the free market rate of 50 Afghanis to the dollar, a fair average for recent years, these savings would total almost $4 millions or enough to service the entire potential foreign debt shown in Table 62.

Afghan Developmental Policy: Economic, Social and Political Factors

Having established both the most promising directions for Afghan economic development and the optimum locational distribution for each type of development, as well as the means at the disposal of the Afghan Government for encouraging and directing such development, it remains to enquire into the exact nature which such development is likely to assume. In this enquiry we must move beyond that comparatively objective area in which we can analyze physical and human resources, power and transportation facilities, import-export statistics and fiscal data into a realm where we must try to take account of such non-objective considerations as governmental developmental policies and the fluctuating social and political factors which tend to shape or alter them. If, in so doing, we move into rather more nebulous territory than we have covered previously, we are at the same time moving closer to a correct appreciation of the true position of the Afghan economy today, of its developmental potentials and of the prospects of attaining those potentials.

We may start by reiterating one basic fact which is clear to all students of contemporary Afghan affairs: the RGA has inextricably involved itself in the economic development of the nation on a scale previously unknown. This characteristic appears to be common to most "underdeveloped" nations which, particularly since the end of World War II, have accepted the premise that government can no longer content itself with the role of a mere onlooker and maintainer of the framework of law and order within which private enterprise is to take the lead in investment and construction. Rather, the technological lag appears so great, the need for large-scale, deferred-amortization projects so vast, that only national and supranational agencies can attempt to underwrite the capital-intensive projects so necessary to bring such development into being. In the case of a nation so remote and resource-poor as Afghanistan, lacking moreover the advantages of well-established ties with political or economic blocs, it is inevitable that the government take the lead in development, using its established authority to direct and control the utilization of the resource base and of any created or borrowed capital surpluses. Neither domestic nor foreign capital can be expected to invest in Afghanistan on a scale sufficient to provide the desired rate of economic growth. Furthermore, since the private investor must of necessity look to immediate or short-range returns, it is left to the government to take the longer view and to provide the economic as well as the social-legal framework within which the private entrepreneur can operate. If, in the process, freedom of private allocational decision is somewhat curbed, this is the price which must be paid, and few students of developmental economics would seriously argue the point. At any rate, it can be safely stated that the conditions which prevailed in Afghanistan from 1929 to 1946, during which period the RGA concentrated upon maintaining a stable matrix for laissez-faire enterprise, have gone the way of the prewar pound sterling. Beginning in 1946 with the hiring of MKA, and especially after the resignation of Abdul Majid Zabuli as Minister of National Economy in 1950, the Afghan Government has assumed primary responsibility for initiating and coordinating economic development projects in the country. While the high degree of government involvement represented by the work of General Malik as

Minister of Finance and Minister of National Economy has perhaps been subject to some retrenchment since his ouster in July, 1957 (see Chapter I), it is most important to realize that the present orientation of the RGA with respect to "guidance" of the national economy is more than an expression of the personal convictions of certain ministers. Rather, it appears as an outgrowth of a logical evolution of government policy, and one which is likely to be continued indefinitely, not only for the economic reasons set forth above but because of certain historical-social and political considerations which must now be discussed.

The Afghan Government, although certainly a tight social group based primarily on family or clan[1] allegiance, is not conspicuously wealthy. In fact, it is well known that Nadir Shah's major handicap, upon his return to Afghanistan during the 1929 insurrection, was his lack of personal wealth to hire and equip an army. His appeal was primarily to the tribal loyalties of the Abdali Pushtuns and to the conservative religious leaders who had been outraged by Amanullah's radical reforms. The common people, especially those in and around Kabul, regarded Nadir Shah as a savior from the chaotic rapacity of the rebel, Bacha-i-Saqao, and his cause took on messianic overtones which were confirmed by his martyrdom in 1933. Nothing which Nadir Shah did in his four-year reign, and nothing done since 1933 by his son, the present king Zahir Shah, has alienated these feelings. In distinct contrast to the personal aggrandizement which has characterized the rulers of other Asiatic monarchies, at least until recent years, the royal house of Afghanistan has not utilized its position primarily to enrich its members. The break with the Bank-i-Millie interests in 1953 merely emphasized the fact that the rulers of Afghanistan prefer to be regarded as the leaders of the struggle against poverty for a higher general living standard rather than as

[1] Specifically, the Yahya Khel family of the Mohammedzai clan of the rrani (Abdali) Pushtuns.

the leaders and benefactors of a form of economic exploitation. The royalty maintains the degree of ostentation which is considered essential to its domestic and international prestige, but is careful not to give offense by any form of "conspicuous consumption". Of course, the cynic might put this down to Afghanistan's lack of readily exploitable resources, particularly the mineral wealth to be found in Iran, Iraq, Saudi Arabia and the Gulf Sheikdoms, as well as to the precarious balance of power which characterized the early years of the present ruling house. But the author believes that the major credit for the situation in Afghanistan is due to the sincerity and far-sightedness of the King and Prime Minister. At any rate, it is the effect and not the cause of the situation which concerns us here.

