



**CENTER FOR NATION RECONSTRUCTION AND  
CAPACITY DEVELOPMENT**  
United States Military Academy  
West Point, New York 10996

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# **Ebeye 2023: Comprehensive Capacity Development Master Plan**

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## Abstract

The city of Ebeye, Republic of the Marshall Islands, is facing a number of challenges to include overpopulation, collapsing infrastructure, a weak school system as well as a very limited economy. With the reduced mission of US Army Kwajalein Atoll (USAKA), Ebeye is facing a new reality that will be much different in 2023 than it is today. The need for a comprehensive approach to tackle the challenges facing Ebeye cannot be understated. The master planning document points toward self-sufficiency for the island of Ebeye, Republic of the Marshall Islands (RMI) by 2023.

The first step in the process of creating a comprehensive capacity development plan was conducting research into topics of importance to Ebeye: history, economy, government, social well-being and infrastructure. Essential to development of the plan was integrating the complex and rich culture of the Marshallese people.

The plan used the eight-step planning process as a guide as well as inculcating the Systems Decision Process. Goals related to government, social well-being, economy, education, and infrastructure. We then developed challenges and solutions for each of these five areas along with a phased implementation schedule. This first step identified potential gaps and solutions toward achieving self sufficiency.

Ebeye 2023 is a first step in achieving self-sufficiency. As a master plan, no cost estimates or funding sources are developed or identified. This is the responsibility of the RMI government, the Ebeye government (KALGOV) and traditional leaders (TLs). This plan provides a framework from which the leadership can use as it chooses. A follow on effort is needed to start a dialog with the US Agency for International Development, non-government agencies, regional stakeholders, and others that can contribute financial resources to the plan presented. Also, as a first step detailed life cycle costs (not just initial construction costs) must be developed.

Additional work is required and is emphasized as a key to success for this plan. The effort and work to make Ebeye a jewel of the Pacific must come from within the RMI national and Ebeye local governments as well as from the traditional leaders.

The Assistant Chief of Staff for Installation Management funded this effort.



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## About Us

The Superintendent of the United States Military Academy (USMA) at West Point officially approved the creation of the Center for Nation Reconstruction and Capacity Development (C/NRCD) on 18 November 2010. Leadership from West Point and the Army realized that the United States Army, as an agent of the nation, would continue to grapple with the burden of building partner capacity and nation reconstruction for the foreseeable future. The Department of Defense (DoD), mainly in support of the civilian agencies charged with leading these complex endeavors, will play a vital role in nation reconstruction and capacity development in both pre and post conflict environments. West Point affords the C/NRCD an interdisciplinary and systems perspective making it uniquely postured to develop training, education, and research to support this mission.

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- Research enhances professional development opportunities for our faculty. It is important to develop and grow as a professional officer in each assignment along with our permanent faculty.
- Research maintains strong ties between the USMA and Army/DoD agencies. The USMA is a tremendous source of highly qualified analysts for the Army and the DoD.
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# Chapter 1

## Introduction

### 1.1 Importance

On 19 September, 2011, the government of the Republic of the Marshall Islands (RMI) accepted the project proposal from the Center for Nation Reconstruction and Capacity Development (C/NRCD), United States Military Academy, to develop a comprehensive capacity development plan (Ebeye 2023) that addresses the needs and desires of Ebeye, RMI. Ebeye has a close association with US Army Kwajalein Atoll (USAKA) due to their economic ties and close geographic proximity. The overall satisfaction and quality of life of the Ebeye population are key components of the USAKA mission. The positive and close relationship between USAKA and the people of Ebeye is an integral component of the future success of this region. The importance of Ebeye 2023 has kept the C/NRCD focused on providing the people of Ebeye the best possible course of action to achieve self-sufficiency by 2023. The approval document from RMI supporting this endeavor is found in Appendix A. We are honored to be able to participate in this collaborative effort with the KALGOV and TLs.

### 1.2 RMI-US Relations

The relationship between the US and the people of the Kwajalein Atoll officially began on 1 February 1944 when American troops from the 7<sup>th</sup> Army Division landed on Kwajalein Island. The US assumed control of the region after a battle that claimed the lives of Japanese, Americans, and Marshallese. The Marshall Islands became an extremely important way station for US forces and was used throughout the rest of the war. Kwajalein proved to be strategic as an airfield, while Ebeye was used as a seaplane base.

