

MEMORANDUM
RM-5444-ISA/ARPA
AUGUST 1968

TEMPORARY VILLAGES FOR REFUGEES:
COSTS, PROBLEMS AND OPPORTUNITIES

J. W. Higgins

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PREFACE

This analysis of the requirements and costs involved in establishing and operating refugee villages is intended to answer this question: What would it cost to provide temporary homes for rural Vietnamese people until their home areas can be made secure? The type of refugee village envisioned is a temporary one without sufficient land for rice farming; refugees would be provided with schools and medical care, and with enough food and money to maintain normal living standards when self-support opportunities are not available.

Using a 1000-family refugee village as a convenient unit, this Memorandum identifies costs and planning and personnel requirements for establishing and maintaining such a settlement. The immediate applications are to Vietnam and rural insurgency, as an aid to deciding whether rural evacuation is a desirable strategy, and as a planning guide if rural areas are to be evacuated.

The methodology is simple: needs have been specified and costs of meeting these needs have been estimated, based on Vietnamese data, on refugee operations elsewhere, and sometimes on costs and experience in the United States and other countries. Costs for other areas and situations have been modified to fit a Vietnamese refugee village.

Some caution is necessary in using the costs shown. Price levels in Vietnam have been affected greatly by inflation and by transportation difficulties, and the impact is different in various areas of the country. The approach used here has been to base both costs and living standards on the 1957-1958 period, when the country was relatively peaceful, reasonably normal situations existed, and data could be collected. Costs in Vietnamese currency have been converted to dollars at the exchange rate current at the time that the source data were collected. This reduces the overall inflationary impact somewhat, but does not account for regional differences. For more accurate cost predictions, the user must be familiar with price levels at the time and in the section of the country of interest to him, just as he must know the local situation to estimate refugee prospects for self-support and predict the feasibility of successful establishment and administration of the village.

Users of this Memorandum who are concerned with the desirability of establishing refugee villages in a specific area and situation will need to tailor the projections of costs, resource requirements, and problems to fit the particular situation. The Memorandum should be useful here as an aid; it does not offer direct answers that can be utilized without further inputs by the reader. For this reason, costs have been estimated for several different types of complete or partial self-support, and many costs are shown as upper and lower limits rather than as single values.

It should also be noted that a refugee movement that appears economically feasible may be unwise for other reasons. The availability of qualified, reliable administrative personnel, the likelihood of cultural or economic conflicts with local villagers, and the disruptive effect of Viet Cong supporters among the refugees are just three of the non-cost factors that should be considered. Many of these are identified and discussed, but it seems unlikely that all have been anticipated.

Some aspects of refugee village design and operation considered here, such as expansion of the educational system, are also pertinent to nonrefugee communities. This Memorandum should therefore interest American planners concerned with strategy for counterinsurgency, with Vietnamese refugees, with Vietnamese educational and economic development, and with similar problems in other areas of the world.

This study is part of the RAND research program on force requirements for counterinsurgency. Another study, L. P. Holliday and R. M. Gurfield, Viet Cong Logistics (U), The RAND Corporation, RM-5423-ISA/ARPA, June 1968 (Confidential), analyzes the value of the rural population as suppliers of food and labor for insurgent forces and the resulting costs to the insurgents if the local population is removed. Other current research at RAND and elsewhere deals with related aspects of the refugee question.

SUMMARY

This Memorandum describes one type of refugee resettlement: the establishment of temporary villages to house rural Vietnamese people for several months or years while their home areas are being secured. Most of the following analysis treats village planning, construction and operation, with some discussion also of moving the refugees to the temporary village and of returning them home when it is safe to do so.

The military reasons for moving Vietnamese villagers into refugee camps are to separate the population from the Viet Cong, thereby denying them a source of labor, food and military recruits; to reduce Viet Cong influence; and to clear the area to permit unrestricted combat operations. On the positive side, refugee villages of the sort described here permit expansion of the educational system and, in some cases, also development of national consciousness and provision of a labor force where workmen are in short supply.

Whether refugee movements of this sort are desirable in the balance, from the standpoint of the refugees, the Vietnamese nation or the United States, involves many considerations outside the scope of this Memorandum. The intent here is to identify as many as possible of the costs and other requirements involved, so that the reader can better assess the desirability and the practicability of temporary refugee villages in a particular situation or as a nationwide or regional strategy.

A village of 1000 families, or approximately 5500 people, has been used for cost projections and discussion. This figure was chosen in part for convenience and in part because it corresponds roughly to typical rural village size. Costs have been projected on the basis that living standards should be generally in line with those of Mekong-Delta farm villages.

Refugee support may come from relief payments, or may be wholly or partially obtained from animal husbandry and garden produce, village industry, or refugee employment in nearby areas. Rice growing, the typical village means of self-support, is probably not feasible, since

sufficient agricultural land is not generally available in relatively secure sections of the country.

Costs. The cost projections given in Secs. III through IX, and collected and summarized in Sec. X, show that initial costs of establishing a 1000-family refugee village should run about \$150,000 to \$170,000, mostly for construction materials. Annual costs for a village having no outside income are projected at about \$320,000 for the first year and \$260,000 per year thereafter, with direct relief the predominant component. These costs can be reduced significantly by locating the village where jobs are available, by developing village production to meet national shortages and, to a lesser extent, by using what villagers bring when they become refugees and by making use of any available unused land.

Depending on the extent of devastation in the home village, resettlement costs when refugees return home can also be substantial, as high as \$250,000 if their return is timed for the start of the rice-growing cycle. If they arrive too late to plant for the current growing season and must remain on relief for a year or more, costs can be as high as \$500,000.

Cost projections used here are based to a large extent on data for 1957-1958, the last "normal" period for numerous Vietnamese rural areas, and many prices have risen significantly since then. The impact of price inflation is not the same for different areas of the country and for different commodities. This and other regional differences--in land availability, locally available materials, jobs, markets, transportation--should be considered when using cost projections.

Non-Cost Requirements. Effective planning and good administrative personnel are needed in many aspects of refugee village operation. Planning for economic viability may involve simply selection of a village site where labor is in short supply; it may involve development of village light industry or livestock production, including marketing assistance. Relief funds and supplies must be controlled and honestly administered if they are to be used effectively. Small investments in seeds, tools, and training can lead to large savings in relief

costs. Among the factors that can reduce the effectiveness of a refugee program as well as raise its costs are administrative inefficiency, graft, diversion of supplies, economic conflicts with residents of the area near the refugee village, and continued Viet Cong strength within the refugee population.

Scope of the Memorandum. The Memorandum incorporates discussions and analysis of many of the aspects of planning and operating a refugee village, with emphasis on what resources and actions are important and on the costs involved. Where possible, cost factors and computations are presented in some detail. This permits the reader to determine the costs appropriate to a particular situation by changing or disregarding cost components that do not apply. Specific topics range from village site planning to self-support, schools, and the relationships between refugee villages and nearby communities.

Some specific possibilities, such as pig-raising, educational technology, vocational education, and literacy training have been explored in greater detail, with an extensive projection of educational television and film costs in the Appendixes. The discussion length here indicates complexity of the subject, not relative importance.

Many topics in this Memorandum are reasonable subjects for further research, which should include more current and localized costs and feasibility data. Another subject meriting further study is the long-term effect of refugee movements on Vietnamese society and economic growth, which is not treated here except as related to educational opportunity.

CONTENTS

PREFACE	iii
SUMMARY	v
Section	
I. INTRODUCTION	1
II. TYPES OF REFUGEE SETTLEMENTS	5
III. PLANNING AND BUILDING THE VILLAGE	7
Site Selection and Preliminary Planning	7
Village Location	7
Village Size	8
Site Layout and Land Allocation	9
Preparing for and Moving the Refugees	14
Advance Preparation of the Village Site	14
Final Preparations for Refugee Arrival	18
Collecting and Moving the Refugees	19
Village Construction	24
Permanent Homes	25
Schools and Public Buildings	29
Streets, Roads and Pathways	32
Electricity	33
Water Supply	34
Sanitation	36
Drainage	36
IV. FOOD, SEEDS, AND MEDICINE	37
Food Relief	37
The Food Ration	37
Entitlement	39
Distribution and Control	40
Other Living Expenses	42
Long Term Requirements	42
Immediate Needs	43
Medical Aid	45
Entitlement	45
National Medical Situation	45
Rural Medicine	46
Specific Refugee Requirements	47
Veterinary Services	48
Seeds, Garden Tools, Fertilizer	48
Livestock	49
V. SELF-SUPPORT	52
Types of Self-Support	52
The Self-Supporting Village	52
Self-Supporting Individuals	52
Income Requirements	53

-Agricultural Production	53
Production for Outside Sale	53
Production for Home Consumption	58
Nonagricultural Production	60
Handcrafts and Light Industry	60
Fishing	61
Production for Home and Village Use	62
Employment Outside the Village	63
Types of Employment	63
Military Base Employment	64
Jobs in the Resettlement Program	66
Public Works Projects	67
Opportunities for Small Business	69
Village Location and Outside Employment	70
Employment Within the Village	72
 VI. EDUCATION	 74
General Questions	74
Child Education	74
Literacy and Vocational Training	74
Related Issues	75
Primary and Secondary Education	75
The Existing System	75
Expanding and Improving the System	80
Requirements for Teachers	83
Increasing the Teacher Supply	84
Increasing Productivity of Trained Teachers	86
Technological Aids	87
Vocational Training	97
Nature and Types	97
How Much Vocational Education in Refugee	
Village Schools?.....	97
Skilled Trades	99
Administrative, Commercial and Clerical Skills	104
Professional Training	105
Homemaking	107
Agricultural Courses	109
Technological Aids in Vocational Education	110
Literacy	112
Magnitude of the Task	112
The Need for Adult Literacy	112
Methods of Literacy Training	114
Maintaining Reading and Writing Skills	120
Other Classes and Educational Miscellany	121
Classes for Adults	121
Pre-School and Youth Programs	122
 VII. RELATIONSHIP TO LOCAL COMMUNITIES	 124
Resource Conflicts	124
Land	124
Commodities	125
Water	126

Economic Conflicts	126
Competition for Jobs	126
Competition for Markets	126
Differing Living Standards	127
Sharing Facilities	128
Ethnic and Religious Problems	129
VIII. COMMUNITY ORGANIZATION AND VILLAGE GOVERNMENT	131
Village Leadership	131
Normal Organization	131
Refugee Village Leadership Selection	132
Costs of Village Leadership and Administration	132
Outside Leadership	133
Municipal Services	133
Police	133
Fire Protection	135
Maintenance and Utilities	135
Administration, Population Registration, and Population Control	136
Information and Cultural Centers	137
External Security	137
Some Administrative Problems	138
IX. PREPARING FOR RETURN	139
Timing	139
Land Ownership, Leasehold and Occupancy	139
Resettlement Assistance	141
Returning Villagers	141
Migrants to Other Areas	143
X. COLLECTED COSTS	144
The Dominant Cost Factors	144
Costs to Set Up the Village	146
Education	148
Relief	149
Other Village Operating Costs	149
Costs of Return	150
A Note on Inflation and Exchange Rates	151
Appendix	
A. UNRWA AND THE PALESTINE ARAB REFUGEES	153
Background and Scope of UNRWA Operations	153
Direct Relief	155
Education	156
Health	158
Social Welfare	158
Other Programs	159
Costs and Manpower Requirements by Function	159
Food Rations	159
Camp Operation	160
Population Control and Registration	160
Education	160
Medical Services	161
Social Welfare	162

Jordan Development Bank	162
Administration and Common Costs	162
Missing Items	162
Total Costs and Manpower Requirements	163
Other Relocations	163
 B. RURAL ECONOMICS AND REFUGEE LIVING COSTS	166
Khanh Hau Living Costs	166
Regular Food Purchases	166
Other Regular Purchases	168
Other Expenditures	169
Living Costs in the Refugee Village	173
Self-Supporting Villages	173
Livestock-Raising Villages	175
Villages with No Outside Income	175
 C. INSTRUCTIONAL TELEVISION COSTS	179
Samoan Costs	179
Initial Investment	179
Operating Costs	179
Summary	181
Electricity	182
Availability	182
Village Power Plants	182
Fuel Costs	183
Maintenance and Depreciation Costs	183
Costs per Classroom	184
Urban Areas	185
Television Costs for the Saigon Area	185
Cost-Cutting Options	186
Production Economies and Videotape	186
Transmitting Costs	187
Receiving Costs	188
Programming for Eight Levels Rather Than Twelve Grades	189
A Nationwide Network	190
Network Techniques	190
Cost Sharing with Commercial Broadcasters	195
 D. INSTRUCTIONAL MOTION PICTURE COSTS	197
Cost Components	197
Steps in Production and Distribution	197
Production Costs	197
Costs of Copies for School Use	198
Distribution, Storage and Control	200
Classroom Costs	201
Summary of Cost Components	202
System Costs	202
Dominance of Film Print Costs	202
Costs for Saigon and Nationwide Systems	204
Special Applications	205
 REFERENCES	207

I. INTRODUCTION

Wars, revolutions, and civil disorder create large movements of refugees, ordinary people who leave their homes to avoid the combat area or to stay out of the control of an invading army. Refugees are often the people who lose the most in the conflict. Sometimes they return home after the fighting, and rebuild; sometimes they settle in another area; sometimes they remain in camps or temporary villages, waiting to return home or hoping for a chance to move onward.

Forced transfer of populations, like refugee movement, is probably as old as organized large-scale warfare. Such transfers have led to permanent resettlement, and temporary or permanent exclusion of people from their home area. People forced to move where their labor is needed by the controlling government encounter some of the same problems as refugees, but their case is somewhat different and is not treated here.

Refugees and people forced to move usually find the receiving governments and areas inadequately prepared for them. The displaced impede military combat operations and initially drain the resources of the area into which they move. The most common treatment of refugees has been to encourage them to go back home. Forced transfers are usually more organized and come with more advance notice than do refugee mass movements, and it is also easier to predict whether the transferred people will be able to return home. But in both cases the only source of aid for these people--until the recent development of international organizations taking responsibility for refugee relief--has been a government which is still fighting a war or has just lost one, and the refugees, whether voluntary or forced, have had to make do with less than a proportionate share of the host country's scarce resources.

Refugee resettlement was much less of a problem in the pre-industrial world that had a smaller population, arable land available for resettlement, and a generally lower level of education, medicine, and similar services. If today's rural refugee family is left to subsist as best it can, the children are likely to grow up without the basic education needed in an increasingly urbanized world, and also without

the agricultural skills and work habits that children acquire as they grow up on a family farm. Farmland often is not available for either temporary or permanent resettlement. Refugees are more dependent on outside help than their counterparts a hundred years ago; the alternatives to giving aid may be mass starvation or the creation of a generation of unemployed, essentially unemployable people who will be a source of unrest and discontent for years to come.

Although a refugee movement brings problems, it also presents opportunities, at the price of some resources and some planning effort. Educational levels in many agrarian societies are too low to produce enough administrators and managers, professional people, skilled craftsmen, and others needed for a developing society. Farm families often know little of the world beyond their own villages. If refugees from such rural areas cannot be resettled on farmland and instead are concentrated in villages or camps, adults as well as children will have more free time. This opens up educational opportunities for both children and adults. Educational programs can be designed to meet the needs of a future society with growing industrial and commercial activity, as well as to aid agricultural development. Literacy training and lessons in national culture, history, and geography can enhance the background for self-government. Training in health and sanitation can improve refugee living in the long run. A planned refugee village management program may be able to realize these benefits; a policy of letting refugees shift for themselves is more likely to create a permanent group of unskilled poor.

This Memorandum examines the requirements and costs associated with a refugee village, including those functions that contribute toward long-term improvements in national society and in the lives of refugees, as well as those functions having the nature of immediate emergency relief. This study focuses on Vietnam and the rural refugees there, although it may also apply to refugees in other underdeveloped nations. Experience with refugees elsewhere in the past 25 years is the source of much of the data.

Vietnam has seen several refugee movements over the past fifteen years. Individuals and families fled from the Viet Minh and from

combat areas before 1954. Entire villages moved south from the Hanoi-Haiphong area in 1954 when the country was divided. More recently, individuals and families in a growing stream have sought freedom from combat, from Viet Cong threats, control, restrictions and taxes, and from government and allied air and artillery fire by moving into safer areas. Sometimes, as in 1954, national resources have been mobilized to aid resettlement; sometimes refugees have been given a small allowance or relief food while relocating; sometimes they have been treated as a burden and as people who should have stayed in their home villages.

The rural Vietnamese villager in a contested area is not only personally insecure, he is also a hindrance to military operations designed to clear out Viet Cong forces. Villagers provide cover for the Viet Cong and add to the difficulties and costs of air and artillery operations against them. The villagers, as a resource available to the Viet Cong, are forced to provide rice and labor whether or not they sympathize with the Viet Cong. Removing villagers from contested areas promises to increase the effectiveness of air and artillery attacks against the Viet Cong, reduce the enemy supply of food and labor, keep boys and young men out of the reach of the Viet Cong, and end much of the human agony that results when villages are caught in the middle of a military operation.

The question this analysis treats might be phrased like this: What would be needed in planning, supervision, money, and other resources to run a refugee program that would attract potential refugees away from contested and Viet Cong controlled villages and permit them to become assets to Vietnamese society and the national economy in the long run? The monetary costs, although large when compared to nonmilitary sections of the Vietnamese Government's budget, are small compared with costs of the counterinsurgency effort. The availability of human resources may be more important in determining whether a large-scale refugee program is practical. Trained personnel are needed to plan and organize, to govern according to changing needs, and to run an administrative system that can deliver goods, equipment, and trained people to the right place at the right time. Planning and manpower are discussed here, but not the administrative ability of either the Vietnamese Government or the United States to make such a program work smoothly.

Refugee villages are treated here as temporary communities, not as permanent resettlement villages, with the expectation that refugees will be able to return home once the present warfare ends. One objective assumed for a refugee village program is that refugees will eventually be able to choose whether they want to return home, resettle in another rural area of Vietnam, or move into urban areas, having acquired knowledge and skills that will permit them to be productive members of a developing and self-governing society.

II. TYPES OF REFUGEE SETTLEMENTS

Planned refugee villages can be categorized in several ways. Two of the most important are permanence and economic viability. A permanent camp that is not economically viable is certainly undesirable, although there are cases of refugees living on relief for indefinitely long periods of time. The Palestine Arab refugees in the Gaza area have been in this status for almost twenty years, with political and economic factors both working against resettlement elsewhere. Then there are refugee camps from which selective emigration takes place, like those in postwar Europe, which are likely to have a hard core of refugees who do not meet the immigration requirements of those countries where other refugees have been resettled. But these situations occurred from a lack of careful planning. A planned refugee village might sensibly fit into any of the three following categories:

1. Permanent resettlement on a sound economic footing. This requires either land for farming or opportunities and, if necessary, training for nonfarm employment.
2. Temporary resettlement where jobs are available. Refugee settlements may be self-supporting on a temporary basis if relatively unskilled labor is needed for construction, military requirements, and the like, or if farmland can be rented near suitable sites for refugee villages.
3. Temporary resettlement on relief. In the absence of economic opportunities, refugees can be settled in temporary camps, with the local government or other agencies supplying food and other needs.

A given settlement may not fall neatly into one of these three categories. Settlements can be partially or intermittently self-supporting, with refugees depending on relief or savings when jobs are scarce or wages are below subsistence level. Perhaps a temporary resettlement area will become permanent as economic opportunities open, or the refugees' hopes to return home are not realized.

The following analysis is directed at temporary resettlement, both with and without opportunities for self-support. This is not meant to rule out permanent resettlement when the situation permits, nor to

preclude the possibility of some temporary refugee villages developing into permanent communities. But unused arable land is scarce in many parts of Vietnam, and Viet Cong forces are particularly strong in lands that are not cleared and farmed (e.g., the north-central mountains, the Plain of Reeds, the mangrove swamps of the extreme south). Cities are already crowded with refugees. Permanent resettlement and the opening of new lands may be suitable for many underdeveloped nations, and even in the most crowded parts of Asia there are often other islands or highland regions that could be developed (this may be a solution to the crowding problems of Java or the Pampanga plains of central Luzon). Such areas are particularly difficult to defend against insurgency, however; since we are talking about a wartime situation, the reclaiming of new lands for agriculture is outside the scope of this Memorandum.

For the Vietnamese situation, then, refugee resettlement involves the following: planning and establishing temporary villages that may be used for several years; giving initial relief assistance, which may continue over the life of the village; developing opportunities for self-support where appropriate; providing education, community administration and self-government; and planning for the refugees' return to their homes.

III. PLANNING AND BUILDING THE VILLAGE

SITE SELECTION AND PRELIMINARY PLANNING

Village Location

The minimum requirements for a refugee village are available land for homes, roads or paths, and public buildings; a water supply and drainage; and access to transportation. In the Vietnamese context, such a village must also be defensible unless it is in a secure area. If the village is to be self-supporting, there will be additional constraints on site selection, either in location (close to jobs, raw materials, markets, the ocean or inland waterways) or in land area and type of soil.

The potential relationship of a refugee village to neighboring non-refugee communities is another important factor. A small village or hamlet may be located adjacent to an established community, so that they can share services, facilities and defenses. A village of several thousand people, on the other hand, is likely to dominate any rural area, and will need to have its own schools and administration. Section VII discusses the factors that planners should consider before selecting the village site, so that they can hold local resentment to a minimum and avoid economic, ethnic and religious conflicts.

Situations do exist where refugee villages can be located as a tool to implement changes. The Ngo Dinh Diem government attempted to develop the Central Highlands by relocating coastal villagers into new communities (Land Development Centers), often by force, and thereby weaken the power of highland tribes by introducing ethnic Vietnamese settlements into tribal areas. Expected benefits were not realized. Highlanders resisted assimilation and resented the encroachment onto their lands; the centers did not become government strong points, and their forcibly relocated inhabitants were vulnerable to Viet Cong propaganda and recruiting. Some centers were abandoned when the Diem government fell. A more promising example of area development through resettlement, described in Ref. 1, involved moving several hundred refugees from Phu Yen province to the Cam Ranh Bay area, where there was a labor shortage.

Village Size

The maximum desirable size for a given refugee village will often be set by local factors: the number of jobs likely to be available, the land available, or the number of people living in the area to be evacuated. If there are many refugees and the village size is not constrained by limitations on the availability of jobs or land, there are some economies of scale that reduce costs per capita as villages grow larger; for example, schools can be used more efficiently, the defensive perimeter increases less than linearly with population, access roads for moderate traffic cost little more than roads for light traffic, and the like. Larger communities do involve costs that are proportionately smaller or completely absent in smaller villages, however. Examples are the increased crime rate and police requirement where communities are too large for everybody to know his neighbors, water pollution, and the need for a more sophisticated administrative system with better controls against graft. If these factors are recognized, it should be possible to avoid planning a community that is too large to be efficient, since several smaller communities can be built and spaced far enough apart to be administered and policed separately.

Costs in this Memorandum are based on a 1000-family village, using an "average" Vietnamese refugee family of 5.5 persons.⁽²⁾ The age distribution within the village is assumed to follow Khanh Hau* in general, but with an increase in the 11 to 14 year bracket; births in Khanh Hau were unusually low in 1945 and 1946, as this was a time of unrest and disruption which caused a dip in the age distribution at 11 and 12 years when the population data of Ref. 2 were compiled.

Table 1 summarizes the age distribution for Khanh Hau and for the refugees in Phu Yen province in 1966. Phu Yen refugees were asked about

* Khanh Hau, a village 34 miles southwest of Saigon on the road to My Tho, was the subject of an extensive study in 1958-1959 by three American researchers, James B. Hendry, Gerald C. Hickey, and Lloyd Woodruff, under Michigan State University sponsorship in cooperation with the Vietnamese National Institute of Administration. Much of the data on Vietnamese rural life and rural economics used here are based on their work, as reported in Refs. 2, 3, and 4.

absent family members, and their answers have been used to derive an age distribution more typical of a rural village not greatly disrupted by insurgency. Columns 2 and 4 reflect normal migration of young adults to urban areas. Column 5 is the age distribution assumed for the 1000-family refugee village.

Table 1
VILLAGE AGE DISTRIBUTION^a
(In percent)

(1) Age Group	(2) Khanh Hau (1957 Data)	(3) Phu Yen Refugees	(4) Phu Yen Including Absent Family Members	(5) Assumed for Refugee Village
0-5	19.9	19.1	18.1	20
6-10	16.2	17.7	16.7	16
11-14	8.7	12.4	11.7	10
15-17	7.2	} 22.0	26.2 {	7
18-34	20.6			20
35-49	15.6			15
50 and over	11.8	14.1	13.4	12
Total	100.0	100.0	100.0	100

SOURCES: Column (2), Ref. 2; columns (3) and (4), Ref. 5. Data are in 2-year groups in Ref. 2 and 5-year groups in Ref. 5. A straight-line distribution within each of these respective groupings has been assumed for this table.

^aTotal populations are 3241 for Khanh Hau and 6174 for Phu Yen refugees. An additional 354 absentees from the 15-34 age group in Phu Yen is broken down as follows: 121 in government service, 133 other absentees (presumably including Viet Cong), and 100 killed in the insurgency.

Site Layout and Land Allocation

Overall Allocation. The village plan must provide land for home-sites, roads and pathways, schools, administrative buildings, churches, pagodas or temples (or all three, depending on the religious diversity of the refugees), and a cemetery. The plan should also provide for drainage, which may require land for ditches. Recreational areas are desirable if there is enough land.

Additional land is needed for a village that will be wholly or partly self-supporting through either agricultural production, animal husbandry, or some type of manufacturing or craft work. The maximum requirement applies when each family is given enough farmland to support itself through agriculture, a situation that would allow village life to resume with minimum change to the refugees' way of life, but one that is impossible in many areas of Vietnam because land either is unsuitable for cultivation or is already being farmed. Gardens, fish ponds, pigpens, and chicken coops take much less land, as would small shops needed for manufacturing enterprises.

An additional land requirement will exist if the village must be guarded and defended. This need may be substantial, since defense is easier if an area can be cleared outside the defenses, or between outer and inner perimeter fencing.

Homesites. Guidelines used for refugee villages in Dinh Tuong province are for homesite plots of 350 square meters, the usual dimensions being 14 by 25 meters or 46 by 82 feet. This is enough to permit a small fruit and vegetable garden and space for livestock, in addition to house, cistern and sanitary arrangements. A small thatched house typical of the Delta village of Khanh Hau* will occupy less than 10 percent of this homesite. It is possible, of course, to decrease homesite sizes, saving land (or accommodating more people in a village whose land area is fixed) at the cost of garden space. The 350-square-meter plot is a goal and a guideline, not an absolute minimum. It would provide a more pleasant environment than maximum-density housing.

School and Public Buildings, Roads and Pathways. Excluding agricultural land, canals and defenses, a distribution of land within the village of 80 percent garden homesites, 10 percent streets and paths, and 10 percent schools and other public buildings seems reasonable in view of what little information is available on land use and requirements in a temporary village. The map of three hamlets of Khanh Hau on p. 27 of Ref. 3 tends to support this approximation. This is 35 hectares (350,000 square meters) for homesites and 3.5 hectares each for streets and public buildings.

* See p. 28 of Ref. 3.

American land use data⁽⁶⁾ indicate a much greater allocation of land to streets and roads, as is natural for an automobile-using society. Land used for streets averages about 28 percent of the developed area in this sample. The 80-10-10 allocation of refugee village land implies a street area of 0.2 acre per 100 persons, well under the minimum reported in Ref. 6. Allocating 10 percent of the developed land area to "public and semipublic uses," including schools, churches, and administration, but not including retail stores, appears to be typical of American practice, but the average population density of the projected refugee village is greater than that of the American cities studied, so that public-use land per person is less than in the United States.

Schools will take up the largest area of land allocated to public buildings. The buildings themselves will need only 16 percent of public-use land; school grounds could increase this to anywhere in the 20- to 40-percent range. The remaining 60 to 80 percent of publicly-used land includes sites for village administrative offices, the dispensary, market, temples and churches, cemetery, and open land. Specific requirements for buildings for these functions as well as for schools are discussed later in this section under Village Construction.

Agricultural Land. Rice production in the Delta runs about 140 to 200 kg of milled rice per 1000 square meters.* From Khanh Hau data, rice consumption is around 200 to 250 kg per year per adult⁽²⁾ or 1000 to 1200 kg per year per family. The land requirements for rice to feed a refugee village on Delta quality single-crop rice land is then 5000 to 8500 square meters per family, or 0.5 to 0.85 hectare, which is roughly 11 to 18 times the townsite area projected here. Self-support through rice production requires something like four times this much land, judging by Delta village economics. This implies a village agricultural land area of 2 to 3.5 hectares per family, which is 45 to 80 times the projected townsite area. Self-support through rice production clearly requires a land allocation far beyond that required for residential purposes, even if the village can be built on land suitable for

* In Vietnamese measures, 10 to 15 gia per cong.

rice production, and even if improved techniques or more fertilizer permit doubling or tripling rice production per hectare.

Land for Industry or Craft Work. Nonagricultural self-support activities, such as handicrafts and light industry, do not make large demands on land area except for production of raw materials. Prospects for this type of economic support have not been analyzed in detail, but the following comments appear to hold for the sort of activity in which refugee villages might engage, since the planned length of temporary resettlement should be short enough to discourage the establishment of major industries:

1. Raw materials needed will come from outside the village.
2. There will be little or no heavy machinery.
3. Much work may be done in villagers' homes, as is common throughout Asia.
4. Some space will be needed for collecting products for shipment, and perhaps for final stages of assembly; provision for the needed land and buildings should be made when the village site is selected and land is allocated.

The space requirements will probably be small enough that this will not add much to the cost of land for the village.

Village Commerce. In a predominantly agricultural community, the few small stores are attached to houses and the land requirements for village retail stores therefore are zero.⁽²⁾ If the village is on a money economy, however, it will need retail rice stores or a village market. Land for this is treated here as part of the 10 per-cent allocated for "schools and other public uses."

Other Uses and Summary. The amount of land allocated for village fishponds and for recreational areas is likely to depend on availability and cost of land, rather than be imposed as a requirement.

Defenses for the village may be quite extensive; may be limited to a perimeter fence; or may be completely unnecessary. This depends on the military situation in the area. While land for defenses is a requirement rather than a luxury, it is not possible to make general statements about this requirement since protection needed will depend on a specific village location, terrain and surrounding land use.

Open space between the perimeter fence and houses might be used for fishponds, recreational area, or pastureland for livestock.

Simple roadside ditches may suffice for drainage, but it is probably more realistic to assume that some small canals will be needed, quite possibly around the village perimeter where they can be combined with defenses. This requirement also depends on local terrain.

For planning purposes, it may be sufficient to allocate somewhere between 10 and 20 percent of the total village land for the above purposes, perhaps categorized as "defenses and open space." This is an arbitrary estimate.

The overall rule of thumb for village land distribution might read like this:

Total village area	500 sq meters per family
Reserved for defenses and open space	62 sq meters (12.5 percent of total land)
Land available for development	438 sq meters per family
Public buildings, schools	44 sq meters (10 percent of developed land)
Streets, pathways	44 sq meters (10 percent of developed land)
Homesites	350 sq meters per family

The precision of these estimates is overstated by using such numbers as 438 square meters and 12.5 percent, but 500 square meters per family is probably reasonable if the standards implied by the goal of 350 square meters per homesite are followed.

An estimate of land costs for a village located on reasonably good rice land can be obtained from Khanh Hau data; Hendry⁽²⁾ quotes median prices in the 1957-1958 period as VN\$19,000 per hectare for land used for one crop, and VN\$25,000 for double-cropped land. Prices paid landowners under the 1958 land reform were from VN\$12,000 to VN\$15,000 per hectare. These convert, at the 70:1 rate Hendry found appropriate for 1958, to sale prices of U.S. \$270 and \$360, and land reform prices of \$170 and \$210, per hectare. Based on these prices, a 1000-family nonagricultural village, requiring 500,000 square meters or 50 hectares, would need land costing from \$8500 to \$18,000.

If land were rented rather than purchased, Khanh Hau experience suggests U.S. \$21 (VN\$1500) per hectare per year, or U.S. \$1100 annually for the 50-hectare village, assuming a rental rate the same as the average rent for the same property as farmland. This is based on land productivity of 120 gia* per hectare, a paddy price of VN\$50 per gia, and rent of 25 percent of the rice crop, and is taken from Table 4.2, Ref. 2.

Some areas of the country have unoccupied land which can be used free, and this appears to be common practice for refugee villages in the central coastal region. Flat, brush-covered land near Cam Ranh Bay was used to resettle refugees moved from Phu Yen province;⁽¹⁾ sand dunes and spits have been used for villages in Phu Yen and Quang Nam. Where free land is not available, it may be possible to find less productive farmland at a lower price than good rice land.

Land purchase costs should be recovered when the village is dismantled and the land resold, unless the land is no longer useful for farming and not needed for nonagricultural uses.

PREPARING FOR AND MOVING THE REFUGEES

Advance Preparation of the Village Site

Preparation Required. Some sort of land preparation will be needed before home and public building construction begins. The nature and extent of preparation will vary by type of land and its use prior to refugee village construction. Reasonably level, drained, unoccupied land may need nothing more than clearing away brush, or cutting trees and perhaps removing stumps. Hillside sites may require some terracing as well as vegetation clearance. If the land is flat enough to collect water during the rainy season, drainage canals may be needed first, so that land can drain and dry out enough for clearance before streets and homesites are laid out and construction begins.

Cultivated land may already be drained and cleared, depending on the crop. Paddy rice fields may need filling. A refugee village constructed in paddy rice farming country probably should use the

*One gia is 40 liters. Paddy rice, which is rice after threshing but before milling, weighs about 19 kg to the gia. The yield from milling is about 11 kg milled rice, 1.4 kg broken rice, and 1.8 kg bran per gia, with the remaining weight as rice husks.

highest land in the area, since high land is less likely to flood (rainfall drains sooner and canal water must be pumped farther), and is likely to produce only one crop a year while lower-lying fields can be double cropped.⁽²⁾ For homesites, however, better drainage is a definite advantage, and use of slightly higher land may make it unnecessary to fill in land to raise house and school floors above the high water level.

While rice land is already clear of brush and trees except along canal banks (which should be left intact with trees in the refugee village plan), land used for such crops as tea, sugar, and rubber will need some site clearance.

Land clearance, terracing and ditching lend themselves well to mechanization, and a few hours with a bulldozer can take the place of many man-days of work with shovels and baskets. Constructing access roads may be a necessary part of the site preparation, and can also be done more quickly if earth-moving machines are available.

Advantages of Advance Preparation. Land can be cleared and drained before the refugees reach the village site, or most of this work can be delayed until they have arrived. Earlier preparation reduces the initial confusion. At least enough of the village site should be cleared and drained in advance to provide space for temporary shelter, even though it may be desirable to clear and ditch the rest of the site later in the process of village settlement.

If the entire village site is cleared and drained when the refugees arrive, they can begin building their houses as soon as homesite plots are assigned, so that they spend minimal time in temporary shelters. Outside employment, school classes, gardens, and other activities of village life can also be started sooner if refugees do not have to clear and drain land before beginning to construct houses and public buildings, although schools can be started in tents (or in an open shaded area during the dry season). Cleared land is also easier to defend.

Other advantages are that earth-moving equipment is easier to operate in an unoccupied area, before refugees arrive and children are playing in the new townsite. And a prepared village site, as evidence of government action on their behalf, should have a favorable psychological impact on the refugees.

Land clearance might be done by a "task force" of skilled machine operators, moving with their equipment from one refugee village site to another, and supplemented by unskilled labor, who could be either part of the task force or local residents hired by the day. Manpower for the unskilled force might be recruited from the first refugee villages established in an area. At the other extreme, skilled labor might be obtained completely outside the refugee population: for example, from the U.S. Navy Seabees.

Advantages of Delayed Preparation. There are some offsetting factors in favor of having the refugees clear and drain the bulk of the land. The chief one is that land clearance provides jobs; if no other work is available, it may be better to employ refugees in town-site preparation and offer them wages rather than straight relief, or to require work in exchange for relief commodities. Since the only alternative to providing jobs and paying wages in this case is providing relief goods, the net cost of refugee labor for site clearance and preparation is less than the cost of employing other locally available unskilled labor.

If refugees clear the site, they may be able to salvage brush and small growth for house materials. Thatched houses like those observed in such Delta villages as Khanh Hau⁽³⁾ use bamboo, sticks, and small logs, and these are normally found in village woodland and hedges. Materials of this sort growing in the townsite are less likely to be lost if refugees do the land clearing labor and salvage whatever they can use.

If refugees arrive over several weeks' time rather than all at once, it may be advisable to delay some of the site preparation so that it can be done by workmen from the first groups to arrive. This suggests a compromise between advance and delayed site preparation, in which an access route and the entire site for the first hamlet or section of the village are cleared, drained, and surveyed before the first refugees arrive, so that they may receive homesites in this prepared area. The remainder of the site might be left entirely for preparation by refugees, or might be cleared but not ditched, depending on the availability of

machines and the difficulty of site preparation by hand labor. This procedure is particularly adaptable to a village whose final size is not known when the first refugees arrive, since the refugee labor force will be available to extend the cleared and drained areas as needed during the settlement's growth.

Some tools will be needed for whatever site preparation the refugee workers do. This may be nothing more complex than shovels and baskets, but the need must be anticipated and the tools provided if work is to be done on a predictable schedule. Delays and hardship can be caused by the lack of simple tools, which are readily available in countries with a well-developed economic system.

Supervisory Requirements. Site preparation must be supervised by persons familiar with the site plan and aware of the differences in requirements (e.g., in drainage and sanitation) between a refugee village and a dispersed rural settlement. For this and later supervision and management functions it appears necessary to have an organized supervisory group on hand before refugees arrive, and to have them remain in charge of the village until village life is functioning smoothly and refugee internal leadership can take over. The supervisory group has been called "resettlement cadre" in this study. Initial members of the resettlement cadre must come from outside the ranks of new refugees, since some training is necessary; the refugee population may prove a good source of persons for training as resettlement cadre for later use in their own or other villages.

Site Preparation Costs. In the Central Rural Reconstruction Council's 1966 budget for Quang Nam, land clearing costs (included in Appendix C to Ref. 7) are given as VN\$4.50 per square meter; ground leveling is quoted at VN\$4 per square meter. These are VN\$2.25 million and \$2 million, or U.S. \$32,000 and \$29,000, respectively, for a 50-hectare village needing both clearing and leveling over the entire area, and are listed under the subhead "Bulldozing," which may imply machines or may be used as a synonym for land clearing and leveling by any method.

If level agricultural land is purchased or rented, it should not need clearing, but may need grading for streets and ditching. Costs

for streets and ditching, if done by paid workers at the Quang Nam cost estimate, would be about \$3000 to \$6000 U.S. Free land might be level and easy for refugees to clear; preparation costs could be negligible or could be in the \$60,000 range indicated by Ref. 7.

If refugees do most of the site preparation, receiving pay instead of relief or working without pay while receiving relief supplies, site preparation costs can probably be disregarded entirely.

Final Preparations for Refugee Arrival

Personnel. Members of the resettlement cadre should be ready to meet refugees at the village site, register them, direct them to temporary quarters, and see that immediate needs for food and medical care are met. They should also be ready to answer questions and provide information about jobs, relief, and life in the village, and should be well informed about village construction and development plans.

Land and Temporary Housing. The area used for temporary housing should be cleared, drained, and staked or otherwise marked to show where shelter, sanitary facilities, etc., are to be located. Some shelters, enough to accommodate the first group of arriving refugee families, should be erected or in place ready to erect before any refugees arrive. The temporary shelter should have a sound roof and dry floor, space for furniture, cooking space, and access to water supply and sanitary facilities. The structures need not be large or of high quality; e.g., an earth floor is adequate, but in the rainy season some ditches are needed so that rain water is carried away from the houses and does not run through them. Space per person can be at a minimum consistent with health; cooking facilities can be located in a separate area from individual shelters.

Temporary provisions will also be needed for refugees' livestock, particularly for larger animals such as water buffalo. This involves fenced land, pasturage (or food supplies from the relief program), water supply or access to water, and some shade. Land should also be allocated for pigpens, chicken coops, and the like.

Temporary Village Facilities. A food distribution center, associated food storage buildings or temporary storage shelter, a dispensary, and an administrative office should be ready when the refugees arrive.

Building Materials. Materials can be simple: tents, thatched huts, shelters of tree trunk frames with galvanized roofs and packing case sides are among the possibilities open, and the choice should probably be based on ready availability of materials. Other building materials, such as house posts, palm fronds for thatching, and cement, can come later; but if building materials for homes, schools, and so forth, are on hand when refugees arrive, it will permit faster settlement and should also raise morale.

Water Supply. If wells are needed they should be drilled before the refugees arrive; if river or stream water is to be used, plans should be made to keep pollution out of the river upstream from the place where water is to be drawn.

Defenses. A refugee village in an area not cleared of Viet Cong forces is an obvious target, and refugees themselves may be targets for attack if Viet Cong cadre have instructed them to stay on the land and refuse resettlement. For these reasons, it may be necessary to give defense priority over other needs, and to have barbed wire, trenches, guns and gun emplacements ready before giving attention to temporary housing.

Collecting and Moving the Refugees

Origin of Refugees. The concept of refugee resettlement underlying this analysis is that a well-planned, adequately staffed and funded refugee operation can: (1) provide a better life for Vietnamese rural families than their present existence in zones that are either contested between government and Viet Cong control, or under control of the Viet Cong and subject to attack by government forces; and (2) permit more effective military action against Viet Cong forces in the areas from which the refugees are moved and deny the fruits of their labor to the Viet Cong. In some areas it will be easy to convince

villagers to move; many thousands of farm families have already left Viet Cong controlled and contested areas even in the absence of plans and promises of resettlement aid, while others have received aid but on a smaller scale and shorter term than is envisioned here. But many villagers will need more than promises, for some have family members in Viet Cong service, and some will be reluctant to give up their land and the known world for an unknown future. Areas that are now relatively peaceful under Viet Cong domination will become military operational areas as effective government control is expanded. Here it may be desirable to evacuate villagers before the fighting starts and their life becomes grim and hazardous.

Planning the Move. The first step in evacuating a village should be to inform the villagers about the evacuation program: when they will be moved; what they can bring; what the resettlement village will provide; and what the future holds for them. This naturally will be a combination of information and propaganda, pointing out the advantages of schools, medical care, freedom from combat action and Viet Cong taxation, while stressing also that the villagers will be free to return home when their home area is secure, and reassuring the refugees that their land titles and use rights are being safeguarded.