One principal effect of the RGA's recognition and leadership of popular social-economic goals is the virtual absence of any known left-wing outgroup. Here, again, the cynic might point to the restrictions imposed upon press polemics, enhanced by the prevalent illiteracy, and to the curbs upon partisan political activity. But the fact remains that the best-organized out-group - and even it is not completely excluded from ministerial representation - is one which would move Afghanistan to the right of present governmental policy. Thus it might be said that Zahir Shah's Government has succeeded where Farouk's and Faisal's failed, and has done so without even a Mossadegh interlude. By identifying itself with the nationalistic and social-economic desires of the Afghan people, the present ruling group has reduced discontent to a degree which mere repression could never hope to attain.

Another effect or manifestation of the political wisdom of the RGA course is that Afghanistan so far has been eminently successful in maintaining its traditional position of neutrality between its northern neighbor and whatever external power opposed Russian-Soviet interests in South Central Asia. The neutrality policy may be regarded as a logical extension of Afghan nationalism and desire for unfettered independence. But here again the RGA policy has proven, up to the time of writing, to be as rewarding in external as it has in domestic relations. In fact, in recent years the U.S.S.R has gone out of its way to use Afghanistan as an example of its post-Stalin regard for neutralism. Here the cynical observer may point out that the U.S.S.R has probably gained as much politically as it has given economically in this exchange, but the fact that the Soviet leaders included Afghanistan in their late-1955 state visits to South Asia and entertained Zahir Shah in Moscow in July, 1957, stands in sharp contrast to the pattern of relations between the U.S.S.R. and other Asian monarchies.[1] Such Soviet endorsement of the ruling group of Afghanistan, which has no recognized Communist Party, may be regarded as a further success for that group both in maintaining its own position within Afghanistan and in maintaining Afghanistan's position in the world. While it would be foolhardy, especially after the events of July, 1958, in Iraq, to state categorically that there is no danger of a leftist coup in Afghanistan, one may at least consider such a development unlikely so long as RGA continues its present policies, and this for at least two major reasons. From the Afghan point of view, the present Government is the embodiment of the national struggle for independence, world prestige and an improved domestic living standard. From the Soviet point of view, as exemplified in the post-Stalin foreign policy, there is no need for anything so abrupt as a coup in Afghanistan.

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[1]It should be noted that Riza Shah Pahlevi of Iran visited Moscow in June, 1956, but that the U.S.S.R. has sent neither top-ranking visitors nor large-scale assistance to Iran.

It may be well to pause and examine this last assertion lest it appear too glib without elucidation. One may assume that the ultimate aim of Soviet foreign policy is the triumph of "Socialism" in every country, as the Russians themselves would be the first to admit, and that this goal coincides to a certain extent with the traditional aims of Russian nationalism and expansionism. At the same time, the Soviet Union has been wary of "capitalist encirclement" ever since the days of the intervention which followed the Bolshevik Revolution. Whether this fear of encirclement is today as real as it was when the U.S.S.R. was a comparatively weak power, of course, may be debated, but the end product of Soviet theoretical, political and strategic motivations is sufficiently fused that we need not try to assign individual weights to them. Thus we may say that, with regard to the nations which border the U.S.S.R., Soviet policy amounts to the following points, roughly in order of priority: 1) they must not be controlled by powers hostile to the U.S.S.R.; 2) they must pursue foreign policies compatible with those of the U.S.S.R.; and 3) they must eventually be brought into the "Socialist" camp in accordance with the dictates of Marxist-Leninist theory and of Russian national interest. Especially since the death of Stalin, it has appeared that the U.S.S.R., with a firm belief that time is on its side, is primarily concerned with accomplishing the first two steps and is willing to be patient concerning the third, rather than proceeding as bluntly as was done in Eastern Europe in 1945 or Czechoslovakia in 1948. Analysis of the differences between the Polish and Hungarian "revolutions" in the fall of 1956 will serve to bear out this conclusion.