In 1979, the US recognized the Constitution of the Marshall Islands and in 1986 it recognized the full independence of the RMI. After more than a decade of negotiations, the RMI and the US signed the Compact of Free Association (CFA) on June 25, 1983. The people of the RMI approved the CFA in a United Nations observed plebiscite on September 7, 1983. The US Congress subsequently approved the CFA, adding several amendments that were accepted by the RMI Government. The CFA entered into force on October 21, 1986. From 1999-2003, the two nations negotiated an Amended Compact that entered into force on May 1, 2004. Under the Amended Compact, the US will provide the RMI at least \$57 million every year until 2023, including contributions to a jointly managed Trust Fund. Marshallese will continue to have access to many US programs and services (Department of State, 2012). With the expiration of this aid in 2023, the importance of self-sufficiency is paramount.

The Department of Defense (DoD), under a subsidiary government-to-government agreement of the original CFA, has use of the lagoon and several islands on Kwajalein Atoll. The atoll consists of approximately 90 islets around the largest lagoon in the world. The original agreement allowed the US continued use of the USAKA missile test range until 2016. An amendment to that agreement, extending US rights until 2066 with an option until 2086, was negotiated in conjunction with the Amended Compact. The USAKA installation has been downsizing since the mid 1980s. Because of technological improvements (such as a new trans-oceanic fiber-optic cable), many test ranges can be operated remotely from sites in the US. This reduces operation costs and support personnel. Currently the US pays \$15 million annually to the landowners for compensation. Because of differences between the landowners and the US roughly \$4 million of the \$15 million has been going into an escrow account pending resolution.

The RMI government is the largest employer, employing approximately 46% of the salaried work force in the RMI. The Gross Domestic Product is derived mainly from payments made by the US under the terms of the CFA. Direct US aid accounted for 62.2% of the RMI's \$132.2 million budget for FY 2011.

Ebeye is home to a third of the RMI population (estimates vary between 11,000 and 15,000 people). The livable area of Ebeye is approximately 80 acres, thus giving Ebeye the distinction of being one of the

most densely populated areas of the world. With this high population density the need for proper long term planning is critical. The current conditions of the city require a pragmatic approach involving all of the stakeholders to develop a solution that will provide a bright future for the next generation. It is through the vision and leadership of the KALGOV and traditional leaders that this plan is presented.

## Chapter 2 Methodology

### 2.1 Introduction to Methodology

The first step in the process of creating a comprehensive capacity development plan is researching the topics of important to Ebeye. A literature review was conducted in the areas of history, economy, government, social well-being and infrastructure. Understanding the complex and diverse culture of the Marshallese people proved critical in developing a plan that is acceptable to the Ebeye leadership. Conducting interviews with major stakeholders was another important way of collecting information on Ebeye, its culture and power structure. Some of these major stakeholders included RMI Chief Secretary Casten Nemra, US Ambassador Martha Campbell, Ebeye Mayor Johnny Lemari, USAKA commander Colonel Joseph Gaines, and more than a dozen others. In order to gain a better understanding of the Ebeye cultural travel to the Marshall Islands occurred in January 2012.

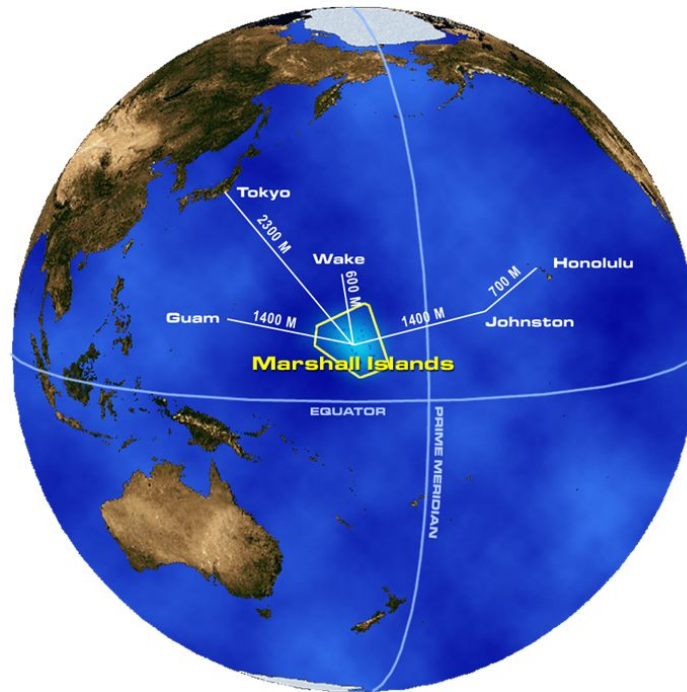
Meetings were conducted with Kwajalein Atoll Joint Utility Resource (KAJUR), the Ebeye Chamber of Commerce (ECC), Ministry of Health officials, the Secretary of Education, the Environmental Protection Agency (EPA) and others. Tours of the major infrastructure components of the island, noting the condition of each sector were conducted which greatly enhanced the detail aspects of Ebeye 2023.