The more advance notice the better, although it may be necessary to evacuate an area quickly and on short notice to avoid Viet Cong impressment of the labor force. Perhaps the best way to handle an evacuation without advance notice is to bring in a military force by helicopter at sunrise for the combined purposes of announcing the evacuation, assisting villagers, providing security against Viet Cong attack during the preparation, and, if villagers are moved even against their will, enforcing this decision and seeing that no villagers escape.

Movement planning must include a decision about whether the move is compulsory; if so, what methods will be used to move unwilling villagers; if not, whether villagers who do not move will be regarded as "neutral" or "enemy," and whether they will be given another chance to move to the refugee village later. Compulsion, of course, is undesirable in itself, but total evacuation of an area may be necessary. It may also be necessary to give an appearance of compulsion so

that residents will not refuse to move because they fear retaliation against relatives in Viet Cong service, or against themselves if they fall into Viet Cong hands later.

Family groups and residents of the same hamlet should be kept together as much as possible. Movement in hamlet and kinship groups permits the existing social and organizational structure to be maintained, and reduces the strangeness of the move.

In the move it is important to take along as much as possible of the villagers' property, including tools, livestock, and supplies of food, even at higher costs, for this reduces the shock and sense of loss at the move and also provides villagers with a start (materially and psychologically) toward their new homes and new economy. What is left behind should be destroyed so that it does not become an asset to the Viet Cong.

Provisions should be made for meals enroute if the travel time is long enough; villagers can prepare food to take with them if there is enough notice, but on short notice moves it may be more efficient to provide food for them.

Transportation and Limitations Imposed by Movement Distance. The maximum distance over which the evacuation can take place, the time needed for villagers to prepare to go, and the transportation method are interrelated. There are several options open for providing transportation. If time and distance permit, villagers may be able to move in their own carts, pulled by their own livestock, with additional vehicles needed only to move property of poorer villagers who cannot provide their own transportation, to take ill and aged villagers and others who should not make the journey by oxcart, and to provide security for the move.

Moves from a contested or Viet Cong controlled area may be constrained by the need to reach government controlled territory or a defended military area before sunset to avoid the need to establish and defend an overnight campsite enroute. Travel from the abandoned town to the refugee village might have to be planned in a series of such moves. This requirement may set limits on the kind of transportation used, and on the amount and type of property villagers can transport.

If villagers have advance notice and can collect their property and plan to move on a certain day, then they can use the full day for travel. Evacuation without advance notice requires an additional time allowance to assemble villagers, tell them what is happening, and allow them time to gather their property for movement, so that a full day's travel is not possible.

Assuming a 20-percent allowance for stops enroute (that is, one hour of stopping time for every five hours in motion, or 1/6 of total time spent at enroute halts), and 12 hours of usable daylight, the following maximum distances are possible:

1. Oxcarts. At 2 mph, 20 miles if they start at dawn, and if air cover is adequate protection for the first part of the move. Combined oxcart and truck movements of up to 16 miles are possible by having trucks start at dawn from the secure area and drive to the village while villagers, having been notified by helicopter-brought personnel, prepare for the move so that they can be ready to go three hours after dawn when the trucks arrive. These figures will be reduced for a large-scale movement over one road, since no allowance is made here for convoy length, and the last vehicle will need to be in a safe area at sunset. (Villagers being moved by truck could go in a truck convoy and have an additional six hours to load.)

2. Trucks staying overnight in the village to be evacuated. At $7\frac{1}{2}$ mph (the average speed of travel for trucks on poor dirt roads, Ref. 8), 75 miles if the trucks are loaded early enough to leave at sunrise, less whatever allowance is necessary for the length of the convoy. Longer journeys are possible if roads are surfaced or well maintained dirt.

3. Trucks coming from the secure area in the morning, loading, and returning to the same secure area. The maximum distance possible for a move of this type on minimum quality roads is 31 miles, which provides for five hours of travel each way (including allowance for enroute stops) and two hours to load.

The minimum distances apply to the first day of the move, not to the entire distance from home village to refugee settlement. Travel on succeeding days can then continue at daily rates of 20 miles by oxcart, 85 miles by truck on poor roads, or 120 miles by truck on fair dirt roads.

Quite a different situation will exist if the village is brought within a secure area temporarily as by search-and-clear military operations, and villagers are then moved out with military forces when the

operation is completed. Military units in this case might well provide protection for overnight stops as well as for convoy movement. The possibilities for oxcart movement would depend on the military situation; it might be less costly to transport everything (including livestock) by truck rather than maintain local convoy protection for a 2 mph movement.

The extensive system of waterways in the Delta may permit movement by boat, using either military craft or village-owned sampans. Boat speeds, canal security, and the distance to reception areas or safe stopping places will determine whether village sampans can be used and how much time is available for loading.

Records. Those supervising the evacuation should list the people being evacuated, although on a quick move it may be best to defer interviews and detailed data collection until the villagers reach the refugee site. A more difficult problem is that of recording land ownership and tenancy if village tax rolls have become obsolete, as is likely during Viet Cong control of a village. The requirement at the time of evacuation is simple but may be difficult to accomplish--to know who owns each piece of land; whether it has been rented and who the tenant is; and whether any of the land holdings and land tenancy arrangements have changed as the result of Viet Cong land redistribution or abandonment of land by refugees. No decisions about ultimate land ownership are necessary at evacuation time, but villagers must be told something about the future of the land, and information must be recorded that will permit the land to be returned to its rightful owner--and probably also preserve each tenant's right to rent--at the time that villagers return home.

Refugees from Existing Camps. A resettlement program attractive enough to draw rural villagers from their homes will also attract those who have already become unprogrammed refugees and are living on the fringes of Vietnamese economic life, as is the case with many of the two million refugees in Vietnam today.

Refugees moving from temporary camps and shack towns to resettlement villages will present somewhat different problems than those posed

by refugees from farming areas; they may have lost their home village and hamlet grouping; they are less likely to have furniture and tools; they have already been through the psychological shock of becoming refugees and have few, if any, local ties that would deter their moving again. From the standpoint of program management, resettling those who are already refugees will not remove resources from Viet Cong control, but may reduce the strain on the Vietnamese civilian economy.

There are three ways to treat people who are already refugees: encourage and help them to resettle in refugee villages; restrict the villages to refugees coming directly from specific rural areas; or admit but not seek refugees from earlier voluntary refugee movements. Cost factors should be about the same for "old" refugees admitted to resettlement villages as for "new" ones brought from the countryside, with differences in transportation costs and perhaps in the amount of aid needed for homebuilding and furnishing. The total program costs can rise sharply if it is open to "old" as well as "new" refugees, however, and this will be most noticeable in areas where jobs are short and people in resettlement villages live better (through access to employment or through relief programs) than others in the same general area. In these cases, it may be necessary to limit refugee village population unless funds are sufficient to provide villages for all refugees living nearby.

VILLAGE CONSTRUCTION

Once refugees get their bearings and are assigned their individual homesites, they can begin constructing their own homes, so that the temporary housing they leave becomes available again for new arrivals. Eventually the temporary buildings should be dismantled and the materials salvaged for other uses. Land for temporary shelters can be reallocated later for recreation (e.g., the schoolyard), or can be homesite land where the last dwellings will be built.

This whole process of locating, erecting, using, and dismantling temporary shelter requires supervision to see that land and materials are used fairly in accordance with the overall village plan, and to enforce health and sanitation practices.

Permanent Homes

Assignment of Homesites. Homesite assignment, on the basis of one site per family, would logically be done as soon as possible after arrival at the village when the family is registered. Some special cases will require either advance guidance or decisions at the time of homesite assignment.

Persons living alone, such as older people whose children have set up separate homes, might be assigned individual homesites or might be combined with relatives. It may also be possible to assign smaller plots. Wives of government soldiers might be assigned house plots even though they may be living with relatives while their soldier husbands are absent, with their land used as extra farm or garden land until husbands return from military service and houses are built. Similar land allocations might even be made to families of men serving in the Viet Cong, as an incentive for the absent members to defect from the Viet Cong and join their families.

Village and hamlet chiefs and village council members might be assigned additional land (e.g., two adjacent homesite plots) as a mark of prestige. The requirement is small, perhaps ten extra homesites per village of 1000 families or one percent, but some problems arise if this is attempted; village and hamlet leadership may not be fixed when homesites are assigned, and homesite reassignment might be quite difficult if village leadership were changed after homes were built. Even so, it may be desirable to have some sort of recognition for the village chief and perhaps also for other leaders. Additional land is one available method; other methods may be more suitable or less costly.

House Construction Materials. Most homes in rural Vietnam are simple. Delta villages, insofar as Khanh Hau is representative, primarily have thatched huts with wood framework; more expensive types of construction are wood with thatched roofs, wood with tile roofs, and at the upper extreme, masonry or brick with tile roofing. Floors in most homes are dirt. Materials for thatch houses are wood poles, palm fronds, and cords (usually from palms, but ordinary twine may be easier to store and supply). It may be possible to bring the frame posts from the home village.

Another type of construction, reported in Ref. 1, involves wood framing, concrete floors, and tin roofing; this is in the Cam Ranh Bay area where palm fronds are not readily available. Families here are allocated VN\$3500 (about US \$25), 20 sheets of tin, and ten bags of cement; it is not clear from the account whether the cash allocation is for house materials, furniture, or ordinary living expenses (to supplement relief food) until villagers can begin work outside the refugee village. Costs for a particular refugee village house will vary depending on the type of materials used, and their local availability; in some areas both wood and palm fronds are locally available, while cement and tin costs should run about the same anywhere in the accessible areas of the country. Cement implies permanent construction, and may not be useful where land is to be returned to agricultural use after the war. Where it can be used, cement construction is suitable also for cisterns, pigpens, and other auxiliary parts of the house.

Actual Construction. Most house construction can be done by villagers, either working as individual families or exchanging assistance with neighbors. Simple houses of the type discussed in Ref. 3 require no specialized skills, and learning how to make thatched roofs and walls is part of the normal life of village men. Squared, fitted timbers are used for framing for larger thatched houses, and this also can be done by refugee villagers if their population includes carpenters.

House construction should proceed somewhat faster if villagers combine their labor and work on houses in succession; mutual self-help also may solve the construction problem for incomplete families with no person on hand who knows how to thatch. This is another reason for assigning house plots by hamlet of origin; if refugees from the same hamlet are housed in the same section of the refugee village they can help each other.

Some instruction and supervision will be needed to guide the refugee villagers in those features of the environment that differ from the rural villages they know. This includes advice on handling unfamiliar building materials and attention to sanitation and drainage (perhaps also fire protection) which is necessary in a village of greater population density. Specifically, it may be necessary for

supervisors to work closely with villagers to see that latrines, if built for individual homes, do not pollute neighbors' water supplies; adjacent houses are located far enough apart that fires do not spread; tin roofing sheets, if used, are joined so that water runs out, not in; and cement is mixed and poured properly. These should not require much supervisory effort; a little advice, a few demonstrations, and being on hand to answer questions should be adequate.

House locations on individual homesites can be prescribed, suggested, or left entirely to the individual refugee. This does not affect costs or resource requirements, but is a factor with psychological impact on the refugee villagers and should be considered in the planning stage. There seems to be no compelling reason for all houses to be lined up in the same location on each plot, but there may be reasons for having gardens or livestock shelters on one particular side of the house (sun exposure, prevailing winds, etc.), and if so this is something which should be pointed out to refugees if they come from an area where the same factors do not apply. If the village administration must fix exact house locations, the planners should consider local customs, traditions, and beliefs about fortunate and unfortunate locations and alignment.

Furnishings. Rural villagers need some simple furniture, whether at home or in a refugee village--beds, table and chairs, wardrobe cabinet, and cooking equipment. They also need rice bowls, spoons, etc. These may be brought from home, provided from stocks that the refugee village administration maintains, made in the refugee village by the carpenters among the evacuees, or bought in local markets near the refugee settlement.

Bringing furniture from the home village is probably the most desirable from the psychological standpoint, but whether this is practical depends on the availability of transportation for the move, and on the cost of providing the needed additional trucks and escort vehicles. This would probably have to be supplemented by a small supply of light furnishings for the occasional family whose furniture is lost enroute. If many families arrive without household equipment and furnishings, a combination of all available local resources will be needed to replace what could not be brought. This includes furniture making by refugee

carpenters in nearby villages, "making do" with packing containers for tables and similar improvised furniture, and anything that the refugee village administration can provide.

Village carpenters, judging again by Khanh Hau experience, are qualified to make furniture and can produce more than the normal village requirements. These carpenters usually are part-time farmers, but in a refugee environment might well devote full time to carpentry. This does not mean, however, that there are enough carpenters in a village to make new furniture for every family as fast as houses are built. Carpenters will need tools (worth perhaps US \$20 to \$30) if they have not been able to bring their own, as well as access to markets for suitable wood. In a refugee village in the same general part of the country as the home village, carpenters may be able to use their regular sources of supply (Khanh Hau carpenters sometimes go as far as Saigon or Bien Hoa, 30 to 50 miles away, for wood of the desired quality); if this is impossible, carpenters will need some advice on where to look for wood. They may also need transportation to and from lumber yards.

Local purchase of furniture may be possible on a small scale, but a sudden demand for furniture for several thousand families probably could not be met quickly anywhere outside of the Saigon area, and perhaps not even there in the present overstrained state of the Vietnamese economy.

In principle, temporary furniture supplies could be acquired and provided by the village administration, much as is done for American military families who move into quarters before their furniture arrives. This adds to the requirements for planning, purchasing, storage and control, and should probably be limited to light or small items such as beds (of temporary, lightweight type, such as folding cots or hammocks), cooking equipment, rice bowls and spoons, and something simple to sit on like floor mats; tables and wardrobe cabinets probably can wait. An alternative to temporary issue is to provide small items of this sort free as needed when the refugees arrive. A supply of those few items needed immediately will reduce the urgency of replacement, as well as improve health and morale. Maximum requirements per "average" family of $5\frac{1}{2}$ persons might be $5\frac{1}{2}$ hammocks, two or three mats, and two cooking pots.

Schools and Public Buildings

Buildings used for public purposes in Vietnamese villages include schools, village offices, and other administrative centers, markets, dispensaries, police stations, and military posts. Schools and some sort of village administrative center are common to all villages. An information center may be included, and some villages also have post offices. Resettlement villages will need many of these buildings, as well as places to store relief supplies, construction supplies and equipment, and perhaps such other items as temporary furniture.

Certain other buildings might be placed in the "public" category in the sense that they are for purposes other than refugee homes. These include housing for resettlement cadre and other nonrefugees; buildings for craft work, light industry, or other economically useful products; and churches, pagodas, and temples.

Most public functions can be performed under rudimentary shelter before more substantial structures are built; tents or even poles supporting a tin roof with no walls can serve the purpose. Priority on more substantial construction should probably be given to schools, particularly if they are to have electricity or use equipment that needs good shelter.

Schools. These can be frame, masonry or concrete structures, with roofs of thatch, metal, tile or whatever material is most economical and conveniently available in the region. Thatch walls as used for house construction do not admit enough light unless walls are partly open, which will let water in when it rains. A combination of wood and thatch may be reasonable in areas where palm fronds are plentiful. Concrete and masonry will not be suitable if the village is to be completely dismantled when it is no longer needed for refugees.

School building space requirements can be expected to run about 5500 square meters for a 1000-family village if all children of primary or secondary school age (ages 6 through 17) are in school, while schools for just the primary school age bracket (6-10 inclusive) would need about half this amount. These are based on the 30 square feet (2.8 square meters) per pupil in new schools in Samoa,⁽⁹⁾ which should be

reasonably representative of tropical area construction; the population distribution of Table 1 (Column 5); and a 10-percent allowance for such non-classroom space as school offices, storage of equipment and supplies, walls and interior partitions.

School construction should be planned in advance, supervised by the resettlement cadre, and begun immediately after refugees are registered and temporarily housed, and house plots are assigned. Early attention to school construction can serve as a morale improvement factor, since villagers do feel the need for schools, while there is probably no similar enthusiasm for a large and permanent type village office or police station.

Other Public Buildings. Here again, there is a choice of building materials, and selection may depend on availability of materials or on costs. The market may be an open roofed area; a cement floor is advisable, since it reduces dust and mud in the market area and can be washed easily.

Building size and construction priority will vary with the situation as well as with village size. Unless the refugee settlement is attached to a nearby village for administration, there will be a need for some sort of administrative office and village council hall, and for a police station or police box. The dispensary may be quite small, perhaps an office for the nurse or doctor and storage for medicines. Khanh Hau has had a maternity center since 1962.⁽³⁾ This type of care, which UNRWA provides to Palestine Arab refugees,⁽¹⁰⁾ probably requires an added room at the dispensary with room for two or three beds.

A market may not be needed within the village if nearby villages have them; it may not be needed for the first few weeks in any case, for if refugee villagers arrive with their possessions essentially intact, and receive relief food or live off their own stocks, there will be little to buy and sell at first. But when refugees begin working for pay (inside the village or elsewhere), they will need stores of some sort; a nonagricultural village needs places to buy and sell bulky commodities like rice and straw, as well as incidentals like the crockery, oil and spices sold at small stores attached to houses in Khanh Hau.

Military posts and facilities can be prepared by military personnel just as would be done for military facilities outside an inhabited area. Costs will depend on the terrain, threat, and the size of the defense force, which in turn will depend on the local security situation. It appears likely that refugee villages should be located only in secure areas or within a defense perimeter, and that no added defense forces would be needed.

Resource requirements and cost factors for housing for nonrefugees, such as resettlement cadre and school teachers, may be similar to those for the refugees' own homes, with the exception that refugees will probably provide labor for this additional housing and should be paid for it.

Buildings for self-support activities will be required only if some refugees manufacture and sell something that needs machinery or a protected working space. Some form of grants or small business credit may be necessary to start such ventures, but for this analysis the investment in cement, wood and labor to build a small factory can be treated as an investment to reduce the costs of the refugee operation, rather than as part of the village costs. It may be possible to plan a village around the concept of a particular type of production for self-support. If this is done, it may be both possible and financially desirable to give priority to building the factory. In other cases, refugee enterprise may develop markets for potential production and lead to construction of a factory after the rest of the village is complete.

Churches, pagodas, and temples are of varying importance in the lives of Vietnamese villagers. Khanh Hau, like many other Delta villages, has a temple that is the repository for the guardian spirit of the village; in fact, Khanh Hau has two of these in different hamlets. There are also two Buddhist pagodas and two Cao Dai temples (different sects) in this village of 3241 people (1958), while Catholic villagers attend church three miles away in Tan An. Quite different religious patterns can be found in Hoa Hao areas or among refugees from North Vietnam, most of whom are Catholic.

The degree to which churches, pagodas, and temples normally receive community support should probably determine the amount of assistance

given when the village is established. In villages like Khanh Hau, one temple serves as a community temple, with Cao Dai participation and Catholic representation at its Buddhist ceremonies. For a village of this religious pattern it would seem sensible to allocate land for several churches, temples, and pagodas; to provide building materials for only the village temple; and to expect unpaid village labor (organized by the normal village and hamlet leadership) to do the construction work.

Streets, Roads and Pathways

Access Roads. At least one road linking the village with the outside transportation network should be wide, firm, and drained well enough to be passable in all seasons. An access road should be completed before the refugees arrive. If the village is settled during the dry season this can be a dry-weather road initially, and can be improved to an all-weather access route later using refugee labor. Some village sites will have ample gravel or dry soil for road construction; in other areas it may be necessary to bring gravel to the village to get an all-weather access road.

Road construction costs vary by type of terrain and soil. Clearing trees or brush from the right-of-way can be treated as part of the site preparation work, and can be done by the same crews and equipment used to clear the village site; if low-lying land must be filled in, this can be done for the road in the same manner as for homesites. There will, of course, be exceptions, for it may be necessary to run an access route through wooded country even though the village site itself has only light brush cover; access road construction in this case may require special equipment.

Local Streets and Pathways. Requirements for streets within the refugee village will depend on village size. The access road may provide adequate truck access to any part of a small village, while larger villages and those whose shapes are not compact may need a well-defined system of streets passable for vehicles. These additional streets should probably be built to be passable for medium-weight trucks at low speeds in all seasons.

Refugees can build local streets and pathways using carts and shovels. Bulldozers may be much faster, and trucks may be needed if local soil is not suitable for the surface or the subgrade and gravel must be brought from outside the village. If a gravel source is located close enough, it may be sensible to use villagers' oxcarts. Here, as with the access roads, using refugee labor and a minimum of machinery makes the most economic sense for villages having no external source of employment income.

Pedestrian pathways require only labor, shovels, and perhaps baskets for moving earth; in some types of terrain, the pathways require no construction at all.

Bridges and Culverts. These can be built by village labor, given some supervision, but will require materials probably coming from outside the village--timbers, cement, or some of each.

Electricity

Farming villages in Vietnam, as in most underdeveloped areas, do not normally have electricity. While electric power would be helpful for many activities, it appears important for only a few: power for local industries; lights for perimeter defense; lights for school classes at night; and power for television receivers, film projectors, and shop equipment in schools. Villages without these specific requirements do not appear to need an electric power supply.

The costs of electric power for a refugee village are discussed in some detail in Appendix C, Instructional Television Costs, since electricity must be provided if television is used in the schools. Initial costs for a village power supply should be about \$300 per kilowatt of generating capacity. Operation, maintenance and depreciation might run anywhere from 2 to 7 cents per kilowatt-hour (kwh), depending on maintenance policies and how efficiently the generating capacity is used. An intermediate value of 4 cents per kwh is used for cost computations in Sec. VI and Appendixes C and D.

Water Supply

The type of water supply will depend on geographic factors, and in particular on the availability of good river water or ground water supplies. Possible systems for potable water include:

1. A central system of wells and pumps, with water piped to taps serving groups of homes.
2. A well serving each group of homes.
3. Individual cisterns, filled by runoff from house roofs.
4. Water intake from nearby rivers or streams, possibly treated (chlorination, sedimentation, or both), with pipes to taps serving groups of homes.
5. Individual collection of water at specified points from a stream or river, with supervision to prevent pollution of the river at, and upstream from, the collection points.

These water supplies might be supplemented with water from other sources for other uses, such as river or canal water, or rain water stored in ponds for washing and gardens; the village also may rely on other sources in emergencies, such as water trucks bringing water from another area to fill cisterns that are emptied during the dry season.

Requirements for materials and labor will vary depending on the system used, of course. If the "water system" is a designated place by the side of a river, and families carry their own water, the only cost is that of supervision to see that the river is not polluted--that nobody washes cattle or empties slop buckets upstream from the place where villagers fill water buckets. Wells must be dug and cased; pipes must be purchased and installed; cisterns need cement and labor.

A single well and pump large enough to provide 100 gallons per minute would provide a 1000-family village with 144 gallons per day per family, or 26 gallons per capita (less nonrefugee use and leakage), which is more than enough for household needs. The well and pump would cost \$2000 for a 100-foot well depth and \$5000 for a 600-foot depth, according to U.S. cost data in Ref. 11; the depth of the well depends on how far down one must go to get an adequate underground flow. Well water should not need treatment. Distribution system costs are not included, nor is storage, which can be had at costs as low as \$130 per thousand gallons when 15,000-gallon pressure tanks are used. This

includes fittings and valves. A system of one deep well and three 15,000-gallon storage tanks would run about \$10,000 plus pipes and delivery facilities, and less in areas where good water is near the surface.

Some estimates of household and farm needs are given in Ref. 12, which cites U.S. Public Health Service and Venezuelan data. Rural American use for 1954 is given as 10 gallons per person per day in a house with a hand pump; 15 gallons in a house with one pressure faucet; and 50 gallons with hot and cold running water. Venezuelan data quoted 50 gallons per person per day when water is piped to homes and 2.6 gallons when carried from public taps. Design to 30 to 50 percent beyond estimated demand is suggested in the reference; wells providing 26 gallons per person per day will meet the household demands estimated by USPHS for single-faucet piped supply with a 70-percent safety margin.

It may be necessary to add to the water system if large-scale livestock raising is practiced, as discussed in Sec. V, and local river water is not available or not suitable. USPHS usage estimates are 12 to 15 gallons per day per animal for cattle; 4 gallons per day per hog; and 4 gallons per day per 100 chickens.

Water systems built for Vietnamese provincial cities with AID assistance indicate that total costs, including distribution, are in the \$20,000 to \$50,000 range for a 1000-family community. This is based on budget estimates by city for the 1965-1967 AID program, as given in Ref. 13, for each of seven provincial cities* scheduled to receive wells or treatment plants, storage and distribution facilities; population figures for these cities are shown in Refs. 13 and 14. The range in costs is from \$3.90 to \$9.20 per capita. Both dollar and piaster costs are included, so that the estimate includes both labor and equipment. It

*Cities in this sample are Hoi An, Kontum, Phu Vinh, Phuoc Binh, Quang Tri, Qui Nhon and Tuy Hoa, with populations from 8,000 to 41,000. An eighth city, Vi Thanh, was to have a water system without storage facilities, at \$1.50 per capita. The remaining 51 cities receiving assistance under the Municipal Water Supply AID project were excluded from the sample because funds were allotted from pre-1965 budgets (and not itemized by city in Ref. 13), population estimates were not available, or the AID project involved extending or improving an existing water system.

seems reasonable to use the lower value, \$20,000, for a village whose facilities might be temporary and could be installed when the village is built, avoiding such costs as removal and replacement of street paving. This is consistent with the well, pump and storage facility costs derived from Ref. 11.

Sanitation

Sanitation is another aspect of village construction requiring a mixture of planning, supervision, simple materials, and unskilled and semiskilled labor. Labor for latrine construction can come from the refugee population, while planning, supervision, and the required wood or other material must be provided.

Rural village practices may not be useful, since the population density in a nonfarming refugee village is much greater than that in a farming hamlet; if canals in the village area are used for other purposes, such as washing and garden water, it will be important to see that latrines do not drain or overflow into these canals.

The method used can be individual privies, or groups of latrines serving groups of homes; costs should be similar, and the choice, which may be based on cost differences or on pollution and disposal problems, may be different for different types of soil and terrain. Hickey reports an innovation in Khanh Hau, encouraged by the nearby School of Fundamental Education, in which wooden latrines were built over fish ponds; the innovation did not last, however, and latrines built in the 1958-1959 period had all been removed by 1964.*

Drainage

An overall plan for draining rain water from the village should be part of the preliminary planning. Ditches can be dug by refugee labor, with supervision to see that the overall plan is followed; it is also possible to use bulldozers for digging the principal drainage ditches, and to do this during the site clearance period before refugees arrive.

* See p. 26 of Ref. 3.

IV. FOOD, SEEDS, AND MEDICINE

FOOD RELIEF

Most refugees will need some economic aid before they become economically productive. The most critical need is food. The extent of need depends on several factors: whether refugees bring their stored food supplies with them; how soon they become self-supporting; and whether they can borrow from relatives or others having food supplies until they begin earning money. While some refugees in any village group may be self-supporting from the beginning (village carpenters, for instance, who work on village public buildings and on furniture), others will depend on commodity relief until outside jobs are available or the village develops an economic base for self-support. Villages that do not become self-supporting will have a continuing requirement for relief food. Entitlement is discussed later in this section.

The Food Ration

A complete food ration should include rice or a rice substitute such as wheat, potatoes or manioc; meat or fish; vegetables and fruits; cooking oil; salt and condiments. For the Delta villager, the normal diet is based on rice, and the important condiments are nuoc mam (fish sauce) and soy sauce. Food costs in the Delta normally are about \$200 per family per year, or 10 cents per person per day. The allocation of this \$200 is given in detail in Appendix B, which is based on data for Khanh Hau.⁽²⁾ Other sources confirm this; for example, Viet Cong personnel in Dinh Tuong province who bought their own food received from VN\$5.5 to VN\$7 per day (1961-1964);⁽¹⁵⁾ this is 8 to 10 cents per day at the 70:1 rate used in Ref. 2.

Villagers with gardens should be able to produce much of their own food, once the village is established. Estimates from Khanh Hau data indicate that annual village production should be at least \$40 per family and could be as high as \$95. Most of the remaining food expense is for rice, \$80 per family per year.

United Nations food costs for Palestinian Arab refugees receiving rations were 4.3 cents (U.S.) per person daily in 1964-1965.⁽¹⁰⁾ But this was only for a basic ration of grain, dry vegetables, sugar, oils and fats, with no meat, fish, fruits, or leafy vegetables. This ration is 1500 to 1600 calories per day, well below the Southeast Asian national averages of 2000 to 2400 calories per day reported by ECAFE for 1959-1961.⁽¹⁶⁾ The UNRWA figure tends to support 10 cents per day as a reasonable overall estimate for a complete ration, and to suggest a 4- to 5-cent figure as a ration appropriate for a village having productive vegetable gardens, local fishing, and animal husbandry on a small scale, but without either outside income or rice land. Young children need a smaller total ration, but this may be offset by a need for supplementary items in the diet of the very youngest (suggested by UNRWA practice) and special rations for pregnant women, nursing mothers, and others with special health needs.

Costs for food transportation and storage can be estimated very roughly from UNRWA experience⁽¹⁰⁾ in which a total rations cost of \$13.6 million in 1965 was accompanied by \$3.2 million for related costs, including some amounts allocated to roads and buildings as well as to food transport, storage, and handling. These related costs are 24 percent of the rations' cost. This should be reduced somewhat to allow for the components in "related costs" that do not pertain to food rations. A 20-percent assumption leads to a handling cost of \$40 per family per year at first, declining to \$20 as gardens begin to produce. Perhaps half of this handling cost will be for refugee labor. Some supervision by resettlement cadre will be necessary, at least initially, and some costs will be incurred outside the village.

The volume of food involved can be estimated from Khanh Hau data⁽²⁾ for normal consumption per family per week of nine liters of rice and sauces and 18 to 28 kg of other foods, or a total volume of 1.7 to 2.5 cubic feet, including an allowance for packing. The storage space required for one week's supply of food for 1000 families, assuming storage space six feet high with one-third of the floor space reserved for aisles, is then 850 to 1250 square feet or 80 to 120 square meters--one-fourth to one-third of a standard housing plot.

Entitlement

Refugee families will need relief food if they arrive with no food stocks and have no opportunities to earn money for living expenses. A family who has constructed a house in the refugee settlement and whose head holds a job paying wages adequate for family support does not need free food. The proper extent of support for families in other situations, however, is not as clear. Policy decisions will be needed to set the level of relief entitlement in cases such as these:

1. Refugees arriving with the family stock of food, particularly if the food supply was transported or escorted by a government organization arranging for the refugee movement.
2. Refugees working on village projects such as school and road construction. These might be paid standard wages and not receive free food, or might be paid less than a full wage (perhaps no pay) and remain on the food entitlement list.
3. Refugees working for other refugees, such as carpenters. Options here include working for lower than standard wages while receiving food relief, working for standard pay and coming off the relief list, or working for standard pay while also receiving relief.
4. Refugees having a family member employed at substandard wages that might not be adequate for family support.
5. Refugees who are not working, but for whom jobs are available in the outside economy or within the village.
6. Refugees having an outside income, such as the refugee who owns and collects rent from land outside the evacuated area.

The decision about whether refugees in each category should receive full, partial, or no food relief is outside the scope of this analysis. Decisions should be based on whether relief supplies are plentiful, and whether abuses of the rules can be discovered and prevented, as well as on what appears to be equitable in each situation.

For cost estimation purposes, the two extreme cases are that everyone depends on food relief, and that no food relief is necessary. Either extreme can exist. If refugees arrive at the resettlement site with no money and no belongings, and no jobs are available in the outside economy,

everyone will depend on relief supplies initially, whether these are provided free to everyone or are sold to those who are given paid jobs in the village. At the other extreme, villagers may be brought to a site in a labor-short area and family heads can immediately begin work on paying jobs, while house construction is left to other family members.

Relief supplies can be used to accomplish other resettlement objectives. Entitlement can be controlled to encourage families to keep children in school; to encourage or discourage refugees from finding work outside the village; to compensate for participation in village projects (anything from road repair to literacy classes); and the like.

Distribution and Control

Almost all ration distribution costs go for controlling food issues. If controls were not necessary, food could be given out like water at a minimum distribution cost on a self-service basis. Controls are necessary, however, to prevent relief food from reaching the Viet Cong and from being sold in large quantities for personal enrichment, and to see that food rations reach the families entitled to them. For these reasons, a control system must be planned and enforced.

Control procedures have several purposes. They are primarily designed to prevent misuse of resources by ensuring that rations are given only to entitled persons and only in entitled amounts, by ensuring that no distribution personnel or other middlemen collect unauthorized fees from ration recipients, and by preventing theft through misappropriation or burglary. Controls may be used to help refugees become aware of the aid available to them, and to learn how to claim it. In the Vietnamese situation, it may be desirable to keep relief food resources out of normal commercial channels and thereby reduce the amount available for Viet Cong purchase; if this is to be done, control procedures will be needed to prevent sale or barter of food outside the village.

If the normal village and hamlet organizational structure is intact, it may be possible to distribute food through village and hamlet leadership, relying on local leaders to see that the proper quantities of food go to those families entitled to it. This will not work well if local

leaders do not know their people personally, if the leaders are vulnerable to persuasion or pressure by some villagers, or if there is a working remnant of Viet Cong organizational structure in the village. Distribution to local leaders has the best chance of working fairly if all villagers, working or not, are supposed to receive the same quantity of food; such distribution probably cannot be used if food entitlements change frequently unless a clerical staff is provided for village or hamlet chiefs.

Direct issue to villagers requires some sort of ration card system. Cards can be issued initially to each family, to each adult, or to each person, and this probably should be done when villagers register on arrival. This is also the best time to explain ration entitlement and ration pickup procedures. The complexity and the resulting costs and manpower requirements for the control system, once ration cards have been issued, depend on two factors: how much effort is necessary to prevent improper issues; and whether family entitlements keep changing as refugee family members consume the food stocks brought with them, find or lose employment outside the village, participate in village work projects, and the like. A complex system of entitlements may be more equitable if it is well run, but it can fail through lack of information, or be more expensive to maintain than it is worth. A "fair" ration system would provide for stopping free ration issues to self-supporting refugees. The costs of finding out which refugee families are fully self-supporting may be high, however, and it is not "fair" to withdraw free rations from some self-supporting families and not from others who conceal their outside jobs from the village management. Problems of this sort are familiar in welfare aid distribution in the U.S.

If a village is in an area where there are no opportunities for outside employment, the ration control system can be simplified by giving free rations to all villagers and paying substandard wages for in-village jobs. This should eliminate the need to keep records of changes in ration entitlement resulting from changes in job status. Changes resulting from exhaustion of family food stocks pose no particular control problem if the existence of these stocks is known, since stocks can be measured and the ration entitlement adjusted accordingly when cards are issued.

Manpower requirements for ration distribution and control, therefore, include the following:

1. Personnel to determine initial entitlement, explain the ration system, and issue ration cards--probably a small addition to the initial workload of population registration to be done by resettlement cadre.
2. Ration handling personnel--the refugee equivalent of grocery clerks; refugees can do this work. The number needed will depend on whether distribution is direct to families, as well as how frequently rations are issued.
3. Ration control personnel--requirements will vary depending on how much the system is likely to be misused if not watched. This may be a task for a mixed team of resettlement cadre and refugee leadership.
4. Guards--warehouse guarding can be handled as part of the normal police (internal security) function discussed in Sec. VIII.

OTHER LIVING EXPENSES

Long Term Requirements

Vietnamese rural families are not merely subsistence farmers; they are in the money economy too, having a cash income and purchasing many of their nonfood needs on the open market. Some items purchased, such as furniture, are produced in the village or are a composite of village labor and outside materials; some, like medicines and kerosene, come entirely from outside.

Nonfood purchases can be grouped into three categories of goods and services: those the village administration can provide free; those produced within the village; and those produced outside. Each family will need money for whatever "outside" foods and services are necessary. Families with no salable labor or skills will need money to purchase village-produced goods and services, while others will take in more than they pay out on such transactions.

For Delta farmers, normal living expenses can be taken from Khanh Hau data⁽²⁾ and adjusted to provide estimates of living costs in a refugee village. These costs are treated in detail in Appendix B. In Khanh Hau, annual nonfood consumption averages about \$200 per family in middle and lower economic levels; \$60 of this is for goods and services produced within the village, including retail markups in village stores.

Refugee village cost estimates differ in some respects. Medical care is treated separately in this section. House repairs should not be necessary, since houses will be new, and the small expenses reported for taxes and homeplot rent should also not apply. Removing these four items reduces applicable nonfood expenses in the village to \$150 per family per year: \$40 in village production and labor and \$110 in goods from outside. The \$40 figure includes in-village handling and distribution of relief food by refugee workers in a village with no outside income, and in-village retailing for food and other goods sold in village stores.

Requirements for relief therefore total \$110,000 per year for the village, in addition to food, medical care and resettlement assistance. A simple distribution of \$110 to each family will not be adequate, however, since families with skills useful in the refugee village (carpenters and barbers, for example) will be able to earn part of their support by working for other families, but only if the other families have enough money to hire them. One option is to give larger relief payments to those with no nonfarm skills; another is to hire unemployed villagers for work projects, paying \$150 per year per family to the 73 percent of the families who cannot find jobs within the village. The problem is similar to that facing any welfare program: how to maintain acceptable living standards, keep costs to a minimum, and still encourage people to work if they have salable skills.

Immediate Needs

Refugees arriving at the resettlement village may need immediate aid even if outside jobs will be available and long-term money relief will not be necessary. The need will depend on the particular situation.

The normal economic cycle of a rice-growing village is for villagers to live on the proceeds of one harvest until the next crop is in, perhaps by selling the crop at harvest time and making their major purchases then; perhaps by storing part of the crop and selling it when they need the money. In either case, villagers who are brought to a settlement

with their belongings, including their savings in the form of food stocks, should be able to live on these savings until the next harvest, just as they would do in the home village. Villagers arriving totally destitute, however, will need some means of obtaining the simple supplies like soap and kerosene that make up normal weekly purchases, and this can be done by either money relief or emergency supplies of these commodities. Money will be useful only if there is some place to buy the needed supplies: a village market, markets in nearby towns, direct sales by the refugee village administration, transportation from distant markets, or whatever fits the particular village location and situation. Nonfood commodity relief involves planning, transportation, storage, distribution, and supervision, which may be necessary in some situations, but in other situations may be more costly than providing money and letting refugees do their own purchasing.

Situations in which refugees might arrive without any money or commodity resources include the following:

1. Confiscation of all rice stocks by the Viet Cong while villagers are still in their home village.
2. Destruction of rice stocks by combat in the home village before evacuation.
3. Evacuation just before the rice crop is harvested.
4. Covert evacuation of the home village without military protection.
5. Evacuation without transportation of goods, e.g., by helicopter.
6. Loss of supplies during evacuation, such as by ambush of the evacuation convoy.
7. Movement from other refugee camps after refugees have used up all their resources.

These are quite likely situations in an unplanned evacuation, and also are possible in a planned clear-and-evacuate sweep operation, so that provisions probably should be made for immediate relief in nonfood commodities or cash as well as food, even though distribution may not be necessary in each individual case.

If a village is in an isolated area, refugees who are fortunate enough to have brought their salable rice stocks may need some help to get to markets. This should pose only a minor problem, since rice can be bought from villagers by the refugee resettlement administration and either used in another refugee village or sold in Saigon. Failure to make some such arrangement might force refugees to sell some of their rice at distress prices and reduce their economic self-sufficiency.

Immediate needs for nonfood relief can be estimated from Khanh Hau data. Normal consumption of items regularly purchased is about \$110 per family per year, as discussed in Appendix B. Refugees can do without some items temporarily (beer, for instance), but will need others (e.g., fuel for cooking), and in the absence of a more detailed analysis it seems reasonable to estimate family emergency needs for nonfood relief at about half of this, or about U.S. \$1 per family per week for the period of getting organized and settled and finding jobs.

MEDICAL AID

Entitlement

Medical aid can be provided on a free basis to every refugee family, or for fees to self-supporting families. For cost computation purposes, it is assumed here that no charges are made and that all refugee village families have equal access to medical services, facilities, and medicines. If a refugee village is located in a populated area that is short of medical care (and newspaper and magazine reports touching on this subject give the impression that all of Vietnam is short of medical care except, perhaps, the military services), it may be necessary to set up controls to limit services to registered refugee villagers, or alternatively to expand facilities and add personnel to serve the entire district.

National Medical Situation

The distribution of medical personnel in government service in Vietnam in 1962 (listed in the Statistical Yearbook⁽¹⁷⁾ as recorded by the Medical Assistance) may provide some idea of the proportions of

doctors, nurses, etc., in a given level of total medical personnel. The distribution is 7 percent physicians (including a few "surgeon dentists"), 12 percent midwives, 72 percent nurses, laboratory assistants, etc., 8 percent health technicians and 1 percent pharmacists. This is not the overall distribution of health personnel in the country, but the numbers of nurses, etc., outside the government service are not given in the Yearbook, and it is probably reasonable to draw only one useful conclusion from these data: that only about 10 percent of the personnel coming under the "health" category in a Vietnamese refugee village need be well-trained professionals, such as doctors, pharmacists, and head nurses.

Physician-population ratios as tabulated by the United Nations⁽¹⁸⁾ show that the Republic of Vietnam, with one doctor per 29,000 population, is well below average in medical services even without wartime demands on the limited number of doctors. Burma and Thailand report three or four times this relative number of doctors (1:9300 in Burma, 1:7600 in Thailand); countries on a par with Vietnam in this respect include Afghanistan, Cambodia, Cameroon, Mauritania, Somalia, and the Sudan. (Reported leaders in physician to population ratios are Hong Kong, 1:280, and Israel, 1:430; at the other extreme are Rwanda, 1:144,000, and Ethiopia, 1:96,000.)

Rural Medicine

Medical services in rural Vietnam normally include the services of nurses and practitioners (using both Chinese and Western medicines) and midwives, as well as a small amount of hospital care, with additional needs in recent years resulting from war injuries to civilians as well as to the military. Routine medical care in prewar Khanh Hau, for example, was provided by two nurses, two Chinese pharmacists, one farmer who also performed traditional therapy, and several other part-time practitioners of traditional Chinese-Vietnamese medicine--sometimes mixed with sorcery. Midwives were apparently part-time. The total personnel involved in health and medicine in some way is, perhaps, the equivalent of six or eight full-time people, or about 0.2 percent of Khanh Hau's population. Khanh Hau villagers also had access to the hospital in nearby Tan An, though they tended to avoid hospitalization.