Applying these three goals to Soviet-Afghan relations, we can see that the first was achieved as long ago as the Russo-British settlement of 1907 which guaranteed that Afghanistan would not be used as a base of operations against the Russian Empire. This achievement was confirmed by the Third Afghan-British War in 1919-1921 which resulted in assumption by Afghanistan of complete control over its foreign relations, and by the signing of Soviet-Afghan treaties of neutrality and non-aggression in 1926 and 1931. The 1931 treaty was renewed for a period of ten years on the occasion of Khrushchev's and Bulganin's visit to Kabul in December, 1955. At the same time, the U.S.S.R. achieved a fulfillment of its second goal in the form of joint Soviet-Afghan statements favoring co-existence, the banning of atomic weapons, and the admission of Communist China to the United Nations. Afghan foreign policy can hardly be regarded as incompatible with that of the U.S.S.R. Furthermore, so long as Afghanistan continues to hew firmly to these positions and to her traditional neutrality, the U.S.S R. cannot make any overt gestures against Afghan independence without seriously alarming the "non-aligned" nations of South Asia, principally India and Indonesia, which are much more important prizes for Communism and Russia in the long run.

This brings us to the third goal, the achievement of "Socialism" in nations bordering the U.S.S.R. and eventually throughout the world. Not only would any overt political or military action to achieve this goal in Afghanistan tip the hand of the U.S.S.R. before Asian and world opinion, but the acquisition of the Afghan economy, with its serious problems, would in no way compare with the acquisition of an oil-rich Southwest Asian nation or of India or Indonesia. Present-day Afghanistan would present to the Soviet Union the same sort of problems which it faced with the Kazakhs and Kirghiz in Central Asia, both after the Revolution and in the early years of collectivization. The Soviet Union has probably little desire to repeat these experiences. And if she had, the lessons of post-Stalin Soviet policy in the Middle East seem to indicate that she would vastly prefer to operate by economic and psychological-warfare means, which might bring into being a satellite government, rather than by overt action which would probably produce a lingering guerilla war with the Pushtun tribes, if not with the regular Afghan Army. We shall return to the question of economic penetration a bit later. But it should be said here that there is as yet no sign of psychological or propaganda warfare between the U.S.S.R. and Afghanistan. And it may be worth repeating that, in the author's opinion, the U.S.S.R. has far more to lose than to gain by any hasty form of action against Afghan sovereignty.

Before leaving this section dealing with political considerations, we must look at the other side of the coin, free Afghanistan's value to the West. Economic contributions being minimal, this value is principally political and strategic. The political value, of course, resides in the existence of twelve million independent Afghans in the heart of Asia and on the southern border of the Soviet Union. The value of Afghanistan as a proving ground for free ideas, to the extent that they can be circulated, and for Western enterprise, engineering and aid programs in direct contact with their Soviet counterparts, must not be underemphasized. While Afghanistan is dwarfed by India, where the same sort of struggle is going on for democracy, its survival and advancement may actually be more significant to the smaller, independent nations of Asia and Africa than that of the truncated Subcontinent whose needs and cultural claims are better known, and better presented, in Washington and London.

With respect to the strategic value of Afghanistan, however, considerable updating and reappraisal appear in order. In the days of land-tied armies, from Alexander to Alamein, the possession of the Khyber Pass and the passes of the Hindu Kush was rightly regarded as a considerable military advantage for anyone who sought to invade India or Central Asia. Today, the missile, The Bomb, the airplane and the parachute have considerably vitiated, if they have not entirely eliminated, such strategic concepts. One nuclear explosion, correctly placed, could deny the use of the Khyber Pass to a land army for months or years. Another could destroy the Sarobi Dam and turn the uncontrolled waters of the Kabul River into the Lower Gorge. A third could seal the Great North Road, so painstakingly carved through the Hindu Kush. At the same time, airborne armies could pass over Afghanistan in a matter of hours, to land either in Central Asia or on the U.S.-constructed fields in West Pakistan. The vaunted "strategic value" of Afghanistan must now be regarded as greatly depreciated by technology.

To sum up, Afghanistan's present value is simply this: to the Russians, a useful example of Soviet economic and technical cooperation with an under-developed Asian nation which is already in the political status of an Austria or a Sweden and which may eventually become a Finland or even a Czechoslovakia; to the West, a country whose actual possession by the Russians would greatly discomfort the "Bagdad Pact" partners of Iran and Pakistan, but whose loss would presumably have little effect upon the ultimate defensibility of either of these nations and even less upon the Free World position in Asia since it would alarm the non-aligned nations without discrediting the West which is in no way committed to the defense of Afghanistan. Thus, paradoxically, the U.S.S.R. may be more hesitant to incorporate Afghanistan into its bloc for fear of repercussions among the uncommitted nations than for fear of retaliation by the West. A Soviet take-over in Kabul might do as much to drive South Asia into the SEATO alliance as the Prague coup did to expedite the formation of NATO. So long as the Bagdad Pact and SEATO appear to be ready to fall apart of their own accord, or to be held together only by the action of military dictator-ships, the Soviet Union can well afford to postpone the actual acquisition of 250,000 square miles of barren territory and 12 million people whose standard of living is below that even of their cousins in Soviet Central Asia. The Party

Line, well-known by now for its flexibility, can easily accommodate a progressive monarch among the U.S.S.R.'s friendly neighbors, while the Voice of America is busy explaining, or avoiding mention of, the existence of military rule in Pakistan.