#### Physical Geography

The remote location of Ebeye (Figure 2.1) is unique and problematic. The isolation of the island creates a limited environment in comparison to other societies. For example, the time, distance and cost of transportation to the island are large obstacles to economic development. The distance makes it very difficult to receive goods and services, which exacerbates the difficulties of trying to provide for the population.

Ebeye is roughly 80 acres with a population of 11,000 people. This population density ranks Ebeye near the top of the world's most densely populated areas. This density, combined with Ebeye's location, exacerbate the living conditions as well as the difficulties faced by Ebeye's government and traditional leadership in trying to provide for the population.

For the reasons described above, an important aspect of this report will entail Geographic Information Systems (GIS) analysis. The use of GIS entails digitally creating and manipulating spatial areas for various analytical purposes. Different applications of this tool can be used to allow users to create interactive queries, analyze spatial information, edit data in maps, and present the results of these operations. This can be extremely useful for city planning. Specifically for Ebeye, this tool will allow for multiple layers to be created that highlight infrastructure facilities, various buildings and any other types of significant spatial data.



**Figure 2.1** Marshall Islands and Kwajalein Atoll maps<sup>1</sup>

<sup>1</sup> Map of the South Pacific was copied from USAKA Command Briefing dated 9 July 2011. Image of Kwajalein Atoll take from Google earth accessed 5 August 2012.

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### The Planning Process

The Eight Step Planning Process (ESPP) is a well-known and vetted process for developing comprehensive master plans. This process is used by the C/NRCD as a structured approach to assist in the plan development.

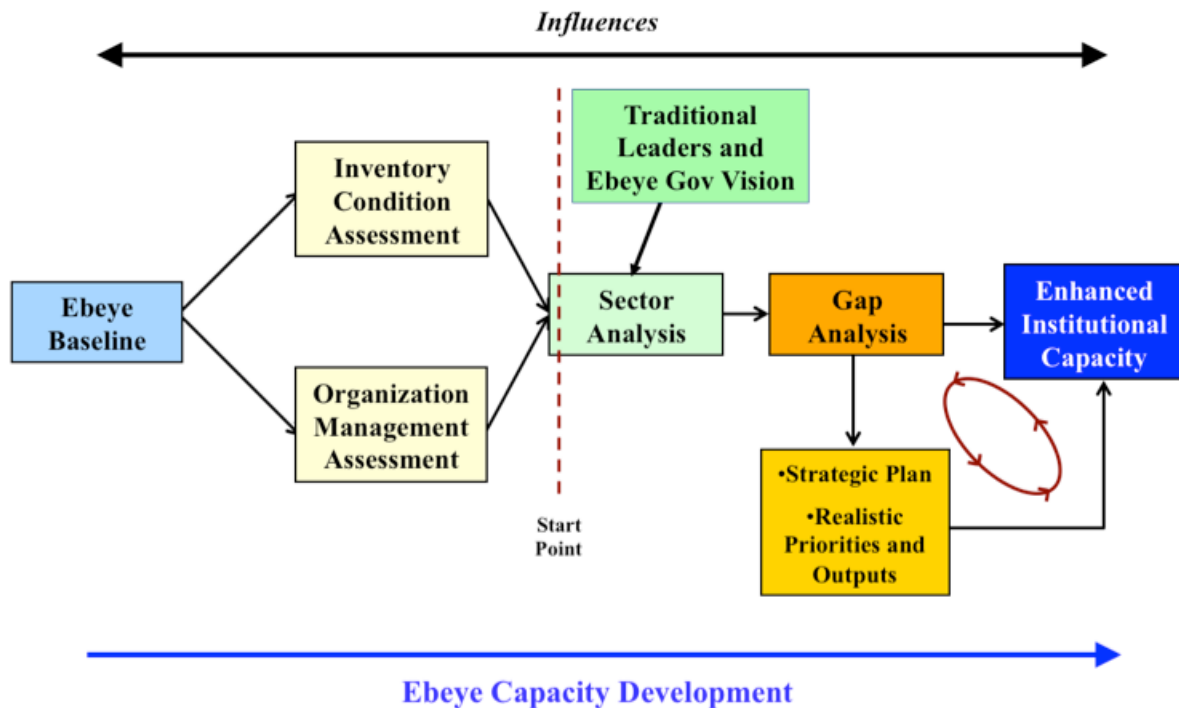
The eight steps of the process are:

1. Identify Issues
2. State goals
3. Collect and analyze data
4. Prepare the plan
5. Evaluate alternatives
6. Adopt the plan
7. Implement plan
8. Monitor plan.