Specific Refugee Requirements

In addition to individual medical care, medical functions in a refugee village should include control of epidemics and communicable diseases. Immunizations, school health checks, quarantines, and supervision of water supply and sanitation come into this public health category and represent a requirement of urban and semiurban living which is only partly applicable--and is less costly to ignore--when people live in a dispersed rural village. The refugee village situation also offers opportunities to introduce maternity clinics, care for tubercular patients, etc., which would improve the health level of the refugee population, and which are already being introduced into rural communities in Vietnam and other less-developed countries as funds permit.

Comparative figures for health and medical personnel in refugee operations in other countries differ widely, often depending on the availability of qualified refugees rather than on needs. The European Displaced Persons camps of 1945-1946, for example, had an adequate supply of doctors from among the displaced persons population.⁽¹⁹⁾ The Japanese and Nisei relocation camps in the U.S. had fairly large "health" staffs that provided a level of services based on American standards. The staffs were recruited almost entirely from evacuee population; sample March 1943 percentages of total evacuee population employed in the "health" function are 2.1 percent (361 of 17,308) at the Poston camp in Arizona, and 4.6 percent (421 of 9121) at the Minidoka, Idaho camp.⁽²⁰⁾ These figures were supplemented by a very small number of nonevacuees, eleven at Poston and nine at Minidoka. The UNRWA Palestine Arab refugee camps had 3411 "locally recruited" health staff and 17 "international" staff in medical and health work in 1959⁽²¹⁾ to serve a population of slightly over a million refugees entitled to medical care, a ratio of slightly over 0.3 percent of the population, supplemented by hospital beds (two per 1000 refugees) in non-UNRWA hospitals. The difference between the Poston-Minidoka and Palestine cases is probably due to a combination of greatly different medical standards and the availability of funds at Poston and Minidoka to put evacuees on the payroll as nurses and health workers of various types.

From the above assorted statistics and the general knowledge that present nonmilitary medical care in Vietnam is less than adequate, it seems sensible to suggest a personnel level for medical and health work of somewhere between 0.5 and 2 percent of the population. To bring medical services up to this level throughout Vietnam requires a major training effort. A training program to produce village medical aides, nurses, and practitioners of the type found in Khanh Hau might be a reasonable activity to conduct within the village; costs should be small, but it may not be possible to get a qualified instructor. Training for the top 7 to 10 percent--the doctors, dentists, and head nurses--is another matter, and refugee villages, like other communities in Vietnam, will have to depend on limited access to hospitals in provincial and district capitals, occasional aid from military or foreign doctors, and other scarce facilities at least for the next several years. This, of course, also means that villagers trained for various jobs in the health field would be unlikely to get qualified supervision and further training on the job.

Veterinary Services

Villagers owning livestock, particularly pigs and cattle, should have access to veterinary services. This requirement is small, including some diagnosis and injections, and probably quantifies to one fairly well-trained person full or part-time. The Provincial Veterinary Service met this need in Khanh Hau.

SEEDS, GARDEN TOOLS, FERTILIZER

Homesites of 350 square meters have space for vegetable gardens that will meet some food requirements. Villagers should be able to get a good return on a small investment of supplies and labor by planting vegetables. These can be of the same types as are grown in the home village, unless soil conditions are radically different.

A garden vegetable crop requires land, seeds, labor, hand tools, fertilizer, and water. The water requirement probably governs how soon the garden can produce food, for unless there is a good all-season

source of irrigation water, it will be impossible to grow anything during a dry season. Seeds and chemical fertilizer are commercially available in Vietnam, but it may be necessary to provide these as initial relief if the refugees do not have savings when they arrive or the village is located far from existing markets. Some organic fertilizer will be available if villagers have livestock. Shovels, probably the only necessary tools, are also needed for village construction work (streets, ditches, house foundations). The only specific additional resource requirements for gardens, then, are for seeds and for whatever chemical fertilizer is needed to supplement animal fertilizer. The seed and fertilizer costs seem small in relation to the results, and these may be treated as a food cost (i.e., as an advance payment on food rations), since vegetables produced in home gardens will reduce the future requirement for food relief. If the village is to be self-supporting, it may even be possible to provide seeds and fertilizer on credit, for repayment when villagers have jobs and incomes.

LIVESTOCK

Villagers who own chickens, ducks, pigs, or other food animals can supplement their relief rations with meat, eggs (for the chicken and duck owners), and perhaps some cash income from other villagers or from outside. Food requirements for these animals are small relative to total village food needs, and since these animals convert grains and waste food into protein, it appears reasonable to treat any additional food issues for animal feeding as an investment in future food rations rather than as a net cost.

If a large proportion of refugee villagers have brought livestock, other villagers can buy piglets and day-old chicks within the village. It may be desirable to stimulate livestock raising within the village by giving or selling animals to be raised for food, particularly if refugees have been unable to bring their own. The cost of livestock distribution can also be treated as an alternate way of paying in advance for food rations. Refugee families with promised jobs might be offered a chance to buy food animals on credit as an alternative to free distribution or open-market purchase.

While costs and supervisory requirements for livestock and livestock food may be disregarded here because they reduce the need for future food rations, the planning process should take into account the following: the prospects for chicken, duck, and pig raising in the planned refugee resettlement village; the needs for supplying animals in addition to whatever refugees can bring; and any special requirements for foods such as rice bran that are important for animal food.

Water buffalo may not be useful. In some areas of Southeast Asia, these animals provide labor, meat, hides, fertilizer, etc., at very little cost, since they use free pasturage and are tended by children too young to do other work. But their value in Khanh Hau is primarily as draft animals for plowing and harrowing ricefields. In a refugee village with no large-scale farm production, water buffalo might be useful as draft animals--or might be useful only as converters of grass into garden fertilizer, in which case their immediate economic value would depend on the availability of free pastureland. Children who are available to tend water buffalo in rural Vietnam normally should be in school. It is quite possible, therefore, that water buffalo will be a net liability to villagers, and that the most useful service the village administration can perform in this respect is to help villagers sell their water buffalo at nondistress prices. This will depend on the situation, and calls for some advance thought and planning; costs should be small.

Cattle may be in the same category as water buffalo here, but have value as food animals. If refugee villagers own and can bring cattle, and if pastureland is available, this should improve the village diet at no cost in relief food. If there is no pastureland, refugee village planners may have to choose between providing cattle food (not necessarily free to cattle owners), arranging for villagers to sell their cattle (which may be easy if there is a nearby urban market), or seeing villagers forced to kill their cattle for food when they arrive at the village. As for other categories of livestock, any direct costs involved should be more than offset by the value of the animals as food or as articles that have a market value, and costs can be disregarded here even though planning requirements cannot.

It seems unlikely that villagers can bring fish from village fish ponds. So although fish raising is a potential means of partial self-support, it is not something requiring immediate action when refugees arrive at the village.

V. SELF-SUPPORT

TYPES OF SELF-SUPPORT

The Self-Supporting Village

A refugee village can be regarded as self-supporting when it produces and sells enough to the outside world to pay for the goods and services it imports. Most self-supporting villages in rural Asia are agricultural; the inhabitants sell farm products and buy many types of manufactured goods, agricultural products grown outside the village, and outside services. Village "exports" can also be nonagricultural goods, such as fish or handcrafts, or services such as labor outside the village for money wages.

While there are still some hill tribes whose subsistence village economies are independent of the outside world, most people in Asia need some goods from outside their home villages. Villages having insufficient farmland must depend on the outside for food as well as for industrial goods. A refugee village like the one described here is in this last category. This section analyzes the prospects for such a village to be self-supporting after the initial construction and settlement period, as well as the requirements for different methods of self-support.

Self-Supporting Individuals

Within a refugee village, whether the village as a whole is self-supporting or living on relief, there are certain demands for services and locally produced goods whose producers can become self-supporting without having an income source outside of the village. If the village receives no external income from either exports or relief, these producers can be paid only in goods or services available within the village--paying the schoolteacher in eggs and vegetables, for example. But a village without sufficient farmland to export agricultural products cannot survive without some other source of outside income. The self-supporting individual, such as a schoolteacher or a furniture maker, may not produce any goods or services for sale outside the village, but he

will draw his support, in the long run, from those who export their goods and services to the outside world. These opportunities for internal self-support are also discussed in this section.

Income Requirements

The "average" refugee family needs something like \$360 per year to be self-supporting at the Khanh Hau 1958 level, with a rough breakdown into \$210 for food, \$40 for nonfood goods and services produced within a resettlement village, and \$110 for outside goods and services. This includes the value of food the family produces, and excludes costs associated with food production. Medical care is not included, and is about \$20 per family per year at Khanh Hau levels. Details are in Appendix B.

AGRICULTURAL PRODUCTION

Production for Outside Sale

Crops. Self-support through crop production requires two inputs that may not be available in a temporary resettlement village--land and development time. Land requirements for self-support through rice production were estimated in Sec. III as from 2 to 3.5 hectares of good land per family, assuming single-cropping of most of the land as in Khanh Hau. The yield per hectare of double-cropped land is less than twice the single-crop yield, and an estimate of 1.5 to 2 hectares per family seems reasonable if the land equals the quality of Khanh Hau's delta farmland.

Since it may take as much as one year from the time a village is settled until a given crop can be harvested--depending on the seasonal cycle as well as on time from planting to harvest--farm production does not offer an immediate source of income, and may not be a suitable source of self-support even if there is enough land available and cleared for planting. The time involved in draining and preparing uncultivated land is likely to be longer. For these reasons, and because unused land suitable for agriculture is not likely to be available in some areas,

the prospects for creating new agricultural villages have been disregarded here. It may, however, be possible for refugees having a basic income from some other source to supplement it by selling garden produce, either within the village or in nearby communities.

Livestock. While land limitations probably rule out the prospect of a village making its living by raising beef cattle or water buffalo, smaller animals like pigs, ducks, chickens, and rabbits can be raised for sale, as can fish if there is land for fish ponds. The local situation and marketing prospects will probably determine which animals can best provide support for the village. A short examination of the economics of pig-raising is given here because Hendry discusses costs and profits of pig-raising in Khanh Hau;⁽²⁾ pigs are selected as an example, not as a recommendation.

A Khanh Hau family commonly buys a two-month-old piglet for U.S. \$6, raises it for six months and spends \$14 for food, and can then sell it for about \$28. The venture will show a gain of \$8 if all goes well. Inoculations or veterinary treatment may be needed, however, and an allowance of \$1 has been made here, based in part on the Provincial Veterinary Service price of 20 cents for inoculations.

The \$6 purchase price presumably covers costs and some return on investment for those farmers who breed pigs for sale in Khanh Hau.

If a village family were to earn its living entirely by raising piglets, at a net income of \$7 per pig, it would need to raise about 52 in the course of a year, using two for food and selling the other 50 for cash. The receipts of \$1400 would pay for pig-raising expenses of \$1092 and leave \$308 for living expenses. Family net income can be expressed as \$364 total: \$308 in cash and two \$28 fattened pigs. The number of pigs is determined here by the need for income, not by labor or space requirements for pig-raising.

A similar estimate for families specializing in breeding pigs can be made on two assumptions for litter size, an average of 10 surviving and healthy pigs per litter⁽²²⁾ and an average of 6.⁽²³⁾ Sample feeding programs in Ref. 23 indicate that sows eat about twice as much as growing piglets, on the average; the specific figures used, for diets of corn plus supplements, are about 3.5 pounds per day for weaned and growing pigs, 5 pounds per day for pregnant sows, and 10 to 11 pounds

per day for nursing sows. The cost of food for sows then is \$28 per six-month breeding cycle, and if medical costs are \$1 every six months (the same as for piglets), the annual maintenance cost will be \$48 per sow. The same expenses are assumed per boar. Replacement costs for breeding stock can be disregarded, because animals past their prime for breeding can be sold for meat and replaced by young animals who would otherwise be destined for marketing.

If litters average 10 piglets (counting only those piglets which survive their first two months and are then healthy enough to sell), a pig-breeding family would have to maintain 6 breeding sows and a one-fifth interest in a boar at a cost of \$360. The 120 piglets produced in a year (two litters of 10 per sow) would be sold for \$720, leaving a balance of \$360 for family living expenses. If the litter size averages 6, profit per producing sow would be much less. The corresponding figures are 30 sows and one boar, with annual income of \$2160 from sale of 360 piglets and annual costs of \$1798, leaving \$362 for the year's net income. In both cases it is assumed that pig-breeding families buy their pork from families who specialize in pig-fattening, and that other foods are produced by families not in the pig business.

These individual family receipts and costs have been extended to show possible village income and expenses for a 1000-family village whose entire outside income comes from raising and selling pigs, with over 800 of the village families directly involved in pig-raising and the remainder producing other needed articles and food. Table 2 shows the cost picture for average litter sizes of 10 and 6 piglets, with the number of families in pig-breeding and pig-raising chosen to provide \$240,000 in annual net income from outside sales.

Time factors in pig-raising are roughly four months from breeding to birth; two months from birth to weaning; five months from birth to first breeding; and eight months from birth to sale.⁽²⁾ If village pig-raising started with the full number of sows and boars, the first piglets would be fully grown and ready for sale after one year (or less if sows were pregnant at the start of the enterprise). If the initial number of sows is smaller, the initial extent of self-support will be less since pig production will be lower and female pigs will be needed

for brood sows. An enterprise starting with 30 sows and one boar will produce some pigs at market weight at the end of the first year, but full-scale marketing will not be reached until the third or fourth generation of village-born pigs is at market weight some three years after the first breeding in the village.

Table 2

COST AND INCOME PROJECTIONS FOR A PIG-RAISING VILLAGE

Statistics and Costs	Healthy Pigs per Average Litter	
	<u>10</u>	<u>6</u>
Number of pig-breeding families	247	103
Breeding stock per family: boars	0.2	1
sows	6	30
Breeding stock in village: boars	50	103
sows	1,482	3,090
Number of pig-raising families	570	713
Pigs fattened per family per year	52	52
Annual village pig production	29,640	37,080
Pigs eaten in village per year	2,000	2,000
Pigs sold outside village per year	27,640	35,080
Total annual sale income at \$28 per pig. . .	\$773,920	\$982,240
Annual costs:		
Food for breeding stock, \$56 per animal . . .	\$ 85,792	\$178,808
Food for growing pigs, \$14 per animal . . .	414,960	519,120
Medical, breeding stock, \$2 per animal . . .	3,064	6,386
Medical, growing pigs, \$1 per animal . . .	29,640	37,080
Total annual costs	\$533,456	\$741,394
Net annual income from pig sales	\$240,464	\$240,846

The initial investment for a quick start is quite large; the major part of the investment is in feed for breeding stock and for the first piglets being fattened for market. Table 3 shows the initial cost of sows and boars, food and medical costs during the first year, and interest, on the assumption that capital is borrowed at the 1-percent-per-month interest rate charged by Vietnam's National Agricultural Credit Office.⁽²⁾ It is assumed here that one-sixth of the breeding sows and boars are bought at the beginning of each of the first six months, that sows become pregnant during their first month in the village, and that

Table 3

INITIAL INVESTMENT IN PIGS, FEED AND MEDICINE PRIOR TO FIRST MARKETING

Statistics and Costs	Healthy Pigs per Average Litter	
	<u>10</u>	<u>6</u>
Sows and boars required	1,532	3,193
Piglets produced each six months	14,820	18,540
Breeding stock		
Cost at \$28 per animal	\$ 42,896	\$ 89,404
Interest on initial cost over average 9½-month period, ^a		
10%	\$ 4,290	\$ 8,940
Food and medical costs over 9½ months, ^a \$44 per animal	\$ 67,408	\$140,492
Interest on food and medical costs for average 4-3/4 month period, 5%	\$ 3,370	\$ 7,025
First generation piglets		
Food before oldest ones are marketed, average 3 months, total \$7 per piglet	\$103,740	\$129,780
Medical costs, \$1 per piglet (inoculations)	\$ 14,820	\$ 18,540
Interest on food and medicine for average 3-month period, 2%	\$ 2,371	\$ 2,966
Total outstanding debt, including accrued compound interest, when marketing begins	\$238,895	\$397,147
Interest payable per month	\$ 2,389	\$ 3,971
Net income per month from pig marketing (1/12 of annual income in Table 2)	\$ 20,039	\$ 20,070
Portion of net income needed for interest payments	11.9%	19.8%

^a Animals are assumed to be bought in equal monthly increments, 12 through 7 months before the first piglets are marketed; this is the basis of the 9½-month average.

the cycle of birth, weaning, fattening and marketing moves evenly forward so that the first pigs reach market weight one year after the first sows and boars are purchased and marketing continues at an even rate thereafter. By the time the first pigs are marketed and the first money is received, debts of \$240,000 to \$400,000 would have accumulated (this includes purchase price, food and medical costs, and interest at 1-percent-per-month compounded) and liability for interest payments would have risen to between 12 and 20 percent of net income from the enterprise. Pig production would have to be increased somewhat to cover interest payments along with village self-support; this implies increasing the number of pigs each family raises. If pigs per family shown in these projects are more than a family can

handle, then pig production for full village self-support may not be practical.

Allocating duties among families is arbitrary. Overall village income would be the same if pigs were raised in a large cooperative pig farm rather than by individual families, or if each family owned a few sows and raised the piglets from birth to marketing.

Some points should be emphasized in connection with these approximate projections of pig-raising costs and income. First, the number of pigs in the village at any one time would be almost 28,000 with 6-piglet litters and over 21,000 with 10-piglet litters, including nursing pigs under two months of age. This requires land and pigsties not specifically covered in previous estimates of village needs. Second, the marketing of enough pigs to support a village of 1000 families is big business. Establishing one such village would add about three percent to Vietnamese "controlled slaughtering" of pigs as reported in the Statistical Yearbook;⁽¹⁷⁾ the impact of ten or twenty such villages on both pork supplies and pork prices would be quite substantial. Third, the availability of some twenty tons of pig food per day on the local markets is not likely without some planning and organization. Fourth, there is a large requirement for inputs, essentially agricultural credit or the equivalent in commodity or money relief, before pigs begin to produce cash income.

Yet self-support through livestock raising appears to be possible in principle, given the markets. Partial support may be possible if this much credit or other inputs are not available, or if the market will not absorb large quantities of pigs in the area of the refugee village. Similar possibilities exist for chicken, duck and rabbit raising and perhaps also for fish; lead time for any of these should be shorter than for pigs.

Production for Home Consumption

Crops. While the projected 350-square-meter homesite plots are inadequate for family rice needs, they do provide room for fair-sized vegetable gardens, assuming that the land is not all devoted to such

self-support activities as large-scale pig raising. Probably 200 square meters of each plot can be used for vegetables. At average Delta productivity of land planted to vegetables (from government statistics⁽¹⁷⁾), a garden of this size should produce about 220 kg of vegetables per year, or an average of 4 kg per week. This is only a small part of the family consumption of 11 to 15 kg per week reported for Khanh Hau,⁽²⁾ but is based on average rather than intensive use of land.

Livestock. Families raising one or two pigs at a time, keeping chickens or ducks, or raising fish should be able to meet some or all of their protein needs, at some cost in grain or other feed. A family that kept and fattened one pig, butchering it for family use after six months feeding and buying a two-month-old piglet at that time, would have meat worth \$56 per year. Costs for the two pigs would be about \$42: \$12 for piglets, \$28 for food, and \$2 for medical care. From the village economic standpoint, the important aspect is that if the village is not self-supporting, it makes sense to substitute \$42 so that a family can raise its own meat, rather than give the family \$56 worth of meat in relief assistance. Savings are probably similar for chicken, duck, and fish-raising. Since animal feed is cheaper to store and transport than meat, the comparative savings to the refugee relief program may be greater than the 30 percent to 40 percent estimated here when direct supply of meat, fish, and eggs is replaced by village production based on relief supplies of feed for livestock. If the village is self-supporting from nonagricultural outside income, some livestock production can still help raise the standard of living, but it should be possible for villagers to buy their own animals and feed to reduce their food purchase costs.

Sale or Barter Within Village. Somewhat more variety can be included in village diets if villagers have the opportunity to exchange home food production, either by selling to each other or by barter. This can be facilitated by the availability of a covered market area as discussed earlier. The need here is only for space protected from the weather; actual sale and exchange can be handled quite well by individual refugees.

NONAGRICULTURAL PRODUCTION

Handcrafts and Light Industry

Types. Light industry and crafts that do not require long setup time or expensive industrial development have potential application to refugee village self-support, as well as to nonrefugee rural villages in underdeveloped areas in general. Such industries should be labor-intensive rather than capital-intensive, and should either draw on existing skills or require only minimal training. Handcrafts of the folk-art type, furniture making and building fishing boats, for example, can provide an income if the circumstances are right and a demand for these products exists. Analysis of specific possibilities for self-support industries is outside the scope of this Memorandum, but some requirements imposed by such industries are outlined here.

The refugee resettlement program may create opportunities for industries in the villages. One possibility here is to establish a furniture-making industry in the first of a group of villages to be set up, with future refugee villages as the intended market. Village offices and schools are also potential customers. UNRWA⁽²⁴⁾ paid Arab refugee carpenters to produce furniture for offices and schools and also paid tinsmiths to make measures for food distribution.

General Economic Requirements. The success of any industry depends on the availability of needed materials, a labor force, equipment, a place to work, and access to markets. Some person, group, or organization must do the planning and managing, provide or arrange for financial backing, and take the risks associated with the industry. Such factors as changes in raw material prices, market demands, and competition must be considered. The labor force may need to be trained, imposing a requirement for planning and conducting a training program.

Requirements Peculiar to the Refugee Village Situation. A temporary refugee village is unlikely to benefit from an industry that takes five years to develop, unless a substantial labor force is needed during the developmental period, and someone (corporation, government agency, entrepreneur) is willing and able to pay the labor force before

production begins. Raw material sources in insecure areas may be undependable, or may impose higher material costs. New industry in a refugee village, if given subsidized access to materials, facilities, or markets, may undercut and impoverish existing producers. The labor force, while available, will have few skills other than those used in normal farm work. An industry whose labor force comes from a temporary resettlement village will end when villagers return home and resume farming, so that industries that meet a temporary need may be attractive while long-term investment is inappropriate.

Receipts and Costs. It is impossible to predict receipts and costs for "village industry" in general. Light industry should at least sell enough to cover costs for materials produced outside the village and for nonrefugee services required, but it is not really necessary for village light industry to be economically viable if the alternative is an unemployed or underemployed labor force. A subsidy to industry which is paying wages to villagers may be cheaper than direct relief payments. Care must be taken to estimate the full extent of subsidy to village industry which is not self-supporting (i.e., to include transportation of goods to market, managerial services, tax exemptions, and the like in the subsidy if the refugee program administration provides them free), and also to estimate the effects on nonsubsidized industries in the same field.

Fishing

Refugee villages supporting themselves through coastal or ocean fishing constitute a special case that has a precedent in the 1954-1955 resettlement of refugees from North Vietnamese coastal villages. Coastal fishing is probably practical only for villages whose population is drawn predominantly from fishing villages. Refugees who are fishermen have the skills to reestablish themselves if they resettle along the coast or a secure navigable inland waterway. The only assistance they need would be fishing boats and equipment (or assistance in construction) and access to markets.

A village of refugee fishermen who have their boats and equipment intact, and have been resettled in a coastal area where fish can be

marketed easily, should have no trouble reestablishing themselves economically, and should need only a minimum of aid in building new homes. This is probably the easiest type of village to guide toward economic self-support. Security restrictions on coastal fishing, of course, could change this.

Production for Home and Village Use

Refugees in a resettlement village should logically build the houses and other buildings, furniture, chicken coops, and pig pens, make tools, do repairs, and other work normally done by village craftsmen. This sort of activity provides jobs for refugees, keeps their skills current, permits them to teach skills to young men in the normal manner of village apprenticeship, and reduces village inputs from outside.

Costs associated with production for internal use are incurred for tools (a one-time cost that may be avoided if refugees can bring their own); tool upkeep, repair, and replacement; and materials. A typical Khanh Hau carpenter or implement maker owns \$15 to \$30 in tools and spends \$7 to \$9 per year on tool upkeep, largely for replacement blades.* Materials may come from within the village, may be available from an area nearby where it can be gathered, or may be purchased; costs will depend on the type and quantity of material as well as the source.

About 30 of Khanh Hau's families, or 5 percent of the population, make a substantial part of their year's income from carpentry or farm implement manufacture. If this is typical, a refugee village of 1000 families would have about 50 families with these skills for full or partial support, owning something like \$1000 in tools and spending about \$400 per year on tool upkeep.

If refugees are living entirely on minimum-level relief with no opportunities to produce for customers outside the village, carpenters will be idle much of the time because their production will be limited to what can be made from locally available materials, while their

* See p. 157 of Ref. 2.

potential customers will have no money to buy furniture, and little or nothing to barter for it. A higher level of relief payments can overcome both limitations and stimulate this type of economic activity within the village, but some of the money involved will flow out of the village to pay for outside materials and tool upkeep, and some will be spent for outside goods having no village labor component. This is similar to the situation in international economy in which internal prosperity increases the demand for imports and causes a payments deficit. Associated with this higher level of relief payments will be higher costs that enable village carpenters to be fully employed making goods for use within the village; these costs can be offset only in part by removing carpenters from relief rolls; the net cost can be regarded as the price of an economic environment that allows carpenters to maintain and use their skills and teach them to others.

EMPLOYMENT OUTSIDE THE VILLAGE

Types of Employment

Most jobs potentially available to refugees will be in new or expanding areas of the Vietnamese economy, and in the present Vietnamese situation this means jobs related to war activity. Refugee employment in these fields is suitable from several standpoints. Some of these jobs are in areas away from major cities, and therefore do not have an adequate local labor force to draw on; many jobs will end whenever a reasonable degree of internal security is established in Vietnam, and at this time the refugees will be able to return home and will no longer depend on outside employment.

In this category are construction of military bases, ports, logistic facilities (e.g., the port at Cam Ranh Bay) and associated roads, power stations, and the like; direct employment by military forces, Vietnamese and American; and employment by firms expanding their labor force to do more work under military contract. Jobs in the refugee resettlement program are similarly war-related and temporary. Some refugees should be logical recruits for the resettlement cadre, while

others may clear land and do initial construction work for new refugee villages. Refugees who meet age and health qualifications for military service, of course, may be enlisted, and while military recruits will normally leave the village and be stationed elsewhere, it is quite possible for their families to live in the refugee villages and receive aid if needed to supplement military income and the incomes of any other employed members of the family.

Public works on roads, railways, power stations, and other facilities not related exclusively to new military requirements, can also be done by refugees. And some refugees may find employment in more normal types of work, particularly in labor-short areas where workers have been lured from their normal jobs to higher-paying work on military projects, or where it has not been possible to replace drafted workers. If refugees saturate the area labor market, however, this will work to depress wage rates and adversely affect both the economic status of nearby communities and the relationships between these communities and the refugee village, as discussed in more detail in Sec. VII.

Only a small minority of rural villagers have skills in nonagricultural work, however, and the jobs likely to be available in an area with no real labor shortage are undesirable, underpaid, and seasonal positions like city garbage collection and farm labor at harvest time. The emphasis in this discussion, therefore, is on the types of employment that appear most desirable and most readily available to refugees, the situations where refugee villages might be self-supporting through this employment, and the impact this has on planning, building, and operating a refugee village.

Military Base Employment

Job opportunities at new and existing military bases range from highly skilled labor, such as aircraft maintenance, to completely unskilled labor of the earth-carrying and ditch-digging type. Most jobs at a base under construction probably require no training; some others require either simple training that can be given on the scene, or a knowledge of house building and carpentry at a level common to rural

carpenters. It should be possible, then, to employ rural refugees for most jobs related to constructing or expanding a military base.

Many of the unskilled labor jobs will disappear when a new base is completed, but refugees can fill some of the long-term jobs. Military logistics bases need cargo handling labor. Work crews employed in road maintenance can acquire needed skills as they work under supervision. Cleaning and janitorial services need no skills that cannot be taught on the scene. Literate villagers have other and better prospects for continuing employment on a base.

Military bases generate other types of employment and commerce, as military personnel buy transportation, souvenirs and craft type merchandise, and several types of commodities and services that can be grouped here as "recreation." This last category of commerce undoubtedly puts money into the hands of whoever provides the goods and services, but has a distorting effect on wage levels and also has unfortunate social side effects. Free-spending military personnel create a demand for feminine company and alcohol, and it may be advisable for military authorities or village leaders to discourage this sort of commerce. This potential problem area should be recognized by both military and village leaders, and they should be prepared to work together if controls are needed.

Still another type of "commerce" the presence of military bases makes possible is theft and sale of stolen goods. Refugees are probably neither more nor less likely to engage in this type of enterprise than other persons in rural Vietnam, although the entrepreneurship involved is likely to come from city people rather than from either refugees or established local inhabitants. This is essentially not a refugee problem, since necessary procedures and precautions against theft are the same whether the people living nearby are refugees or have been living in the area all along. There may be ways of reducing the ease of theft, however, by carefully choosing refugee village locations.

Security requirements may limit the employment of new refugees on military projects, since the refugees considered here are now living in Viet Cong controlled or contested territory, may have relatives in

Viet Cong units, and may have to be moved by force. Earlier, "voluntary" refugees look like better security risks. Supervision can minimize direct sabotage by refugees who maintain covert Viet Cong connections, but it seems probable that any information refugee workmen glean could easily find its way to Viet Cong hands, and this may mean added costs for security, supervision, or use of other personnel for jobs in sensitive sections of the base. It may be, on the other hand, that these precautions are necessary with any labor force, old or new, refugee or local resident.

Jobs in the Resettlement Program

Within the refugee resettlement program there will be job opportunities for resettlement cadre and construction crews when new villages are established. In most cases, the specific needs are for personnel with some training. One prediction of the training and time requirements for resettlement cadre can be taken from present practice for Revolutionary Development Teams at Vung Tau, who go through a 13-week course.

Site preparation and construction crews for new villages can be drawn entirely from newly arriving refugees. One possibility here is a village construction work force drawn from the first refugee village of several being set up in an area; this crew would go to village sites in sequence, clear some or all of the land, and put up temporary shelter and perhaps permanent public buildings. This would be a useful technique if outside jobs (e.g., on military base construction) were to become available in large numbers, but not as soon as the first refugee villagers were looking for work.

The size of a construction crew would depend on the time available for doing the work, the terrain and ground cover, and the availability of bulldozers. It is not something that can be estimated for a general case. Resettlement cadre can be estimated somewhat better; the need is small in proportion to total village population and does not make much economic impact on the village from which the cadre come.

Public Works Projects

Public works have probably been used for relief for as long as there have been urban unemployed. Where the only two options are public works projects and direct money or commodity relief, public works have the advantages of maintaining work skills, work habits and morale of the work force, while producing new or improved roads, buildings or other visible output. They are also self-policing if time sheets and payroll records are honest; if attendance at the job site is required, a man cannot collect work relief money while working on another job or collect on two rolls at the same time, as is possible with ordinary money or commodity relief.

The arguments against public works projects often are directed against lax or dishonest payroll records or political misuse, such as use of the work force to improve personal property or access roads to benefit certain individuals, graft on purchase of materials, and the like. There are also some questions of cost and benefits that can be raised legitimately against any public works relief program, however well run. In general, such programs are for building things that presumably will benefit the community, but that are not valuable enough to be built in normal times when there is no need for relief. This implies that the gains from most public works relief projects will not be worth as much as they would cost if wages paid were high enough to draw workers from other jobs, even if there were none of the usual political factors that affect the allocation of public works money. Costs of a public works program are higher than direct relief payments to the same work force, since materials and equipment must be bought, plans made, supervision and perhaps transportation provided; the net additional cost may be low, however, if the people providing materials and equipment, plans and supervision would also otherwise be on relief.

For the Vietnamese refugee situation, the merits of public works relief projects can be evaluated along these lines by comparing the value of the projects (work accomplished, skills learned and work habits maintained, and relief abuses reduced) to the net additional cost in inputs not available within the refugee community. Evaluating "work accomplished" means estimating the gain to the community of having the roads, buildings, or other facilities built; "net additional cost"

should take into account possible inflationary pressures, use of scarce equipment, planning and organizational effort, increases in costs of village land, construction or security due to locating the village near a project site; gains in skills and work habits are difficult to measure.

The public works projects that might be logical candidates for refugee work in Vietnam are the following: those which could be performed in a local area (within commuting distance of a suitable location for the refugee village); require primarily unskilled labor; and are in an area where there is good security against Viet Cong attacks and harassment. The security requirement probably eliminates land reclamation projects like draining more of the Plain of Reeds or clearing and terracing new land for farming, and also rules out road extensions into inaccessible areas. Remaining possibilities include highway and railroad improvements, including damage repair; new road construction in secure rural areas; extending city water and sewer lines; constructing dams, power plants, levees, causeways, and other facilities for power generation, land protection, or road or railroad use; constructing public buildings, schools, hospitals; improving irrigation systems by constructing new canals, enlarging old ones, installing gates, clearing obstructions, constructing and improving docks and other port facilities. Other construction, improvement and damage repair possibilities could be added.

The village need for outside income is discussed in Appendix B and summarized in Sec. IV under Other Living Expenses. If public works projects are the only source of refugee income, the wages to be paid by public works project employment must total \$235,000 to \$290,000 for a 1000-family village, with the lower figure applying only if refugees can produce all of the meat, fish, fruits and vegetables they need. If relief grants are to be eliminated, all families must have someone earning wages, either on public works or within the village economy.

The wage component of public works costs can be treated in the same way as work relief or direct cash relief payments. Other components

such as supervision, equipment, and transportation have been mentioned earlier, and while costs can be estimated for specific projects, it is not sensible to make a universal estimate of the cost of public works projects. Another factor which merits mention, but is hard to cost, is the value of the training refugees receive working on public works projects, which will apply only in certain cases and only if supervision is good enough to permit on-the-job training as well as direction for unskilled tasks.

The 1950-1951 UNRWA Palestine refugee experience with public works relief in Jordan and Lebanon was discouraging and proved too costly to continue.^(24,25) Jordan and Lebanon did not reimburse UNRWA for the road and forestry work accomplished, and UNRWA relief costs increased with no offsetting income or savings from the projects. Since UNRWA had consistently operated with inadequate financial resources, they could not continue the relief projects as gifts to Jordan and Lebanon and as morale and skill builders for refugees.

While on the project, workers had continued to receive ordinary commodity relief, but had been charged for it, usually by having the value of the relief food and services for four persons deducted from their salaries. This reduced take-home pay to about \$10 to \$15 per month per worker in addition to full relief food.⁽²⁵⁾ Even so, UNRWA estimated⁽²⁴⁾ that the cost of providing work relief for a refugee was five times the cost of supporting him on relief. This would not necessarily hold for an American-financed program in Vietnam. These cost tradeoffs are larger than the difference expected for a Vietnamese refugee operation with living standards as described in this Memorandum, since UNRWA food rations were (and still are) at a minimum subsistence level, and had to be increased for those on public works projects.

Opportunities for Small Business

Rural Vietnam has its own small entrepreneurs, and those individuals among the refugee population who have the ability and the drive to look for ways of self-support can probably become self-supporting in a refugee community that is located in a populated area. Khanh Hau businessmen have built rice mills and started a one-truck transportation

business outside the village; carpenters and tailors have skills that are salable in other villages. These opportunities apply to only a small minority of the village population, but it is possible for these people to go off the relief rolls if they have the tools or capital required, and if the refugee village is not completely isolated.

Either grants or credit can be used to provide tools or working capital; in some cases, refugee artisans will bring their own tools. UNRWA has found small grants to be a helpful investment in refugee welfare when a refugee has a skill but lacks tools with which to pursue it; such grants are noted in earlier UNRWA reports, but have apparently been discontinued, perhaps due to budgetary problems as the refugee population has grown. The concept is that grant recipients become self-supporting, and can be taken off relief rolls.

Village Location and Outside Employment

The general relationship of village location and employment opportunities is obvious: if the refugee village is too far away from potential locations for employment, villagers cannot be self-supporting. This general statement can be refined somewhat, and a few other points should also be noted.

Villagers can travel to their jobs by foot, bicycle, motor vehicle owned by villagers or the village administration, motor vehicle owned by the employer, public transportation, or by sampan. Costs vary. Foot travel is essentially free, as is travel by family-owned small sampan. Bicycles, given approximate costs of \$30, credit at 1 percent per month, and a life expectancy of ten years with \$2 per year in repairs and new tires in that period, have an average cost of 60 cents per month, or two to three cents per working day, assuming repayment and repair costs are evenly spread over the ten-year period. This will vary with the length of the daily trip only insofar as the trip length affects bicycle life and repair costs.

Public transportation fares run about 0.75 U.S. cent per mile in Southeast Asia, judging by a small sample of available fares: 0.5 cent per mile for train travel in the Bangkok suburban area; 0.8 cent in Thailand outside of the central plain; 0.9 cent average receipts per

third-class passenger mile in Vietnam in 1962;⁽¹⁷⁾ and 0.7 cent per mile (1961) for the 14-mile bus trip between downtown Bangkok and Don Muang. Travel by noncommercial motor vehicles may cost little if vehicles are needed during the day but not during commuting hours, as would be the case if trucks used on road improvement projects were garaged in the village and used to transport workers to and from the work site. Trucks or buses owned by the village and used to carry commuting workers would be quite costly per trip if they made only one round trip per day, but would be more economical, probably costing about as much as commercial bus transportation, if they made several trips each in the morning and evening travel hours.

There is no fixed limit to commuting distances and costs, but it seems reasonable to set limits for desirable commuting distance at one hour's travel and to assume that bus fare costs must be reflected in wage levels.* On this basis, walking limits are about three miles, bicycle about eight miles depending on road condition, and employer-paid bus or truck riding 15 to 20 miles. The maximum practicable limits for commuting are probably about three times these "desirable" limits. A general rule for village and employment locations might be that the village and the worksite should not be more than about five miles apart unless transportation is either provided or subsidized, or workers have bicycles. The subsidy for transportation for a ten-mile trip would be about 15 cents per worker per day if at commercial bus rates.

The costs involved in locating a village within five miles of employment can be in any of several categories: long-distance movement of refugees; use of land that is more expensive to buy or to prepare; provision of facilities such as markets where no established communities are close enough to potential refugee village sites; defense and security for outlying areas. Expenses like these help provide self-support, and are alternatives to larger relief costs.

*It is common in Japan for employers to purchase or to reimburse employees for monthly commuter tickets; this may be an acceptable method of subsidizing long bus rides in Vietnam.

If village support is to come in part from work in preparing other village sites, the village sites must be close enough to permit home-to-work travel. And for work on military bases, ports and the like, village location must also reflect base and port security requirements by being far enough from the fence to permit the base to protect itself against pilferage.

The number of jobs within reasonable commuting distance of a refugee village site and the wage scale for these jobs is a key factor in refugee village size. An industry, military base, or public works project with a total payroll of a little less than \$300,000 per year for jobs that refugees can fill will support a 1000-family village, and only one such village (or several smaller ones totaling 1000 families) should be planned to depend on this source of income. Jobs could, of course, be rotated among three 1000-family villages to give each village \$100,000 in outside income per year, which would permit the relief program to be limited to food, medical care, and resettlement assistance.

EMPLOYMENT WITHIN THE VILLAGE

Some jobs will be available within a refugee village, even if it is fully self-supporting with no need to expand these job opportunities as a form of work relief. These include operating small stores, selling garden produce, carpentry and tailoring. In addition, village administration and public services will need some personnel, although not all such jobs can be filled by untrained rural villagers.

Village administration and related requirements are discussed in some detail in Sec. VIII, and requirements for trained and untrained school personnel in Sec. VI. In summary, administration, police, and public services could employ as many as 25 to 30 persons full-time in a 1000-family village, but a normal rural village of this size has only two or three full-time people in administration and police activities and uses unpaid labor for such "municipal services" as are provided. Schools may be able to employ village women usefully as assistant teachers or classroom monitors, or even in place of regular teachers.

Salaries for persons working in these jobs in a self-supporting village would logically be at standard rates. If the village is living

wholly or partly on relief, however, those holding jobs might be given food relief and a supplementary wage rather than full wages, if this is easier from the relief administration standpoint.

Placement in village government jobs may be one way of providing support for families with an absent family head, particularly if the family head is in the army, has been killed in military service, or is unable to provide family support for some other reason that might merit preferential treatment for the family. It may be sound practice to give women in such families a priority on employment with the village administration.

VI. EDUCATION

GENERAL QUESTIONS

Child Education

A refugee village can expect to have better schools and higher school attendance ratios than schools in farm villages, even without special efforts to expand educational opportunities. This is so for several reasons. The children's school attendance is not hampered by farm chores, the village will probably be compact and the school centrally located and accessible to the entire village, and teachers will be easier to find and keep in a secure area than in a contested farm village. The existing Vietnamese school system does not produce enough trained administrators, technicians, and businessmen for a developing society, and educational opportunities have not generally been available to rural youth. Vietnamese rural villagers generally are reported as eager for schools for their children. A combination of national needs, local wants, and opportunity therefore exists; the problems have to do with the level and types of education that might be offered, techniques that might be used, and the associated costs in manpower, equipment, and scarce skills.

Literacy and Vocational Training

Much the same combination of needs, wants and opportunities can be found with respect to adults and to young people who have left school, even though the latter would be in school if they were in a country with a more complete school system. Special educational programs can be designed to help people fit better into a developing world where literacy, arithmetic, and some knowledge of government and world affairs are important even to the small farmer; programs can also be directed toward job training. If the village is not self-supporting, programs of this type can utilize otherwise idle time as well as build for the future. And even in a village with ample employment it will probably be possible to set up evening classes for

adult education. One related question in a village with jobs available is the desirability of efforts to keep young people in school when they are old enough to hold jobs and add to family income.

Related Issues

In addition to quantity, quality, types, and costs of educational services, an analysis of the educational aspect of a refugee program should consider the impact on nearby communities. A good educational program will attract prospective students from nearby villages, and it may be possible to expand the program to serve the entire district--or may be necessary to discriminate against nonrefugees by limiting attendance to residents of the refugee village. A program offering teacher salaries above standard might draw teachers from other villages in the area, which would transfer a teacher shortage rather than eliminate it.

Another potential pitfall of educational system development is that of producing trained persons who are not prepared for the mix of available jobs, creating an unemployed educational elite who compete for scarce civil service and legal positions as in India. This is a problem taking several years to generate, and education of refugee children over a one- to five-year period would not be likely to produce more graduates on any level or in any specialty than the country can utilize. It is important, however, to relate education to national needs and national ability to utilize trained personnel, matching educational programs to future jobs as well as to the aptitudes and ambitions of the students.

PRIMARY AND SECONDARY EDUCATION

The Existing System

Curriculum and Attendance. The Vietnamese school curriculum is on a 5-4-3 system--5 years of primary school, 4 years in the first division of secondary school, and 3 years in the second division, leading to a baccalaureate examination that is a prerequisite for

university entrance.* Academic work is of prime importance, with language, literature, and philosophy included in the secondary school curriculum.