Evaluation

He who ventures to predict events in the Middle East may be foolish, but he who assumes that conditions will remain static is not only foolish but blind as well. On the basis of the information presented in this essay, and on the basis of even less quantified impressions received in Afghanistan, the author feels obliged to conclude with his personal assessment of the prospects for regional development in Afghanistan. And since the regions which have been chosen are so preponderant within the Afghan national economy, the author may be permitted to draw some general conclusions with respect to national economic prospects.

Assuming then that the foregoing historical, political and social analyses are generally correct, and that one can reasonably expect a distinct Afghan society and economy to continue to develop along the present lines at least until the start of World War III, the following conclusions can probably be supported on the basis of the material presented and a few additional, unattributable insights:

1) The Kabul Valley. The hinterland of Afghanistan's capital provides a satisfactory agricultural base for the maintenance and gradual expansion of that city as well as for the export of deciduous fruits and nuts to Pakistan and India. The progress made in expanding or intensifying this base and the export industry depends upon the wisdom with which the RGA makes use of its resource base and of existing foreign credits and technical assistance services.

The major need of the fruit export industry is for quality control and improved packaging and transport. Since the industry is completely in private hands, one must either wait for competition to force upgrading of produce or advocate the extension of RGA "guidance" to this area, presumably through the Ministry of Agriculture. In view of the importance of fruit exports in Afghanistan's foreign exchange earnings, the same sort of government attention as has been extended to karakul exports is probably advisable.

The importance of Kabul City as a collecting, distributing and financial-administrative center, as well as its deliberately-chosen locational advantages as the seat of the Afghan Government, assure its continued and expanding importance, and probably dominance, within the nation. While landform, and to some extent climate, serve to limit agricultural expansion in the Upper Kabul Basin, the outstanding advantage inherent in waterpower potential ensures the continued development of processing industry to supply both local and national markets. We have seen how improvements at the Iqbal Tannery and Shoe Factory could greatly reduce Afghan imports of leather and leather goods. A completely new woolen mill may be needed to replace or augment the production at the obsolete RGA-owned installation, but more immediate and less costly steps could be taken to improve the quality and grading of the raw wool which is now collected at Kabul for processing and export. The most hopeful sign in this region is the completion, by private enterprise, of the Gulbahar Cotton Textile Mill whose production, combined with that of the enlarged Pul-i-Khumri plant, will go far towards reducing Afghan imports of cotton piece goods. The new Czech-built cement plant at Jabal Seraj represents the first step in the provision of another basic material in which Afghanistan is fully capable of self-sufficiency.

The specialized agricultural patterns of the Jalalabad oasis will continue to ensure its unique place within the national economy of Afghanistan.

Here, too, quality control, including disease prevention, for citrus fruits and sugar cane, are among the urgent requirements and should receive immediate attention from RGA and foreign, including United Nations, technical agencies. In the long run, it may well be found impracticable to produce sugar from cane here, particularly if the proposed sugar beet cultivation in the Helmand is successful. But the Jalalabad region will remain highly important in rice cultivation, and there is a distinct possibility for the extension of irrigated agriculture, probably with the aid of Soviet technical assistance.

2) The Kunduz Valley. The area most developed by private capital has now become the principal focus of Soviet technical assistance in Afghanistan. Soviet improvement of the roads leading from the Amu Darya to Kunduz and Pul-i-Khumri is well under way, and Soviet engineers have surveyed the short-cut route over the Hindu Kush via the Salang Pass to Jabal Seraj and Kabul. It is also possible that some of the uncommitted portion of the $100 million Soviet loan may be devoted to an integrated program for the Kunduz Valley, but barring such a program the lack of a reliable water supply will continue to be the major handicap to expanded agricultural production in this region of comparatively fertile and well-drained soils. In some areas, a shortage of labor, not found in the Kabul or Helmand Regions, will also retard development. However, there exist a number of small-scale development projects, designed to increase the output of the technical crops, cotton and sugar beets, which should receive early RGA attention if an integrated program, vastly to be preferred, is not yet financially feasible.

Early attention to increased coal output at Kar Kar and the tapping of the rich Darra-i-Suf deposits, which require an access road, is also highly important if the industrial promise of the Kunduz Valley, and indeed of the Kabul Region, is not to be neglected. The petroleum explorations at Sar-i-Pul, however, are not yet sufficiently advanced to allow any sound evaluation or prognostication. A cement mill at Pul-i-Khumri may be erected with Czechoslovakian assistance if experience at Jabal Seraj indicates such a step to be desirable.