To identify the issues a thorough understanding of Ebeye's history, culture and current challenges is required. This is done through literature research and interviews with RMI, Ebeye, and USAKA leaders. Stating goals, is the phase in which specific objectives are detailed based on the stated desires of stakeholders. Data collection and analysis is needed to present the full picture Ebeye's current condition. Using this data a gap analysis is conducted to identify where short falls occur between what is wanted and the current condition and finally preparing a plan to fill the shortfalls between the two. After the plan is prepared, alternative solutions are generated and evaluated with the best alternative selected. After the plan is adopted, it is turned over to the KALGOV. This is an important phase of the project because even a great plan can lead to poor results if it is not executed properly. The last step of the process is monitoring the plan. Monitoring the plan is important since it allows Ebeye to constantly assess progress and identify any challenges and make adjustments. Monitoring the plan creates a feedback loop. This means that as the plan is implemented and results are produced, constant evaluation of the results will dictate the success or failure of certain aspects of the plan. This will require adjustment and flexibility on the part of the KALGOV. These eight steps are not inflexible but should be viewed as a winding path which leads to the goal of Ebeye self sufficiency by 2023.

By laying out the foundation of the planning process, Ebeye can refer back to this method and adjust accordingly. Although simple in nature, the planning process is the key when tackling any multifaceted challenge.

We need to understand Ebeye from a number of contexts to make meaningful recommendations to the complex social-economic problems unique to the island. In order to assist Ebeye a pragmatic approach to the challenges and an understanding of the culture is essential. The model in Figure 2.2 is called the Ebeye Capacity Development Model (ECDM). This model lays out the foundation of the approach to solving Ebeye's challenges while developing capacity.



**Figure 2.2 Ebeye Capacity Development Model (ECDM)**

## 2.2 Ebeye Capacity Development Model

The ECDM is bounded by influences above and capacity development below. The influences above the model are those influences such as the RMI government, culture, traditional leaders, KALGOV, population, etc. These influences represent numerous entities that directly and indirectly affect how Ebeye operates. As Ebeye develops and progresses (left to right) through the model, capacity is developed. This capacity development is manifested in a number of ways to include but not limited to the KALGOV, the infrastructure sectors, etc.

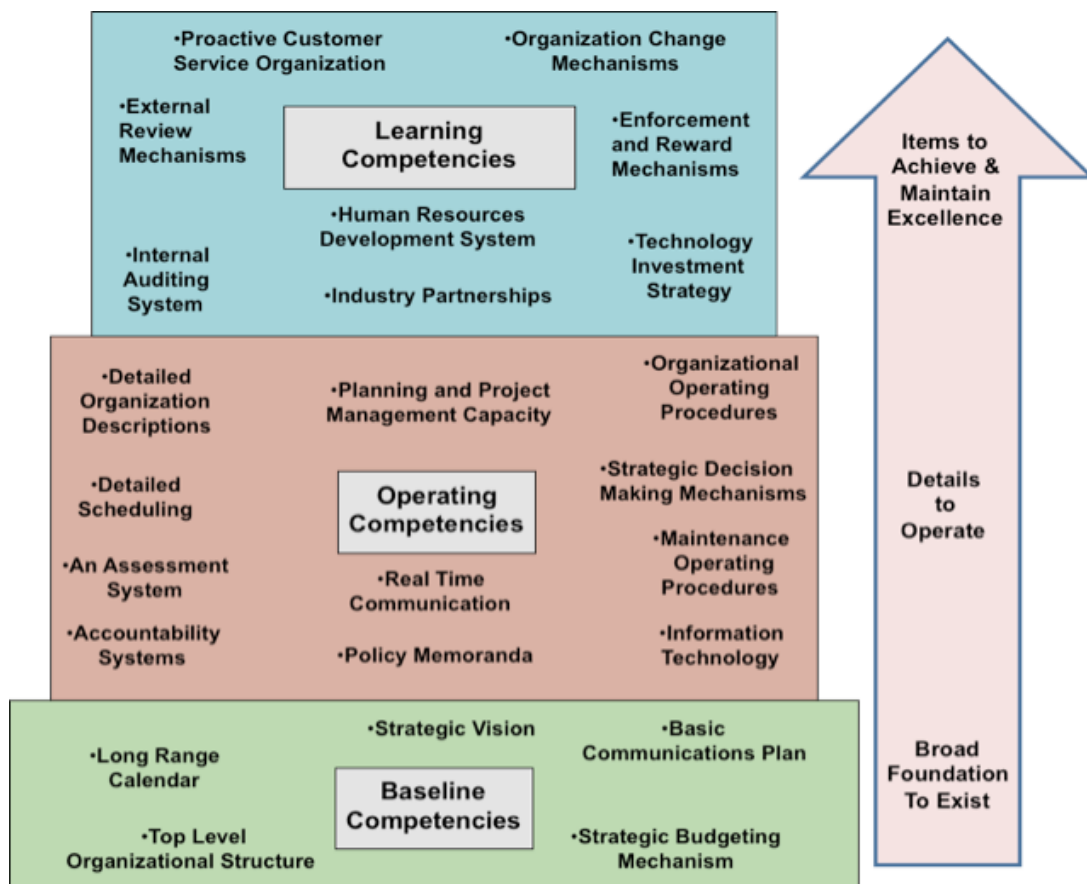
The begins with a baseline assessment to determine the initial system status. The baseline assessment includes a complete inventory of the physical aspects of all governmental sectors, which include infrastructure, health, safety, etc. Additionally, an assessment of the organizational management and structure is necessary. Without understanding how Ebeye is organized and how it operates, no amount of money or repair can fix the systemic challenges face Ebeye. Once assessments of the physical and the management aspects of Ebeye are completed a sector analysis is done to marry up them up, which allows for planning to begin at the start point. The input of the KALGOV and the TLs is essential to determine the long-term goals of Ebeye and how it will achieve those goals. Once the long-term goals are established, a gap analysis is conducted to determine differences between where Ebeye is currently and where it wants to be.