Dropout rates are high. Enrollment statistics for 1964-1965⁽²⁶⁾ indicate that only about half of those students who finish primary school continue on to secondary school, and a similar loss is shown between the two divisions of secondary school. Comparisons based on first-grade enrollment are probably of limited value, since many new primary schools have opened, and students have not been attending them long enough to continue into the upper grades. But a comparison of student enrollment in the beginning years of each school division shows this: for every 100 first-grade pupils, there are 15 students in the first year of junior high, and 5 students in the first year of high school. Continuation rates are greater in Saigon than in rural areas, and are generally lowest in the Central Highlands.

Primary schools have strong support in rural villages; studies consistently show that parents believe in education as a means to a better life for their children, and schools seem to be well attended where they are established and the security situation permits. Continuation beyond primary school is apparently quite rare in rural areas, the principal factor being the shortage of secondary schools. Village children must compete for scarce places in schools in provincial and district capitals; if they are successful, they then must either live away from home or commute.

Khanh Hau experience indicates that rural families will send their children to schools beyond primary level when one is available within the village. A course equivalent to the first two years of secondary school was begun in Khanh Hau in 1958, and was well attended

*The usual American terms for schooling corresponding to the two secondary school levels, "junior high" and "high school," are used hereafter to avoid the confusion of such terms as "first division of secondary school." This is not to imply that curricula and standards are identical, but the number of years of schooling correspond--9 years to complete first division or junior high, and 12 years for the full course.

despite a tuition charge which Hickey terms "rather high by village standards."^{*} Attitudes may be different in isolated areas and among highland tribes. Khanh Hau villagers are well aware of economic opportunities off the farm, since the village is on a main road and accessible to Saigon, and Hendry reports that some families prefer nonfarm careers for their children. But this interest in economic advancement, nonfarm careers, and education can be found in other villages as well.

At higher levels, Nighswonger⁽⁷⁾ notes that 90 percent of the junior high graduates who applied for senior high admission in Quang Nam in 1964 were turned away. This suggests that the interest in education at all levels runs well ahead of the supply of schools, and also that rejected students apply again in later years, for 1964 enrollment in grade 10 in Quang Nam was about 50 percent of enrollment in grade 9.

Class Size. Pupil-teacher ratios in Vietnam are high by Asian standards, averaging 55 students per teacher in primary schools and 30 in secondary in 1958,⁽²⁷⁾ and rising to 59 in primary and 50 in secondary by 1964.⁽²⁶⁾ Ratios of 30 to 45 primary pupils per primary teacher were reported⁽²⁷⁾ for Burma, Indonesia, Japan, the Philippines, Singapore and Thailand, while their secondary school ratios ranged from 25 to 31. Khanh Hau, in 1958, had 778 pupils (including some from neighboring villages) in its 15-class primary school for an average class size of 52.

Costs. Expenses are the one-time costs of school building, construction and initial equipment (mostly furniture), as well as the recurring costs of salaries for the principal and teachers, textbooks and writing materials, and building and equipment maintenance.

Building construction costs will vary depending on the space per pupil, the type of construction, the transportation costs of building materials, and how much outside labor is needed. Vietnamese costs per classroom now appear to be about U.S. \$1000,^(7,13) with the AID

^{*} Reference 3, p. 208.

figure⁽¹³⁾ including furniture. UNRWA costs for schools in Palestine Arab refugee camps have run \$500 to \$1100 per classroom, depending on location, with concrete block construction used for newer schools;⁽²⁸⁾ this is for classes averaging about 30 students. All of these costs are for permanent construction. As discussed earlier and as is common practice now (as noted in the discussion of village construction in Sec. III), refugee labor can be used for schools on an unpaid or work-relief basis more easily than for other public buildings, since the motivation for schooling and school construction is high. Materials and some supervision will probably come from outside of the village resources, and it is this component that represents the minimum cost of school building construction. A classroom space allowance of three square meters per pupil, also discussed in Sec. III, should be adequate.

The cost of school chairs and desks or tables depends on two factors: the cost of materials and the availability of carpenters. If carpenters must be taken off other jobs to build school furniture, then it is probably better to cost the furniture at current Vietnamese market prices; if carpenters would otherwise be underemployed and on relief, then wood is the only cost component applicable to school furniture.

Recurring costs for 1962 can be estimated from Ref. 17. National government expenditures for primary schools totaled VN\$539 million, or U.S. \$7.7 million, which is \$320 per class and \$5.89 per student per year. Materials and other nonpersonnel costs were only 3.7 percent of this. At the secondary level, expenditures of VN\$315 million (U.S. \$4.5 million) are \$641 per class, or \$20.65 per student. This incorporates both public schools and subsidies to private schools, but does not allow for the portion of private school costs paid by students, so that the costs for public schools are probably somewhat higher, particularly at the secondary level where most students are in private schools. If the \$7.7 million spent for primary education had been allocated to government schools only, costs would have been \$398 per teacher, or \$7.05 per student. The overall cost in 1962, therefore, was somewhere between \$27 and \$33 per month per primary

teacher, or between 49 and 59 cents per primary student, with school materials accounting for less than 4 percent of this.

AID budgeted VN\$15 (21 cents U.S.) per pupil for school materials, exclusive of textbooks, for AID-sponsored hamlet schools for 1966.⁽¹³⁾ AID is providing textbooks for Vietnamese elementary school children, and it plans to include junior high schools in this program too. Textbooks cost about 25 cents each. Since students are permitted to keep these books after the school year ends, the current textbook cost is about one dollar per student per year. Textbook distribution is available to all schools, whether public, parochial or private, which teach in the Vietnamese language.

(French and Chinese schools and their student population have been excluded from these computations. If any of the national education budget was allocated for subsidies to these schools, then the average costs in the above paragraph have been overstated by small amounts.)

Teacher salary is the largest component of school operating costs. The monthly 1965 salary of VN\$1700 (U.S. \$24) reported for Duc Lap in a recent RAND study is probably a reasonable estimate. As seems typical of school salaries in most countries, this is low enough that teacher recruiting for Duc Lap was difficult for salary as well as security reasons. Salaries in 1966 for teachers in rural Quang Nam are shown as VN\$2500 in the Central Rural Reconstruction Council budget quoted in Ref. 7, probably reflecting recent inflation that has also been reflected by changes in the exchange rate. AID used a VN\$1500 estimate in 1964 when budgeting for fiscal 1966.⁽¹³⁾ Other recurring costs include both nonteacher personnel and materials (texts, pencils, paper); utilities are nil in a rural Vietnamese school, and building and furniture maintenance should be insignificant. For cost estimating purposes, it seems reasonable to compute the monthly operating costs of a primary school at \$25 per teacher; \$2.50 per class for school principals, administrators and clerks, at an arbitrary 10 percent of total teacher cost; and 10 cents per pupil for textbooks and materials. This is a total of \$33 per month per class of 55.

For a 1000-family village, schooling at this level for 100-percent attendance among the 880 children aged 6 to 10 would entail 16 classes for a total monthly cost of \$528--\$400 for teachers, \$40 for administration, and \$88 for books and materials. This is in addition to construction costs for 16 classrooms and furniture for them. Salary costs might be reduced somewhat if the village population included school teachers who would otherwise be on relief, but this would be an unusual situation in a time of national teacher shortage. So the above costs of approximately \$500 per 1000-family village per month appear to be minimal. For the 1815 potential students aged 6 to 17 in a 1000-family village, the similar costs for 33 classrooms would be \$1089 per month--\$825 for teachers, \$82.50 for administration, and \$181.50 for books and materials.

It is more accurate to describe these costs as the normal expense of extending education to rural villagers as security permits, for current GVN and U.S. AID efforts to expand education have concentrated on opening elementary schools in the more secure rural hamlets. Costs should be about the same for village schools of a given size whether the village is made secure or the inhabitants move to a secure area as refugees.

Expanding and Improving the System

Categories of Pupils. Since secondary education is rare in Vietnamese rural villages, almost all rural refugee children will fall into one of the following age and education categories:

1. Primary students who have been attending school and are working toward graduation from fifth grade; ages 6-10 inclusive.
2. Primary school dropouts who are still in the primary school age bracket of 6-10 years, but have left school before completing the fifth year.
3. Older dropouts who did not complete primary school and are beyond primary school age but still children, taken here as ages 11-17 inclusive.
4. Primary school graduates who are not attending school and are not yet 18.

A 1000-family village can be expected to have about 880 children of ages 6-10, 550 of ages 11-14, and 385 of ages 15-17, if the age distribution has not been unduly distorted by the insurgency.* The "minimal" system outlined earlier provides school facilities for the 880 aged 6 through 10, permitting current students to continue until graduation, and for "dropouts" who are still in this primary school age bracket to return to school until they have reached age eleven.

Primary School Expansion. Additional primary school classrooms and teachers, using the normal primary curriculum, will permit both groups of "dropouts" to return to school and continue to graduation. The schooling needs for this group will depend on how many failed to complete five years of primary schooling, how much schooling they received, and how old a person can be and still be eligible to return to school. Many villages do not yet have the full five-year primary course.

For example, if the school in the home village provided just the first three grades, as some village schools do, and all children aged 6 through 8 had attended, there would be about 528 children currently enrolled in the three school grades and 1287 ready to enter fourth grade, some of whom would need quite a bit of refresher work to remember half-forgotten arithmetic. If five grades had been available at home and universally attended, there would be 935 children ready (and, by the criterion used here, still young enough) to go on to the first year of secondary school, in addition to the 880 primary school students.

Reduced Class Size. The present pupil-teacher ratio in Vietnam is high even for Southeast Asia, as previously noted, and is probably the result of trying to expand the educational system as much and as rapidly as possible on a limited budget. Class sizes around 30 are considered a reasonable compromise (between the improved educational opportunities and better discipline of smaller classes and the cost of adding teachers) in American schools, and other national school

* See Table 1, page 9, for an outline of the expected age distribution.

systems appear to use 30 as a reasonable goal. This does not increase school building size significantly, although there is a need for more partitions. Teacher costs go up and there is probably a proportionate increase in administrative supervision required.

With class size averaging about 30 pupils, the monthly operating cost of a school for 880 children in the 6-10 age bracket would be U.S. \$885: \$725 for 29 teachers' salaries, \$73 for administration, and \$87 for school materials. On the same basis, a school for 1815 would have 60 classes and monthly costs of \$1800: \$1500 for 60 teachers' salaries, about \$150 in supervisory and administrative salaries, and \$180 in materials.

Secondary Schooling. While the above teacher manpower requirements apply independently of the mix of school grade levels, secondary schooling does impose some additional requirements for different curricula and facilities and for teacher training, and probably also higher salaries for qualified teachers. A curriculum problem arises from the strong academic bias of Vietnamese secondary schools and the consequent orientation of the school system toward preparation for the baccalaureate and toward university entrance, even though only a small minority of secondary school entrants achieve this. The existing system is designed to produce an educated elite group, not to provide a balance of knowledge and skills for the entire population.

The immediate problems of planning and teacher training are made less acute by the scarcity of secondary education in rural Vietnam. Few, if any, of the village children will be ready for classes higher than sixth grade (the first year of secondary school), and it is not necessary to specialize along college preparatory and vocational lines this early in the educational process. There is some lead time for planning modifications to the curriculum and for teacher training if the full secondary school course is to be made available in refugee villages as pupils become ready for it. Initially it is possible that all 935 children in the 11 through 17 age bracket would be candidates for sixth grade; this would hold true for a village in which five-grade primary education has been universal but no opportunities

have existed to go on to secondary school. Once secondary schools have been available for several years, this potential student population of 935 would be distributed roughly 550 in the four junior-high grades and 385 in grades 10 through 12. Ten teachers would be required in junior high and 7 in high school, with all 17 teaching initially at junior-high level. This assumes no dropouts, and also assumes that an average class size of 55 is reasonable for secondary schools. Costs are included in the \$1089 per month estimated earlier for schooling for all children of ages 6 through 17, except for costs such as teacher training and perhaps higher salaries for secondary school teachers.

Requirements for Teachers

Minimal System. The smallest of the four school systems considered here, in which five-grade primary education is made available to pupils aged 6-10, is essentially the present rural educational system. In a village having a working five-year school, the staff can be moved with the rest of the population to the village and no additional requirements are involved. The present system, however, has been implemented in full only in some of the more secure areas of the country. Villages from which the population is evacuated as part of a temporary resettlement program are likely to be without teachers, and their schools may have been destroyed in the Viet Cong campaign against teachers and the government school system.

In many cases, therefore, teachers will need to be recruited even for meeting minimal needs, and teacher recruiting, while easier for schools set up in secure areas, nevertheless draws on a limited number of trained personnel.

Expanded Systems. A primary school for a village of 1000 families would require the following: 16 teachers to provide classes for all children aged 6-10 for 55-pupil classes; 33 teachers if classes were provided for all children aged 6-17; 29 teachers if class size were cut to 30 and the age limits set at 6-10; and 60 teachers if classes with 30 children were made available for the entire 6-17 age group.

Some measure of the impact of these requirements can be inferred from statistics in Ref. 26 for 1964: In a population of about 15 million there were a total of 37,306 teachers in preschool, primary and secondary education, including private, French and Chinese schools, and 57 percent of these were government primary school teachers. This is 14 teachers to an average 1000-family village. The number has been increased by recent AID-supported programs, but teachers and schools are still in short supply in both rural and urban Vietnam.* Allocating more than the "minimal" 16 teachers to a 1000-family village requires that the village have substantially more than its share of the national teacher pool. The cost of training these additional teachers appears to be one that should logically be assessed against the refugee program.

There are several methods for providing additional classes for refugees and for others in Vietnam without lowering the quality of education. In general, these methods fall into three categories:

Ways to increase the supply of trained teachers;

Ways to increase the productivity of trained teachers;

Ways to use technological aids as a substitute for training.

Some specific methods are discussed below.

Increasing the Teacher Supply

Primary Teachers. Adequate salaries and good village security may be sufficient to attract more people into teaching, but the overall shortage and the lead time necessary to produce trained teachers probably mean that refugee village schools will have to rely on villagers who have completed primary school and can be given the 90-day training course that AID and the Vietnamese government have established for new teachers under the Hamlet School program. Discussions with AID personnel indicate that some of these teachers have eight or more years of schooling, and that it is normally possible to use people with some secondary education as teachers for grades 4 and 5, assigning

* See, for example, pages 356-358 in Ref. 29, and Refs. 7, 30 and 31.

teachers with only primary schooling to grades 1, 2 and 3. Even so, this is a minimal level of teacher training and probably should be regarded as an emergency measure, to be followed by in-service teacher training and expansion of normal schools. The current AID program⁽³²⁾ recognizes both short- and long-term training needs. The AID policy might be summarized as rapid expansion of the elementary school system to get some sort of schools into rural hamlets, followed by long-term improvement in educational quality. This seems to be a reasonable course to follow in refugee schools.

The cost of 90-day training for hamlet school teachers is about VN\$6000 (U.S. \$86) according to Ref. 7, which quotes the 1966 Central Rural Reconstruction Council budget for Quang Nam Province. The total cost of training 60 teachers is given as VN\$359,000, which includes VN\$800 per teacher per month for salary or living allowance.

Secondary Teachers. Rapid expansion at the secondary level is more difficult, since the national supply of high school graduates is small relative to needs for trained personnel in both public and commercial fields. The 1964-1965 enrollment at the high school level was 64,320⁽²⁶⁾ with only 9541 in the senior class. Since about 10 percent of the Vietnamese population is of junior high age (grades 6 through 9), universal junior high education would mean about 1.5 million students, and 27,000 teachers if the 55:1 ratio is maintained. There were 7295 teachers at the junior high level in 1964.⁽²⁶⁾ Nationwide secondary school expansion would not be faster than one grade a year, as students previously without secondary school opportunities move up, but even the addition of 4900 teachers a year would use a major portion of Vietnam's annual high school graduating classes. This would probably not be possible even if teacher training facilities were adequate, and it makes no provision for classes for pupils who are already out of primary school and would return to school if they had the opportunity.

Expansion of secondary schooling to include only refugee villages would, of course, have much less national impact, and high school graduates can probably be hired and trained for these teaching

positions. They will, however, come from outside the rural refugee population. The lead time involved is the length of the teacher training course--one or two years for high school graduates. AID has supported a one-year training program to meet the most critical need--to accommodate more primary school graduates through the first year of secondary school (sixth grade). Training for 400 such teachers each year, 1965 through 1968, is listed on p. 359 of Ref. 29 and should provide necessary cost data: VN\$1,228,400 (U.S. \$17,549) for staff and supplies plus VN\$12,000 (U.S. \$171) per trainee for salary and allowances, or an average cost of U.S. \$215 per trainee. On this basis, training 17 teachers to staff secondary schools for all children in the 11-17 age group in the village would cost U.S. \$3655.

Increasing Productivity of Trained Teachers

Longer Hours and Larger Classes. Longer hours and larger classes will accommodate more students when the number of teachers is limited, at a cost in quality of education. Longer hours would allow students to come in shifts, with each teacher having both morning and afternoon classes; this immediately doubles the school's capacity, but imposes strains on teachers unless the school day is shortened. Shift operation and larger classes with one teacher should be considered as useful emergency measures, and (within not-well-defined limits) have advantages over restricting enrollment and excluding some pupils entirely. It appears desirable, however, to make plans and estimate costs on the basis of an adequate school system and reserve these methods of doubling-up for emergencies.

One report⁽³⁰⁾ states that Saigon's 44 government primary schools were on shifts in 1966, with pupils attending for two to three hours and with three shifts in the school day, as an emergency measure to cope with the city's greatly increased population. The same source contains an estimate that only about half of the city's children are in schools.

Assistants and Classroom Monitors. Persons who are not trained as teachers may be useful for maintaining order, checking papers,

listening to pupils read out loud, answering questions about word meanings, and other tasks the teacher would ordinarily do. This would alleviate the teacher shortage and be a way of employing some villagers in the school system. Assistants and monitors probably must be literate and should be primary-school graduates.

Assistants and monitors permit larger classes, thus reducing the amount of money that must be spent for salaries to outside personnel. If the potential assistants and monitors would otherwise be on relief, their employment can be treated as free in cost computations. It may also be possible to use unpaid volunteers from the refugee population. The extent to which various assistants can contribute to learning is not analyzed here, but it is suggested that one assistant per class may help improve educational quality if it is impossible to reduce class size below 55.

Vietnam may already be using something of this sort. The Michigan State University group studying local administration in Vietnam in 1960⁽³³⁾ found payments listed for "Rural Teachers" in the village budget of My Thuan, in Vinh Long Province in the Delta. These were temporary personnel, paid VN\$700 per month (U.S. \$10) in February 1960. The Binh Minh district had four rural teachers among the local teaching staff of 82. They were engaged to help regular teachers, according to village officials; exact duties were not stated. In any event, they were not used extensively and may have been assisting only with special subjects.

Technological Aids

Types. Television and motion pictures can perform the basic teaching function of presenting and explaining facts and concepts, and computerized "teaching machines" now under development can go beyond this by modifying the presentation to match the response of the individual student. While an individual "teaching machine" for each student in a Vietnamese refugee village would require a disproportionately large allocation of resources to education, it is quite possible that closed circuit television, broadcast television, or

motion pictures in classrooms would permit better quality education while reducing teacher training requirements.

Broadcast Television. A multi-channel educational television network is perhaps the easiest option to examine here, since this is the heart of a rather spectacular reconstruction of the educational system in American Samoa in 1964-1965. (The Samoan system is described in detail in Appendix C.) The Hudson Institute report on this for AID⁽⁹⁾ and a newer UNESCO report⁽³⁴⁾ contain comprehensive descriptions of the old and new systems and much cost data.

Samoa's 6-channel educational television system provides instruction for all twelve grades; each channel is used for two grades, and classes spend about two hours of their 5-1/2-hour school day watching televised instruction. The remaining class time is used for recitation, drill, practice, etc., under the direction of the classroom teacher. Workbooks and guides are provided for teacher and student use as necessary. Individual televised lessons run 10 or 15 minutes for grades 1 and 2, and are longer, up to 25 minutes, for higher grades.

While classroom teachers are still required under the Samoan system, the level of teacher training can be much lower. This was the primary reason for installing the television network. Samoan teachers, most with less than a high school education, were not qualified to teach in English. The television network permitted faster upgrading of the educational system than was possible through extensive teacher training, and was less expensive and less disruptive to the community than replacing these teachers with outsiders.

Most educational use of television has been for supplemental courses and "enrichment," presenting only a part of the curriculum and relying on trained teachers in the classroom. One of the earliest American installations is the closed-circuit system in Anaheim, California;⁽³⁵⁾ this is used for science, social studies, art, spoken Spanish and other subjects that lend themselves reasonably well to lectures and demonstrations, but not for skills such as reading, writing and arithmetic. This has permitted class rearrangement into larger groups for televised subjects and smaller classes for skills. The Anaheim method

of using instructional television permits students to be taught subjects in which the classroom teacher has no background, without the need to hire enough special teachers to handle each class individually. The best example of this is conversational Spanish at the elementary school level. But for most subjects, television does not replace the trained, experienced classroom teacher.

The instructional television network in Colombia is also used as a supplement, but includes mathematics and language lessons as well as social studies, natural science and music. A single channel is used for ten hours of instructional telecasts per week, 1-1/2 to 3 hours weekly for each of the five elementary grades.

Even with a minimum-cost system, instructional television is expensive. The dominant costs are for the equipment to produce and transmit the programs; adding more classrooms to an existing instructional television network is relatively inexpensive. Costs for several possible installations have been estimated in Appendix C based on the Samoan system and incorporating several ways of economizing. These costs are summarized in Table 4.

Table 4
INSTRUCTIONAL TELEVISION FOR VIETNAM: ESTIMATED COSTS
FOR FOUR 12-GRADE SYSTEMS
(In \$ million)

System	Saigon Area, 1 Million Students	Nationwide, 5.5 Million Students
Samoa style		
Initial	\$8.1	\$56
Annual	\$7.3	\$41
Economy ^a		
Initial	\$4.2	\$30
Annual	\$3.1	\$19

^a This system has lessons for 12 grades combined into 8 programming levels; shared receivers; and extensive use of videotape.

None of these costs include teacher salaries, texts, workbooks, classroom construction or any of the other components of the present Vietnamese education budget; the costs given include only the additional expenses of using television as a substitute for thorough teacher training and as a means of upgrading the quality of Vietnamese education. The cost of even the lowest of these systems is large compared to the national education budget, which was \$7.7 million in 1962.

The basis for Table 4 is as follows: initial cost components of a Samoan-style 6-channel, 12-grade system are \$1 million for production studios and equipment; \$1 million for a transmitting station; \$340 per television-equipped classroom for receiving sets, antennas and cables; and \$75 per television-equipped classroom for electric generating facilities in rural areas. Annual costs, including program preparation, equipment maintenance, depreciation (or equipment replacement), and electricity, are \$0.9 million per year for production, \$0.45 million for transmitters, and \$330 per receiving classroom for sets and antennas.

Instructional television for the Saigon area, using a single-site, multichannel station and serving the area's potential school population of one million primary and secondary students, would cost \$8.1 million for installation plus \$7.3 million annually for two hours of programming a day for each of 12 grades, a television receiver in each classroom, and station facilities available for other educational uses in the evening.* This might be reduced to \$4.2 million initially plus \$3.1 million annually, while still providing two hours of lessons for each student, by the following: combining lessons for the five elementary grades into three separately-programmed levels; providing two levels of programs for the four junior high grades, while keeping separate programming for the three grades of high school; and moving children between rooms so that three classes can share the same receiver.**

* See Table 29, Appendix C.

** This is the system in the extreme right column of Table 31, Appendix C.

A nationwide network reaching all 5.5 million potential primary and secondary school students in the Republic of Vietnam would cost something like \$56 million initially plus \$41 million annually for 12-grade programming with receivers in each classroom,* or \$30 million initially plus \$19 million annually for an 8-level, shared-receiver system. The relay method used here for cost estimation is the Colombian rebroadcast method, in which each station picks up telecasts either directly from the primary station or from an intermediate station and amplifies and rebroadcasts the received signals. Additional savings, perhaps as great as 20 percent, may be possible if commercial users share facilities and costs.**

Costs for a system designed to serve only refugee villages are not of much interest, because production and transmitting expenses are high enough that it does not seem sensible to install television in refugee schools unless other schools in the area can also be reached. The cost of equipping schools to receive programs which are already being broadcast, however, is pertinent to the refugee village analysis. Costs per classroom are shown in Table 30, Appendix C, for a Samoan-style installation with a set in every classroom and for less expensive installations involving set sharing among classrooms and double shifts in schools. These costs are the basis for Table 5, which shows costs for adding television to schools serving 880 and 1815 students. The two lowest-cost installations shown, for 2-shift operation and for 8-level programming with shared sets, apply only if the broadcast schedule is designed to permit their use. Costs of electric power generating facilities are included.

The costs of providing less than two hours of instruction per class have been omitted because instructional television is proposed here as a prospective substitute for teacher training, rather than as a means of adding a few supplementary lessons to the curriculum.

Some minor offsetting savings in teacher training costs and in salary levels might follow the introduction of television as a result

* See Table 33, Appendix C, for details.

** This is shown in detail in Table 34, Appendix C.

Table 5

VILLAGE RECEIVING COSTS FOR INSTRUCTIONAL TELEVISION
(In U.S. \$)

Classroom Schedule and Set Allocation	Primary School Only		Complete School System	
	Initial	Annual	Initial	Annual
Television in every classroom	\$6640	\$5264	\$13,695	\$10,857
One set for every 2 rooms; schools on single shift	\$3648	\$2688	\$ 7,524	\$ 5,544
One set for every 2 rooms; schools on double shift	\$1824	\$1376	\$ 3,762	\$ 2,838
Sets in 40 percent of class- rooms for 8-level programming; single shift	\$3040	\$2192	\$ 6,270	\$ 4,521

of the reduced requirement for training and experience, since new schools, even at the secondary level, might be staffed by less well-trained teachers who would probably not be paid as much as normal-school graduates. But the important gains are in quality and time, not in reduced cost.

The time factors involved are the planning, construction and installation time for the television system and the training time for classroom teacher/monitors. The Samoan system took two years from start of work to commencement of broadcasts on one channel, but a Vietnamese system could be built more quickly once plans are ready; the transmitting antennas in Samoa are in an extremely difficult location, on a mountaintop with no feasible route for an access road. Schools were completely rebuilt for television in Samoa and some reconstruction might also be needed in Vietnam for already existing schools. It should take no longer to build a new school adapted for television use than to build a new school to conventional design, once the plans are available.

Since television would permit a very small number of well-qualified teachers to serve all television-equipped schools, it is one way to expand the educational system faster than training persons as qualified

teachers. And classes can be larger with television, so that reducing class size from 55 to 25 or 30 becomes less important, although 55 is probably the maximum for viewing from one set.

Teachers who work in an educational system placing primary reliance on televised presentations and demonstrations need less education and can be trained faster than those who must understand the subject matter thoroughly and also know something of educational psychology and teaching methods. Teachers in the television-oriented classroom must be sufficiently literate, educated and mature to read, understand and use supplementary text material, direct students in drill, administer and correct tests, answer questions and maintain classroom order. All this is within the capacity of an intelligent high school student, but as previously mentioned, Vietnam is short of high school students and graduates. The present hamlet school program uses a mixture of primary school graduates and junior high graduates for teaching at primary level. Television may permit a further reduction in minimum teacher standards, but not very much.

Teacher training for television-equipped schools, while not as demanding as regular teacher training, is not a trivial matter. The Samoan experience offers no guidance because the existing teaching staff continued as teachers after television was introduced. Teacher training in Samoa is apparently to take the form of supervised apprenticeship plus summer classwork, quite likely limited to high school graduates.

Training for classroom teaching using television would become easier once the system began operations. Initial school telecasts in the Saigon area, for example, could provide training opportunities for persons who planned to teach in Nha Trang or Can Tho after the system was extended to these localities. Some advance training will be needed for persons who will write, direct and present material on television, and also for persons who will serve as classroom teachers in schools that will be the first to use television. This might be done by American or other educators familiar with educational television, who would work in Vietnam during the test stages of the television network and use aids such as videotape. An alternative is to have Vietnamese

personnel observe teaching and practice the preparation and presentation of lessons using a working educational television system--in American Samoa or elsewhere--where experienced advisors would be available. It seems likely that any of these options for training the television teachers and an initial group of classroom teachers could be accomplished during the year or so needed for studio and transmitter installation.

New schools within an existing educational television receiving area could be set up quite rapidly, requiring only the television sets and related equipment, classroom teachers who could be trained in advance at other television-using schools, workbooks and other materials, normal building construction, and electricity. Costs are as shown in Tables 5 and 30.

Motion Pictures. Most of the advantages of televised lessons could be obtained by substituting a movie projector for the classroom television receiver; movie cameras for the television cameras in the studio; and mail or messenger transportation of films for the television transmitters, microwave relays and other equipment that make up a television network. Costs for equipment would be substantially less. From the standpoint of quality of education, movies have two clear advantages over broadcast television: they can be rerun for review or in case other activity or equipment failure causes students to miss the scheduled presentation, and it is easy to use color. The comparative disadvantages of filmed lessons include the heavy investment in film prints; the resulting commitment to a given curriculum once it has been filmed and large numbers of film prints have been made; the loss of some features that are useful for other purposes but not important for education, such as instant transmission of news events and availability of broadcasts to set owners outside schools; and the need for film distribution arrangements.

Costs for an instructional motion picture system used here, and outlined in more detail in Appendix D, are based on the Fairchild Camera and Instrument Corporation's "Movie-Pak" system, which uses 8-mm sound films in cartridges. This avoids the question of the need

for a projectionist, or for projectionist-training for teachers, to run the system. A lesson schedule of five 22-minute films per class per day is used in these computations, with the further assumption that one of each day's five lessons is either a repeat showing or a film borrowed from another grade, so that each class needs four new films each day. This involves a library of 720 films for each grade or level (for 180 school days). With costs approximating \$28 per film print, a complete one-year, one-grade set of films represents an investment, in film, sound striping, processing and cartridges, of approximately \$20,000.

Production-transmission cost components run much less than comparable costs for instructional television, while projector costs and television receiver costs are not much different. Initial costs for production studios and equipment should be about \$200,000, and operating and depreciation costs about \$265,000 per year during a four-year phase-in period and \$105,000 per year thereafter. Classroom costs, in addition to the film prints, include projectors (420), the electric power supply if not already available, and a share in the school facilities for storing and handling film. If three classes share one projector, which allows each class to receive the full 110 minutes of filmed instruction per day with some spare time for moving either students or projectors, projection and library costs per classroom are estimated as \$165 initially plus \$111 per year. Power plant costs will increase the initial cost by \$10 per classroom for rural schools. This sharing arrangement is assumed in the cost estimates that follow.

The high cost of film prints makes some sharing necessary. Cost estimates are based on the average film print being used by ten classes (of the same grade) per year over a ten-year period. Initial system costs might be spread out over several years, since it is not likely that a full 12-grade curriculum could be prepared, filmed and copied for distribution in the first year. System annual costs shown are averages over the long term, and costs for the first few years, when films and projectors are all new, should run somewhat below these long-term averages. Costs are about the same for programming for eight levels as for separate programming for each grade.

Instructional films reaching all school-age children in the Saigon area, including those not now in school, would involve an initial cost of \$40 million (of which \$36 million is for film prints) plus \$5.7 million per year. A nationwide system serving 5.5 million students would cost somewhat over \$200 million to install and \$31 million annually to maintain and operate. This is high, and would be higher still if changes in the curriculum, frequent losses of film prints or wear and tear made it necessary to replace films more often than once every ten years. On a per-student or per-class basis, these costs look somewhat less frightening, averaging less than \$10 per student per year if the system is used over a several-year period. But costs are quite large compared to present educational budgets. An instructional film system also appears to cost more than instructional television, and to offer fewer opportunities for sharing costs with commercial or other educational uses.

Cost of film prints, projectors and electricity for refugee village schools, with both prints and projectors shared among classrooms as outlined above, would average \$2191 per classroom initially and \$313 per year, as outlined in Appendix D, Table 37. This is the appropriate cost for adding more classrooms to the filmed-lesson system when studios and master films already exist. Over 90 percent of the initial cost and 65 percent of the annual cost is for film prints.

Educational films do have a comparative advantage over television in reaching smaller groups, since almost all of the system cost is directly proportional to the number of classes receiving filmed instruction. This suggests two possible uses in the refugee village context: for secondary education and for minority-language groups. Both situations may present problems in teacher recruitment and training that are harder to solve than teacher recruitment for primary school teaching in Vietnamese. If the school population for such a special group is large enough to permit sharing films among several classes in the same geographical area and sharing projectors within the same school, total costs would not be much greater than the class share of the projectors and the film prints--approximately \$2000 per class initially plus a little over \$300 per class per year. This is

in addition to teacher or classroom monitor salaries, workbooks, building construction, electrical supply to the school, and other usual school costs.

VOCATIONAL TRAINING

Nature and Types

The types of vocational training suitable for a refugee village school system might include training in agriculture; in skills such as carpentry, metal-working, auto mechanics; in administrative, secretarial and clerical skills; and in nurse and teacher training. Training courses may include short, intensive training to acquire a particular skill; vocational classes as part of the regular school curriculum; full-time vocational training following completion of a certain level of regular schooling; courses of varying lengths for persons who have been out of school and may be beyond school age, but who need to acquire or improve a skill for economic reasons; and the like. The characteristics common to the many possible combinations of course subject, course length, age level and prerequisites are that the purpose of this type of training is economic rather than cultural and that it is important for students to have opportunities for supervised practice and to "learn by doing" as a major part of the curriculum.

For cost projections it is easier to study vocational training courses by type of vocation, and within each vocational type to examine the course lengths, age levels, and staff and facilities required. This is done in the following paragraphs, and is followed by a discussion of the applicability of technological aids (television and films) to vocational training.

How Much Vocational Education in Refugee Village Schools?

Full-time training in skilled trades, unlike literacy and mathematics, will be wasted if graduates do not find employment in a specialty related closely to their training. Job opportunities in a developing economy are limited, and full-time vocational school

enrollment should be matched to the need for skilled workers. Training in certain specialties might be done best by a few large vocational schools, distributed around the country roughly in proportion to the regional distribution of job opportunities. There may be no strong reason for attaching such schools to the refugee village school system. The question might be phrased like this: Should the growing national needs for vocational skills be met by training refugee children or by training children selected from the entire population?

There are at least two advantages associated with locating vocational schools in or near refugee villages: refugee youth are likely to be unemployed or underemployed, and they will probably be more mobile (and therefore more likely to move to where jobs are available in their specialty), since they have already left their home village. If television or film instructional systems are installed in refugee village schools but not elsewhere, then these media can be used for vocational instruction only in these villages. Neither point appears strong enough to require that vocational schools be placed in refugee villages. There are also arguments in favor of urban areas for vocational schools: more jobs in the immediate vicinity, more student exposure to the nonfarm world in which most vocational graduates will be employed, and the like. Instructional films can be used wherever the school is located.

It seems reasonable, therefore, to treat full-time vocational schools separately from refugee village schools, and to project a vocational school system that would be open to qualified refugees, rural nonrefugees, and urban youth alike. Such schools might be located in or near refugee villages if convenient, but would not necessarily be a part of their educational program. The possible use of trade schools at night for upgrading adult skills, local machine shop work, and other uses outside of regular class hours may also be a factor in selecting school location.

The above reasoning applies also to training courses for nurses and teachers; it does not appear necessary to locate training schools in refugee villages, although in some cases it may be sensible to do so. It also may not be desirable to give automatic preference to refugee village children for enrollment.

Skilled Trades

Training in skilled trades--those requiring a knowledge of the use of tools and machinery--is particularly useful for a developing nation. Such countries have an expanding requirement for workers having some training or experience in construction, wood and metal working, vehicle maintenance, and the like. There is usually no reservoir of semi-skilled workers whose skills can be upgraded by short on-the-job training. The economic opportunities for vocational school graduates therefore are much better than those for untrained workers; jobs are easier to find and keep, and wages are higher.

Reports on two vocational training programs in other developing regions can be used to illustrate the costs and the potential economic advantages of vocational training where the local economic picture is not dominated by military construction and military operations. These may be more representative of future Vietnamese needs than current Vietnamese data. The training programs discussed are the SEATO Skilled Labor Project in Thailand and the vocational schools operated by UNRWA for Palestine Arab refugee students.

The SEATO Project. This project, financed two-thirds by the United States and one-third from counterpart funds, established vocational schools in 20 Thai provinces, with a total capacity of 7000 students. Existing Thai schools of carpentry were absorbed into the new schools, teachers were retrained, buildings expanded and equipped, and the curriculum redesigned. Three-year courses are offered in auto and diesel mechanics, welding and sheet metal, machine shop, building construction using power woodworking tools, basic electricity, and radio. Students spend their first year taking a basic course in every subject offered and then concentrate for two years on one particular shop course. Most of the 20 schools do not offer all six courses; as of June 1965 there were 93 shops in these schools and another 9 at the teacher training center for the project.

Some points pertinent to a Vietnamese situation are given here; the source, Ref. 36, is the final report by the University of Hawaii, which worked with the Thai Ministry of Education to establish the system over a seven-year period.

Age levels were changed from Thai secondary (U.S. grades 8 through 10) to post-secondary (U.S. grades 11 through 13), which meant that graduates would have the age and maturity level needed to qualify them for civil service employment.

Student mobility, before and after schooling, was great enough that the original idea of designing each school to serve the particular needs of the province was dropped, and regional and national needs took precedence.

Class size was originally set at 20, with first-year classes expanded later to 25 (and in some cases 30) to allow for early dropouts.

Initial costs of remodeling buildings, installing electricity, purchasing and shipping shop equipment, purchasing supplies, building a teacher training school, and training teachers totaled about \$2.9 million. The dollar portion of these costs was spent through a \$1,835,000 contract with the University of Hawaii; \$833,000 of this is identified in AID reports as "commodities" and the remainder covers personnel costs for University of Hawaii personnel directing the project and training costs for Thai participants in Hawaii. The Ministry of Education funds, about \$100,000, were used to construct the teacher training school in Bangkok. Other expenses within Thailand, such as building conversion and local salaries, were paid from a local currency counterpart fund equivalent to \$900,000. In addition, a British contribution of shop equipment and vehicles was valued at \$80,000, and some equipment, not itemized in the project's final report,⁽³⁶⁾ was made available from U.S. military surplus.

Building, remodeling and electrical installation costs varied by school, the maximum being \$12,000; the total for all 20 schools was \$128,000 (\$6400 per school) excluding the teacher training school. Average costs for the six schools having all six shops were \$3700 for buildings and \$3000 for electricity, or \$6700 total.

Operating cost components include electricity, which is about \$50 a month for a six-shop school; building maintenance, a low-cost component because students do the work; materials for shop work; and staff salaries. The former carpentry schools were self-supporting through work done in school shops for outsiders, and the SEATO vocational schools have continued this practice.

The UNRWA Vocational Schools. (10,37) Vocational schools for Palestine refugees have provided opportunities for a small minority of Arab youth to acquire skills that make them prime candidates for employment in the Near East, and thereby allow them to escape the usual life of unskilled, unemployed and virtually unemployable refugee-camp dwellers. During 1965-1966, courses in metal, electrical and building trades had a total enrollment of 1295. A somewhat smaller number of students are trained on a more advanced level to be foremen or trade instructors.

Age levels for the trade courses are 16 and over, apparently without a requirement that the student have completed all nine grades of the regular curriculum. The foreman/instructor course requires two years of trade courses and a year of practical experience as prerequisites.

Costs for 1964-1966 ran a little under \$3 million per year for the entire vocational and teacher training portion of the educational system; this is about \$1000 per student per year, and includes both capital costs (in the year the money was spent) and operating costs. In contrast, the general education (primary and secondary) costs for the same period were \$9.2 million for 217,000 students (168,000 in UNRWA schools; 49,000 elsewhere under UN subsidy), or \$42 per student per year.

Mobility of graduates is illustrated by a statement in Ref. 37 that "Some of the larger oil companies in the region now recruit through the UNRWA Placement Service all their requirements for personnel in the trades taught in the Agency's vocational training programme." This is probably the result of two factors: UNRWA's courses are of at least comparable quality to others in the Near East, and refugee children are more willing to leave home for job offers elsewhere, since the camps offer few opportunities.

Cost Estimates for Vietnam. A six-shop vocational school in Vietnam patterned after the SEATO schools in Thailand, graduating 120 students a year from a three-year course, should cost something like \$70,000 initially and \$18,000 per year over the long term. This estimate was derived as shown in Table 6, and does not include land

Table 6

COST ESTIMATES FOR A VOCATIONAL SCHOOL: 3-YEAR COURSE, 120 GRADUATES PER YEAR

Item	Number	Unit Cost	Total Cost	Basis
Initial cost				
Building: shops	6	\$1000	\$ 6,000	a
classrooms, small	12	500	6,000	b
office; storage room	2	500	1,000	b
Electrical wiring			3,000	c
Equipment	6	9000	<u>54,000</u>	d
Total			\$70,000	
Monthly Cost				
Salaries	20	\$ 25	\$ 500	e
Electricity			50	c
Equipment repair			450	f
Equipment depreciation			450	f
Texts and class materials			<u>50</u>	g
Total monthly cost			\$ <u>1,500</u>	
Total 12-month cost			\$18,000	

^aStandard size elementary or secondary school classrooms, seating 55, are assumed to be about right for classes of 20 using shop equipment.

^bThese are for classes of 20 for non-shop instruction; two additional rooms of small-class size are provided for other uses.

^cThese are the average costs of exterior installations and interior wiring and electricity for the 6-shop SEATO vocational schools in Thailand.

^dThe \$833,000 "commodities" component of the University of Hawaii contract for the SEATO schools and the \$80,000 British grant were mostly spent on equipment for 102 shops and its transportation to Thailand. This averages about \$9000 per shop. It is assumed here that non-shop "commodities" such as vehicles roughly balance equipment obtained free from U.S. military surplus.

^eEighteen teachers (three grades, six courses), one principal and one clerk are assumed, at an average salary of \$25.

^fEquipment repair, including replacement of short-lived parts such as blades and electronic tubes, is computed as 10 percent of the equipment cost per year. Depreciation, providing for eventual replacement of shop machines, assumes a 10-year average life for this equipment. Repair and occasional replacement of buildings, electrical wiring, furniture and the like are assumed to be done by students, using materials bought with profits from outside jobs done in school shops.