The region from Mazar-i-Sharif to Maimana is important both in supplementing the cotton production of the Kunduz Valley proper and, together with the Kunduz, as the center of the production of karakul fur, still Afghanistan's principal hard currency earner. The problems of that industry in meeting foreign competition necessitate better organization and marketing techniques, but also go back to the proper marshalling of fodder and water reserves and to increased use of veterinary medicine and sanitary techniques. They are being dealt with by United Nations technical assistance programs, but require fuller support from the Ministry of Agriculture and the karakul producers' cooperatives.

c) The Helmand Valley. This region has been discussed at considerable length both because of the amount of quantitative information available and because it is the only region within Afghanistan where a large-scale expansion of irrigated agriculture is presently under way. Although this expansion, as now envisaged, is regarded by the author as overly ambitious, it is felt that the project has yet to prove itself one way or another. There is still time to save most of the expense and effort which have gone into the Helmand Valley Project provided that all parties thereto are able to take a new, clear and objective look at the situation as it actually exists and adjust their hopes and plans accordingly. The principal needs are for curtailment of any further expansion without more careful study than has previously characterized the program, for withdrawal from marginal areas or putting them under large-scale cultivation of legumes and fodder crops with the RGA bearing the financial burden inherent in deferred returns, and for a concentration of effort upon the areas of fairly good soil and drainage in order to realize, in farmer income and government tax revenues, some of the financial benefits inherent in the project. At the same time, the HVA and ICA must face up to the enormous problem of educating resettled tenant farmers and ex-nomads to the type of agriculture which can make the Helmand lands pay. At present, the ICA agricultural program in the Helmand has practically collapsed, and no amount of United States Government support for the Kandahar International Airport or Industrial Center or for Arghandab power can offset the damage done to American prestige by the failures on Nad-i-Ali. This is a job for dedicated men, to be sure, but the time has come for the governments of both Afghanistan and the United States to decide whether they are going to write off these lands as a costly lesson, or whether they will make the painful, pedestrian effort, benefitting from recent Indian experience, to develop a type of prosperous, self-conscious agriculture in southwestern Afghanistan which can compete with the collectives of the Ferghana Valley for the interest and admiration of arid zone inhabitants of South Central and Southwest Asia.

Returning to the consideration of the Afghan economy as a whole, it is fairly evident that the nation, in its efforts to maintain national independence and simultaneously to develop its economy, has divided itself into several "spheres of involvement". United States' interest centers on the Helmand Valley and has, wittingly or not, taken the position of favoring Kandahar over Kabul as the transportation and commercial center of the nation. This position ultimately is untenable, for the Durrani Afghans long ago decided, despite their personal attachment to the South, that the only way to rule Afghanistan was from Kabul. It is also a fallacious position from the American point of view, for in the long run the work done by ICA-contract teams serving the

Ministries of Education and Agriculture at Kabul may prove as influential as the projects in the Helmand in providing a base for responsible and literate democracy in a free Afghanistan.

The Soviet "sphere" of course includes all the Afghan areas bordering on the Soviet Union, within which Moscow exercises a virtual veto power with respect to even United Nations operations (as witness the proposed contracts for petroleum exploration). But the Soviet sphere also extends across the Hindu Kush to include construction of the jet air-field at Bagram and possible improvement of the Kabul airport, as well as the Salang Pass surveys, the famous Kabul road-paving project and the engineering studies for the Naghlu and Darunta Dams on the Kabul River. The Soviet effort is supported by that of the Czechs, embodied in the Jabal Seraj cement plant.

To a slight extent, West German technical assistance may be said to augment American, but it is primarly commercially-oriented, as is the work of the Siemens-Shuckert, Koch and Unimac (Austrian) firms. The work of the French archaeölogical mission is distinctly non-political in character. So are the efforts of the United Nations Technical Assistance Mission and Specialized Agencies, although their ultimate importance in such fields as malaria control, veterinary medicine, producers' cooperatives organization, karakul and wool grading and marketing, cotton cultivation, irrigation, statistical surveying, economic planning and airline development, to mention only those referred to in this study, cannot be overestimated. It is a genuine pity that in the few areas where American and United Nations technical assistance programs have overlapped, such as in the community development projects in the Logar Valley, cooperation has been something less than conspicuously successful. In the North, where the greater part of the UN effort is directed, it is largely ignored by the Russians except for occasional vetoes on certain projects in certain areas.