With an idea of where Ebeye is going, a strategic plan is developed to help Ebeye achieve its goals. The key here is that all things cannot be achieved quickly and will require time. Therefore, realistic priorities and outputs are established to help support the strategic plan. At this point the model displays a rotating circle between the gap analysis, strategic plan and enhanced institutional capacity. This represents that the plan will require numerous iterations; reviews and updates to ensure the realistic outputs are updated and support the strategic plan. This is a living model that requires continual work. Over time, the

KALGOV and TLs will develop greater institutional capacity through project completion, training and planning updates.

This living model is a way to illustrate the approach to solving the long term physical and management challenges faced by Ebeye while developing an approach that will allow capacity development to occur. Understanding how this works will allow a greater understanding of how to implement the Ebeye 2023 Comprehensive Master Plan.

The Paradigm for Building Organization Capacity in Figure 2.3 displays the levels of competencies that a developing organization transitions through as it develops. The first level of competencies, the baseline level, contains the essential capabilities that an organization must have to gain autonomy and plan for the future. Without achieving the baseline competencies, an organization will remain passive, constantly relying on assistance from outside sources. An organization with baseline competencies will be on track to develop efficiency and autonomy, but will still require outside help for full functionality. To master the baseline competencies, an organization must have a strategic vision. This means that there is a clear overarching mission that is understood by all members. A proper strategic vision will include universally accepted goals and objectives that unite the organization. Another important baseline competency is top-level organizational structure. An organization with an effective top-level structure is arranged with clear lines of communication and functionality that address the overall mission. The structure of the organization must be completely laid out, with clearly delineated roles and responsibilities of all parties.



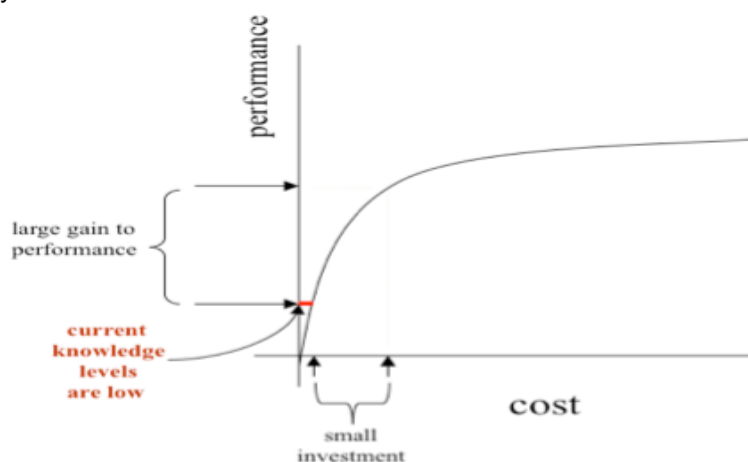
**Figure 2.3** Paradigm for Building Organizational Capacity

The second level of competencies, called operating competencies, consists of the conditions of an organization necessary to operate at a sustainable level. An organization at this level of competency actually provides a consistent product to its customers and can maintain its operations internally. This level builds on the baseline competencies, and focuses on higher maturity organizational functions like maintenance, communication and organizational systems. An operating organization has written operating procedures that dictate to workers the basic processes of everyday functions. Necessary operating procedures include reporting, human resources and scheduling processes. Another important competency of an operating organization is planning and project management capacity. While it may be occasionally necessary to hire outside work for engineering design planning, it is vital that the operating organization has the capability to perform cost estimates and conduct preliminary planning internally. An operating organization must also have strategic decision-making mechanisms that address the common day-to-day decisions that are necessary for operation. Important decisions require information from subordinate levels of the organization, so information reporting procedures must be established.