^gThis is rounded upward from \$1.20 per year (\$1 for books, 20 cents for paper and other materials) for each of 360 students. Costs of materials used in shop work are assumed to be paid from income from outside jobs done in school shops.

costs or teacher training. Another way of expressing these costs is to say that each of the students in the school represents an investment of \$200 and an annual cost of \$50; this is far below the \$1000 per student per year cited earlier for UNRWA schools.

Implications for Refugee Villages. Several conclusions can be drawn from SEATO, UNRWA and other experience in training in skilled trades:

1. Costs are much higher than for classroom education, by factors of 10 or 20. The primary reasons for this are the cost of shop equipment, the requirement for a good electricity supply, and the need to keep classes small. However, students can do some work for outside sale or contract or to meet needs within the village, and thereby cover some or all of the school's operating costs.
2. Typical courses are two years of specialized training at an age level corresponding to high school. This is in addition to the time needed to determine student aptitudes and interests before placement in the specialized course. There seems to be no reason for excluding older trainees, but younger age groups are not as satisfactory.
3. Neither program has met the entire local demand for trained workers because output has been small relative to total population: in Thailand, there is one skilled graduate per 15,000 local population per year; in the UNRWA program, one per 1700 refugees per year, but graduates find jobs outside the refugee area.

Short Courses for Adults. Shop equipment and electric power generating facilities are the large components in the cost of "shop" courses. Once these initial expenses have been met, the added costs of using trades training facilities in the evening are relatively low: teacher salaries, electricity (for lighting and machinery), and materials. This may permit a vocational school to offer evening courses for adults who need to acquire or expand their skills. Short courses of a few weeks or a few months have not been used in any of the vocational schools studied, and probably cannot be used for adult training either if the objective is to train farmers to be skilled craftsmen. It is quite possible, however, to offer short courses with more limited objectives: training village craftsmen such as furniture-makers in the use of power tools in their own trade, raising skill levels of semi-skilled workers, providing low-level skills, supplementing on-the-job training, and the like.

School shop facilities would not necessarily be available in the evening for these purposes. The class day for regular vocational students may extend into the evening, or the school facilities, which would probably be the only well-equipped shops in the area, might be needed for production work using workers already trained. Still another potential evening use, for either students or adults, is for short familiarization courses in various trades to determine which persons show the most promise for enrollment for full-length vocational training.

Administrative, Commercial and Clerical Skills

One trend associated with national development is growth in requirements for administration, secretaries, clerks, and other personnel having office skills; another trend is an increase in the quantity and complexity of business. Both trends create employment opportunities for school graduates with aptitudes for arithmetic and clerical work, and, at a higher level, for persons trained in administration.

Educational requirements for some of these types of employment are less specialized than trade-school training, and the basic needs for literacy, competence in the spoken and written language, and in arithmetic can be met from a general education curriculum extending at least through the junior high level. Specialized courses in school, similar to the typing and bookkeeping courses commonly available in American high schools, can be quite useful. Typing classes of course require typewriters, but other commercial and clerical classes should require little or no specialized equipment, and it makes little difference in cost projections whether a given class in high school is studying history or bookkeeping.

The long-term school requirements to meet Vietnamese needs for these skills might be universal education through junior high level without any significant amount of specialization, followed by a choice of high schools, vocational schools of various types, or job training as necessary. Under this general educational pattern, special classes for commercial and clerical training need not be incorporated immediately

into the regular school system in a refugee village because there will be few, if any, children who have completed junior high school until the refugee village has been established for two or three years. Similarly, children who have stopped attending schools in a rural area and who return to school in a refugee village will not have gone beyond elementary schools, and will return at the elementary or beginning junior high level.

Some vocational training in the administrative-clerical-commercial fields may be useful as soon as the village is established, since these skills will be needed in both the refugee village and the surrounding area. Since the number of junior high graduates in Vietnam is not large, there may be a need for short courses for primary-school graduates who show aptitudes for business or office work. The objective would be to equip people to fill jobs in the local area, with the expectation that they would add to their skills by experience on the job. While graduates might be unable to compete with secondary-school graduates for jobs in Saigon, they would be valuable in outlying areas where the supply of secondary-school graduates is small.

Costs of such training can be kept low if school buildings are available during the evenings and have electricity, or alternatively, if there is a daytime period when schools can be used. Requirements include teacher salaries, workbooks, and perhaps electricity.

Professional Training

Rural refugee children are unlikely to be candidates for training in such professions as medicine and law when the refugee village is established, since few of them will have gone beyond fifth grade. A long-term refugee program should of course make some provisions for developing the most talented refugee children. UNRWA has done this for Palestine Arab children through teacher training schools and university scholarships. This follows the introduction of secondary schools and several years of available secondary schooling.

While fully trained teachers need several years of education beyond the primary level, young men and women who have completed only

the five-year primary course have been trained and employed as teachers under the current AID-supported Hamlet School program. Refugees coming from a home village with a full five-year school should have some persons eligible for this 90-day teacher training program, with prospects for employment as teachers in the refugee village and perhaps in other rural communities. Training course costs were discussed earlier, along with the costs of setting up a village school; they run about VN\$6000 for the three-month course, of which VN\$2400 is living allowance. Teacher training costs for villagers supported by other family members or by relief funds therefore would run about VN\$3600 per trainee at 1966 prices, or a little over U.S. \$51.

Nursing is another profession in which subprofessional training would help fill a national need, with the added benefit that training as a nurse or nurse's aide may benefit the trainee when she becomes a mother, and is therefore useful to the girl who does not continue in nursing as a vocation. As cited earlier in Sec. IV, refugee villages elsewhere have required varying numbers of medical and health personnel; UNRWA had about 3 per thousand population (1959, and based on persons entitled to medical care whether living in or outside of camps⁽²¹⁾), while Japanese-Nisei relocation camps in the western United States in 1942-43 employed 2 to 4 percent of the camp population in this field.⁽²⁰⁾ Another figure more specifically related to nursing is in the 1966 UNRWA report:⁽¹⁰⁾ 158 graduate nurses and midwives, 303 auxiliary nurses and 119 traditional midwives, exclusive of personnel in UN-subsidized but separately operated facilities, were serving 1,209,000 registered refugees. This is a ratio of about 1 nurse or midwife per 2000 refugees.

Clearly the training of large numbers of refugee women and girls as nurses, at a level probably equivalent to the "auxiliary nurses" of the UNRWA Palestine report, would saturate local peacetime demand. Military and civilian medical needs resulting from both combat and terrorist activity, however, generate a requirement for more medical personnel, and it may be possible to meet some of this by short courses for refugee villagers who are looking for self-support opportunities and are free to travel to areas of need. This indicates short intensive

courses for unmarried girls who have some education, probably requiring completion of primary school.

Homemaking

Types of Training. The training discussed here considers skills women use in the home such as sewing and dressmaking, cooking and nutrition, and child care. Education in these areas takes many forms; examples are evening classes for housewives, home economics classes in junior high school, private schools specializing in dressmaking, and demonstrations of how to preserve vitamins when cooking food. Many such courses may be useful for rural villagers, and the refugee village situation offers opportunities to teach and train the people for life in their home villages as well as help them adapt to refugee life.

Training for Self-Support. A rural community normally needs the services of a few people with such skills as sewing, knitting, dressmaking and tailoring. Individual refugees may be able to achieve self-support in this way after some training. Persons already having some of these skills may be able to do more difficult jobs or better-quality work if they can take training courses. It is not possible to reach conclusions about the economic value of such training for refugee villages in general, since this is determined by the local situation: the supply of skills already available in the village, the economic status and population density of the surrounding area and the supply of skills there, the demand for more difficult or better-quality sewing in the local area, the market for cottage-industry products in other parts of the country, and the like. The refugee village situation does not create new opportunities for dressmakers, and dressmaking is not a skill for which demand increases rapidly as the economy begins to industrialize and develop. Dressmaking, sewing and related skills, therefore, do not offer the same prospects for refugee economic improvement that metalworking and automotive mechanics skills offer.

Training for Homemaking. Cooking, nutrition, and child care,

along with sewing, can usefully be included as part of the school curriculum and can also be taught to girls and women who are beyond school age. This is often done as part of rural education in developing countries, and is also quite common as part of the school curriculum in areas where most children attend school. Among refugee groups, UNRWA has been offering six-month courses in sewing and cooking to girls who do not continue with school beyond the junior high level, and classes in handcrafts, child care, first aid and household skills to adult women. Trainees can use these courses to supplement their income by doing small jobs for less-skilled neighbors, but the primary payoff is probably that housewives are better equipped to run a home and raise children.

Classes in the general field of homemaking can be set up to fit an extremely wide variety of situations and student backgrounds. A nutrition and cooking course at the junior high level, or designed for adults who have been through junior high, can incorporate discussions of quantitative requirements for vitamins and mineral elements, specific data on nutrients in foods, and the effects of moderate and severe deficiencies. This subject, if taught to a group of illiterate women from a migratory highland tribe, would necessarily rely more on visual aids and on demonstrations. It would be presented as a course in food and food preparation for better health, without much discussion of the existence and nature of vitamins and minerals, and probably without any quantitative comparisons at all. Dressmaking, household sewing and knitting can be taught with the use of fractional adjustments to convert from one clothing size to another, while the same subjects can be presented at a simpler level to persons who have never been exposed to arithmetic. The resulting levels of competence are naturally different, but courses designed to fit the educational and cultural background of the refugees in a particular village can be useful in raising living and health standards, whether or not villagers have primary-school educations and exposure to modern ways.

When to Teach. School courses with direct applications in the home might sensibly be introduced into the curriculum as early as

girls can understand and use the information, which is probably the age at which girls normally help around the house with a particular task. Child care and simple nutritional concepts can be introduced quite early in primary school and carried through the curriculum.

It seems likely that the junior high level is the appropriate place for in-school courses like sewing, dressmaking, knitting and similar vocational subjects. These require some degree of manual dexterity, and for work outside the home there is probably a minimum employment age for a sewing job even if the girl has taken all the courses her school can offer. Special courses in these skills might be offered also to girls and women of junior-high age and over who are not enrolled in the regular school system.

Cost Components. Costs of courses incorporated into the school curriculum can be disregarded except for materials, special equipment and teacher salaries. Sewing and dressmaking courses require materials, but until students have learned to make useful articles, materials can be of low quality and low cost. Equipment costs for hand sewing and for cooking can be disregarded. If the school curriculum includes sewing machines, they will be a cost factor. Another cost factor will be salaries for special teachers. Perhaps teachers for homemaking courses, both inside and outside the regular school curriculum, can be drawn from the refugee population--more likely for sewing than for nutrition. The instructor requirements are not large in any case; one instructor, teaching classes of 20 for two hours per class per week, could handle 400 students in a 40-hour teaching week.

Agricultural Courses

Lessons related to farming can be incorporated into any level of the curriculum, since this is a familiar subject to rural children who often tend animals or do other farm chores before they enter school. A specifically agricultural curriculum first appears in the Vietnamese school system at grade 8, the entrance level for the country's three agricultural high schools. These schools, with a two-grade junior level (grades 8-9) and a three-grade senior division (grades 10-12),

prepare young men and women for entry into the national College of Agriculture and into training courses for work as government agricultural technicians.⁽³⁸⁾

While refugee children should naturally be considered among potential entrants to agricultural high schools, and jobs as agricultural technicians and extension agents should be open to refugees as well as to other rural youth, it seems logical that the main thrust of agricultural education in a refugee village should be toward better farming by individual farmers. Farming classes for adults and post-school young people may be more important here than classes within the school curriculum. Adult classes seem particularly useful for a village whose economy is based on a type of agriculture new to the villagers (for example, one in which vegetable raising on small garden plots is a significant income producer); instruction in animal husbandry would be similarly important for a village supporting itself by raising pigs or chickens for outside sale. The length of the courses and the consequent demands for teachers will vary depending on the novelty of the subject, its inherent difficulty, and the general level of agricultural or animal-husbandry knowledge of the refugees. Highland tribes will present particular problems and require a greater allocation of teaching resources than most lowland villagers will need.

In general, agricultural courses for those beyond school age differ from other vocational-type courses in that an agricultural course of some type, pertinent to Vietnamese farming, can be designed for any group that is reasonably homogeneous in age, skill level, general education and farming experience. Course content and presentation methods naturally will differ. Since agricultural instruction is most effective when accompanied by practical work and observation, courses that deal with the types of farming, gardening and animal husbandry in the refugee village will be easier to teach than courses in the types of agriculture practiced in the home village.

Technological Aids in Vocational Education

Value of Visual Aids. Such technological aids as films and

instructional television offer the same advantages in reducing the need for trained teachers of vocational subjects as they do in the general education field. There are some differences, most of them indicating that vocational subjects are particularly adaptable to the use of visual aids.

1. Vocational teaching includes a large amount of demonstration, where it is important for each student to see clearly what is being done and how the instructor does it.
2. Steps in a long process, such as the growth of a farm crop, the construction of a house and the healing of an injury can be condensed into one lesson on film or videotape.
3. Tools or other equipment not available at local schools can be demonstrated in a filmed or televised lesson.
4. Students can be shown what a well-done job looks like, whether the subject is furniture, needlework, typed letters or healthy pigs. Conditions needing correction can also be shown.
5. Lessons of value to adults can be taught without the use of books, which is very important if the literacy rate is low. It is possible to save some lesson-material costs this way too.
6. Trained teachers are still needed at the school, although fewer are required if visual aids are used as the primary method of instruction. Manual skills cannot be tested through multiple-choice examinations or other techniques that permit measurement of the student's level of knowledge by anyone who has his test paper and the answer sheet. But one well-trained vocational teacher should be able to look at student shop, craft or farm work, determine whether students are acquiring satisfactory skill levels, and help those who have not mastered techniques from television, without devoting his full time to one class. A teaching pattern of one trained teacher per school or group of schools plus one teaching assistant per class may be feasible with instructional television or films. How well this works depends on the quality of televised instruction and on student learning abilities.

Comparative Advantages of Films and Television. While vocational courses would naturally use whatever technological aids are installed for general education, and the choice probably would not be based on comparative advantages for vocational class use, there are several reasons for preferring a locally-run system (films or closed circuit television using videotape) to nationwide or area-wide broadcast lessons. The most important of these is ease of repetition. A film shown in the classroom can be repeated entirely or in part at student

request. Videotape serving several classes is somewhat less responsive, and broadcast television cannot be used this way. Films and closed-circuit telecasts can be scheduled to meet local needs, while this cannot be done with a single series of broadcasts if schedule requirements are different at different schools. If channel time is heavily committed during the day it may not be possible to telecast specialized vocational courses. Repetition of televised lessons, while providing more flexibility for local school scheduling and permitting students to see difficult lessons a second time, increases the total demands for broadcast time and is a cumbersome method of achieving the flexibility available with films and a classroom projector.

LITERACY

Magnitude of the Task

Literacy rates in underdeveloped countries vary, of course, but three trends are common: rates are higher in urban areas than in the countryside, higher for men than for women, and lowest among rural minority groups speaking a different language than the national one. Adult literacy rates among a group of Vietnamese rural refugees might range anywhere from the 70 percent of Khanh Hau (Ap Dinh hamlet)⁽³⁾ down to complete illiteracy in a highland tribal group. Highland tribes present a serious problem in literacy education, since they will be somewhat set apart from the economic and cultural mainstream of the country unless they become literate in Vietnamese, and this involves learning a "foreign" language as well as acquiring reading skill.

The Need for Adult Literacy

Since universal adult literacy cannot be achieved without establishing a training program and allocating some resources, it may be useful to examine the value of literacy to a refugee farmer before discussing methods and costs of teaching him to read and write. Reading can broaden a villager's horizon and increase his sense of

national consciousness, as well as show him how to increase his farm production and his standard of living. Radio, television and films all can be used for the same objectives, and visual presentation is superior to reading for some purposes; the ability to watch films and television, furthermore, does not deteriorate when not used, while reading skills can be forgotten. There is a legitimate argument here for allocating scarce teaching resources elsewhere and concentrating on reaching the farmer through visual aids.

The arguments against adult literacy programs run something like this:

1. Farmers do not need reading ability for subsistence farming; they must be shown the value of improved seeds, fertilizers or farming methods, and this requires visual demonstration, not printed matter.
2. Rural villagers have no incentive to read, and lose their skills through disuse.
3. Villagers who read about the city are more likely to migrate there in search of a better life, but are not likely to have the skills to find good jobs in the city.
4. Literate villagers are easier to reach with subversive propaganda.

It is suggested here that the latter two arguments lost all of their validity with the invention of the low-priced transistor radio. Villagers will learn about city life and can be propagandized by radio and films; literacy can add to their stock of knowledge and skills so that they can cope more effectively with city life, with political propaganda, and with changes of all types. The first two arguments illustrate the point that literacy is not a panacea. Some information can be transmitted better by visual than by printed means, although pamphlets can be useful to reinforce the basic lesson presented on the screen or observed at a demonstration farm. And villagers should have access to printed material that will be useful and interesting, in order to retain their reading ability once it has been developed.

The principal arguments in favor of adult literacy in the refugee village situation appear to be related to nonfarm life. Some rural villagers are merchants, hold minor government positions, or are

otherwise involved in life outside the farm village; these opportunities are open only to literate persons. Self-government functions best with an informed electorate, and reading is useful for this even if television, radio and films are all available to the voter. Refugees may choose to move to urban areas after the fighting ends, rather than return to the farm, and an illiterate workman in the city is limited to the lowest paid jobs. Refugee village life itself should offer opportunities to use reading and writing skills as village industries are developed and their products are marketed.

All of the above points apply to school-age children as well as to adults. It seems reasonable to put universal primary schooling ahead of adult literacy programs, since young people are more likely to go on to higher education, and to migrate to other areas, putting themselves into situations where illiteracy is a severe handicap. Many of the same distinctions apply within the adult population, with younger adults likely to make more use of literacy than older adults, and older men more likely to benefit than older women.

Methods of Literacy Training

Classroom Teaching. Literacy classes for adults can be taught in the same way as ordinary school classes and can use the same types of resources. Costs will largely depend on the extent to which school personnel and facilities can be used for adults at times when children are not using them. The following examples illustrate how literacy classes might use school facilities to minimize costs:

1. If regular school classes are on a one-shift schedule, literacy classes might meet in the afternoon, and be taught by teachers from the regular faculty. The only direct cost here would be for workbooks and other classroom materials, other costs being "free" because--and only if--teacher workload and classroom commitments for educating children leave some spare time available.
2. Evening and weekend classes can be scheduled if it is more convenient for the adult students (as may happen if villagers have jobs) or if the school is on shifts and classrooms are used all day, five or six days a week. Whether regular school teachers might be able to teach literacy classes under this schedule depends on their primary or secondary teaching workload. Costs

would again include workbooks and class materials, as well as electricity or other lighting if classes meet at night.

3. Classes might meet in the school building but have their own teachers; since adult classes need not meet full-time, each full-time teacher should be able to handle several classes. Class sizes might be anywhere in the 25-50 range. If classes are large, it may also be useful to employ some literate villagers as classroom aides, particularly to assist in writing practice.

4. There may be other suitable buildings in addition to the school, and a conventional-type class, making no use of technological aids, might find it more convenient to meet in a temple or public building. This should not affect costs.

Course length can be projected for cost-computation purposes as three hours a week (three one-hour sessions or two 90-minute meetings) for about six months, although in practice this will depend on such factors as teacher skill, student learning ability and incentive, and the level of reading and writing skill to be achieved by the completion of the course. Descriptions of literacy classes in Refs. 39 and 40 indicate that part-time schedules of this sort are customary, and graduates of the Guatemala rural course⁽³⁹⁾ can read simple printed matter and write correspondence, though slowly and with much effort. This sort of literacy, while not enough to open the entire world of printed matter to the graduate, does permit him to develop his skills further by reading and writing on his own if reading matter is available at his skill level, while also providing him with some capability to make his way in a strange urban area.

A teacher devoting full time to literacy classes and using prepared materials might handle a 36-hour weekly schedule. (This allows some time to review student handwriting work but very little time for individual attention outside the class period.) This is 12 classes, each meeting 3 hours a week, so that each full-time literacy teacher could teach 24 complete classes (720 to 1200 students) a year. On this basis, all illiterate adults in a village of 1000 families could be enrolled in literacy courses during the first year, given the full-time assignment of one teacher to a village with Khanh Hau's 70-percent literacy rate or three or four teachers to an almost completely illiterate village.

If all village adults were to attend literacy classes of 55 students, about 55 classes would be required. These might be taught by teachers from the village school after normal school hours. If most of the 33 teachers in a school with places for all children aged 6 through 17 also taught two of these adult courses, each teacher would have an additional workload of six hours per week or one hour per day. This is with all villagers enrolled at the same time. The workload could be reduced, classes split into smaller groups, or both, if some villagers declined to enroll or dropped out, some were already literate, or some classes were deferred for six months until others were completed. From this it appears that village literacy classes can be added to a school curriculum without the need for special teachers if the regular teachers have only one regular school class. If the school is in shifts and individual teachers have classes in more than one shift, it appears necessary to add teachers whose sole or primary duty is literacy education.

Volunteer Workers as Teachers. Literacy programs in some countries have drawn upon volunteers, usually recent graduates of primary or secondary schools with no specific training for teaching, to serve as literacy teachers in rural areas as a service project. This supposedly develops a sense of community between urban and rural areas, calls on the educated few to serve their uneducated countrymen as a civic duty, and costs less than hiring trained teachers. Probably an enthusiastic volunteer with good teaching materials will do a better job of literacy training than a teacher who is sent to a rural area, feels that the countryside and farmers are inferior to the city and urban dwellers, and communicates this attitude to his students. But programs of this sort have a tendency to die as enthusiasm wears off and are no substitute for a good local school.

Savings from using volunteer teachers for literacy are not great. Volunteer assistants in addition to teachers would probably be helpful, and might be available from the village population. The chance of obtaining volunteers depends, of course, on the initial literacy rate and on the amount of time literate villagers spend on self-support.

Costs of adding volunteers as teaching aides would be small; benefits, in faster or more thorough learning, are not easy to calculate.

Technological Aids. Literacy courses can be taught with television or films as the primary means of instruction, and can eliminate the need for a trained teacher in the classroom. Reading can even be taught by radio. Classroom materials required for use with radio, television or filmed instruction are graded reading matter and workbooks for writing practice. While reading can probably be taught without formal class organization, it is surely helpful to have someone in class who can answer questions.

Writing classes do require a class leader, since writing is not self-checking. A student can test his own reading comprehension by trying to answer questions in a workbook, but in learning to write, he cannot tell how legible his handwriting is to someone else, or tell whether the differences between his handwriting and the letters in the course workbook are legitimate differences in personal handwriting or are errors. For this reason, someone is needed who can look at samples of student handwriting and give some personal attention to those who need it. This might be done by any reasonably literate villager, but could be done better by a person with some teacher training. Costs should be small.

While a village with a school need not rely entirely on radio for literacy training, Malayan experience with a course in reading taught entirely by radio and workbooks may illustrate some of the requirements for literacy education when trained teachers are not available. The course, reported in Ref. 41, was designed for villagers who could gather for radio broadcasts on a regular schedule but who had no literate instructor or guide. A major part of the first lesson was devoted to finding the first lesson in the first reading workbook; illiterate villagers, unfamiliar with books, did not know how to hold or open the book without guidance. Once they were past this initial hurdle, students were led through the illustrated workbooks by the radio instructor, who spent much of each lesson period reading aloud from the workbook (single syllables in the earliest lessons),

directing students to read aloud with him for drill, and going over the lessons slowly and with much repetition.

Some local leadership is obviously needed for this type of course, since books must be distributed, students gathered together, and the radio turned on, and quite a bit of care is needed in preparing books and lessons. A literate leader with each student group could help the course to move more smoothly.

If the village school is equipped with television or films, literacy classes can use these aids, and the additional costs of adding literacy courses to the educational system will be quite small. Films, and videotape if schools have playback equipment, have the additional advantages that they can be replayed for slow learners and can be scheduled and repeated at times when adults are free to attend.

One basic reading course and one basic writing course, prepared and produced in one central location and using one basic set of readers and writing workbooks, should cover all classes except those that must be taught in a minority language. Supplementary readers can be provided for specific groups such as farmers, fishermen, young urban workers, and mothers of small children, and tailored to their experience and interests.

Lesson production and presentation costs and the costs of writing, printing and distributing readers and workbooks appear to be the only significant expenses for literacy classes if these use an instructional broadcast television system already in place for school classroom use. If motion picture projectors are used, the added costs are for film prints. Films might sensibly be distributed with workbooks and the added postage or messenger cost can probably be disregarded here.

Minority Languages. The most serious problems of poverty and illiteracy in any country can be found among ethnic-linguistic minority groups living in isolated areas and largely outside the money economy. For these people, the barriers of language and cultural differences, due in large measure to lack of education, also make education more difficult.

Competence in speaking, reading and writing the national language is necessary for the tribesman from the Vietnamese highlands who wants a good job in Saigon, just as it is for the Navajo in Phoenix or the Maya who leaves Yucatan for Mexico City. Education for assimilation therefore involves learning a second language, becoming fluent and literate in it, and learning the customs and business practices of the national-mainstream society. Education in the language and culture of the minority group, on the other hand, leaves the minority group member at a disadvantage when outside his local area.

The choice between literacy in the tribal language and literacy in Vietnamese may depend on national policies toward integrating highlanders into Vietnamese cultural and economic life. In some instances the only reasonable choice will be literacy in Vietnamese, for tribes whose language has not been reduced to written form or when there is not enough printed material in the particular tribal language for literacy in it to be of much value. Even here it may be best to teach literacy in the tribal language as an intermediate step.

Schools in refugee villages for highland tribal groups who speak a local language will need special texts and workbooks, and specially prepared films or televised lessons if these are used. Since separate readers must be used for each minority-language group, it seems sensible to design the reading material to fit the cultural background of each tribal linguistic group rather than to provide translations of readers written for urban workers or Delta rice farmers.

If literacy is to be taught in the Vietnamese language, probably along with instruction in Vietnamese conversation, special lessons and teaching materials will be necessary if the tribal language is to be used as the teaching medium. If instruction is by films or television, it may be possible to use the normal Vietnamese-language readers and writing workbooks while using films or televised lessons in which the instructor speaks the tribal language.

The decision about the relative extent of assimilation and separate cultural development in minority-group education is outside the scope of this Memorandum. It is important to note, however, that educating minority groups like the highland tribes in Vietnam will

require greater resource inputs than educating ethnic Vietnamese to the same level of achievement. The minority group refugee population is already significant, for military activity and Viet Cong harassment have already caused many highland tribesmen to seek the safety of refugee camps or to move their villages to more secure areas. The total ethnic-minority population in the Central Highlands is somewhere over half a million (some estimates approach one million), and perhaps 50 distinct languages are spoken.

Two other ethnic minority groups are not likely to require special educational efforts. The Cambodian minority in the Delta are apparently Vietnamese-speaking. The Chinese are concentrated in urban centers, with only a few merchants scattered through rural areas, and those outside the urban Chinese communities need to speak Vietnamese to do business.

Maintaining Reading and Writing Skills

Skills learned can be lost through lack of use. Reading skills may disappear if newly literate adults do not have access to reading material or are not motivated to read. The villager moving to the city, where books and magazines are readily available and signs and advertising provide free "practice material," may find it easy to develop a reading habit, but those who return to their farms after the refugee period may lose contact with printed words. Even in Khanh Hau, a village with a reasonably high literacy rate, Hendry⁽²⁾ reports that villagers generally do not acquire books and that newspapers do not reach the village regularly. A Mexican report points up the potential problem: after 14 years of the "Each One Teach One" literacy program the Mexican Ministry of Education reported (1959) that about one-third of the 4.5 million new literates had lost their reading ability from lack of use.⁽⁴²⁾

It should be easy to provide reading matter in the refugee village, perhaps through a modest library of useful and interesting books, magazines and pamphlets for adult use. Maintaining literacy after the return to the rural village, and maintaining writing skills,

may be more difficult. The situation also changes when the villagers are from a linguistic minority group.

OTHER CLASSES AND EDUCATIONAL MISCELLANY

Classes for Adults

In addition to literacy and vocational classes, it seems sensible to incorporate a program of some sort that will increase villagers knowledge of their nation, including history, government, geography, and life and customs in different regions. This might be done as a series of classes, with lectures (by teachers, films, or television) followed by discussion periods.

Special tapes or film prints with narration in the local language would be desirable for minority-language groups. A less formal alternative is a series of films for evening showing that combine entertainment and instruction and can be shown without a teacher. If schools use instructional television, the additional cost of using the television network and school receiving sets would be small and the series could be presented for little more than the studio production costs, unless the television network is turned over to commercial broadcasters at the end of the school day. If television is not used, films can be distributed directly to villages and shown at any convenient time. This will require electricity and a film projector in the village. Costs for films include production, film units, projectors and bulbs, and distribution; if village schools have film projectors for regular instruction, the additional costs of an evening film series will include only studio production costs, film prints and more frequent bulb replacement, and films can be sent and stored with school instructional films.

There is no reason for limiting such a program to refugee villages; any village having film projection equipment or television receivers could use this suggested series. It does, however, fit well into the refugee situation, for refugees are more likely to live in a compact village close to the school; they may have more free time,

and they will be facing a choice between returning to their home villages and moving elsewhere when the fighting ends. For highland tribal refugees, a series of films or television programs about Vietnam could help provide a feeling of being a part of the Vietnamese nation. Films about tribal minority groups for Vietnamese-language audiences might be similarly helpful in developing mutual understanding.

Primary school courses like arithmetic might also be made available to adults by repeating the lessons after regular school hours.

Pre-School and Youth Programs

Nursery schools and kindergartens for refugee children can be either incorporated into the school system or run separately. Costs involved are for teachers, classroom space and materials. Real costs might be extremely low in some circumstances. For example, it may be possible to hire as nursery school or kindergarten attendants women who would otherwise be on direct relief, or use this sort of employment to increase the income of selected groups (for example, giving employment priority to soldiers' wives). It might be possible for nursery schools to meet in temple buildings or under simple shelter. School classrooms would probably not be available at hours when nursery or kindergarten classes meet.

Youth programs, athletics and recreation programs can be run under the general guidance of the school system, but clearly will have some requirements for leadership, equipment and space. Leadership might come from school teachers, from resettlement cadre, from full-time youth workers (who might even be volunteers from outside Vietnam), or from within the refugee population.

UNRWA has both pre-school and youth activities programs for Palestine refugees; these are separate from the school system. Sixteen pre-school play centers are operated for children from three to five years of age. The centers are financed by donations and by small contributions from parents. The youth program, a joint YMCA-UNRWA activity, trains young men to be volunteer leaders in community service, recreational and cultural activities, with the aim of "channeling

into constructive activities the interest and energies of those young men living in refugee camps whose opportunities for continued education and even regular employment are extremely limited."⁽³⁷⁾ The same factors might justify providing leaders and allocating money for a youth program in Vietnamese refugee villages where self-support opportunities are few, although the education and employment situation is somewhat different in Palestine Arab refugee camps, where most young men have had the opportunity to go through junior high school and where there is no military draft. In Vietnam it seems likely that youth programs would be a spare-time activity, with school attendance taking precedence for youth below draft age.

VII. RELATIONSHIP TO LOCAL COMMUNITIES

Unless the refugee village is built in an uninhabited area, its establishment will cause some economic and social changes affecting nonrefugee villagers. Some of these effects will bear directly on refugee village costs; others may not show up as monetary costs, but will affect refugee life and the overall effectiveness of the relocation program. There may also be opportunities for existing and refugee villages to share facilities. Advance planning is useful to permit taking advantage of possible economies and to minimize adverse effects.

RESOURCE CONFLICTS

Land

Withdrawing farm land for refugee village use will cause some local dislocation, which will naturally be most serious where land is intensively used and where there are no nonfarm jobs available to displaced farmers. The loss of crop production on the land will hurt the local economy, and displaced individuals will be affected by rising land costs and by reduced needs for farm labor.

To be fully compensatory, the price paid to buy or rent farm land for the refugee village should incorporate not only the value of the land but also the value of the labor which displaced farm owners, tenants and farm laborers cannot sell elsewhere. A fully equitable solution is difficult to implement; it involves holding down land prices or rents, providing jobs or relief payments to compensate for reduced job opportunities on village farms, ensuring that farmers who are compensated for the value of the labor they can no longer use on their lost farmland do not compete on the local day-labor job market, and the like. Subsidies to displaced farmers are likely to cause discontent, since other farmers will continue to hold their land and must work hard to make a living from it. It is probably impossible, however, to avoid some inequities and some windfall profits, which will cause resentment against the refugees and their village.

The negative psychological impact of land acquisition for the refugee village can probably be lessened by leasing the land rather than buying it. This fits in well with the general concept that these villages are temporary. Hendry's survey of Khanh Hau indicates that villagers' attachment to their land and to their village would not prevent them from moving elsewhere for economic advancement, but that emigrants would continue to regard Khanh Hau as home and to look forward to returning when their economic situation permitted. Temporary loss of farmland and a move to another house in the same or a nearby village requires somewhat less mobility than this, and should cause no great difficulties if compensation is fair. Land used for paved or gravel roads and for buildings with concrete floors, however, will not be reconvertible into farmland, and some combination of lease and purchase, or of lease and compensation for changes to the land, appears necessary.

The impact of withdrawing land and displacing farmers can be eased by employing displaced farmers as laborers during construction of the refugee village, at least for that part constructed before refugees arrive. And the problem can be bypassed completely if vacant land can be used for the village site.

Commodities

Food and other goods may become scarce or more expensive in local markets when refugees arrive; the impact will be greatest if refugees receive cash relief and commercial channels are slow to respond to increased demand, and least if supplies for refugees are brought in by the village administration. The obvious answer to this potential problem is for the village to be independent of nearby sources of supply at first, even when this means establishing an additional purchasing, transportation and warehousing activity for relief supplies. This problem is similar in principle to the impact that the influx of Americans has had on the Vietnamese economy, and may need similar treatment--dependence on goods brought from outside the area.

Water

Direct competition for water supplies should be rare, for water supplies in much of Vietnam are adequate to support a larger population, although the quality of the water may not be good. Villages away from rivers and depending on reservoirs or ponds to store water for dry-season needs, however, might not have enough to share with an influx of immigrants. There may be conflicts over water purity and pollution; for example, a large refugee village along a stream could pollute water used for drinking and household purposes by a village farther downstream.

ECONOMIC CONFLICTS

Competition for Jobs

Refugee relocation has the potential for upsetting employment patterns and lowering wage levels, causing economic disaster to workers and their families in the area around the village, and creating a new group of economic migrants or refugees. The primary reason is the influx of refugees who may be looking for work; they will be living on relief supplies, and could take jobs at less than a living wage in order to get money to supplement relief income. A secondary factor is the withdrawal of land for the refugee village; persons formerly employed on this land, whether as owner-farmers, tenant farmers or day laborers, now will compete for other jobs. Wage levels will not be seriously affected if there are enough jobs in the area, if the refugee village creates enough jobs for all, or if dislocated farmers are employed in the refugee village while refugees on relief are not permitted to take outside jobs.

Competition for Markets

Some local residents depend for their livelihood on the sale of goods, rather than on the sale of labor, and the refugees' arrival may disrupt this too. If refugees receive food relief and sell this food to outsiders, other farmers may lose their regular customers--although this is unlikely to be a lasting problem unless the region is cut off

from the rest of the country and it is not possible to move surplus salable food to Saigon or other cities. Local carpenters may face competition from refugees; if the refugees get relief aid and have access to free materials such as wood packing cases, they may be able to undercut local prices. Fishing and handcrafts also may be affected by subsidized competition from refugees.

In cases where a problem exists, local farmers, merchants and craftsmen will need protection from subsidized "unfair" competitors who can sell goods and services at lower prices because they receive some inputs free in the refugee village. One way to do this is to cut off this subsidized competition by preventing relief recipients from working outside the refugee village, establishing an exit control system to stop refugees from taking relief supplies out of the village, and taking any other measures necessary to isolate the refugee village economy from the outside economic system. Another approach is to permit contacts and competition but to eliminate subsidies and relief aid from any goods and services going out of the village, taking outside jobholders off relief rolls, charging refugee carpenters for any scrap wood used in furniture sold to outsiders, and the like. A third method is to subsidize the local nonrefugee economy where necessary to avoid favoring refugees at the expense of others.

Differing Living Standards

To the poorer people in the area, a refugee village that is not self-supporting and is subsidized to the extent envisioned here (which is the ordinary-farmer level of a small Delta village such as Khanh Hau) will seem unfairly favored. Those outside the village will resent refugees who live on relief while they must work hard for a marginal living. Another complicating factor may be the presence of refugees who left earlier, did not get much resettlement aid, and are now just getting established as poor but self-supporting local families; these earlier refugees may be those whose government connections or loyalties made it unsafe for them to stay in the home village, and who thereafter would appear to have a greater moral claim for assistance than villagers who stayed and cooperated with the Viet Cong until government troops forced them to move.

Not much can be said about this beyond the obvious truth that wars are not equitable, and the impact of war cannot be distributed "fairly" by any aid or subsidy system. Perhaps earlier refugees should get some preferential status for local relief aid, jobs, places in schools; and the like; probably they should have the same opportunity for resettlement aid in their home villages as later refugees receive. These factors have not been included in cost projections and comparisons here. Actions that apply to an entire area, such as the creation of new jobs or the establishment of new schools open to all, can benefit old residents, earlier refugees and new refugees alike, thus reducing some of the inequities that follow from the establishment of a subsidized refugee village in a populated and impoverished area.

SHARING FACILITIES

Refugee villages will be able to share some facilities with other villages in the area, and very small refugee settlements may be able to use nearby schools, water supplies, health and administrative centers and the like. Vietnamese towns and villages do not have the surplus capacity needed to absorb several thousand new residents without strain on already inadequate physical facilities, however. A village of the 1000-family size used in cost projections here can expect to have free use of only those portions of the infrastructure whose costs are determined more by the size of the area served than by its population, such as main roads, regional military defenses, provincial administration, and perhaps minor facilities such as space in nearby markets.

More promising prospects for sharing are schools, small industry, the water and electricity system, local defenses, etc., built to serve both refugees and nearby villagers. The concept here is that a rural region where refugees are to be relocated might benefit from an overall development program for both refugees and residents of villages whom the refugee settlement will affect. Perhaps the most obvious example is the school system for the refugee village, for the number of schools is still inadequate, particularly from sixth grade on, and local students with no previous opportunities to go beyond primary school will surely seek admission to secondary schools set up for refugees. There are

several possible ways to meet this demand and give local people the same educational chances that refugees get.

1. In areas where population density is low, or there are few local children who have completed primary school, admit the small number of qualified students to secondary schools in the refugee village. This will be a low-cost solution, of course, only if the number of local students is small.
2. Where local demand is higher, develop the local school system at the same time that the refugee village schools are built, perhaps under a common administration. This offers a few economies over separate schools but not much, since the dominant cost factors in conventional schools are teacher salaries, books, and classroom construction, and these costs are generally constant per pupil once a certain minimum school size (one or two classes per grade) is reached.
3. If refugee schools are to use instructional films or television, build or modify the local school system to use the same aids. This means paying for receiving sets or film projectors, putting electricity in nearby village schools, and using the televised or filmed lessons the refugee schools use. It might be necessary to make additional film prints; it should not be necessary to prepare separate lessons or to build additional television transmitting facilities to serve other schools in the immediate area.

Opportunities for types of sharing other than education will depend on the local situation and on the degree and type of self-support. Plans for the refugee village after the refugee program is no longer needed will also affect sharing.

ETHNIC AND RELIGIOUS PROBLEMS

Refugee settlements can be potential sources of conflict along religious or ethnic lines. Some of this was noted during the Buddhist-Catholic rioting in the summer of 1964 in Danang, where the Catholic hamlet of Thanh Bo, inhabited by refugee fishermen who came from North Vietnam in 1954, was the target of attacks by Buddhist groups. ⁽⁴³⁾ Vietnam's four major religions--Cao Dai, Hoa Hao, Roman Catholic, and "mainstream" Buddhist--are distributed unevenly throughout the country, with Cao Dai and Hoa Hao concentrations in much of the Delta, and Catholic strength greatest among refugees from North Vietnam who often moved south as entire villages under the guidance of the parish priest when the country was divided in 1954.

These religious divisions do not appear to be a normal cause of conflict at the village level, and villages with mixed religious affiliations are common. (Khanh Hau, for example, has Buddhist, Cao Dai, and Catholic villagers.) The Thanh Bo attack stemmed from religious divisions and power struggles at the national level, and Thanh Bo apparently just happened to be in the path of rioting supporters of a militant Buddhist faction. Further evidence that religious differences need not lead to trouble in resettlement may be found in the recent history of Duc Lap in Hau Nghia province, where the only effective local defense has come from a small unit of Hoa Hao soldiers defending a village which is not Hoa Hao.

Ethnic mixing can be found too; My Thuan has a hamlet of Cambodian families, and Chinese are found throughout the country. But the highland tribes present a different situation, for they seem to be quite universally regarded as inferior by ethnic Vietnamese, speak different languages and follow their own religions, so that there are several forces that keep them apart and create resentment. It appears that placing a highland tribal refugee village in an ethnic Vietnamese area might cause local problems, while placing a village of ethnic Vietnamese refugees in a tribal region may be taken as another encroachment on tribal areas. Problems are likely to be most acute if refugees are expected to share facilities with local people. And some further study seems necessary if there is a possibility that a refugee program may involve relocating highland tribesmen in ethnic-Vietnamese areas or the reverse.

VIII. COMMUNITY ORGANIZATION AND VILLAGE GOVERNMENT

VILLAGE LEADERSHIP

Normal Organization

Vietnamese villages have a simple organizational structure, according to studies of Mekong Delta local administration. Khanh Hau^(3,4) had a five-man village council in 1958, reduced to three by 1961, with a village clerk and two assistants. Each hamlet in the village had a chief. An intermediate level, the heads of "five-family groups," came between the hamlet chief and the individual villager. The village of My Thuan⁽³³⁾ was organized similarly but with an additional level, chiefs of 25 to 35 households, between five-family group heads and hamlet chiefs. In both villages the council included the village chief, police officer, and finance officer; the information agent and youth agent were assistants to the police officer in Khanh Hau and were council members on part-salary in My Thuan. My Thuan, which had about five times Khanh Hau's population of 3241, also had a political officer (on the village council but not paid for full-time), and an assistant to the chief; each village had a clerk.