Faced with these various influences, the official Afghan attitude is definitely one of non-involvement, and certainly should be so as far as political matters are concerned. But the wise reluctance of most Afghan officials to become too closely identified with any foreign group or project, combined with the insufficient number of well-trained Afghan administrators, technicians and engineers, and the short tenure of most foreign aid personnel require many of the development projects to be held to what appears a snail's pace. The sagacity of the more responsible members of the RGA cannot be doubted, however, and one of the author's most forceful impressions was that Afghan officials cannot be pressured or cajoled into doing anything which they remotely suspect may be inimical to the future good of their country. Woe betide the "expert" of whatever nationality who tries to bulldoze his way through Afghan officialdom: he will eat his heart out in grief and frustration before his short term of service expires.

It has been indicated that the likelihood of rapid internal change, whether through revolution or subversion, is small. In all probability the development of the Afghan economy, under RGA "guidance" will continue gradually along the lines established in the paper barring some violent upheaval of external origin. There remain, however, two major points which the author would emphasize in concluding this study. The principal internal factor which could change the Afghan's attitude of acceptance and even enthusiasm for his Government's economic policy is run-away inflation resulting from an overly-ambitious program of capital expenditure unaccompanied by early increases in available consumer goods. We have traced out the mechanism of this process at the start of this chapter, and demonstrated the soundness of the RGA decision (somewhat unwelcome among American officials) to accept no more foreign credit. It should now be added, and this is the second point, that if Afghanistan, even without accepting additional foreign loans, utilizes the $100 million credit line extended by the U.S.S.R. in 1955 at a greatly accelerated rate, even for so worthwhile a project as the integrated development of the Kunduz Valley, it runs the dual risk of promoting inflation at home and of mortgaging itself to the Soviet bloc. While the U.S.S.R. will advance capital goods under the loan, Afghanistan must pay labor costs in local currency, adding to the domestic inflationary pressure. At the same time, Afghan repayments in materials such as cotton which are thus withdrawn from foreign-exchange-earning exports will serve to reduce the already critically low reserves held by the State Bank. If repayment is made in Afghanis, as the terms of the loan apparently allow, the Russians will be in a position to lower still further the value of the Afghani on the world market and thereby to accelerate the domestic inflation. Alternately, the ability to obtain goods from the Russians for "soft" Afghanis may stimulate the RGA presses to print rapidly-devaluating amounts of currency and leave Afghanistan with virtually no source of commercial credit other than the U.S.S.R. Thus Afghanistan, whether she likes it or not, may eventually find herself economically tied to the Soviet Union in much the same manner as is Finland, and thereby indirectly deprived of that independence of political action which the Afghans have always cherished so highly.

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________. Interview with Albert T. Petersen, Irrigation Engineer, UNFAO.

September 13, 1957. Visit to Paghman Valley.

September 15, 1957. Interviews with Dr. Sultan Popol, Minister of Education, and Dr. Mohammed Akram, Professor of Geology, Kabul University.

September 20-21, 1957, at Baghlan. Interviews with R.P. Davidson, Agronomist, UNFAO.

September 21, 1957, at Baghlan. Interview with Mr. Nau, Chief Engineer of the Afghan Sugar Company, and visit to Sugar Beet Processing Plant.

September 22, 1957, at Baghlan. Interview with District Agricultural Officer.

September 23, 1957, at Taliqan. Interview with Messrs. Galakhoff and Hashim, Geologists from UNTAM and Ministry of Mines and Industries, respectively.

September 25, 1957, at Faizabad. Interview with the Governor of Badakhshan Province.

September 27-28, 1957, at Kunduz. Interviews with Messrs. Fox and Meyer, Engineers, Consolidated Cotton Company, and visits to plant.

September 28, 1957, at Kunduz. Interview with Abdul Naim, District Agricultural Officer.

September 30, 1957, at Mazar-i-Sharif. Interviews with the Governor of Mazar-i-Sharif Province and the Provincial Director of Agriculture.

October 2-3, at Maimana. Interviews with His Excellency Gholam Haider Adalat, Governor of Maimana Province, and visits to agricultural experiment station, local tannery and karakul storehouse.

October 7, 1957, at Herat. Interviews with the Governor of Herat Province and the Provincial Director of Agriculture.

October 10, 1957, at Kandahar. Interview with T. Y. Johnston, Director of Operations, Morrison-Knudsen Afghanistan, Inc.

__________. Interview with Dr. Sayyed Wahdat Shah, Vice President of the Helmand Valley Authority in Charge of Technical Matters.

__________. Interview with Mr. Russell, Photomapping Expert, ICA.

October 10, 12, 1957, at Kandahar. Interviews with George Byrne, Acting Head, Engineering Department, Morrison-Knudsen Afghanistan, Inc.

October 12, 1957, at Kandahar. Visits to Kandahar Woolen Mill and Pushtoon Industries.