The final level of the paradigm for organizational capacity is the learning competencies. These competencies create an environment of learning within the organization and foster new ways of thinking. The various political, economic and cultural challenges that present themselves to an organization can be effectively solved if the organization is operating at the learning level of capacity. Also, as new technology is developed over the decades, a learning organization will be able to adapt and implement important changes to its structure. A learning organization will develop a technology investment strategy that contains provisions for implementing new technologies in the future. Once the learning competency level is reached, an organization has developed into a proactive customer service organization. This means that it views the customer as its reason for existence, and consistently conducts focus groups to ensure that the customer's needs are being met.

An organization cannot move up until it masters the level it is currently in. Ebeye right now is assessed at the baseline competency level.

The graph in Figure 2.4 models the typical relationship between financial costs and performance for developing nations. The logarithmic growth curve shows that small initial investments will produce large corresponding increases in performance. As time progresses and more funds are spent on important projects, marginal increases in performance will decrease in magnitude. Ebeye organizations are in the initial developing stages of growth, meaning that great improvements can be made in satisfying the needs of the public through relatively small, strategically placed investments. Money cannot be injected haphazardly without a plan. The Ebeye 2023 plan will provide the strategic vision and tactical path to help achieve self-sufficiency.



**Figure 2.4** *Investment and Performance*

### **Complex Systems Perspective**

A Systemigram is a mapping tool used to depict a system and its components and their relationship with one another and is used to try and understand first and second order relationships for complex systems. It details various components and their relationship to the overall system. This is an excellent tool that encompasses Systems thinking, which is based on using mental capacities and the tools acquired for cognizing, analyzing and synthesizing to ruminate on the systems in any environment. Specifically, the systemigram is part of the initial phase of defining and understanding the current condition. Without a definitive understanding of the system and its environment it is impossible to find an efficient solution.

The systemigram shown in Figure 2.5 visually depicts how the complex systems that exists on Ebeye. Current issues are linked with their cause and affect relationships. For example, KALGOV policy affects both the economy and health issues, which contribute to the social well-being of the population. This model by no means represents all the factors that are present in Ebeye. The objective is to represent a baseline understanding of the on-the-ground situation. This diagram is a reference tool when analyzing possible solutions. This process is imperative to understanding the complexity that is present in Ebeye.

The goals of Ebeye 2023 express the basic public issues regarding the future. These goals address the areas of government, infrastructure, economy, education and social well-being. These goals are identified by the major stakeholders to include the KALGOV and TLs.

In order for the KALGOV and TLs to address their societal concerns they must identify the specific issues that must be resolved. The purpose of these goals is to outline those issues and provide measurable objectives that will allow progress and increase capacity. Through the use of these goals the KALGOV and TLs will be able to determine where to allocate resources and how to meet their desired end state. These goals include:

#### **Government**

- *Improve the government organization to increase effective administration and communication.*

#### **Social Well-being**

- *Improve living conditions.*
- *Improve overall health conditions and the health of the population.*