Selection of village leadership has sometimes been by popular vote and sometimes by appointment by province officials. The present trend is toward village elections. Khanh Hau experience suggests that leadership at the village council level has traditionally resided with the wealthier farmers, but that this is changing as the council has become smaller and has become full-time work for its members. Also, the risks associated with village council positions in insecure areas have made the local gentry less willing to take public office.*

Village and hamlet chiefs appear to spend most of their time on documentary paperwork (permits, identity cards, and the like) and mediation of disputes between villagers. There is little to do by way of municipal services, with only one police officer, no fire, parks or water department, and welfare services limited to collecting contributions for villagers in need. Security requirements distort the normal

* See p. 185 of Ref. 3.

situation in some villages, of course, and both references cited here ^(3,33) are for villages without security forces.

Refugee Village Leadership Selection

Many villages in contested areas of Vietnam have an administrative structure with appointed village and hamlet leaders who may find it necessary to live in secure areas elsewhere and make only daytime visits to the village. When an entire village is evacuated, it should be easy to have the government-appointed village leadership move to the refugee village and resume full-time functions. This is reported as common practice with highland tribal villages described in Ref. 44.

A leadership selection task will be part of organizing the village under several less ideal situations: refugees coming from an area entirely outside of government control, small numbers of refugees coming from each of many villages, existing leadership known or suspected to be part of the Viet Cong administrative structure, and the like. One task of the resettlement cadre may be to discover what fragmentary leadership exists (heads of five-family groups, former hamlet chiefs, etc.), so that persons who have been leaders and are not committed to the Viet Cong can be identified as candidates for the refugee village council.

Costs of Village Leadership and Administration

Salaries for village leaders are small, perhaps too small to attract the best potential leaders unless some degree of prestige goes with positions on the village council and as hamlet chiefs. Some fringe benefits may be useful; one possibility mentioned earlier is allocating extra land to village leaders.

Total salaries for village and hamlet leadership in My Thuan in 1961 were \$137 per month (VN \$9600) for a village of 15,000 to 17,000 persons; manpower involved was five full-time persons plus the equivalent of one or two more on part-time staff.* Costs were about four cents

* Village chief, police officer, finance officer, chief's assistant, village clerk, three council members without full-time duties, and hamlet chiefs. (33)

per family per month. This corresponds to two full-time staff members and \$40 per month for a 1000-family village, a level that could be doubled or tripled to allow for greater responsibilities without making a noticeable impact on refugee program costs. Present revenue sources for village administration include market and wharf taxes and fees, which accounted for half of the village budget in My Thuan; rental of village-owned rice land, an important revenue source in Khanh Hau;⁽³⁾ house and land taxes, license fees, fines and the like.

Outside Leadership

Certain refugee village functions will be outside the scope of normal village leadership activities, and may best be handled by resettlement cadre or other nonrefugee staff at first, with refugees gradually taking over responsibility for functions continued beyond the initial settlement period. The management of large self-support industries, such as the pig-raising enterprise discussed in Sec. V, may need continued managerial aid from outside the refugee population. It seems likely that villagers could distribute relief goods, maintain water and drainage systems, supervise police and fire services, and do other village government activities not generally needed in rural areas, but a training and transition period might be necessary during which outside management help would be important. Monetary costs of such management aid should be small, but the need for these skills should be considered when planning the size of the resettlement cadre needed for a large-scale refugee program.

MUNICIPAL SERVICES

Police

Rural police forces in both Khanh Hau and My Thuan are apparently limited to one village police officer. Judging by the studies of these two communities,^(2-4,33) there is not much crime in Vietnamese delta villages. This might be the case for several reasons: farm villages do not have much portable wealth; strangers cannot circulate without

being noticed; and houses are dispersed enough that tension does not build up as it does in crowded city slums. Insurgent murders, kidnappings and other acts of terrorism are another matter.

A refugee village may provide more opportunity for theft, particularly when inhabitants come from more than one home village and cannot be so easily identified. Supplies belonging to the refugee village, rather than to individual refugees, are likely targets for theft; building materials, electrical equipment, and food stocks all have resale value. A police force will probably be needed.

Police departments in major American cities ⁽⁴⁵⁾ have from 0.4 to 4.1 persons per 1000 city population, including both police officers and nonuniformed employees of the police department. In general, larger cities have a higher ratio of policemen to population; the problems of large urban size apparently outweigh any economies of scale. Median ratios ⁽⁴⁵⁾ are 1.50 per 1000 in cities of 10,000 to 25,000, rising steadily to 1.72 for cities in the 250,000 to 500,000 group. These ratios do not take into account company guards and watchmen, or such special forces as railroad and state highway police.

The policeman-to-population ratio in Saigon has been similar, with a police force of 6000 in 1961 (expanded from 2500 in 1955) ⁽⁴⁶⁾ for a population of 1,431,000 (1962), ⁽⁴⁷⁾ or 4.2 per 1000. More recent reports indicate that the police force in Saigon has been increased further, but so, of course, has the population.

Refugee camp experience outside Vietnam offers little guidance. UNRWA reports do not show any manpower for internal policing of refugee camps. The ratios reported for relocation camps for Japanese and Nisei persons in the United States are substantially higher (ranging from 5.3 per 1000 at Jerome to 12.3 per 1000 at Topaz, with a 9.0 average), ⁽²⁰⁾ perhaps reflecting the availability of otherwise unemployed men who were already receiving free food and housing, and were willing to work as policemen for the \$12 to \$19 salaries offered.

Judging by the examples cited here, police force requirements for a refugee village might range from one policeman per village to 1.5 or 2.0 policemen per thousand population (8 to 11 for a 1000-family village), with all or most of the police force hired from among the refugee population.

Fire Protection

Rural villages in Southeast Asia do not have fire departments, but a refugee village may have more fire hazards than a dispersed farm community, with greater risk that fires will spread. Closer spacing of houses, wood construction, people cooking in temporary facilities, and the presence of supply warehouses and self-support industry all can contribute to fire hazard, and may justify the organization of a village fire department.

Manpower costs can be minimized by using volunteers. Equipment may be only a few buckets, axes and shovels, or may be more elaborate, depending on the specific village situation. It does not appear sensible to generalize on requirements and costs for refugee village fire protection, but this aspect of village organization should be considered in planning, since village layout and the selection of self-support activities have a major impact on the need for fire protection.

Maintenance and Utilities

Streets, public buildings and the water system will require some maintenance; occasional work will be necessary to keep drainage canals open; refuse must be burned, buried or removed. In a rural village some of these tasks can be left to individual decision, while others can be done by unpaid groups of villagers, either volunteer or compulsory. Hendry⁽²⁾ tells of canal-digging in Khanh Hau by volunteer labor. Compulsory road maintenance, as a form of taxation, is practiced in many less developed areas where roads are not paved and where villagers find it easier to pay taxes in labor than in cash.

Labor on these projects can be a form of public-works employment for otherwise unemployed villagers. If the villagers are not fully employed elsewhere, it should be possible to pay some of them to do this sort of work as an alternative to straight relief. Another option, of course, is for villagers to be taxed in either labor or money, with wealthy or employed villagers having the option of paying in piasters which can then be used to hire less fortunate villagers for village maintenance and service jobs. In both cases, the additional cost to the

refugee administration is limited to the costs of supervision, any necessary training, and equipment. The key points are these: that if a village is fully self-supporting, villagers can afford to pay (in time, money, or a mixture of these) for maintenance and services; if the village is not self-supporting or only partly self-supporting, then some outside aid is necessary, and payment for labor for services and maintenance is one form this aid may take.

While differences in type of services and degree of mechanization make American practices of somewhat limited value for estimating Vietnamese requirements, it may be useful to look at an example of manpower requirements for municipal maintenance and services. Santa Monica, California, which, like the projected nonagricultural refugee village, is an urban residential and commercial city with no rural area, employs 764 persons (September 1966) to provide its population of 89,000 with normal city services, including water, but excluding gas and electricity (which are not city owned) and the municipal bus system. Police, fire, recreation and parks account for half of these. The remaining 384 persons--4.3 per thousand population--include administration, the maintenance and utilities services discussed in preceding paragraphs, and such departments as building inspection, the city attorney's office, and the library. Employment in the public works, public facilities maintenance, refuse collection and disposal, street and water functions (excluding their share of common functions such as personnel administration) adds to 227 of these 384, or 2.6 per thousand city residents.

Administration, Population Registration, and Population Control

The various functions related to village finance and administration, such as licenses, taxes and rent for village market space, identity cards and residence change permits, are performed by village administrations now, with the present small staff of a village chief, finance officer, assistant and clerk (for My Thuan and its approximately 3000 families⁽³³⁾). These would presumably be continued at the same cost in manpower and salaries. Some additional burden might be imposed for control of relief supplies; some improvements in efficiency should result

from the more secure situation and reduced personal hazard to village and hamlet administrators.

Information and Cultural Centers

These are mentioned here because refugees will have more need than usual to know what is being done to and for them, why, and what is likely to happen next. Requirements for staffing an information service are small, and it is also possible to combine information and propaganda dissemination with the establishment of a small library under either the village administration or the school's adult education program. If the school is equipped with television or film equipment, it should be possible to use this for adult programs in the evening. It might be useful to investigate the desirability of coordinating into one center the refugee adult education program, films or reading material to develop national consciousness, and information about employment and future prospects for individual refugees. The subject is outside the scope of this Memorandum, however, since such a center would have little impact on overall refugee program costs.

EXTERNAL SECURITY

The nature and extent of protection against insurgent attack, the degree to which refugees participate in village defense, and the relationship of village administration to military defense forces depend on the local security situation. The best solution is to put the refugee village in a secure area where no defenses are needed. If this cannot be done, refugee village defenses would logically resemble those of a fortified community of the strategic hamlet or new life hamlet type in the same general area. The defense problem is somewhat easier for a newly constructed refugee village than for an older community, since new villages can be concentrated into a defensible unit, a good location for defense can be selected, and fortifications and barriers can be installed at construction time.

Refugee participation in village defense, for those villages in insecure areas, can include construction and maintenance of barbed wire

emplacements and other fixed defenses, and enlistment of a village militia, much as is done in fortified nonrefugee villages.

SOME ADMINISTRATIVE PROBLEMS

Refugee village officials will have some problems and tasks not common to normal villages, and it may be useful to list them here even though related costs have not been computed.

Refugees on relief are particularly vulnerable to delays in supply deliveries, relief payments, or wages for public works or village employment. They will also be concerned with future prospects, so that information on jobs, schools, and the situation in the home village can help reduce anxiety and raise morale.

Ethnic, linguistic and religious differences among villagers can cause conflicts; so can differences of these types between refugees and outside leadership, particularly if accompanied by an attitude of superiority (urban over rural, educated over uneducated, ethnic Vietnamese over tribesmen) on the part of the village administration or the resettlement cadre.

Serious situations may develop should the village have a functioning Viet Cong administrative and control structure, for it will work against the success of the refugee program if it is not discovered and eliminated.

Where these problems exist, the costs of early treatment appear to be smaller than the costs associated with a collapse of morale or the establishment of a village Viet Cong organization strong enough to exercise control and leave the government administration powerless.

IX. PREPARING FOR RETURN

TIMING

The return move to the refugees' home village naturally will be deferred until the area is secure and there is little likelihood of further combat or major military movements there. Some further delay may be advisable to allow moving during the dry season, when transportation and rebuilding are easier, or to time the move to fit the agricultural calendar. If refugees are self-supporting it may be sensible to delay the return move until their labor is no longer needed or others can take over their jobs.

The agricultural cycle may be controlling in Delta villages where rice farming is timed for the annual rainy season. During a normal year in Khanh Hau, plowing and planting begin in early June with the arrival of steady rains; the latest date for planting is roughly September, even in fields low enough to have water long enough for a second crop.⁽²⁾ Refugees returning between October and May to an area with this weather cycle would sit idle until the rains began, with only building and dike repair to do and no source of income. If refugees were earning any of their support while in the refugee village, it would seem sensible to schedule their return for sometime in April, just far enough ahead of the planting season to get fields, houses, and yards in order.

LAND OWNERSHIP, LEASEHOLD AND OCCUPANCY

As refugees return to their home villages, some arrangements must be made for restoring land ownership and leasing rights to those who held them before the evacuation, or alternatively, for redistributing land under a land reform program and insuring that villagers receive the land they are supposed to get. From the standpoint of refugee village administration, the requirements are an accurate set of land ownership and tenancy records, a set of policies to deal with the unusual situation of temporary abandonment of leased land by refugees, a process for settling normal land disputes, and policies and manpower to deal with

any squatters who have moved in, perhaps with Viet Cong land titles, and occupy land belonging to refugees.

Land ownership and tenancy records should be available at the village office when the village is evacuated, and should be moved with village leadership. If removal is not feasible (for example, when only part of the village is evacuated), it may be useful to microfilm these records in order to have a set of land ownership documents available in the refugee village.

Abandonment of leased land by tenants might under normal arrangements entitle the landowner to cancel the lease and lease the land to someone else. It seems likely that when tenants are directed or encouraged to become refugees their land lease rights should be preserved. It is not so clear what should be done when a tenant has left the land to become a refugee, another tenant has replaced him, and the second tenant, perhaps several years later, is moved to a refugee village. Other problems may arise when the normal lease period (five years in Khanh Hau) expires while the village is still evacuated. These situations may not be covered by written law, common law or precedent, and some new legislation may be needed if there are to be extensive government-encouraged refugee movements. The village council normally handles disputes over boundaries, inheritance, water rights, and the like, according to both Khanh Hau and My Thuan studies.^(4,33) There is no reason evident for changing this.

If the land is occupied by persons having no legitimate land title or leasehold, it may be necessary to remove them by force and to decide where to send or resettle them. There may not be a squatter problem in areas where military action has continued during the evacuation period, but villages that have come under Viet Cong control and have not been in zones of active combat may have been resettled under a Viet Cong land distribution program. From the legal standpoint and from the viewpoint of the returning refugees, these persons have no rights on the land and should be evicted. The problem is not that simple, of course, for "winning the hearts and minds" applies to those who have been under Viet Cong control as well as to those who have come out, and some plans should be made for the future of squatters and beneficiaries of Viet Cong land redistribution.

RESETTLEMENT ASSISTANCE

Returning Villagers

Refugees returning to their homes will need to rebuild both homes and farms, and probably will be without farm income until the first rice harvest. Some may be fortunate enough to find fruit trees, vegetable gardens and coconut palms still producing, but neglect and military action may have destroyed these; paddy rice production will have stopped in the villagers' absence. It seems reasonable to assume that in most cases there will be no yield from farms until villagers have returned, planted, and harvested completely new crops.

Specific needs include these: transportation; house materials; furniture; kitchen equipment; temporary shelter; seed, fertilizer, farm implements; food or food money to last until the first crops are in, which is probably four months even with careful timing, and could be as much as a year. It is not necessary to provide all of these items as free resettlement assistance. Furniture and kitchen equipment can be transported from the refugee village; some house materials, such as thatch, may be available near the home village; if credit is made available at reasonable interest rates (such as through the National Agricultural Credit Office) villagers can borrow money for seed and fertilizer and repay when the crop is harvested. If villagers have held jobs while in the refugee village, they may have savings that will carry them through the resettlement period until the first crop is harvested.

The need for resettlement aid to individual families may be negligible where refugees have savings, houses are intact, and credit is available. At the other extreme, if refugees return from a nonself-supporting refugee village to a devastated home area, and must rebuild homes and farms without having savings or inexpensive credit, the need for resettlement aid might be about \$220 per family: \$50 for house materials, \$110 for food and nonfood goods from outside the village for four months from resettlement to harvest, and \$60 for the seed, buffalo, farm implements and fertilizer needed for the first crop.* A poorly

* This \$60 is an average for the village, based on three-quarters of village families receiving fertilizer and seed at \$13 per hectare, and farming an average of two hectares, while one-third of these farm families

timed return with a one-year wait until the first harvest would involve an added \$230 for purchases for consumption, raising the total to about \$450. This is based on annual consumption needs of \$340 per family exclusive of in-village nonfood goods and services as explained in Appendix B.

Schools, public buildings, canals and other common-use facilities would probably also need to be reconstructed. Their costs would be small compared to the \$220,000 to \$450,000 in resettlement aid to individual families. Although family resettlement needs may be wholly or partly met from savings or loans, it seems likely that government sources will have to provide direct material aid to restore the common facilities. Costs may be similar to those involved in setting up the refugee village, except that land need not be bought or rented. If the refugee village is being dismantled, it can be used as a source of materials for home village construction. Villagers can provide the labor for these projects, and payment for their labor can be used as a way to distribute resettlement funds.

School building costs were estimated earlier as about \$1000 per large classroom (holding 55 students), excluding any special facilities or equipment needed for televised or filmed instruction. For a 1000-family village, with the school-age population projected in Sec. VI and based on Khanh Hau 1958 data, this would mean \$16,000 for a school for all children in the normal primary-school age group, or \$33,000 for universal schooling through secondary level. The costs to rebuild administrative facilities would be less. Canal and road repair should require only shovels and labor, and costs can probably be disregarded here.

also receives a team of two buffalo and a set of farm implements at a total cost of \$165 per receiving family. Farmers receiving buffalo and implements would be able to sell these services to other farmers at planting time, and this would affect the allocation--although not the total amount--of living-expense allowances going to village families.

Migrants to Other Areas

Some refugees may prefer to move to Saigon or to other cities, rather than return to their farms. This is a normal trend, but the rate of movement to urban areas can be expected to be higher than normal among refugees leaving resettlement villages; they have already made the break with their home villages, have been exposed to more outside influences, and often will have picked up additional skills and improved their reading ability.

There is no apparent reason to extend government resettlement aid to refugees who elect to move to town rather than back to the farm, since nonrefugee rural villagers do not get any such assistance. The refugee village administration can provide some low-cost help to persons trying to decide where to go and what to do, however; for instance, administrators could give refugees advice on employment opportunities in various skills, city living conditions, wage levels, and costs. The village information center or the school system could be the channel for this type of advice.

Refugees are also a natural group to contact if the government is opening new lands and is looking for villagers interested in settling and farming there. Programs of this type have included draining sections of the Plain of Reeds in the Delta, opening this land to voluntary resettlement, and establishing new villages in highland provinces by forcible movement of coastal villagers. There is still land available for reclamation and settlement once the insurgency has been defeated, and it may be useful to give refugees the added option of establishing farms on new lands with government resettlement aid.

X. COLLECTED COSTS

THE DOMINANT COST FACTORS

The various aspects of refugee village construction and operation discussed in Secs. III through VIII include many topics for refugee program planners to consider. Some actions require an allocation of money, goods or services; others need little more than planning, supervision and administrative attention. Factors that can be given a significant money cost are discussed in this section, and cost estimates are summarized in Table 7.

Relief expenses are by far the largest cost component of a nonself-supporting village. If refugees are unemployed, village maintenance and operation tasks they can perform can be treated as free, since refugees can be required to do these jobs as a condition of receiving relief or can be hired as workers and taken off relief rolls; in either case, allocating costs between relief and village operation is an arbitrary one, and village services such as road maintenance can be kept at high standards without any increase in village costs. This applies, of course, only to the refugee-labor components of village operating costs, and not to supervision, equipment, skilled labor or materials not available within the village.

If refugees have outside income, the net cost of village operation should be much less as the relief costs component should go down to the cost of supporting unemployable refugees, and may vanish entirely as employed refugees can pick up this burden. Wage payments for maintenance work and other village jobs might be made by the village administration, as a subsidy to a village that is not fully self-supporting, but also might be paid with tax revenues from employed villagers or performed without pay as a form of taxation. A fully self-supporting village, of course, would have enough income to pay educational, medical and village administrative costs as well as land rent; the minimum village operating cost to the refugee program would be zero, but it seems unlikely that many refugee villages could be self-supporting on this level.

Initial costs are easier to predict, since they will normally be incurred whether or not there are jobs in the vicinity open to refugees.

Table 7

SUMMARY OF SIGNIFICANT COSTS FOR A 1000-FAMILY VILLAGE

Cost Component	Initial Costs	Annual Costs
Site acquisition and preparation	0 to \$18,000, plus refugee labor	0 to \$1100; if any cost is incurred here, initial costs will be \$5000 or less.
Temporary shelter and equipment	Maximum \$5000	None.
Village construction	\$105,000, plus refugee labor	Refugee labor only.
Schools for all children ages 6 through 17	\$33,000 to \$40,000	\$13,000 to \$18,000.
Literacy classes	None	\$1200 (for first two years only).
Relief	None	Maximum \$290,000; should be less (\$230,000) after first year.
Village administration	\$5000	\$4400, plus refugee labor.
Medical services	None	\$2000 to \$6000, plus refugee workers.
Total refugee village costs	\$143,000 to \$173,000	First year \$310,600 to \$320,700 Later years \$249,400 to \$260,700

House, school and water system costs are important; site leveling and clearance may add a significant amount, but will be small in some types of terrain or if refugee labor is used and other jobs are not available. Land costs are not prohibitive, running at most 10 percent of total initial costs, for villages with individual homes and garden plots.

Costs of returning to the home village might be quite high, depending on the length of time until the first crop can be harvested in the home village and on the extent of reconstruction or repair needed to make fields productive and the village habitable.

COSTS TO SET UP THE VILLAGE

The significant money costs of site acquisition and preparation and village construction are in the categories of land purchase, lease or clearance, house materials, and water supply. Smaller items include rudimentary shelter and household equipment (mats, hammocks, cooking pots) for emergency use when refugees arrive, and the village office and other public buildings; schools are discussed later in this section. When villagers do not provide their own transportation, the costs of collecting and moving the refugees can be treated as part of the costs of military operations in the area.

Land for a 1000-family village with household gardens but no rice land could cost as much as \$18,000 to purchase if it is of farming quality; if rented, the rent could be as great as \$1100 per year. Land of this type would need little preparation. In some areas, such as lightly-wooded terrain in the central highlands and sand dunes along the coast, free land should be available with very little preparation.

If land must be cleared and leveled, costs could run as high as \$60,000. It seems likely that about 10 percent of the land should be prepared in advance, to provide access routes and acreage for temporary facilities while work is in progress on the balance of the village site. On this basis, something like \$5000 to \$10,000 of the site preparation cost would be done by nonrefugee labor (although perhaps by refugees from other villages); the remainder of the \$60,000 maximum cost could be disregarded if refugees who would otherwise be on relief and earning no income do the rest of the work. This \$5000 to \$10,000 estimate applies to nonagricultural land that is probably obtained without cost. For agricultural land, the maximum likely preparation cost is about \$5000 for ditching and street grading, all of which is within the capability of refugee labor.

Materials for a small house cost about U.S. \$75, or \$75,000 for the entire 1000-family village. Public buildings, while probably made of more substantial material, need not be large, and \$5000 to \$10,000 should cover all but the school. The water system, including distribution to public taps located throughout the village, should cost about \$20,000.

Maintenance costs can be ignored, since refugees will do their own house repair work, and maintenance requirements for other buildings and the water system will be small.

Table 8 summarizes these costs for setting up the village. The \$5000 cost shown for temporary shelter and equipment, including tents, hammocks, cooking pots, etc., for refugees to use as soon as they arrive is arbitrary; actual costs will depend on how much the refugees can bring from their home villages, the time period over which they arrive, and the safety margin provided for unexpected arrivals and property losses.

Table 8

COST SUMMARY: SETTING UP THE REFUGEE VILLAGE

Item	Initial Costs		Annual Costs	
	Payments to Outsiders	Payments to Refugee Labor	Payments to Outsiders	Payments to Refugee Labor
Cost of site ^a				
Purchased and ditched or	\$18,000 maximum	\$5000 for ditching	none	none
Rented and ditched or	none	\$5000 for ditching	\$1100 maximum	none
Unused land, cleared and leveled	\$5000 to \$10,000	\$50,000 to \$55,000	none	none
Temporary shelter and equipment	\$5000	none	none	none
Village construction				
Houses	\$75,000	labor but without pay	none	none
Other buildings, excluding schools ^b	\$10,000 maximum	probably small ^c	none	small
Water system	\$20,000	some ^c	small	small

^aIncludes street and pathway construction at time of ditching.

^bSchools are shown separately in Table 9.

^cRefugee labor may be used for some of the work included in "payments to outsiders" if time and available skills permit.

EDUCATION

School system costs with the various class sizes and technological aids considered in Sec. VI are shown in Table 9. Costs for schools to serve only ages 6 through 10 are about half those shown here for ages 6 through 17, since the cost components involved are all proportional to enrollment.

Table 9

SUMMARY OF SCHOOL COSTS FOR ALL CHILDREN AGED 6 THROUGH 17 (1815 pupils)

Class Size and Technological Aids	Initial Costs	Annual Costs (12-months basis)
Conventional schools, classes of 55. . . .	\$ 33,000	\$13,100
Conventional schools, classes of 30. . . .	\$ 33,000	\$21,600
Classes of 55 with television ^a		
In-village costs only ^b	\$ 39,300	\$17,600
Including share of single-site "economy"		
TV system costs.	\$ 41,700	\$18,700
Including share of nationwide "economy"		
TV system costs.	\$ 44,800	\$20,000
Classes of 55 with films	\$105,000	\$23,400

^aThe village share in television system costs includes system production and transmitting costs prorated over the maximum potential student population. The share of costs for the single-site system is 0.001815 of the system total, since the village schools would serve 1815 of the one million persons in the 6 through 17 age bracket, while the share of costs for the nationwide system is 0.00033 (1815 out of 5,500,000). Commercial facilities are not assumed to be sharing costs in this example. Similar prorating for films was unnecessary because production and transmitting costs are a very small part of the total.

^bClassrooms, teachers, class materials, electricity, and TV-receiving equipment with sets in 40 percent of the classrooms.

Table 9 shows that educational television costs less than adding teachers to reduce class size to 30 on a nationwide or metropolitan-area basis. It also shows the high initial cost of film systems.

Some other costs mentioned in Sec. VI should be repeated here. Vocational school shop courses require about ten times as much initial

investment and seven times as much annual expense per pupil as standard classroom instruction. Three-month training classes for teachers cost about \$51 per student if no support allowances are paid, or if support is already provided from relief funds. And literacy training costs should run about \$1200 a year for two years if most villagers are illiterate and are enrolled in these classes.

RELIEF

The maximum requirement for continuing relief aid appears to be \$290,000 per year for a 1000-family village with no other income. This is based on an annual total consumption of \$370,000, with in-village production of \$35,000 in food and \$45,000 in other goods and services, as outlined in Sec. IV and Appendix B. It appears reasonable to expect food production to rise and for the village diet to be modified to make full use of foods that can be produced in homeplot gardens, so that the village might produce \$95,000 in food each year after the first. This reduces the cost of relief assistance to \$230,000.

Relief costs can be cut below these levels if refugees have any outside income. Minimum requirements apply when jobs are available for all refugees as they arrive, for in this case the only relief needs are for small supplies of food to those families who do not bring their rice stocks.

OTHER VILLAGE OPERATING COSTS

The size and cost of the resettlement cadre, a term used here for the personnel needed to guide and supervise the construction and organization of the refugee village, has not been estimated in detail. The number of people and the skills required should be something like the requirements for Revolutionary Development teams--59 people including those whose primary job is providing security for other team members. The security requirement should be reduced in the refugee village environment. A 59-man team at salaries of U.S. \$25 per man per month would cost \$17,700 per year (plus transportation, training, etc.), and from this a supervision cost of \$10,000 to \$15,000 per year can be

projected for a village, applying to the initial period and until village leadership can establish itself and take on the resettlement cadre's responsibilities.

If the village has no outside source of income other than relief, it may be necessary to retain some of the resettlement cadre to supervise the storage and distribution of relief supplies. For the maximum-cost case, then, the village may need the full resettlement cadre for six months, and one-third of it thereafter, or, in dollar cost terms, \$7500 for the first six months and \$5000 per year thereafter. This can be expressed as \$5000 initially plus \$5000 each year. Some part of the initial \$7500 will apply under almost any circumstances, but the continuing \$5000 per year can be expected to drop to zero if the village is self-supporting and has reasonably good local leadership.

Other village administrative costs are small, running about \$500 per year including salaries for village and hamlet chiefs and the village council and clerk. Even this small amount might not be a net cost to the refugee program, for a self-supporting village might be able to pay taxes to cover these salaries; if the village has no outside income, the persons receiving these salaries would be on relief and their relief allowances might be reduced. Refugees can provide street and drainage ditch maintenance, local police patrols, and other labor for village operation in exchange for relief aid, or on a salaried basis paid from locally collected taxes. In any case the costs need not be direct to the refugee program.

Medical services have been estimated as requiring from 27 to 110 people, with about 10 percent trained personnel and the remainder refugees. This probably means \$2000 to \$6000 per year in salaries for trained personnel or in training costs for refugees, and is a continuing cost.

COSTS OF RETURN

The costs of returning the refugees to their home village, rebuilding it and maintaining the refugees until the first crops are harvested could be as great as \$500,000. This includes, roughly, \$340,000 for food and other consumption needs for a year; \$50,000 for house

reconstruction materials; \$60,000 for seed, fertilizer, farm animals and tools; \$33,000 to build a new school and for the first year's operating costs; and smaller amounts for public buildings, administrative salaries, medical costs, and other items similar to those involved in a year of refugee village operation. The controlling factor here is that refugees will have no income until the first crops are harvested. Proper timing can shorten this period, and if refugees return to their home villages immediately before planting time the cost of needed food and other commodity relief would be about \$110,000 rather than \$340,000. Several factors may permit other cost reductions. Livestock, furniture, house materials and food stocks may be brought from the refugee village. Refugees from a self-supporting refugee village may have built up cash savings. Credit may be available. Schools and other buildings in the home village may still be usable. And some villagers may elect to go to urban areas or remain in the vicinity of the refugee village and not make use of resettlement aid.

A NOTE ON INFLATION AND EXCHANGE RATES

Wartime inflation in the Vietnamese economy will have changed some of the costs shown. The most complete studies available date from 1957 to 1960, and it seemed unwise to correct those costs for which newer data can be found, while leaving other prices unchanged; the 1957-1960 period is also more representative of the normal situation which the refugee village would try to create. Costs in Vietnamese currency (piaster or VN\$) have been converted at VN\$70 to U.S.\$1, the rate used in Refs. 2 and 3 for 1957-1958, except for a few costs which are for the 1965-1966 period and for which an exchange rate of 118:1 was used. This reduces the impact of inflationary change by eliminating that part of it which is covered by devaluation of the piaster.

Appendix A

UNRWA AND THE PALESTINE ARAB REFUGEES

BACKGROUND AND SCOPE OF UNRWA OPERATIONS

The Palestine Arab refugee relief operation began in 1948, after many thousands of Arabs fled into Jordan, the area of east-central Palestine then held by Jordan, Lebanon, Syria, and Egyptian-held Gaza during the fighting between the Arab armies and Israel. Initial relief efforts were provided by UNICEF (beginning September 1948) and voluntary organizations. UN efforts were initially organized under the United Nations Relief for Palestine Refugees and then, from May 1, 1950, under the United Nations Relief and Works Agency for Palestine Refugees in the Near East, more commonly referred to as UNRWA.*

Like most refugee movements, the Palestine Arab movement was thought to be temporary, and both refugees and relief agencies expected that the "Palestine problem" would be settled in a way that would permit the refugees to return home. The trend of international events since 1948 has taken a quite different direction. Arab nations refused to acknowledge the legal existence of Israel, and have maintained the position that Israel should vanish and that the Palestinian Arabs should--and in time will--return home. Israel filled the vacated lands with Jewish immigrants, many coming from Arab countries where they, like the Palestinian Arab refugees, were caught in the middle of the Arab-Israeli conflict and were victims of the anti-Israel theme that became such an important policy principle for many Arab governments and political movements. These events combined to prevent a long-term solution to the refugee problem. The refugees cannot go home; Israel will not give up the land to its neighboring Arab enemies, Israeli immigrants are now settled on it, and neither Israel nor the Arab nations would welcome the movement of a million Arabs into areas under permanent Israeli control. Permanent resettlement in Jordan, Lebanon, Syria,

*Most of the data for this Appendix came from UNRWA annual reports to the UN General Assembly for 1950-51⁽²⁵⁾, 1959-60⁽²¹⁾, 1961-62⁽⁴²⁾, 1964-65⁽³⁷⁾, and 1965-66⁽¹⁰⁾, and from an interim report for 1949-50⁽²⁴⁾.

Gaza, and Sinai would imply giving up the expectation of returning home and would also require development of desert lands for farming or development of extensive industries to provide employment in countries which are short of water, industrial resources, and organizational skills. Movement to other areas in the Arab world poses the same problems. So the refugees remain in camps, nearly twenty years afterward, sustained by UN relief and by the hope of returning to a homeland that the younger half of the refugee population has never seen. At this writing many of the camps are in Israeli-occupied territory (west of the Jordan and in Gaza), while the refugees' future is still uncertain and likely to remain a political issue.

The "works" portion of the UNRWA title relates to an unfulfilled hope that refugees could be provided with employment that would take them off relief rolls and stimulate the economy of the host countries. This was begun in early 1950, reached a peak in December 1950, and was dropped in mid-1951. According to the 1950-1951 UNRWA annual report, the program was under-financed, and it also met some opposition from refugees themselves, on the grounds that it implied renouncing their right to return home. The reason for discontinuing the program appears to have been financial. UNRWA has been chronically short of money, and it costs five times as much to provide work for a refugee as to keep him on relief.* The road-building and reforestation accomplished were probably useful to the host countries, but provided no income to UNRWA to offset the added costs. Since 1951, UNRWA employment of refugees has been limited to those engaged in camp services and UNRWA activities.

UNRWA is, then, a relief agency with activities that can be grouped into the direct relief, education, health and social welfare fields, with a small amount of effort in economic development and employment assistance. There is also an administrative structure for refugee registration, control of relief supplies, school administration

* This includes the take-home portion of a refugee workman's pay, after deduction for the value of relief goods and services for himself and three dependents (cash payments averaged \$13-\$14 a month in Syria and Lebanon, and less in Jordan), and costs in equipment, supplies, project management and the like.

and the like, and a headquarters in Beirut. About half of the headquarters staff and the great majority of other UNRWA employees are "local," primarily refugees.

In June 1966 there were 1,318,000 registered refugees, of whom 1,209,000 were eligible for rations and/or services.

DIRECT RELIEF

Most registered refugees receive rations from UNRWA and wear clothing contributed to UNRWA and transported and distributed at UNRWA expense. Almost half were housed in the 54 UNRWA camps until the June 1967 conflict.

The daily ration--1500 to 1600 calories of grain, dry vegetables, sugar, oils and fats--is a minimally adequate diet for a population doing little manual labor. Refugees with some earning or with gardens or livestock can supplement this with fruit, fresh vegetables, eggs and the like, which are not included in the relief ration. A supplemental ration provides milk and vitamins to such groups as young children and expectant and nursing mothers. The basic diet, while uninspiring, does maintain the nutritional level of the refugees on a par with that of the populations of Lebanon and Jordan.

Also provided are blankets and small amounts of soap and kerosene. Tents were used for refugee housing at first, but a program of hut construction brought an end to tent housing in 1960. The 456,000 refugees housed in the 57 UNRWA camps in June 1962 were living in 116,700 huts. By June 1966, camp population had risen to 518,000. Each camp population is a little less than 40 percent of the refugee population registered at that time. Most of the remaining 60 percent depended on UNRWA for rations and other services, and were outside of the camps because they initially moved into towns or with relatives and friends in 1948. UNRWA reports state that employment opportunities outside the camps were no better than those available within the camp, that there was constant pressure for admission to camps, and that camps were becoming seriously crowded as new families were formed and squatters moved in. The camps have been enlarged somewhat, and the population has climbed steadily since 1950 (at annual rates occasionally as high as 10 percent), but UNRWA finances have not permitted major expansion programs.

Population registration and ration control has been a continuing problem, aggravated by financial limitations. UNRWA personnel have periodically checked relief rolls in Gaza, and elsewhere when host countries would permit, to remove persons whose death or movement out of the area has not been reported, so that someone else could collect their rations. Money limitations, again, have forced UNRWA to impose ceilings on ration registration, so that children otherwise eligible for rations are placed on waiting lists and added as places are opened or the ration total is increased. Ideally the program would provide for removing families from the ration list when their income is high enough for self-support, and for reinstatement on the list if the wage-earner loses his job. This is attempted, but is only partially successful.

EDUCATION

The UNRWA/UNESCO school system was expanded steadily from its 1950 level to provide primary and "preparatory" (junior high level) education for all refugee children who qualify for UNRWA assistance, including many whose family income is high enough that they do not draw rations. The school system was directly accommodating 176,000 as of June 1966. UNRWA subsidies were provided to primary and preparatory schools in Jordan, Lebanon, and Syria for the education of an additional 35,000 refugee children; these schools also accommodated 4500 children having refugee status but for whom no subsidies were paid. This was a major expansion of the initial program, which provided schooling for about half the children of primary-school age, in line with normal conditions in pre-1948 Palestine and adjacent Arab countries. The refugees established schools in the earliest days of the camps, and were given UNESCO support and direction in 1949. The present extensive school system developed from this, with particularly marked increases in the number of girls attending school and the number of years pupils attend.

While the elementary and junior high system is by far the major portion of the UNRWA/UNESCO effort, there are also programs for vocational and secondary-level education and teacher training. The UNRWA/UNESCO system has discontinued its few secondary schools, which

had a peak (May 1962) enrollment of only 875, in favor of expanding the subsidy arrangements for local secondary schools. In 1966, there were 12,500 pupils attending local high schools under UNRWA subsidy arrangements, along with 7000 registered as refugees but attending high school without UN subsidy. University scholarships were held by 621 students, primarily in engineering and medicine. Vocational schools had produced less than 1700 graduates through 1961, but the program was then expanded, with 700 graduating in 1962, 900 in 1963, and 1500 each in 1964 and 1965. Teacher training centers were opened beginning in 1959, and accounted for about 30 percent of the vocational graduates in 1965.

Vocational training centers and university scholarship aid are designed to permit training of the most qualified students to a higher level than is usual in the Arab countries of the Near East. Many graduates have found employment in more prosperous areas such as the oil states of the Persian Gulf. Teacher training, although designed to raise the quality of teaching in the UNRWA/UNESCO system, also has made it easier for refugees to find employment elsewhere.

These programs are far from universal, however; even the 1965 level of over 1500 graduates of vocational and teacher training courses is small compared to the total number of refugee children, estimated in 1960 as 35,000 born each year and 500,000 under sixteen years of age.⁽²⁸⁾ Vocational training has also been introduced into the regular school curriculum after two false starts--an apprenticeship program in 1951-1952 that taught only trades and did not produce either literacy or sufficient skill to assure employment, and a vocational program at the junior high level that had the appearance of a substitute for academic education and was unpopular with parents for this reason.

UNRWA also runs training courses in carpentry and sewing for young adults not taking the longer vocational courses. The six-month sewing and cooking courses graduated 1748 women in 1962, and 1602 in the 1965-66 fiscal year; a much smaller number of students, 101 in 1962, and 58 in 1965-66, have completed the one-year course in wood-working. Training at these centers is not sufficient to qualify the graduates for skilled or semi-skilled employment, but it is enough for

women graduates to be able to sew clothing for their families and neighbors, and for men to do odd jobs, thereby adding a bit to individual incomes.

HEALTH

Medical and public health services in 1966 included the operation of 122 medical centers of various types, 105 by UNRWA and the others by local governments and voluntary agencies receiving some UNRWA financial support. Eighty of these centers had prenatal clinics and 77 had infant health centers. Nursing services at the UNRWA centers required a staff of 158 graduate nurses and midwives, 303 auxiliary nurses, and 119 "traditional midwives." Particular attention is given to tuberculosis patients and to those with communicable diseases.

Health and disease-prevention information is provided in various ways, including school programs and 25 health education workers (1962) who work directly with refugee groups and communities.

While there were still two small hospitals run by UNRWA in 1966, the trend has been for UNRWA to pay for space in outside hospitals, at ratios approximating two beds per thousand refugees entitled to medical services.

Water supply, sanitation, insect control, refuse disposal, and similar public health problems in the camps are the responsibility of UNRWA, and require both direct efforts and education of refugees.

SOCIAL WELFARE

Projects under this heading comprise only a small proportion of the total UNRWA effort. A youth recreation, sports and service program was begun in 1960, largely under YMCA sponsorship. Direct financial aid has been provided to old and infirm refugees; small grants have also been made to refugees having craft skills, to enable them to buy tools and resume work. UNRWA welfare workers continue (as recently as 1962) to try to reunite families separated in the confusion of 1948. Training programs are conducted for a small number of handicapped youth (175 in 1964-1965). Several cooperatives of various types were

organized with UNRWA help, and 2500 families were involved in these in 1965.

OTHER PROGRAMS

Two programs outside of the above categories are listed in recent annual reports: UNRWA participation in the Development Bank of Jordan that was set up to make loans that would encourage local economic development; and a UNRWA placement service that acts as a link between potential employers and qualified refugees, particularly those graduating from vocational courses. By 1962 the Development Bank had aided projects on which 13,000 refugees were employed, but by 1966 more loan capital was available from other sources and UNRWA was planning to withdraw its Development Bank capital. The placement service found positions for 835 applicants in 1962, the majority of them teachers; 1965-66 placements are probably above this level because vocational school output has increased.

COSTS AND MANPOWER REQUIREMENTS BY FUNCTION

Food Rations

Food costs, including the basic ration, supplementary rations, and the share of administration warehousing, supply control and transportation allocated to relief services, totaled \$16.5 million in 1966 (this and other costs for 1966 in this section are estimates from the 1965-1966 annual report), or \$19.30 per refugee on rations--a little over five cents per person per day. Basic and supplementary rations accounted for \$13.5 million, while the remaining \$3 million, allocated from common costs in the 1966 UNRWA report, includes common costs allocated to camp shelter (huts, roads) and hardship assistance as well as food. The total cost per person per day (for 853,000 refugees receiving rations) therefore was 4.3 cents for food and 1 cent for related costs. Most of the 1293 staff members (17 international, 1276 "area" and mostly refugee) in supply, transport and distribution functions in December 1959 were probably involved in food relief.

Camp Operation

This is shown in two categories in the UNRWA reports--"shelter" and "environmental sanitation," at \$350,000 and \$941,000, respectively, or a total of \$1.3 million. Shelter includes roads and road maintenance as well as buildings; environmental sanitation includes water supply, drainage, etc., which might be grouped as public health services. The total cost was \$2.49 per year per refugee in camp, down from \$3.72 in 1962 and \$2.88 in 1965 due to a shortage of funds. The tent replacement program was completed in 1960, so that these costs include only such hut construction as was necessary to expand camps, replace squatters' shacks and repair storm damage.

Some portion of the 3428 personnel in "medical, nutrition and sanitation" functions in 1959 were in camp operation functions, but reports do not show a breakdown between public health and other medical manpower. The requirement for an international staff was small, totaling only 17 for combined medicine, nutrition and sanitation. The 1965 report notes that the internationally recruited doctors in charge of UNRWA health programs in the four host countries have been replaced by locally recruited doctors, implying that the international staff in medical services is even smaller than in 1959.