October 14, 1957, at Lashkar Gah. Interview with Dr. Abdul Kayeum, Vice President of the Helmand Valley Authority.

October 14, 1957, at Marja. Interview with Dr. Abdul Wakil, Vice President of the Helmand Valley Authority in Charge of Agriculture, and visit to area.

October 15, 1957, at Lashkar Gah. Interview with Nathaniel R. Patterson, Area Director for the International Cooperation Administration in the Helmand Valley.

__________. Interview with Richard L. Hughes, Agronomist, Wyoming University ICA-contract Team, in Charge of Helmand Valley Agricultural Experimental Station at Marja, and visits to Marja, Nad-i-Ali, Shamalan and Darweshan areas accompanied by Mr. Hughes.

October 16, 1957, at Lashkar Gah. Interview with Carl O. Kohler, Jr., Chief Advisor to the Helmand Valley Authority.

October 17, 1957, at Lashkar Gah. Interview with Mr. Mabub, Helmand Valley Authority Officer in Charge of Extension Training.

__________. Interview with P. Preston Fitzhugh, ICA Livestock Advisor to HVA.

October 19, 1957, at Kandahar. Interview with Walter G. Firestone, MKA Soils Engineer.

October 20, 1957. Visit to Arghandab Storage Dam, Arghandab Diversion Dam and Central Arghandab Area.

October 24, 1957, in Kabul. Interview with William Anderson, Associate Director of the Vocational-Agricultural School, staffed in part by personnel of the Wyoming University ICA-contract Team.

October 24, 26, 27, 29, at Kabul. Interviews with Dr. Arnold J. Krochmal, Director of Research, Wyoming University ICA-contract Team.

November 2, 1957, at Kabul. Interview with Jon Mohammed of Afghan (Baghlan) Sugar Company, Kabul Office.

November 3, 1957, at Kabul. Visit to Shaker Ceramic Factory and interview with Abdul Hadishakur, Director and Owner.

November 4, 1957, at Kabul. Interviews with Ian W. Kelton, FAO Representative and Agricultural Advisor, Albert T. Petersen, FAO Irrigation Engineer, and Hans H. Buchmann, FAO Farm Implements Specialist.

November 5, 1957, at Kabul. Interview with Dr. Hari G. Gupta, Community Development Advisor, UNTAM.

_________. Interview with Robert M. Snyder, Chief of Mission, ICA.

November 6, 1957, at Kabul. Interview with Albert T. Petersen, FAO Irrigation Engineer.

November 9-10, 1957. Visit to Laghman Valley, Jalalabad Oasis.

November 11, 1957, at Kabul. Interview with Sardar Anwarj, Vice President of the Textile Company.

November 13, 1957, at Kabul. Interviews with Saiyid Ahmad Alishah Mazumi, President of Industrial Section, Royal Afghan Ministry of Mines and Industries, Ghulam Azizi, Assistant to Mr. Mazumi, Mr. Massa, Petroleum Engineer of the Ministry, and Abdullah Rahimi, President of the Coal Union.

November 16, 1957. Visit to Logar Valley Community Development Centers, accompanied by Ch'un Wu, Community Development Expert, UNTAM, and A.F. Khalifa, Agricultural Extension Specialist, FAO.

November 21, 23, 1957, at Kabul. Interviews with Faizal Rahim, Agricultural Statistician, Royal Afghan Ministry of Agriculture.

November 26-27, 1957, at Jalalabad. Interviews with Messrs. L.B. Paul, D.P. Bantra and other technicians at Government Monopolies Sugar Cane Processing Plant, and visits to plant.

November 29, 1957, at Kabul. Interview with Paul Hamer, ICA Minerals Advisor to Royal Afghan Ministry of Mines and Industries.

December 4, 1957, at Kabul. Interview with M. L. Gattani, FAO Plant Pathologist.

December 7, 10, 1957, at Kabul. Interviews with Faizal Rahim, Agricultural Statistician, Royal Afghan Ministry of Agriculture.

December 12, 1957, at Kabul. Interview with M.M. Hassanein, UNTAM Economic Advisor to Royal Afghan Ministry of Planning.

December 12, 18, 1957, at Kabul. Interviews with Edwin Bohlen, Second Secretary, United States Embassy.

December 31, 1957, at Kabul. Interview with Morgan Holmes, Civil Aviation Administration Airport Engineer attached to ICA Air Transportation Division.

December, 1957, at Kabul. Various interviews with Albert T. Petersen, FAO Irrigation Engineer, Hans H. Buchmann, FAO Farm Implements Specialist, and R.P. Davidson, FAO Agronomist.

January 2, 1958, at Kabul. Interview with Mr. Beheroz of the Consolidated Cotton Company.