#### **Economy**

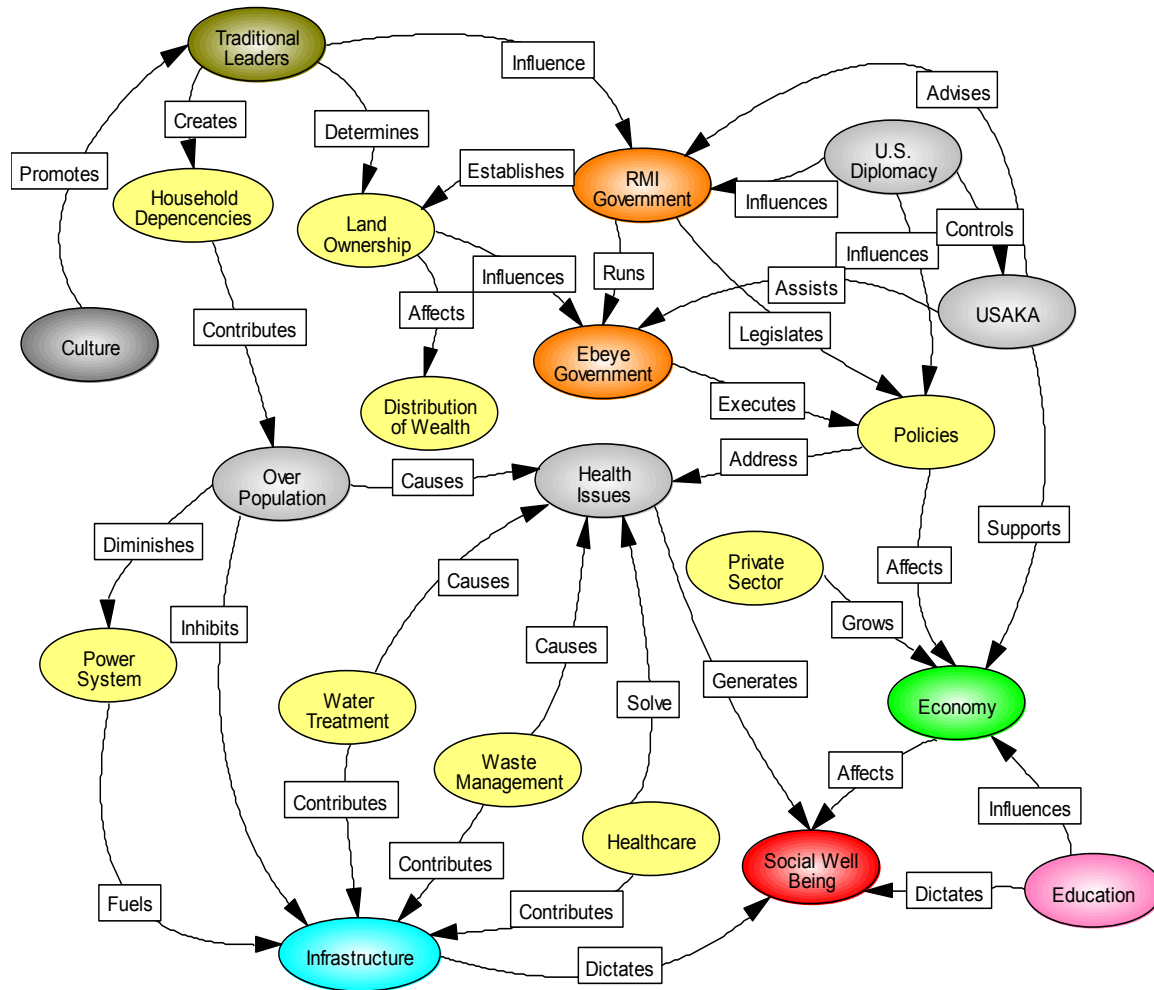
- *Improve the economic foundation that will promote self-sufficiency.*
- *Improve the economic conditions for industries that will promote economic activity on Ebeye.*

#### **Education**

- *Provide no less than an adequate high school education to all Ebeye children.*
- *Provide opportunities for higher learning outside of high school.*
- *Increase the capacity of public schools.*
- *Increase qualifications and training of public school teachers.*

#### **Infrastructure**

- *Improve infrastructure facilities to a functioning level.*
- *Establish a sustainable maintenance programs.*
- *Develop solutions for infrastructure self-sufficiency by 2023.*



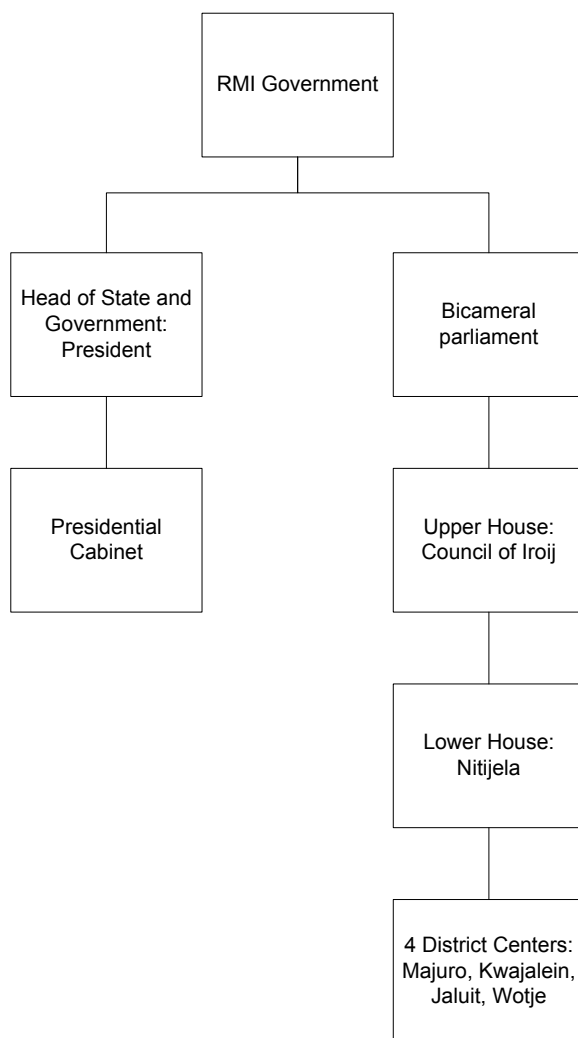
**Figure 2.5 Ebeye Systemigram**

## 2.2.1 GOVERNMENT

### General Overview

The goal of the KALGOV is to improve the government's organization to increase effective administration and communication.