Population Control and Registration

These costs, primarily for personnel, incorporate recordkeeping and verification of the existence of registered refugees and their entitlement to rations and other services. The \$295,000 cost in 1962 was 27 cents per refugee receiving rations and/or services; in 1965 and 1966 this item was apparently contained in one of the components of food ration costs given earlier.

Education

The education budget is divided into general, vocational, and university, with general education including school operating and construction costs for the UNESCO/UNRWA system and subsidies to local schools in the host countries.

The \$10.3 million total general expenditure in 1966 was for 235,000 students, of whom 176,000 are in UNRWA schools. This is an average of not quite \$44 per student. The 1965 budget of \$9.2 million was inadequate to keep pace with expanding classes, and the 1966 budget was therefore increased, largely for school construction; the 1967 budget of \$11.3 million continued this trend.

Costs per student in other categories averaged \$807 for vocational education (\$2.57 million for 1116 teacher trainees and 2067 students at UNRWA vocational schools) and \$565 for university scholarships (\$351,000 for 621 students). Costs for vocational training include both full year and short courses. The costs shown include an unstated amount for an in-service teacher training program, using correspondence courses, and \$48,000 for the placement service; actual vocational education costs per student are therefore less than the \$807 shown. Most university scholarships are being limited to \$500 per year.

In 1959, 4331 persons were employed in education, of whom 27 were international staff. One function of the international staff (1965 report) is to act as advisers on teaching methods and techniques at teacher training schools; another is to render technical assistance at vocational training centers. 1965 plans provided for training Palestinian staff to replace some of these "international" specialists in 1966, which helped reduce costs.

Medical Services

Medical service costs were \$3.1 million in 1966, or \$2.56 per refugee eligible for services. The total 1965 Health Services cost of \$5 million also included \$941,000 for environmental sanitation, grouped here as a camp operation cost, and the estimated health services share of supply, transport and other internal services and general administration costs of the Agency. This allocated share (\$935,000) is 77 cents per refugee if allocated evenly among refugees served; it is probably somewhat higher for each refugee in camp and somewhat lower for refugees not receiving housing and sanitary services.

Social Welfare

Special assistance costs were \$461,000 in 1966, or an average of 38 cents per eligible refugee. This includes clothing distribution and special allocations of money and supplies to hardship cases. The youth program and training for the handicapped, both funded from the education budget, are not included here.

Jordan Development Bank

This lending agency, 85 percent of whose capital is provided by UNRWA, had \$2.4 million in outstanding loans on 30 June 1965. New lending was suspended in 1966, while the future of the bank was to be decided by negotiations between the Jordanian Government and UNRWA.

Administration and Common Costs

These were listed in three categories in the 1966 UNRWA report: supply and transport services (\$3 million), other internal services (\$2 million), and general administration (\$1.2 million). Headquarters costs in Beirut, and the New York, Geneva, and Cairo field office costs are in general administration, a category that probably accounted for most of the 1168 persons (67 of them international staff) in "placement, welfare, administration, etc." in 1959. Costs of the three categories total \$5.14 per refugee receiving services (down from \$5.61 in 1965), and have been allocated among relief, education, and health costs in the 1966 report.

Missing Items

Several functions that a planned refugee operation should provide are missing from the UNRWA reports, sometimes hidden in other function costs, and sometimes not performed. Among these are:

1. Police and civil security, which is mentioned only with respect to protection of UNRWA property (in Other Internal Services). Nothing is said about general police functions, who provides them, and how they are financed.

2. Records of land and other property abandoned by the refugees, for eventual questions of compensation; this is outside the scope of UNRWA activities, and compensation has been politically out of the question since it would imply that the refugees would not be returning home.

3. Military (external) security, which has been provided by the host governments (with lapses in 1956 and 1967) and by the UN through another budget, that of the UN Expeditionary Force. From 1957 to May 1967, UNEF provided both external security and one of the few sources of income for the Gaza area. Military activity by refugees, more or less organized as the Palestine Liberation Army, seems to have been financed by Egypt and Syria, definitely not from UN funds.

TOTAL COSTS AND MANPOWER REQUIREMENTS

Table 10, showing overall UNRWA costs, refugees served and UNRWA manpower (when available), is taken from UNRWA annual reports. This covers the period from May 1950 to December 1966. Costs per refugee in Table 11 are based on the number of refugees at the end of the fiscal year through 1957, and at the middle of the year for 1958-1965 (UNRWA changed its fiscal year from July-June to the calendar year in 1957). The 1966 costs are partly estimated. Table 12 shows the functional distribution of the UNRWA staff in 1957.

OTHER RELOCATIONS

Refugee movements and population relocations in other areas may be of interest to the refugee village planner, even though the situations were quite different.

The 1942 relocation of persons of Japanese ancestry from the West Coast states, the historical background, and subsequent events are described in Ref. 49, which also contains a bibliography. Two useful sources for details on relocation camp organization, operations and costs are Ref. 20, the official report, and Ref. 50, a detailed account of the Poston camp in Arizona.

Malaya's "new villages" were established for compulsory resettlement of the rural population in areas of guerrilla activity; new villages in the Philippines were established during the last days of the Hukbalahap rebellion to provide land for guerrillas defecting to the

Table 10

SUMMARY COST DATA FOR UNRWA OPERATIONS, 1950-1966

Year	UNRWA Expenses		UNRWA Staff (December 31)		Thousands of Refugees Served, June of Each Year	
	Cost (In \$ million)	Period Covered	Total	Int'l	Rationed ^a	Total
1950					Unknown	960
1951	33.6	5/50 - 6/51	5,840	133	877	880
1952	28.6	7/51 - 6/52			864	883
1953	26.8	7/52 - 6/53			837	872
1954	29.2	7/53 - 6/54			838	887
1955	29.2	7/54 - 6/55			846	906
1956	32.2	7/55 - 6/56			847	922
1957	52.5	7/56 - 12/57			847	956
1958	32.8	Calendar yr			853	990
1959	35.0	Calendar yr	10,220 ^b	128 ^b	860	1019
1960	34.7	Calendar yr	10,849	146 ^c	866	1047
1961	39.1	Calendar yr	11,459	164 ^c	870	1074
1962	35.7	Calendar yr			878	1084
1963	36.2	Calendar yr	12,121	180 ^c	882	1112
1964	37.2	Calendar yr	12,084	148 ^c	879	1142
1965	37.6	Calendar yr	11,621	126 ^c	875	1174
1966	37.8	Calendar yr			861	1209

^aA few of these refugees receive half-rations and are counted as half in the cost-per-ration computations given earlier. Since 1954 the number of half-ration recipients has declined slowly from 17,300 (1954) to 15,400 (1966).

^bSee Table 12 for functional distribution. Staff "seconded and loaned from other UN organs" may not be included here; see footnote c.

^cIncludes 20 to 29 persons "seconded and loaned from other UN organs."

government side. Both of these operations are described in detail in Ref. 51.

Refugee movement and resettlement following the Geneva agreements in 1954 involved about one million persons moving south in Vietnam. An extensive description of problems and events, with evaluation of the programs, is contained in Part Two of Ref. 52.

Table 11

COST AND MANPOWER FACTORS

Year	Cost per Year per Refugee on Rations	Cost and Manpower per Refugee Eligible to Receive Services	
		Cost per Year per Refugee	UNRWA Staff per Thousand Refugees
1950-51 ^a	\$32.80	\$32.70	6.6
1951-52	33.10	32.40	
1952-53	32.00	30.70	
1953-54	34.80	32.90	
1954-55	34.50	32.20	
1955-56	38.00	34.90	
1956-57 ^a	41.30	36.60	
1958	38.50	33.10	
1959	40.70	34.30	10.0
1960	40.10	33.10	10.4
1961	44.90	36.40	10.7
1962	40.70	32.90	
1963	41.00	32.60	10.9
1964	42.30	32.60	10.6
1965	43.00	32.20	9.9
1966	43.90	31.30	

^aCosts shown in Table 10 for these periods are for longer than 12 months.

Table 12

STAFF UNRWA EMPLOYED, 31 DECEMBER 1959

Function	Area Staff	Int'l Staff	Total	Staff per Thousand Refugees Served
Medical, nutrition and sanitation	3,411	17	3,428	3.36
Education	4,304	27	4,331	4.25
Supply, transport and distribution	1,276	17	1,293	1.27
Other functions (placement, welfare, administration, etc.)	<u>1,101</u>	<u>67</u>	<u>1,168</u>	<u>1.15</u>
Total	10,092	128	10,220	10.03

SOURCE: Table 23 of the UNRWA Annual Report for 1959-1960. ⁽²¹⁾ Staff per thousand refugees column is based on Table 23 and Table 1 of that report, and includes the 1,019,000 refugees eligible for services, whether or not in camps or receiving rations.

Appendix B

RURAL ECONOMICS AND REFUGEE LIVING COSTS

The following projection of refugee living costs and support requirements is based on the Khanh Hau studies reported in Refs. 2 and 3, with particular use made of the information in Chap. 9 of Ref. 2. Hendry's data on personal living expenses, obtained from surveys of Khanh Hau villagers of different economic levels, is used here to estimate the expenditures necessary to support refugees at standards similar to those in Khanh Hau and to determine how these expenditures are allocated among three categories: food; goods and services that can be produced within the village; and goods and services that must be bought from outside.

Hendry's economic surveys were based on separating the 590 village households into three socio-economic classes: 61 upper-class families, owning more than 4 hectares of riceland or renting more than 5 hectares; 84 middle class, owning from 2 to 4 hectares or renting 2.5 to 5 hectares; and 445 lower class, of which 221 owned less than 2 or rented less than 2.5 hectares and 224 had no land. A sample of 100 village families (12 upper, 18 middle, and 70 lower class) was selected for the survey of recurring expenses, and a smaller sample of 18 families (3 upper, 6 middle, 9 lower) provided estimates of expenses that are not a part of regular weekly spending.

KHANH HAU LIVING COSTS

Regular Food Purchases

Reference 2 describes average expenditures on food per capita for October-December 1958, and the distribution among major categories of food. Middle-class spending per capita ran somewhat under lower-class spending on rice, meat, and eggs, probably because middle-class families are larger. Table 13 summarizes pertinent data from Ref. 2 for middle- and lower-class families, with adjustments for family size and conversion to dollars per year.

Table 13

SIZE AND DISTRIBUTION OF ANNUAL REGULAR FOOD EXPENSES

Type of Food	Average Daily Expenditure Per Capita, VN\$		Average Yearly Expenditure Per Family, U.S.\$	
	Middle Class	Lower Class	Middle Class	Lower Class
Rice	\$2.3	\$2.7	\$ 70.75	\$ 73.20
Meat and eggs	1.1	1.5	33.84	40.67
Fish	0.9	0.9	27.68	24.40
Fish sauce	0.4	0.4	12.30	10.84
Other sauces	0.2	0.2	6.15	5.42
Vegetables	0.4	0.3	12.30	8.13
Fruit	0.2	0.2	6.15	5.42
Other items	<u>1.1</u>	<u>0.5</u>	<u>33.84</u>	<u>13.56</u>
Total	\$6.6	\$6.7	\$203.01	\$181.64

SOURCE: Table 9.3 of Ref. 2.

Family size is hard to pin down from Ref. 2, for Hendry states only that upper- and middle-class families are larger than lower-class ones in his sample population, as well as in the village as a whole. His Table 9.1, food and nonfood expenses per family, and Table 9.2, food and nonfood expenses per capita, are not quite comparable, but indicate family sizes something like 6.7 for upper-class, 5.9 for middle-class, and 5.2 for lower-class--based on food expenditures and on the assumption that the variations in these two tables introduced by using data for different weeks are not significant for food costs.

Hendry estimates (Chap. 12 of Ref. 2) that the village produces all of the rice, 70 percent of the fruits and vegetables, 50 percent of the fish, and 20 percent of the meat eaten by village families. Villagers keep chickens, but egg production is low (and may be part of the locally produced 20 percent of the meat; Hendry is not specific). Most other items are purchased, sometimes in Khanh Hau and sometimes in nearby towns.

An allocation of food money between village production, village retail markup on outside production, and money going outside the village is given in Table 14. The average expenditure shown for each food category is a weighted average for middle- and lower-class families, using the 1:5 ratio in which these families occur in the Khanh Hau

population. Retail markups assumed are 20 percent for sauces, 25 percent for "other items," and 10 percent for the outside produced proportion of other foods.

Table 14
ALLOCATION OF FOOD EXPENSES BETWEEN VILLAGE AND OUTSIDE
(In U.S. \$)

Type of Food	Percent Bought Outside	Percent Retail Markup Rate	Average Yearly Family Expenses			Total
			Village Produced Food	Outside Purchases Less Markup	Outside Purchase Markup	
Rice	--	--	\$ 72.79	--	--	\$ 72.79
Meat and eggs	80	10	7.91	\$28.75	\$ 2.87	39.53
Fish	50	10	12.48	11.34	1.13	24.95
Fish sauce	100	20	--	9.23	1.85	11.08
Other sauces	100	20	--	4.62	.92	5.54
Vegetables	30	10	6.18	2.41	.24	8.83
Fruit	30	10	3.88	1.51	.15	5.54
Other items	100	25	--	13.55	3.39	16.94
Total			\$103.24	\$71.41	\$10.55	\$185.20

Other Regular Purchases

The major components of regular nonfood purchases reported by Hendry are medicines, tobacco, betel and areca nut, beer, soft drinks, rice wine, soap and kerosene. These are sold within Khanh Hau, but not made there. The items are given a retail markup to cover transportation and retail services. Markups, according to Hendry (p. 141 of Ref. 2), are high on low-priced items--25 percent on cheap kitchen pottery--and lower on more expensive items. An average markup of 20 percent (on the cost to the retailer) is used in Table 15. The in-village production component is estimated as \$10 per family per year, and includes local fuel (rice husks), and betel and areca nut.

In the regular nonfood purchases, somewhat different estimates are obtained by using Hendry's Table 9.1 and by using Table 9.2 converted to expenditures per household at the family sizes noted earlier. Results of the two are given in Table 15, including expenditures per capita as well as per household. An overall average of \$110 for a family of 5.5, or \$20 per capita, appears reasonable from these figures.

Table 15

EXPENSES FOR NONFOOD ITEMS REGULARLY PURCHASED

Cost Component	Middle Class Households	Lower Class Households
Family size, estimated.	5.9	5.2
Weekly average expenses per household, \$VN, from Hendry Table 9.1	\$157.3	\$134.7
Daily average expenses per capita, \$VN, from Hendry Table 9.2	\$ 3.7	\$ 4.4
Annual average per capita, U.S. \$		
Table 9.1	\$ 19.86	\$ 19.30
Table 9.2	\$ 19.29	\$ 22.94
Annual average per family, U.S. \$		
Table 9.1	\$117.17	\$100.34
Table 9.2	\$113.81	\$119.29
Annual overall average, U.S. \$		
Per capita	\$ 20.00	
Per family of 5.5	\$110.00	
Allocation of annual family expenses		
In-village production	\$ 10.00	
In-village retail markups	\$ 17.00	
Amount going to outside sources	\$ 83.00	

Other Expenditures

Expenses that do not recur daily or weekly are discussed separately in Ref. 2, in part because they were obtained from a smaller population sample using data for a longer period, and in part because their size indicates the relative importance of some activities of interest--such as village ceremonies--in the life and economics of a rural village. The 18 families in the sample were asked to estimate expenses in various categories for the entire year (1958). Their answers, converted to dollars, are summarized in Table 16.

While Ref. 2 does not identify which of these expenditures are in-village and which are outside the village, it is possible to make an approximate breakdown from descriptions of these activities in Refs. 2 and 3. Two major items are immediately identifiable as money spent to generate income--interest payments on money borrowed for farm expenses or to buy land, and gifts exchanged. On the latter, a family receives about as much in gifts as it spends. Other expenses are divided into five categories as shown in Table 17. Food and nonfood items have been

separated; village production has been separated from outside items purchased; markups by village retailers have been estimated to identify those costs of outside produced goods which go for retaining services and remain with the village. The basis for the breakdown of individual items is explained below.

Table 16

SUMMARY OF HOUSEHOLD EXPENSES, EXCLUDING
REGULAR DAILY AND WEEKLY ITEMS
(In U.S. \$)

Category	Annual Household Expenses			
	Upper-Class, Average of 3 Households	Middle-Class, Average of 6 Households	Lower-Class, Average of 9 Households	Average for Middle-and Lower-Classes
Household goods	\$ 0.33	\$ 9.52	\$ 22.06	\$ 17.04
House repairs	100.00	23.21	21.58	22.23
Medical care	28.57	28.10	20.63	23.62
Taxes	4.53	1.31	.13	.60
Interest	19.05	19.05	7.54	12.14
New year	27.14	15.00	14.92	14.95
Mid-autumn festival	.48	--	.13	.08
Family anniversaries	38.10	13.29	8.73	10.55
Village ceremonies	8.33	4.19	2.32	3.07
Gifts	43.81	20.24	13.49	16.19
Pagoda contributions	4.57	3.57	2.32	2.82
Home plot rent	1.19	.90	.70	.78
Clothing	29.76	7.14	7.94	7.62
Total	\$305.86	\$145.52	\$122.49	\$131.69

SOURCE: Table 9.4 of Ref. 2

Household goods are primarily furniture, much of which is made in the village from materials purchased elsewhere. There are some other items in the sample, such as a battery-powered radio. A guess of 40 percent for outside purchases and 60 percent for village-made furniture, with half of the furniture costs representing outside materials, seems reasonable and yields a 30-percent village-produced component. Major repairs to houses involve materials, most from outside, and village labor. Thatch is not available in Khanh Hau. The estimated breakdown here again is 30-percent village-produced, mostly labor.

Medical care expenses include medicines, hospital treatment, and the services of local medical practitioners; Hendry states that most of this money goes for medicine, on which the only village component is the retail markup on medicines purchased in Khanh Hau. The estimated village components here are 10 percent of the total cost for each item--local practitioners and markups on medicine. These items are excluded from the first total line in Table 17 because medical care is treated separately in the following discussion of living costs in a refugee village.

Taxes go outside the village. Normal New Year expenses include food, clothing for children in the family, firecrackers, and other supplies. Perhaps 70 percent of the total cost goes for food, 10 percent for supplies, and 20 percent for clothing. In-village components include some food, retail markups in village stores, and tailoring on any clothing made locally. A reasonable guess at allocation appears to be 30 percent for in-village food and 5 percent each for food markup and tailoring.

Family anniversary expenses are for food--largely for foods produced outside the village; it seems reasonable to assume in-village components of 30-percent village-produced food and 10 percent retail markup on food from outside.

Village ceremonies are also feasts, with some remaining money used for upkeep of the village temple. Hendry indicates 10 percent for temple maintenance (an in-village expense). Perhaps 60 percent is for in-village food and another 5 percent probably stays in the village as retail markup on food. Pagoda contributions go to temple maintenance and the support of priests, both basically in-village expenses.

Home plot rents probably go to landowning families in the village. Clothing costs include retail markup on materials and clothing, and tailoring costs when tailoring is done locally. The village component might be as high as 30 percent.

An allocation of the expenditures of Table 16 along these lines is given in Table 17. The information in Tables 13 through 17, summarized in Table 18, is the basis for a rounded estimate of farm family living expenses as follows: food, \$200 per year, 60 percent produced within the village; other goods and services, \$200 per year, 30 percent produced within the village.

Table 17

ALLOCATION OF HOUSEHOLD EXPENDITURES, EXCLUDING REGULAR DAILY AND WEEKLY
ITEMS, BETWEEN VILLAGE AND OUTSIDE PRODUCTION
(In U.S. \$)

Category	Average Annual Family Expenses					
	Village Produced		In-village Markup	Outside Purchases		Total
	Food	Other		Food	Other	
Household goods		\$ 5.11			\$11.93	\$ 17.04
House repairs		6.67			15.56	22.23
Taxes					.60	.60
New Year	\$4.48	.75	\$.75	\$ 5.24	3.73	14.95
Mid-autumn festival				.08		.08
Family anniversaries	3.17		1.05	6.33		10.55
Village ceremony	1.84	.31	.15	.77		3.07
Pagoda contribution		2.82				2.82
Home plot rent		.78				.78
Clothing		2.29			5.33	7.62
Total excluding medical care	\$9.49	\$18.73	\$1.95	\$12.42	\$37.15	\$ 79.74
Medical care		2.36	2.36		18.90	23.62
Total nonregular living costs	\$9.49	\$21.09	\$4.31	\$12.42	\$56.05	\$103.36
Interest and gifts						28.33
Total nonregular expenditures						\$131.69

Table 18

SUMMARY AND ALLOCATION OF LIVING EXPENSES: DELTA AGRICULTURAL VILLAGE
(In U.S. \$)

Category	Average Annual Family Expenses					Source Table
	Village Produced		Outside Produced		Total	
	Food	Other	Food	Other		
Regular food purchases	\$103.24	\$10.55	\$71.41		\$185.20	14
Regular nonfood purchases		27.00		\$ 83.00	110.00	15
Other expenses, except medical, interest, gifts	<u>9.49</u>	<u>20.68</u>	<u>12.42</u>	<u>37.15</u>	<u>79.74</u>	17
Total	\$112.73	\$58.23	\$83.83	\$120.15	\$374.94	
Medical care	<u> </u>	<u>4.72</u>	<u> </u>	<u>18.90</u>	<u>23.62</u>	17
Total	\$112.73	\$62.95	\$83.83	\$139.05	\$398.56	

LIVING COSTS IN THE REFUGEE VILLAGE

Self-Supporting Villages

If the refugee village is self-supporting through outside jobs or local industry, the general pattern of living expenses need not change. Food production will be lower and food purchases correspondingly higher, with an increase in total food costs to cover retail markup and transportation on those items produced outside the village. Two specific changes are suggested. Rice would be purchased from dealers who buy from rice growing villages in the same general area and sell at a markup of 10 percent over the price to the grower. Since most fruit trees take several years to grow, 80 percent, rather than 30 percent, of the fruit would come from outside the village at a 10-percent markup. Regular nonfood purchases would probably all come from outside. Other expenditures would be adjusted by eliminating house repairs, since houses will be new; eliminating taxes and home plot rent; and separating medical expenses from normal peacetime living expenses, on the assumption that the refugee administration may provide medical care without charging for it.

With these adjustments, revised versions of Table 18 and supporting tables can be prepared for a self-supporting nonagricultural village. These follow as Tables 19 through 21.

If each village family produces \$40 of its own food annually, and derives its other income from either outside employment or in-village activities (carpentry, retailing, etc.) rather than a mixture of both, outside jobs will be needed for 870 families at an average pay of \$322 per year. It is possible to distribute jobs other ways as long as the same income totals are reached; in-village employment might provide partial support for many families rather than complete support for a smaller number. And it is not important for this analysis whether outside employment and income require two wage earners per family or just one, as long as enough time is available for a family to raise vegetables and livestock to meet \$40 per year of its food requirement. This assumes free medical care.

Table 19

ALLOCATION OF REGULAR FOOD EXPENDITURES:
SELF-SUPPORTING NONAGRICULTURAL VILLAGE
(In U.S. \$)

Type of Food	Percent Bought Outside	Percent Retail Markup	Total	Village Produced Food	Outside Purchase Markup	Outside Purchases Less Markup
Rice	100	a	\$ 80.07	--	a	\$ 80.07
Meat and eggs	80	10	39.53	\$ 7.91	\$ 2.87	28.75
Fish	50	10	24.95	12.48	1.13	11.34
Fish sauce	100	20	11.08	--	1.85	9.23
Other sauces	100	20	5.54	--	.92	4.62
Vegetables	30	10	8.83	6.18	.24	2.41
Fruit	80	10	5.89	1.46	.40	4.03
Other items	100	25	16.94	--	3.39	13.55
Total			\$192.83	\$28.03	\$10.80	\$154.00

^a Markup of 10 percent paid to outside dealers who are assumed to sell directly to village consumers. This is included in the \$80.07 cost of rice.

Table 20

ALLOCATION OF HOUSEHOLD EXPENSES, EXCLUDING REGULAR DAILY AND WEEKLY ITEMS:
SELF SUPPORTING NONAGRICULTURAL REFUGEE VILLAGE
(In U.S. \$)

Expense	Average Annual Family Expenditures					
	Village Produced		In-village Markups	Outside Purchases		Total
	Food	Other		Food	Other	
Household goods		\$ 5.11			\$11.93	\$17.04
Festivals and ceremonies	\$9.49	1.06	\$1.95	\$12.42	3.73	28.65
Pagoda contribution		2.82				2.82
Clothing		2.29			5.33	7.62
Total	\$9.49	\$11.28	\$1.95	\$12.42	\$20.99	\$56.13
Medical care		2.36	2.36		18.90	23.62
Total	\$9.49	\$13.64	\$4.31	\$12.42	\$39.89	\$79.75

Table 21

**SUMMARY AND ALLOCATION OF LIVING EXPENSES: SELF-SUPPORTING NONAGRICULTURAL
REFUGEE VILLAGE
(In U.S. \$)**

Expenses	Average Annual Family Expenses					Source
	Village Produced		Outside Produced		Total	
	Food	Other	Food	Other		
Regular food purchases	\$28.03	\$10.80	\$154.00		\$192.83	19
Regular nonfood purchases		18.00		\$ 93.00	111.00	15 ^a
Other expenses except medical	9.49	13.23	12.42	20.99	56.13	20
Total	\$37.52	\$42.03	\$166.42	\$113.99	\$359.96	
Medical care		4.72		18.90	23.62	20
Total	\$37.52	\$46.75	\$166.42	\$132.89	\$383.58	

^aAdjusted to replace \$10.00 of in-village production by \$10 of outside purchases plus \$1.00 in-village markup.

Livestock-Raising Villages

One special case of self-support is the village which earns its living by raising pigs or other food animals for outside sale, as described in Sec. V. Such a village should be able to meet all of its meat and fish requirements through local production; food expenditures will then be allocated as shown in Table 22. Other expenditures for home consumption should remain as shown in Table 20, with total living expenses as shown in Table 23.

Villages With No Outside Income

A somewhat different set of adjustments will be necessary to estimate the commodity support, cash relief, and in-village earning when there is no income from outside sources. Food production can be increased somewhat in time, and with some help from the refugee administration; some substitution of village-grown items for other foods may be possible without a decrease in living standards. The following alloca-

Table 22

ALLOCATION OF REGULAR FOOD EXPENSES: LIVESTOCK-RAISING VILLAGE
(In U.S. \$)

Type of Food	Percent Bought Outside	Percent Retail Markup	Total	Village Produced Food	Outside Purchase Markup	Outside Purchases, Less Markup
Rice	100	(a)	\$ 80.07	--	(a)	\$ 80.07
Meat, eggs, fish	--	--	64.48	\$64.48	--	--
Sauces	100	20	16.62	--	\$2.77	13.85
Vegetables	30	10	8.83	6.18	.24	2.41
Fruit	30	10	5.89	1.46	.40	4.03
Other items	100	20	16.94	--	3.39	13.55
Total			\$192.83	\$72.12	\$6.80	\$113.91

^a Markup paid to dealers from outside who sell directly to village consumers; this is included in the \$80.07 cost of rice.

Table 23

SUMMARY AND ALLOCATION OF LIVING EXPENSES: LIVESTOCK-RAISING VILLAGE
(In U.S. \$)

Category	Average Annual Family Expenses				
	Village Produced		Outside Produced		Total
	Food	Other	Food	Other	
Regular food purchases	\$72.12	\$ 6.80	\$113.91		\$192.83
Regular nonfood purchases		18.00		\$ 93.00	111.00
Other expenses except medical	9.49	13.23	12.42	20.99	56.13
Total	\$81.61	\$38.03	\$126.33	\$113.99	\$359.96
Medical care		4.72		18.90	23.62
Total	\$81.61	\$42.75	\$126.33	\$132.89	\$383.58

tions, summarized in Tables 24 and 25, show estimated needs for relief given low and high levels of in-village production of food and other goods.

Annual per-family food production within the village should be no less than food production for a village supported by outside jobs. At the other extreme, food production by unemployed villagers might be increased to include all meat, eggs, fish, vegetables, and fruit consumed in the village. This implies some substitution, such as eating village-produced chicken instead of outside-produced beef. For festivals and ceremonies, it is assumed that half of the food normally purchased from

Table 24

FOOD COSTS FOR A VILLAGE WITH NO OUTSIDE SUPPORT
(In U.S. \$)

Type of Food	Minimum Local Production			Maximum Local Production		
	Percent Grown Locally	Local Produce Value	Relief Food Cost	Percent Grown Locally	Local Produce Value	Relief Food Cost
Rice	--	--	\$ 72.79	--	--	\$ 72.79
Meat and eggs	20	\$ 7.91	28.75	100	\$39.53	--
Fish	50	12.48	11.34	100	24.95	--
Fish sauce	--	--	9.23	--	--	9.23
Other sauces	--	--	4.62	--	--	4.62
Vegetables	70	6.18	2.41	100	8.83	--
Fruit	20	1.46	4.03	100	5.89	--
Other items	--	--	13.55	--	--	13.55
Food for festivals and ceremonies	43.3	9.49	12.42	70	15.34	6.57
Total		\$37.52	\$159.14		\$94.54	\$106.76

Table 25

SUMMARY AND ALLOCATION OF LIVING EXPENSES: VILLAGE WITH NO OUTSIDE SUPPORT
(In U.S. \$)

Category	Average Annual Family Expenses					
	Village Produced		Outside Produced			Total
	Food	Other	Food	Handling	Other	
A. Minimum Local Food Production						
Food	\$37.52	\$15.91 ^a	\$159.14	\$15.91 ^b		\$228.48
Regular nonfood purchases		18.00			\$ 93.00	111.00
Other purchases except medical		13.23			20.99	34.22
Total	\$37.52	\$47.14	\$159.14	\$15.91	\$113.99	\$373.70
			\$175.05			
B. Maximum Local Food Production						
Food	\$94.54	\$10.68 ^a	\$106.76	\$10.68 ^b		\$222.66
Regular nonfood purchases		18.00			\$ 93.00	111.00
Other purchases except medical		13.23			20.99	34.22
Total	\$94.54	\$41.91	\$106.76	\$10.68	\$113.99	\$367.88
			\$117.44			

^aIn-village handling and distribution of relief food.

^bHandling and transportation outside the village.

outside could be replaced by in-village production. These substitutions are the basis for the "maximum local production" columns of Tables 24 and 25.

It is assumed that the refugee administration provides food the village cannot produce. Rice is assumed to be bought at the Khanh Hau price; other foods cost the Khanh Hau price less assumed in-village retail markup, which is the price the Khanh Hau retailer would pay in a nearby wholesale center. The refugee administration is also assumed to incur handling and distribution costs averaging 20 percent of the food expenses; half of these costs are for in-village services by refugees.

For computations shown in Table 25, the refugee administration is assumed to provide medical care and to give money relief for refugees' expenses for nonfood purchases, which refugees then buy at the same prices that prevail in a self-supporting village.

The total relief requirement for a 1000-family village with no other outside support therefore can be estimated at \$290,000 annually with minimum in-village food production. Maximum production of foods that can be grown in the village, and maximum substitution of village-produced foods for other foods in the diet, could reduce the relief requirement to \$230,000 per year. Under these assumptions, refugee food production would rise from 10 to 25 percent of their total consumption (food, other goods, and services), and another 10 to 12 percent would be refugee-produced goods and services.

Appendix C

INSTRUCTIONAL TELEVISION COSTS

SAMOAN COSTS

Initial Investment

Installation costs of the 6-channel American Samoa instructional television system are given in two sources, a report by Paul Berry of Hudson Institute⁽⁹⁾ (made before the television system was in full operation) and a paper by Wilbur Schramm in a report published by UNESCO.⁽³⁴⁾ Costs differ in detail, although the totals come out only 10 percent apart. Table 26 is a summary and comparison. These costs have been modified for use in estimates of potential Vietnamese costs by rounding and by deleting the construction cost of the aerial cableway to Mt. Alava, needed in the construction of the Samoan transmitting facilities.* Rounded costs for other system components can be summarized as follows for a 12-grade television installation to these standards.

Production facilities: \$1 million, which includes studios, cameras, videotape recorders and other production equipment.

Transmitting facilities: \$1 million, given an accessible hilltop with no need for a cableway.

Receiving facilities: \$300 per classroom (for one 23-inch receiving set with an 8-inch speaker, at \$200, plus 50 percent spares), and \$400 per school for antennas and cables.

Operating Costs

Operating cost estimates given in the UNESCO report total \$1.2 million per year, as shown in Table 27, allocated as \$1.15 million for production and transmitting facilities plus \$170 per receiving classroom. Depreciation or equipment replacement rates suggested in Ref.

* Mt. Alava rock proved to be too waterlogged to support a road, and local wind conditions made large-scale use of helicopters unsafe. These problems are unlikely to reappear in other areas.

Table 26

CAPITAL COSTS OF THE SAMOAN TELEVISION SYSTEM: TWO ESTIMATES

Cost Component	Hudson Institute	UNESCO
Production		
Buildings.	\$ 420,000	\$ 400,000
Studio equipment	405,000	839,000
Videotape.		314,000
Other.		525,000
Total production	825,000	1,239,000
Transmitting		
Buildings.	50,000	253,000
Microwave to transmitters.	100,000	49,000
Transmitters, repeaters, etc.	1,121,000 ^a	548,000
Aerial cableway to transmitters.	400,000	195,000
Total transmitting	1,671,000	1,045,000
Receiving		
Sets in classrooms		
300 sets	60,000	
400 sets		82,000
Receiving equipment at schools	7,500	15,000
Total receiving.	67,500	97,000
Total	\$2,563,500	\$2,381,000

^a\$60,000 of this is identified as the cost of repeaters to pick up weak signals on the outlying island of Manu'a and rebroadcast them on the next higher channel.

Table 27

OPERATING COSTS OF SAMOAN TELEVISION

Cost Component	Production	Transmitting	Receiving
Salaries			
Teachers	\$285,000	--	--
Others	300,000	\$220,000	\$33,000 ^a
Lesson production aids ^b	89,000	--	--
Electricity and utilities	70,000	64,000	(c)
Replacement parts	40,000	50,000	12,000
Administration and miscellany	21,000	16,000	--
Total	\$805,000	\$350,000	\$45,000 ^{cd}

SOURCE: UNESCO report, Ref. 34, Table 9, for fiscal 1966, modified.

^aSalaries of a seven-man traveling maintenance team.

^bThis includes photography, teaching aids, videotape, film rentals, and similar items.

^cElectricity used by sets in classrooms is not included in this table.

^dThis is for 6600 students, in 264 classrooms averaging 25 pupils, and corresponds to \$170 per classroom or \$114 per set.

34 are a two-year receiving set life and 10 percent for everything else: \$200,000 annually on production and transmitting facilities plus \$150 per classroom and \$40 per receiving school. The short life is probably the result of tropical humidity, and Samoan experience here should be a reasonable basis for prediction for Vietnam.

Summary

With one further assumption, that the average school size is ten classrooms (so that antenna and wiring costs per school can be expressed as costs per classroom), cost factors for a Samoa-quality 6-channel instructional television system can be summarized as follows. The computations underlying these costs are shown in Table 28.

Table 28

COST SUMMARY OF A SAMOAN-TYPE TELEVISION SYSTEM

Cost Component	Initial Cost	Annual Operating Costs	Annual Depreciation Costs	Total Depreciation and Operating Costs
Production				
Hudson estimate	\$ 800,000			
UNESCO estimate	\$1,200,000	\$800,000	10%	
Values used	\$1,000,000	\$800,000	\$100,000	\$900,000
Transmitting				
Hudson estimate, without cableway	\$1,300,000			
UNESCO estimate, without cableway	\$ 850,000	\$350,000	10%	
Values used	\$1,000,000	\$350,000	\$100,000	\$450,000
Receiving				
Receivers with 8-inch speakers				
Cost per set	\$200		2-yr life	
Sets per classroom	1.5			
Cost per classroom	\$300	\$170	\$150	\$320
Antennas and cables				
Cost per school	\$400		10%	
Cost per classroom, if schools average 10 rooms	\$40		\$4	\$4
Total receiving costs per classroom	\$340			\$324

One interesting aspect of Samoan expenses is the dominance of studio and transmission costs, which are independent of the number of classrooms served. With 6600 students, Samoa's initial system costs are \$360 to \$390 per pupil, of which only 3 or 4 percent is classroom cost. Costs for providing television reception in an existing and suitable 25-pupil classroom appear to be about \$14 per pupil initially plus about \$13 annually, trivial in comparison to the system production and transmitting costs when the school enrollment is as small as in American Samoa, and when electricity is available and sets are safe from attack and pilferage.

ELECTRICITY

Availability

Electric power systems serve Saigon and many provincial cities. These systems are generally obsolete and have not kept pace with expanding demand; they do not reach into rural areas where refugee villages might be established. The need for repair and extension has been recognized by both Vietnamese and American agencies, and Vietnamese Government power plans include "generator installation for refugee housing, national police, health stations, schools and government offices in the rural areas."⁽⁴⁷⁾ But it seems reasonable to assume here that electricity will not be readily available in likely locations for refugee villages, and that the cheapest way to provide an electrical supply is to generate power in the village.

Village Power Plants

Several sources cited below indicate an equipment cost of \$100 to \$200 per kilowatt of generating capacity for small power plants in the United States. From this it seems reasonable to estimate an installed cost of about \$300 per kw for a village power plant, including the building, diesel generators with switchgear, and wiring to nearby buildings. This figure does not include the costs of transporting the equipment to Vietnam.

Air Force planning figures in Ref. 53 are \$170 per kw for diesel generators with switchgear and \$120 per kw for buildings to house these generators. This is for the Washington, D.C., area.

An Engineering News-Record survey of costs of emergency power generating facilities⁽⁵⁴⁾ quoted \$100 to \$125 per kw, probably not including the added building construction.

Advertised Sears-Roebuck mail order prices⁽⁵⁵⁾ for diesel alternators designed for continuous operation, FOB Los Angeles, are \$310 for 1.5 kw and \$450 for 3 kw; these are portable generators. Cheaper power plants are also listed but are not indicated as durable enough for continuous running.

These price quotations indicate that investment costs per kw are in linear proportion to capacity, at least above 3 kw. A Navy source for Vietnam construction⁽⁵⁶⁾ also supports the \$300 estimate.

Fuel Costs

A diesel fuel consumption rate of 0.1 gallon per kwh can be derived from Ref. 56, Sec. 10, and from Air Force experience. Paragraph 10-207 of Ref. 56 estimates 1 quart per kwh for a small gasoline-powered plant, and 50 to 70 percent of this (i.e., 0.125 to 0.175 gallon per kwh) for diesel. Tables of fuel content and thermal performance given earlier in Ref. 56 imply 0.07 to 0.08 gallon per kwh for large stationary power plants (to 5,000-10,000 kw). Air Force factors are 0.6 gallon per hour for the 5 kw PU-362 diesel generator and 0.8 gallon per hour for the 10 kw MB-5, or 0.12 and 0.08 gallon per kwh, respectively. At current diesel fuel prices delivered to Southeast Asia (approximately 14 cents per gallon), fuel cost should be about 1.4 cents per kwh.

Maintenance and Depreciation Costs

Maintenance and depreciation cost estimates in Ref. 57 are low if operation is continuous. Air Force factors include expensive overhauls which raise the cost significantly. Reference 57 lists a 10-percent depreciation rate and also lists fuel, depreciation, and interest as the largest items of cost, indicating quite low maintenance. A depreciation allowance of \$30 per kw per year and a maintenance allowance of

\$20 per kw per year--arbitrary, but less than \$30 to conform to Ref. 56--implies a depreciation and maintenance total of 0.57 cent per kwh if the plant is operated continuously (8760 hours per year). If the same depreciation and maintenance costs were incurred, this figure would be 4.6 cents per kwh for operation only during school hours, 6 hours per day for 180 school days per year.

An Air Force source discussing generator operation lists a \$1200 overhaul every 4500 operating hours for the 10 kw MB-5 diesel generator; the \$1200 includes \$400 in parts and 80 direct labor hours at \$10. This is 26.7 cents per generator hour, or 2.67 cents per kwh if all generators operate at full load. Overhaul for the 5 kw PU-362 unit is less costly, but more frequent, and the overhaul cost per generator hour is the same while cost per kwh is doubled. Depreciation is apparently covered by the parts replacement component of the cost of overhaul.

These figures might be reduced significantly by changes in maintenance policy and extensive use of local manpower. If, for example, time between overhauls of MB-5 equipment can be doubled and one man-day of local labor at \$1 can be substituted for each direct man-hour at \$10, these costs are reduced to \$480 per overhaul, 5.3 cents per operating hour, and 0.53 cent per kwh if operation is always under full load.

These projections of maintenance and depreciation costs indicate a range from 0.5 to 5.5 cents per kwh, depending on maintenance policies and efficiency of use. With fuel costs added, operating costs could be as low as 2 or as high as 7 cents per kwh. An operating cost of 4 cents per kwh is used here as a reasonable basis for predicting average operating costs. Marginal costs of operating the power plant over a longer period might be about the same or significantly less. Marginal costs of additional lighting when the system is operating under less than full load should be less, and extended operation at a small fraction of capacity probably will raise the average cost per kwh.

Costs Per Classroom

Electricity costs per classroom for a Samoan-type television system can be estimated on the following basis: generating capacity adequate for simultaneous operation of all classroom sets, 250 watts per set,

and three hours of viewing per class for 180 school days per year. Normal programming on the Samoan pattern involves only half of the sets in use at any one time and two hours per day per class, but the additional generating capacity appears important for special events as well as for a reserve. The extra hour of set operation is an allowance for set warming, supplemental uses such as literacy classes, and special event programs. The resulting costs are \$75 per classroom initially and \$5.40 per class per year.

Urban Areas

Where electric power is already available, it seems reasonable to disregard the capital costs of power plants and to consider only costs per kwh. School use will be concentrated in daytime hours and peak lighting loads come at night. It seems likely that the cost per kwh will also be less where a central system is available, but the effect of this difference is slight and the 4 cents per kwh estimate is used for urban as well as rural schools to simplify the computations and tables which follow.

TELEVISION COSTS FOR THE SAIGON AREA

Based on these estimates, a single-site, multichannel installation serving the Saigon area could be built for an initial investment of \$2 million plus \$340 per classroom. Annual operating costs should run \$1.35 million plus \$329 per classroom, including electricity from the Saigon power system. Station coverage depends on transmitter height and power, among other factors. Reference 58 quotes a 40-mile effective radius for UHF channels 14 through 49, while the radius for VHF is somewhat greater. Costs per classroom for various numbers of schools served are shown in Table 29. An added initial cost of \$75 per classroom will apply for schools in areas having no electric power supply.