January 4, 1958, at Kandahar. Interview with Dale Shockley, Head, Engineering Department, Morrison-Knudsen Afghanistan, Inc.

January 5, 1958. Visit to Tarnak area accompanied by George Anderson, Engineering Department, Morrison-Knudsen Afghanistan, Inc.

January 11, 1958, Lashkar Gah. Interview with Carl O. Kohler, Jr., Chief Advisor to the Helmand Valley Authority.

January 12, 1958, Lashkar Gah. Interview with Dr. Ralph Bailey, United States Public Health Service doctor attached to ICA.

January 13, 1958. Visit to Shamalan area, accompanied by Abdul Ghaffar Shuja, Watermaster and Hydrologist, HVA.

January 20, 1958. Visits to Marja, Nad-i-Ali, Girishk and Shamalan areas, accompanied by Abdul Ghuffar Shuja. Interviews at Boghra Power Station with Mr. O'Connor, MKA Turbine Engineer and Mr. Short, Westinghouse Electrical Engineer.

January 21, 1958. Visit to Darweshan area, accompanied by Dr. Ralph Bailey.

January 22, 1958, at Lashkar Gah. Interview with Dr. Abdul Kayeum, Vice President of Helmand Valley Authority.

__________. Interview with I.A. Heckmiller, Hydrologist provided by ICA to HVA.

__________. Visit to Marja Experimental Farm, accompanied by Donald Brown of Wyoming University ICA-contract Team.

January 23, 1958, at Lashkar Gah. Interview with Mr. Mabub, HVA Officer in Charge of Extension Training.

__________. Interview with Nathaniel R. Patterson, Area Director for ICA in the Helmand Valley.

January 24-25, 1958. Visit to Kajakai Dam, accompanied by Abdul Ghaffar Shuja.

January 26, 1958, at Lashkar Gah and Nad-i-Ali. Interview with Dr. Abdul Wakil, Vice President of HVA in Charge of Agriculture, and visit to Nad-i-Ali area, accompanied by Dr. Wakil.

January 28, 1958, at Kandahar. Interview with Dr. Sayyed Wahdat Shah, Vice President of HVA in Charge of Technical Matters.

__________. Interview with Dale Shockley, Head, Engineering Department, Morrison-Knudsen Afghanistan, Inc.

January 30, 1958, at Kabul. Interview with Robert M. Snyder, Chief of Mission, ICA.

__________. Interviews with Robert H. Burns, Chief of Wyoming University ICA-contract Team, Dr. Arnold J. Krochmal, Director of Research for the Team, and Warren L. Smith, Agricultural Statistician for the Team.

February 3, 1958, at Kabul. Interviews with Dr. Rau, West German Technical Assistance Economic Advisor to the Royal Afghan Ministry of Commerce, and Dr. Willbrandt, Agricultural Economist, UNTAM.

February 5, 1958, at Kabul. Interview with Robert H. Burns, Chief of Wyoming University ICA-contract Team.

February 6, 1958, at Kabul. Interview with Kenneth Milnes, International Harvester Resident Representative in Afghanistan.

February 8, 1958, at Jabal Seraj. Interview with Mr. Pucek, Chief Engineer at RGA Cement Plant, and visit to the plant.

February 8, 1958, at Gulbahar. Interviews with Akbar Saifi, Vice President of the Textile Company, and with various representatives of the Textile Company, the Gherzi Company of Zurich, and the Hochtief Company of West Germany. Visit to the Cotton Textile Plant.

February 12, 1958, at Kabul. Interview with Mr. Beheroz of the Consolidated Cotton Company.

February 13, 1958, at Kabul. Interview with Mr. Massa, Petroleum Engineer, Royal Afghan Ministry of Mines and Industries.

February 14, 1958, at Kabul. Interview with M. M. Hassanein, UNTAM Economic Advisor to Royal Afghan Ministry of Planning.

February 16, 1958, at Kabul. Visit to Hajari-Najari Wood- and Stone-Working Factory.

February 19, 1958, at Kabul. Visits to RGA Woolen Mill and Iqbal Shoe Factory and Tannery.

February 20, 1958, at Kabul. Conference with Dr. Rau, West German Technical Assistance Economic Advisor, Heinz Heckhoff, West German Technical Assistance Tanning Expert, and Mr. Meyer, West German Technical Assistance Expert in Cotton Marketing.

February 23, 1958, at Kabul. Visit to Shaker Ceramics Factory, and interview with Abdul Hadishakur, Director and Owner.

February 25, 1958, at Kabul. Interview with D. E. Nemetz, Chief of Public Administration Advisory Division, ICA.

February 27, 1958, at Kabul. Interview with Paul Hamer, ICA Minerals Advisor to the Royal Afghan Ministry of Mines and Industries.