Table 29

INSTRUCTIONAL TELEVISION COSTS FOR SCHOOLS WITHIN REACH OF A SINGLE TRANSMITTING SITE, USING SAMOAN STANDARDS AND COST DATA

Cost Component	Numbers of Classrooms and Students		
	1,000 55,000	10,000 550,000	18,000 ^a 990,000
Total system costs			
Initial	\$2,340,000	\$5,400,000	\$8,120,000
Annual	\$1,680,000	\$4,650,000	\$7,272,000
Cost per classroom			
Initial	\$2,340	\$540	\$451
Annual	\$1,680	\$465	\$404
Cost per student			
Initial	\$42.55	\$9.81	\$8.20
Annual	\$30.55	\$8.45	\$7.35

^aThis represents a maximum enrollment for Saigon, with all children of ages 6-17 inclusive in school and receiving televised lessons.

COST-CUTTING OPTIONS

Production Economies and Videotape

Production costs can be cut by reducing facility size, the quantity of equipment, or the number of people involved in lesson preparation and production. This need not mean reducing the daily lesson schedule. One alternative is to introduce the system over two or three years and record all lessons on videotape, so that only one-half or one-third of the lessons would be produced live during each of the initial years. Following the initial phasing-in period, some lessons could then be re-done each year while existing videotape would be used for others.

It seems reasonable to assume that the installation, operation and depreciation costs associated with production can be cut to 40 percent of the Samoan level if televised instruction is phased in over a three-year period with maximum use of videotape. The only significant added costs appear to be for videotape and for a tape library. These will eliminate most of the savings in initial cost, for enough tape must be bought to save two-thirds of the curriculum for the following year.

With perfect efficiency in the use of videotape, this is two hours per day for each of eight grades for a 180-day school year, or 2880 hours. Tape run at half normal commercial speed costs about \$100 per hour. If this is rounded to \$300,000, and \$100,000 is allowed for building and \$40,000 per year for operating the videotape library and storage facility, costs are as follows:

Initial: \$400,000 for the studio and facilities needed to produce one-third of the curriculum each year, \$100,000 for the tape library, and \$300,000 for tape, for a total of \$800,000.

Annual: \$360,000 for programming and production plus \$40,000 for the library, for a total of \$400,000.

Transmitting Costs

Transmitting facility costs can be reduced by serving more than two grades on one channel. The original Samoan concept was that two grades would use a channel alternately, so that the channel serving grades 3 and 4, for example, would broadcast about four hours during the school day, with each grade watching for two hours and doing other work (presumably with the set covered and the sound turned off) during the other two hours. If all schools are on a single shift, it should be easy to handle three grades on the same channel, extending to four grades if hours are staggered. If schools are on shifts and broadcasts for the same grade must be shown both mornings and afternoons, two grades per channel is the maximum if each class receives two hours of televised instruction per day. Four grades per channel would be possible under a different two-shift arrangement, with some grades meeting in the morning only and the others having all classes in the afternoon.

The minimum television facility needed here with separate programming for each grade appears to be three channels, but the 5-4-3 division of the Vietnamese school system lends itself better to a minimum of two channels to serve the elementary grades and one each for junior high and high school under this concept. Transmitting facility costs for four channels might be 75 percent of the costs of a 6-channel facility, or \$750,000 initially plus \$350,000 per year.

Receiving Costs

At the classroom level, two grades can share the same set if the broadcast schedule is arranged to permit it; this can be done by moving classes back and forth between television and nontelevision classrooms, or by locating the set so that it can be rotated or moved to be visible from either of two classrooms. Two-shift scheduling of schools also permits double use of sets.* It is of course necessary to plan the broadcast schedule around the school schedule. If some schools are on shifts, it is necessary either to show the entire day's program twice, probably using videotape for the afternoon repeat, or to show lessons for some grades in mornings only and lessons for other grades in the afternoon. In either case, all schools must follow a daily schedule designed to permit two shifts.

By following both the classroom-sharing and two-shift methods, it becomes possible to serve four classes (two on each shift) with one classroom television installation and still provide two hours of televised instruction per class per day. Excluding electric power, the receiving cost per classroom on this basis would be \$190 initially plus \$164 per year; electricity costs would add \$37.50 initially for rural schools generating their own power, and \$9 annually for all schools. Costs per school class with two-shift scheduling then fall to \$114 initially plus \$86 annually for rural schools and \$95 initially plus \$86 annually for urban schools. These computations assume that the average school has 10 classrooms, with 5 receivers plus 50-percent spares, and that electricity is provided for 10 hours per set per school day with capacity for simultaneous operation of all sets. A school on one shift, with 5 hours per day of set operation, would save half of the annual power costs, for a total receiving cost per classroom of \$228 initially and \$168 per year in rural areas, or \$190 initially and \$168 per year if reached by urban power lines.

*This may reduce set life, but the controlling factors for set life are probably humidity and mold; in this case set life is not affected by whether the set is on for two, four or eight hours a day. Samoan practice is to leave sets on at all times to keep the interior components warm and dry.

Programming for Eight Levels Rather Than Twelve Grades

Some additional economies may be possible by using a technique developed in Samoa during the introduction of televised instruction. While high school classes are sharing channels as originally planned, with lessons for two grades alternating on the same channel, elementary school programming is for four levels rather than eight grades. The channel serving grades 1 and 2, for example, carries first-level lessons designed for both grades, and both grades watch all lessons on their channel.

Any evaluation of the educational merits of the Samoan "level" system is outside the scope of this study, but it is possible to determine its effect on the size and costs of an educational television system--production, and transmitting and receiving components--by looking at a minimum-cost approach in which one channel would serve primary schools with three levels of programming (for example, grade 1, grades 2-3, grades 4-5). Similarly, one channel would offer two levels of junior high programming and one channel would carry three levels for high school, following the Samoan pattern as closely as the 5-4-3 organization of the Vietnamese school permits.

Costs would be something like this:

1. Production costs for eight levels, except for the videotape and library components, should be two-thirds to three-fourths of the costs for 12-grade programming. The tape library would be essentially the same size, since a level serving two grades would need a two-year cycle of lesson tapes so that students would get material new to them in their second year in the level. Cost-cutting options discussed earlier might reduce initial costs to \$700,000 (\$300,000 for the studio and facilities, \$100,000 for the tape library, \$300,000 for tape), and annual operating costs to \$300,000 (of which \$30,000 is for the tape library).
2. Transmitting facility costs for three channels should be about 60 percent of the transmitting costs for six channels, or \$600,000 initially plus \$300,000 per year.
3. Receiving set costs would be somewhat higher than the costs per class for 2-shift scheduling with 12-grade programming because shift operation is incompatible with three levels of programming on one channel (unless schools meet in the evening, and it is

assumed here that they do not). It is also necessary to put receivers in enough primary classrooms to give two of the five grades access to lessons at the same time, which means that 40 percent of the primary classrooms must have sets; similarly, half of the junior high classrooms and one-third of the high school classrooms need sets, so that the school system average is about 40 percent. Receiving costs, excluding electricity, are \$300 initially and \$320 per year per television-equipped classroom plus \$400 initially and \$40 per year per school, as shown in Table 28. Television receiving installations for a 10-room school with television in four classrooms will therefore cost \$1600 initially and \$1320 annually.

Since the average set would be in use 5 hours a day plus warmup time and special programs, electric power costs can be based on 7 hours average use per set per day. These costs for a 10-room school in a rural area would be \$300 initially plus \$50 per year; for a school with urban-area power, only the \$50 annual cost applies. Resulting costs per class receiving televised instruction are:

Rural schools: \$190 initially and \$137 annually.

Urban schools: \$160 initially and \$137 annually.

These estimates are shown in Table 30. Table 31 shows the effects of these cost-cutting measures on the single-site facility of Table 29.

A NATIONWIDE NETWORK

Network Techniques

Costs of a nationwide system can be derived from the estimates for a single-site system plus some assumptions about the techniques and costs of linking the several transmitting stations required. A network of eleven coastal stations from Quang Tri to Saigon to Can Tho plus four inland stations would serve almost all of the South Vietnamese population. There are several potential alternative methods of linking the provincial stations to Saigon: these include a microwave network of about 800 miles; a satellite relay; videotape delivered by courier or mail; and a relay system like that used in Colombia, where outlying stations pick up, amplify and rebroadcast telecasts from the primary station in Bogota or from intermediate stations.

The pickup and rebroadcast system is the cheapest, requiring something equivalent to the Samoan system's repeater-translators that are used on outlying Manu'a island (initial cost \$60,000 according to

Table 30

TELEVISION COST COMPONENTS FOR "SAMOAN" AND "ECONOMY" SYSTEMS

Cost Component	Samoan	Economy with 12-Grade Programming	Economy with 8-Level Programming
Production, including tape and library	all lessons live	2/3 lessons taped	2/3 lessons taped
Initial	\$1,000,000	\$800,000	\$700,000
Annual	\$ 900,000	\$400,000	\$300,000
Transmitting	6 channels	4 channels	3 channels
Initial	\$1,000,000	\$750,000	\$600,000
Annual	\$ 450,000	\$350,000	\$300,000
Receiving ^a	sets in each room	sets shared	sets shared
Single shift			
Initial			
Rural	\$415	\$228	\$190
Urban	\$340	\$190	\$160
Annual	\$329	\$168	\$137
Two shifts			
Initial			
Rural	\$208	\$114	(b)
Urban	\$170	\$ 96	(b)
Annual	\$167	\$ 86	(b)

^aAverage per class receiving televised instruction. Rural and urban schools in this table designate schools without access to an electric power supply and schools with electricity, respectively; the difference is the initial cost of a diesel power plant for the school.

^bTwo-shift operation is not compatible with the assumptions used in estimating set requirements. By careful scheduling, however, it should be possible to approach the receiving cost component of 12-grade programming and double shifts.

Ref. 9) in addition to normal transmitting facilities. For other systems, cost factors might run like this: initial microwave costs would be \$9 million (\$10,000 per mile); annual costs would be 10 percent for operation and 10 percent for depreciation and equipment replacement, given a security situation permitting hilltop microwave installations. Yearly satellite costs would run perhaps \$3 to \$5 million for four channels, (according to an informal estimate), and would depend on the extent to which satellite costs are shared with other communications; this has been used here as \$1 million per year per channel.

Table 31

INSTRUCTIONAL TELEVISION COSTS FOR SCHOOLS WITHIN REACH OF A SINGLE TRANSMITTING SITE:
ELECTRICITY AVAILABLE FOR ECONOMY SYSTEMS

Cost Component	Numbers of Classrooms and Students								
	Twelve-Grade Programming						Eight-Level Programming		
	Single-Shift Schedule			Two-Shift Schedule ^a					
	1,000	10,000	18,000	1,000	10,000	18,000	1,000	10,000	18,000
	55,000	550,000	990,000	55,000	550,000	990,000	55,000	550,000	990,000
Total system costs									
Initial	\$1,740,000	\$3,450,000	\$4,970,000	\$1,645,000	\$2,500,000	\$3,278,000	\$1,460,000	\$2,900,000	\$4,180,000
Annual	\$ 918,000	\$2,430,000	\$3,774,000	\$ 836,000	\$1,610,000	\$2,298,000	\$ 737,000	\$1,970,000	\$3,066,000
Cost per classroom									
Initial	\$1,740	\$345	\$276	\$1,645	\$250	\$182	\$1,460	\$290	\$232
Annual	\$ 918	\$243	\$210	\$ 836	\$161	\$128	\$ 737	\$197	\$170
Cost per student									
Initial	\$31.64	\$6.27	\$5.02	\$29.91	\$4.55	\$3.31	\$26.55	\$5.27	\$4.22
Annual	\$16.69	\$4.42	\$3.81	\$15.20	\$2.93	\$2.32	\$13.40	\$3.58	\$3.10
Reduction from costs of Samoan-type sys- tem of Table 29									
Initial	26%	36%	39%	30%	54%	60%	38%	46%	49%
Annual	45%	48%	48%	50%	65%	68%	56%	58%	58%

^aWith half of the grades meeting in the morning and half in the afternoon, so that programs for a given grade are shown on only one shift.

Videotape for one grade or level for one week's lessons is a \$1000 investment. Separate programming for each of the 12 grades and a 6-week tape cycle time would require a \$72,000 tape inventory per local station, or \$1 million for 14 local stations. (Tape cycle time is the period from making the copy tape in Saigon, through shipment, holding time at the local station, showing and return, to erasing for reuse.) Taped programs for eight "levels" would of course involve only two-thirds as much tape as programs for twelve grades. A reliable fast courier system would permit the network to function with a smaller investment in tape, but with an increase in transportation costs. A rough estimate of \$100,000 per year for transportation and \$100,000 for replacing worn or lost tapes seems reasonable. An additional \$100,000 investment and perhaps \$20,000 per year would be needed at each outlying transmitting station for tape playback equipment and personnel, including tape storage and control.

Nationwide instructional television programming and transmitting costs then might be as shown in Table 32 for the four methods of transmitting programs throughout Vietnam and for the 12-grade and the less ambitious 8-level programming discussed above. This is in addition to classroom receiving costs and costs of portions of the educational system not dependent on television. Receiving costs are included with production and transmitting costs in Table 33. As Table 32 shows, relatively little is saved by videotaping lessons to reduce lesson production costs, since costs at provincial stations are not affected.

With classroom receiving costs previously estimated as \$340 plus \$329 annually per class of 55 students if all classrooms have sets, and as low as \$96 plus \$86 annually per class if sets are shared, it is possible to extend the previous tables to arrive at costs for a nationwide television system serving all schools with instruction in a standard curriculum in the Vietnamese language. This is shown below in Table 33 for three of the possible combinations of systems and economies. Electricity is assumed available to 30 percent of the classrooms and diesel generator costs have been added for the remaining 70 percent.

Table 32

PRODUCTION, TRANSMITTING AND NETWORK COSTS FOR THREE DIFFERENT SYSTEMS
(In \$ million)

Network Method	12-Grade System Following Samoan Practices					3-Channel, 8-level System with Extensive Videotaping					6-Channel, 12-Grade System with Extensive Videotaping				
	Common Costs	Costs Dependent on Network Method				Common Costs	Costs Dependent on Network Method				Common Costs	Cost Dependent on Network Method			
		Microwave Network	Satellite Relay	Tape and Courier	Pickup and Re-broadcast		Microwave Network	Satellite Relay	Tape and Courier	Pickup and Re-broadcast		Microwave Network	Satellite Relay	Tape and Courier	Pickup and Re-broadcast
Initial Cost															
Production, Saigon	1.0					0.3					0.4				
Transmitting, 15 locations	15.0					10.5					15.0				
Relay from Saigon to 14 stations		9.0	small	1.0	0.8		9.0	small	0.7	0.5		9.0	small	1.0	0.8
Tape inventory						0.3					0.3				
Tape playback and libraries, 14 stations				1.4		0.1			1.4		0.1			1.4	
Total	16.0	9.0	small	2.4	0.8	11.2	9.0	small	2.1	0.5	15.8	9.0	small	2.4	0.8
Annual cost															
Production	0.9					0.27					0.36				
Transmitting	6.8					4.5					6.8				
Relay		1.8	6.0	0.1	0.2		1.8	3.0	0.1	0.1		1.8	6.0	0.1	0.2
Tape inventory				0.1					0.1					0.1	
Tape playback and libraries				0.3		0.03			0.3		0.04			0.3	
Total	7.7	1.8	6.0	0.5	0.2	4.8	1.8	3.0	0.5	0.1	7.2	1.8	6.0	0.5	0.2
System totals ^a															
Initial		25.0	16.0	18.4	16.8		20.2	11.2	13.3	11.7		24.8	15.8	18.2	16.6
+ Annual		9.5	13.7	8.2	7.9		6.6	7.8	5.3	4.9		9.0	13.2	7.7	7.4

^a Common cost plus network.

Table 33

PROJECTED COSTS FOR FOUR NATIONWIDE INSTRUCTIONAL TELEVISION SYSTEMS
(In \$ million)

Cost Components	Samoa-Type System	Samoa-Type System	Samoa-Type System	Economy System
System characteristics				
Levels individually programmed	12 grades	12 grades	12 grades	8 levels
Lessons produced	each year	each year	each year	every 3 yrs; videotaped
Network technology	microwave	pickup and rebroadcast	pickup and rebroadcast	pickup and rebroadcast
Number of channels	6	6	6	6
Classrooms with tele- vision receivers	all	all	50% (shared)	about 40% (shared)
Television instruction each student receives	2 hrs daily 180 days/yr	2 hrs daily 180 days/yr	2 hrs daily 180 days/yr	2 hrs daily 180 days/yr
Schools on shifts?	no	no	2 daily	no
Costs for 40,000 classes, 2.2 million pupils				
Initial	\$40.7	\$32.5	\$21.1	\$18.9
Annual	\$22.7	\$21.1	\$11.3	\$10.4
Costs for 100,000 classes, all 5.5 million school-age children				
Initial	\$64.2	\$56.0	\$27.7	\$29.8
Annual	\$42.4	\$40.8	\$16.5	\$18.6

Cost Sharing With Commercial Broadcasters

As a final cost-cutting suggestion, it should be noted that in Colombia the studio, transmitting and network costs are shared with the commercial television service that begins broadcast at 6 p.m. Classroom costs, videotape and program production costs are not shared. Costs for several possible Saigon and nationwide systems would be reduced as shown in Table 34 if commercial broadcasters were to pay half of the common-use facility costs on all channels involved. Savings for a Saigon-only installation are not large; savings for a nationwide net depend on the commercial value of provincial television services, and it seems unlikely that commercial users would pick up half the costs of a 6-channel or 4-channel station in such centers as Ban Me Thuot.

Table 34

COST SHARING WITH COMMERCIAL TELEVISION
(In \$ million)

Cost Component	Saigon Area Served			Nationwide Service		
	6-Channel, 12-Grade, Samoan Standards ^a	4-Channel, 12-Grade, Extensive Tape Use ^b	3-Channel, 8-Level, Extensive Tape Use ^b	6-Channel, 12-Grade, Microwave Relay ^c	6-Channel, 12-Grade, Pickup and Rebroadcast ^c	3-Channel, 8-Level, Pickup and Rebroadcast Taped Lessons ^c
Initial costs						
Production facilities	1.0	0.8	0.7	1.0	1.0	0.7
Production costs suitable for sharing	0.8 ^d	0.32 ^e	0.24 ^e	0.8 ^d	0.8 ^d	0.24 ^e
Potential saving	0.4	0.16	0.12	0.4	0.4	0.12
Transmitting facilities, including relay net	1.0	0.75	0.6	24.0	15.8	11.0
Potential saving	0.5	0.38	0.3	12.0	7.9	5.5
Annual costs						
Production facilities	0.9	0.4	0.3	0.9	0.9	0.3
Production costs suitable for sharing ^f	0.16	0.06	0.05	0.16	0.16	0.05
Potential saving	0.08	0.03	0.02	0.08	0.08	0.02
Transmitting facilities	0.45	0.35	0.3	8.6	7.0	4.6
Potential savings	0.2	0.18	0.15	4.3	3.5	2.3
Total potential saving						
Initial costs ^g	0.9	0.5	0.4	12.4	8.3	5.6
Annual costs ^g	0.3	0.2	0.2	4.4	3.6	2.3

^aDetails in Tables 29 and 30. ^bDetails in Table 30. ^cDetails in Table 32. ^dAn assumption.
that 80 percent of the facilities and equipment are suitable for joint use.

^e\$0.4 million of initial costs of production facilities in these examples are for the tape library and tapes for lessons; 80 percent of the balance is assumed suitable for joint use.

^fThis is 20 percent of initial costs of production facilities suitable for joint use and cost-sharing: 10 percent for depreciation and 10 percent for repair.

^gRounded to nearest \$100,000 after adding.

Appendix D

INSTRUCTIONAL MOTION PICTURE COSTS

COST COMPONENTS

Steps in Production and Distribution

The initial steps in producing a filmed curriculum are similar to those for televised lessons: planning the lessons, preparing and assembling visual aids, rehearsing, and finally presenting each lesson before a camera. Once lessons are on film, the films must be processed and perhaps edited before the master film for each lesson is considered complete and ready for copying. This can all be done at one central studio.

Preparation and distribution of film prints for each class, school or group of schools comes next, and may be done either at the central facility or at regional film copying and distribution centers. The steps involved here are making copies of the master film processing these copies, packaging them for distribution and sending them to the using schools.

Schools receiving film prints must maintain some sort of library or distribution center whose tasks are to keep films between showings, see that films are available to classes at the right time in the school schedule, forward film prints to other schools if they are to be shared, arrange for replacement of damaged or lost prints, and probably also receive and distribute workbooks or instructions for teachers to use in conjunction with film showings.

As noted in Sec. VI, costs here are based on the Fairchild Camera and Instrument Corporation's "Movie-Pak" 8mm cartridge system.

Production Costs

Films do not require the studio control equipment that is needed for television, but other production costs should be similar. Samoan instructional television costs shown in Appendix C, Table 26, indicate an investment cost of about \$400,000 in studio buildings and \$500,000 in equipment (excluding videotape equipment) for a facility capable of

producing new lessons each year for all twelve grades. Annual costs for the production part of the Samoan system run about \$800,000 for operation and something like \$100,000 for depreciation. A similar facility for films, producing enough lessons each year for two hours of instruction per grade per day, might involve about half as much investment in equipment and depreciation cost, with other components of investment and operation cost remaining the same as for television.

Costs for the master films are significant. As is shown in more detail later in this section, costs for color film, sound striping and processing will run about \$22 per lesson, or about \$16,000 for a full year's curriculum for one grade (720 films), adding \$200,000 to the annual operating cost if films for all twelve grades are redone each year. This assumes that lessons have been planned, timed and rehearsed well enough to be filmed without later editing, so that all film exposed is productively used....probably not an unreasonable requirement since the same personnel costs are used as for lessons televised "live" with no chance to edit. Occasional retakes and cutting would not change these estimates significantly.

Film print costs, as will be seen later in this Appendix, are high enough to encourage the use of film prints over several years. If filmed lessons were introduced over a four-year period and then replaced selectively so as to have an average life of ten years, it should be possible to save on production facilities as well as on the film purchases and processing. A production cost of \$200,000 initially, \$265,000 per year for the first four years and \$105,000 per year thereafter seems reasonable; this is derived as shown in Table 35. This is easier to treat when restated as \$840,000 initial cost (\$200,000 to set up the facilities and \$160,000 during each of the four years of phasing-in) and \$105,000 annual cost.

Costs of Copies for School Use

The cost of making one copy print of a 22-minute filmed lesson and packaging it in a cartridge is about \$28. Components are the cost of 200 feet of unexposed 16mm (to be cut and spliced as 400 feet of 8mm film), which is about \$9 at American discount-house quantity prices; another \$9 for processing; \$4 for adding magnetic sound striping, at

Table 35

PRODUCTION COST ESTIMATE FOR INSTRUCTIONAL MOTION PICTURES

Cost Component	Estimated Cost	Basis of Estimate
Initial costs		
Studio building	\$100,000	Maximum production is lessons for 3 grades per year. Samoan television studio building for 12 grades per year cost \$400,000.
Cameras and related equipment	50,000	Samoan television equipment excluding videotape, cost \$500,000. Motion picture equipment is less costly because control room is not needed; maximum production rate is $\frac{1}{4}$ of Samoan planned output.
Processing facilities and library for master films	50,000	Arbitrary estimate.
Total initial costs	\$200,000	
Annual costs, years 1-4 ^a		
Personnel	\$150,000	Samoan television production salaries were \$585,000 per year ⁽³⁴⁾ for a planned production rate four times that proposed for films.
Production aids	25,000	Scaled down to a little over 25 percent of Samoan TV cost of \$89,000.
Electricity and other utilities	10,000	Arbitrary.
Depreciation	15,000	10 percent on equipment, 5 percent on building.
Maintenance and spare parts	15,000	10 percent on equipment, 5 percent on building.
Film and processing for master copies only	50,000	The complete 12-grade set costs \$200,000.
Total annual costs	\$265,000	

^a Annual costs for year 5 and thereafter should be about \$105,000, or 40 percent of costs for years 1 through 4, since film production would be reduced to replacement of lessons on a 10-year cycle, reducing direct costs and releasing some studio space and equipment for other uses.

\$1 per 100 feet; and \$6 for the Fairchild cartridge. Processing cost is an advertised American mail-order figure, and it is assumed here that a laboratory that is part of the educational film activity can make the copy and process the copy film for the same cost that a commercial facility charges for film processing alone. The cartridge cost is \$6.20 each on Fairchild's 1967 price list for quantities over 1000, and this has been reduced here to \$6 including freight since very large quantity purchases are involved. Total costs are \$28 with the cartridge and \$22 without; the \$22 total was used earlier as the cost of a master film.

Costs for a full filmed curriculum for one grade have been estimated as \$20,160 and rounded to \$20,000 in the text (Sec. VI). This was derived by assuming that each class would see four "new" lessons--films that particular class had not seen before--on an average school day, and also see a fifth lesson that would be a repeat showing. Four films daily for 180 days at \$28 per film is the investment of \$20,160. Daily viewing time will be 110 minutes if each film runs a maximum of 22 minutes. Shorter films will be proportionately cheaper except for the cartridge cost, which remains constant unless the same cartridge is used for two or more short lessons.

The only recoverable part of these costs when the film is replaced is the cartridge, but cartridges take most of the strain of regular use, since they are the components that are handled, and if film replacement is on a 10-year cycle as suggested earlier in this Appendix, it seems reasonable to assume a 10-year average life for cartridges. Some individual cartridges would probably be reusable; some others would be damaged in use and need replacement while the film inside would still be current and in good condition.

Distribution, Storage and Control

Since each grade would use 720 films during the school year, a primary school would need to maintain a library of 3600 films in cartridges, issuing them to classes as needed. The school would also receive replacements for 360 films in an average year initial establishment of the system. The space requirement is not large; cartridge dimensions are 8" x 9.6" x 1", so that 3600 films have a total volume

of 160 cubic feet. If films are stored on shelves 10 inches deep and 6 feet high along the walls of a library or storage room, and 80 percent of the wall space is occupied by film with the remaining 20 percent for posts and shelves, 42 feet of wall space are needed altogether. This implies two rooms of wall space, or one room if additional shelves or racks are provided.

Mailing costs can probably be disregarded, as they should be smaller than the uncertainty in the \$28 estimate of film cost. Costs of adding a librarian and one or two film-library rooms to a primary school should be something like \$1000 initially for the library and \$25 per library per month for the librarian. Some additional costs and administrative work may be involved if one library must serve several schools and film must be carried or mailed between schools in nearby villages. Libraries for secondary schools would be smaller, since these have fewer grades, but probably not enough so for significant savings.

Classroom Costs

Costs of showing films in the classrooms include projector purchase and maintenance, bulb replacement, and electricity. The Fairchild MK-V projector is designed for projection onto a screen (or white wall) for classroom or other large group use. Prices begin at \$559 each for single projectors, and go down in steps to \$447.25 each in quantities of 100 to 199 ("suggested user net," Fairchild price list, January 1, 1967), and have been extrapolated to \$420 including transportation for the quantities considered here.

One projector can serve three classrooms (five film showings per classroom is $5\frac{1}{2}$ hours of projector use per day). It is assumed here that if some projectors are not in working order, those in working order can be used for more than $5\frac{1}{2}$ hours in the school day, since class schedules can be adjusted to fit projector availability. Bulb life is estimated at 25 hours, and the Fairchild price per bulb is \$4.50 or 18 cents per viewing hour. The companion Mark IV rear-screen projector can be operated with reduced bulb voltage for longer bulb life, but this probably is not bright enough for projection onto a separate screen. It seems reasonable to expect a lower price for large-volume purchases of bulbs, but these savings would probably be offset by losses in transportation and handling.

The MK-V projector uses 100 watts. Electricity cost per viewing hour, at the 4 cents per kwh used in Appendix C, is only 0.4 cent. A more important component of cost is the generating plant needed to provide electricity if it is not locally available; at the \$300 per kw of Appendix C, this is \$30 per projector.

Total projector costs per classroom then are as follows: initial investment is \$140 for one-third of a projector, plus \$10 for the corresponding share of the electric power plant if the school is in a rural area. Annual cost components are 10 percent for maintenance and minor part replacement, 20 percent for depreciation on a five-year basis, and 330 hours of viewing (110 minutes a day for 180 days). At 18.4 cents an hour for bulb replacement and electricity, these respective costs are \$14, \$28, and \$60.72 per year, or a total of \$102.72. If each classroom has its own projector, the initial cost is \$420 plus \$30 if the school is in a rural area. Annual costs, assuming that projector life and maintenance depend on time and climate rather than on hours of use, are \$42 for maintenance, \$84 for depreciation, and \$60.72 for bulbs and electricity, or \$186.87.

One factor not studied here is the need for darkened rooms, with the possibility that school buildings may need modification at extra cost to permit rooms to be dark without total loss of ventilation.

Summary of Cost Components

These components of instructional film costs are summarized in Table 36.

SYSTEM COSTS

Dominance of Film Print Costs

Film print costs are high enough, as Table 36 shows, to overshadow all other cost components if more than a few schools use films. If each classroom has its own set of films, these represent an investment of over \$360 per student (in a class of 55). Most films will be used only once in a given class, and large savings can be achieved by

Table 36

SUMMARY OF COST COMPONENTS, INSTRUCTIONAL MOTION PICTURES

Cost Component	Initial Cost	Annual Cost	Remarks
Production for facilities and equipment	\$840,000 total	\$105,000 total	See Table 35
Film prints for schools, per set	\$20,160 per grade per year	\$2016 per grade per year	Replacement for updating on a 10-year cycle
Film libraries at school	\$1000 per library (bldg)	\$300 per library (salary)	Each library holds one set of film for each grade in school
Projectors			
Shared			
Urban	\$140 per room	\$103 per room	Three rooms per projector
Rural	\$150 per room	\$103 per room	
One per room			
Urban	\$420 per room	\$187 per room	
Rural	\$450 per room	\$187 per room	

sharing films among several classes (in the same grade) as well as by using the same films for several years.

For cost computations in the following paragraphs it is assumed that ten classes share each set of films each year in the 10-year life span. This means that most individual film prints would be shown 100 times, while those that are shown more than once to the same students would have perhaps 200 or 300 showings from a given print. This is well within the life of the film, which Fairchild advertises as "3000 times or more" on continuous repeat. Showings to 10 classes for each of 10 years means repeated handling of the cartridge, however, and cartridge life may not be as much as 3000 showings when each showing involves carrying and inserting the cartridge.

In practice, it is likely that films would be distributed by schools or by small groups of schools, depending on school size. It is easy to plan a school schedule in which ten or fifteen first-grade classes all see the same film print over a period of five school days. In rural areas, however, showing by ten classes might entail transporting

film among five or ten schools. This transportation and the associated storage and control problems (not so much problems of theft or loss as problems of seeing that films are all forwarded to the next school on schedule) will increase as schools become smaller and the same films must serve more schools. In the absence of further study on school size, prospects for consolidating schools, cartridge durability when moved among schools, and the like, sharing of films by ten classes has been taken here as a reasonable estimate of average practical sharing for costing purposes.

If each library serves 50 primary, 40 junior high or 30 senior high classes (with one set of films for each grade, and 10 classes per grade), and projectors are shared, costs per classroom for prints, projectors and film libraries are shown in Table 37. Costs when each classroom has its own projector are also shown in this table.

Table 37

FILM PRINT, LIBRARY AND CLASSROOM COSTS WITH SHARED FILM

Component	No. of Classes Sharing	Initial Cost Per Room	Annual Cost Per Room	No. of Classes Sharing	Initial Cost Per Room	Annual Cost Per Room
Film prints	10	\$2016	\$202	10	\$2016	\$202
Libraries	Avg 40	25	8	Avg 40	25	8
Projectors						
Urban	3	140	103	1	420	187
Rural	3	150	103	1	450	187
Total						
Urban		\$2181	\$313		\$2461	\$397
Rural		\$2191	\$313		\$2491	\$397

Costs for Saigon and Nationwide Systems

Total costs of extending instructional films throughout the present Vietnamese school system, and of further extension to serve school age children not now in school, are shown in Table 38 for several sample enrollments previously used for instructional television costs in Tables 29, 31, and 33. Costs used here incorporate sharing of film prints and projectors as shown in Table 37 and production costs of Tables 35 and 36.

For comparison, television costs per student for the lowest cost systems of Tables 31 and 33 are shown immediately below motion picture costs per student. It is assumed here that all Saigon area schools have electricity available, but that only 30 percent of schools throughout the country are so served.

Table 38

INSTRUCTIONAL MOTION PICTURE COSTS

Cost Component	Number of Classrooms and Number of Students				
	Saigon Area			Nationwide System	
	1,000 55,000	10,000 550,000	18,000 990,000	40,000 2.2 million	100,000 5.5 million
Total system costs					
Initial	\$3,021,000	\$22,650,000	\$40,098,000	\$88,360,000	\$219,640,000
Annual	418,000	3,235,000	5,739,000	12,620,000	31,400,000
Cost per classroom					
Initial	3,021	2,265	2,227	2,209	2,196
Annual	418	324	319	316	314
Cost per student					
Initial	54.93	41.18	40.50	40.16	39.93
Annual	7.60	5.89	5.80	5.74	5.71
Comparative costs per student for minimum cost tele- vision system					
Initial	26.55	4.55	3.31	8.59	5.04
Annual	13.40	2.93	2.32	4.73	3.00

Two characteristics of film costs are readily apparent: initial costs are much higher for films than for television, while operating costs are closer to television costs, and film costs per class or per student do not decrease much as the system expands. Both characteristics follow from the large number of film prints required.

Special Applications

Since most costs of instructional motion pictures are proportional to the number of classrooms reached, films may offer a reasonably economical way to teach groups who are harder to reach with texts or television. Minority language groups and students taking special courses are two

examples. Applicable costs for any desired situation can be estimated from cost component tables in this Appendix. Production costs are related to output of master films, and would rise if films were produced for three grades for each of several language groups in the same year.

REFERENCES

1. LeNoir, J. D., Notes on the Interprovincial Resettlement of Refugees: Phu-Yen Province to Cam Ranh Bay Area Republic of Viet-Nam, Field Research Memorandum 3, Human Sciences Research Field Team/Viet-Nam, HSR-TN-66/6-Aa, August 15, 1966.
2. Hendry, J. B., The Small World of Khanh Hau, Aldine Publishing Company, Chicago, 1964.
3. Hickey, G. C., Village in Vietnam, Yale University Press, New Haven, Connecticut, 1964.
4. Woodruff, Lloyd, "The Study of a Vietnamese Rural Community-- Administrative Activity," Village Government in Viet-Nam--A Survey of Historical Development, Michigan State University Viet-Nam Advisory Group, Vol. 1, Chaps. I-IV, May 1960.
5. Rambo, T. A., J. M. Tinker, and J. D. LeNoir, The Refugee Situation in Phu-Yen Province, Viet-Nam (abridged), Human Sciences Research, Inc., HSR-RR-67/6-Aa, July 1967.
6. Bartholomew, Harland, Land Uses in American Cities, Harvard University Press, Cambridge, Massachusetts, 1955.
7. Nighswonger, W. A., Rural Pacification in Viet Nam: 1962-1965, Advanced Research Projects Agency, May 1966.
8. Holliday, L. P., A New Look at Road Capacity, The RAND Corporation, RM-3331-ARPA (abridged), April 1966.
9. Berry, P. C., Education by Television in American Samoa, Hudson Institute, Inc., HI-582-D, July 30, 1965.
10. United Nations, General Assembly, Report of the Commissioner-General of the United Nations Relief and Works Agency for Palestine Refugees in the Near East, 1 July 1965-30 June 1966, 21st Session, Supplement 13 (A/6313), 1966.
11. Cost Effectiveness of Water Wells, Guy B. Panero, Inc., New York, September 7, 1964.
12. Wagner, E. G., and J. N. Lanoix, Water Supply for Rural Areas and Small Communities, World Health Organization, Geneva, 1959.
13. Agency for International Development, Country Assistance Program-- Vietnam, Part III, Department of State, December 1964.
14. Wilson, J. A., and M. J. Penzo, South Vietnam Political Division Tables and Maps, The RAND Corporation, RM-4254-ARPA, Part I, December 1964.
15. RAND Corporation interviews with Viet Cong defectors (Chieu Hoi [program]), Dinh Tuong Province, beginning May 1965.
16. United Nations, Economic Survey of Asia and the Far East, 1965, also issued as Vol. XVI, No. 4 of the Economic Bulletin for Asia and the Far East, Bangkok, 1966.

17. Statistical Yearbook of Viet-Nam, Vol. 10, 1962, Republic of Vietnam, National Institute of Statistics, 1964.
18. United Nations, Statistical Yearbook, 1965, Statistical Office of the United Nations, New York, 1966.
19. Displaced Persons 1945-1946, Occupation Forces in Europe Series, Training Packet No. 53, The Provost Marshal General's School, Military Government Department.
20. DeWitt, J. L., Lt Gen, U.S. Army, Final Report: Japanese Evacuation from the West Coast, 1942, U.S. Army, Hq Western Defense Command and Fourth Army, San Francisco, June 1943.
21. United Nations, General Assembly, Annual Report of the Director of the UNRWAPRNE, 1 July 1959-30 June 1960, 15th Session, Supplement 14 (A/4478), New York, 1960.
22. Encyclopaedia Britannica, Encyclopaedia Britannica, Inc., Chicago, 1966.
23. Smith, W. O., Pork Production, Macmillan and Company, New York, 1921.
24. United Nations, General Assembly, Assistance to Palestine Refugees: Report of the Director of the United Nations Relief and Works Agency for Palestine Refugees in the Near East, 6th Session, Supplement 16 (A/1905), Paris, 1951.
25. -----, Interim Report of the Director of the UNRWAPRNE, 5th Session, Supplement 19 (A/1451/Rev. 1), October 6, 1950.
26. Secretariat d'Etat a l'Education, Annuaire Statistique de l'Enseignement, 1964-1965, Bureau de Statistique, République du Viet-Nam.
27. UNESCO, Basic Facts and Figures: International Statistics Relating to Education, Culture and Mass Communication, United Nations, Paris, 1961.
28. United Nations, The UNRWA Education and Training Programme, 1950-1962, UNRWA Reviews, Information Paper 3, Beirut, September 1962.
29. Agency for International Development, Country Assistance Program, FY 1967, Vietnam, Part II, Department of State, December 1965.
30. Fitzgerald, Frances, "The Tragedy of Saigon," The Atlantic, Vol. 218, No. 6, December 1966, pp. 59-67.
31. "Schools Abroad," Time Magazine, Vol. 89, No. 16, April 21, 1967, pp. 49, 52.
32. Agency for International Development, Mission to Vietnam, Country Assistance Program--Part II, FY 1967-1968, Education, December 1966.
33. Truong Ngoc Giau, and L. W. Woodruff, My-Thuan: Administrative and Financial Aspects of a Village in South Vietnam, National Institute of Administration, Michigan State University Advisory Group, Report 2, Saigon, July 1961.
34. Schramm, Wilbur, New Educational Media in Action: Case Studies for Planners--I, International Institute for Educational Planning, UNESCO, 1967.

35. Shanks, R. E., "The Anaheim Approach to Closed-Circuit Television," Chap. 5 in R. M. Diamond (ed.), A Guide to Instructional Television, McGraw-Hill Book Company, Inc., New York, 1964.
36. Ewing, C. H., et al., SEATO Skilled Labor Project in Thailand, 1958-1965, Terminal Report, University of Hawaii/Thailand Ministry of Education Contract, Bangkok, 1965.
37. United Nations, General Assembly, Report of the Commissioner-General of the United Nations Relief and Works Agency for Palestine Refugees in the Near East, 20th Session, Supplement 13 (A/6013), 1965.
38. Brooker, M. A., et al., Survey of Agricultural Education in South Vietnam, University of Florida Team, 1967.
39. Howard, Alan, "Petronillo Learns to Write His Name," New York Times Magazine, February 7, 1965, pp. 26ff.
40. "Illiteracy," Time Magazine, Vol. 86, No. 21, pp. 67-68.
41. Williams, N. L., "Teaching to Read by Radio," Fundamental and Adult Education, October 1955, pp. 147-153.
42. Ruiz, R. E., Mexico: The Challenge of Poverty and Illiteracy, The Huntington Library, San Marino, California, 1963.
43. New York Times, August 27, 1964, p. 3.
44. LeNoir, J. D., Notes on the Refugee Situation in Darlac Province, Republic of Viet-Nam, Field Research Memorandum 2, Human Sciences Research Field Team/Viet-Nam, HSR-TN-66/2-Aa, June 1, 1966.
45. Nolting, O. R., and D. S. Arnold (eds.), The Municipal Year Book, 1965, The International City Managers' Association, Chicago, 1965.
46. The Military Assistance Institute, Republic of Vietnam: Country Study and Station Report, The Department of Defense, 1961.
47. Agency for International Development, Vietnam, Annual Statistical Bulletin, No. 9, Joint Economic Division, September 1966.
48. United Nations, General Assembly, Annual Report of the Commissioner-General of the UNRWAPRNE, 17th Session, Supplement 14 (A/5214), United Nations, New York, 1962.
49. Bosworth, A. R., America's Concentration Camps, W. W. Norton and Company, Inc., New York, 1967.
50. Leighton, A. H., The Governing of Men, Princeton University Press, Princeton, New Jersey, 1945.
51. Dow, M. W., Nation Building in Southeast Asia, Pruett Press, Inc., Boulder, Colorado, 1965.
52. Lindhold, R. W. (ed.), Viet-Nam: The First Five Years, Michigan State University Press, 1959.
53. United States Air Force, Military Construction Pricing Guide, AFP 88-16, March 1, 1967.

54. "Emergency Power Fits in a Tight Budget," Engineering News-Record, Vol. 177, No. 20, November 17, 1966, p. 130.
55. Sears, Roebuck and Company, Catalogue for Fall and Winter 1967, Los Angeles edition, p. 1101.
56. Bureau of Yards and Docks, Department of the Navy, Vietnam Construction Budget Cost Estimating Guide (condensed edition), NAVDOCKS 1337, Washington, D. C., April 1966.
57. Knowlton, A. E. (editor-in-chief), Standard Handbook for Electrical Engineers, 9th ed., McGraw-Hill Book Company, Inc., New York, 1957.
58. National Association of Educational Broadcasters (Survey), The Needs of Education for Television Channel Allocations, Office of Education, U.S. Department of Health, Education and Welfare, U.S. Government Printing Office, Washington, D. C., 1962.