Establishing the systems and structure for the government are the foundation to obtaining the status of a learning organization. Once the government becomes an efficient organization, effective policies and programs will develop.



**Figure 2.6 RMI Government Structure**

### RMI Government

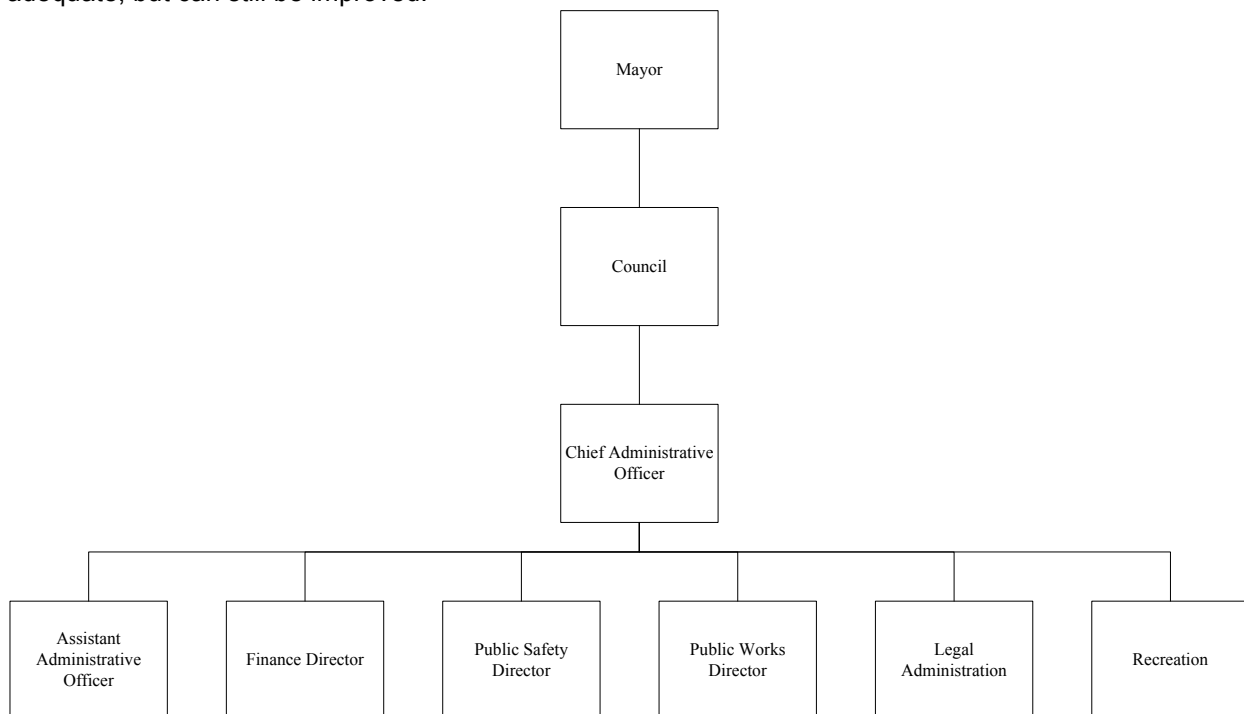
Figure 2.6 shows the current government structure. The legislative branch of the RMI Government consists of the Nitijela (parliament) with an advisory council of high chiefs. The Nitijela has 33 members,

called senators, from 24 districts elected for concurrent 4-year terms. The Nitijela elects the president, whereas the President from the Nitijela selects the cabinet members. Christopher Loeak was elected President in January 2012 and remains the current President. This democratic political system is combined with a hierarchical traditional culture, which lies within the Council of Iroij. The Council is comprised of 12 tribal chiefs who advise the Presidential Cabinet and review legislation affecting customary law or any traditional practice, to include land tenure. Figure 7 shows the structure of the RMI Government, which highlights Ebeye's relative position. RMI possess various ministries that run programs from the national level and are led by the legislative branch. Examples include the Ministry of Health, Ministry of Education and Ministry of Foreign Affairs.

#### Kwajalein Atoll Local Government

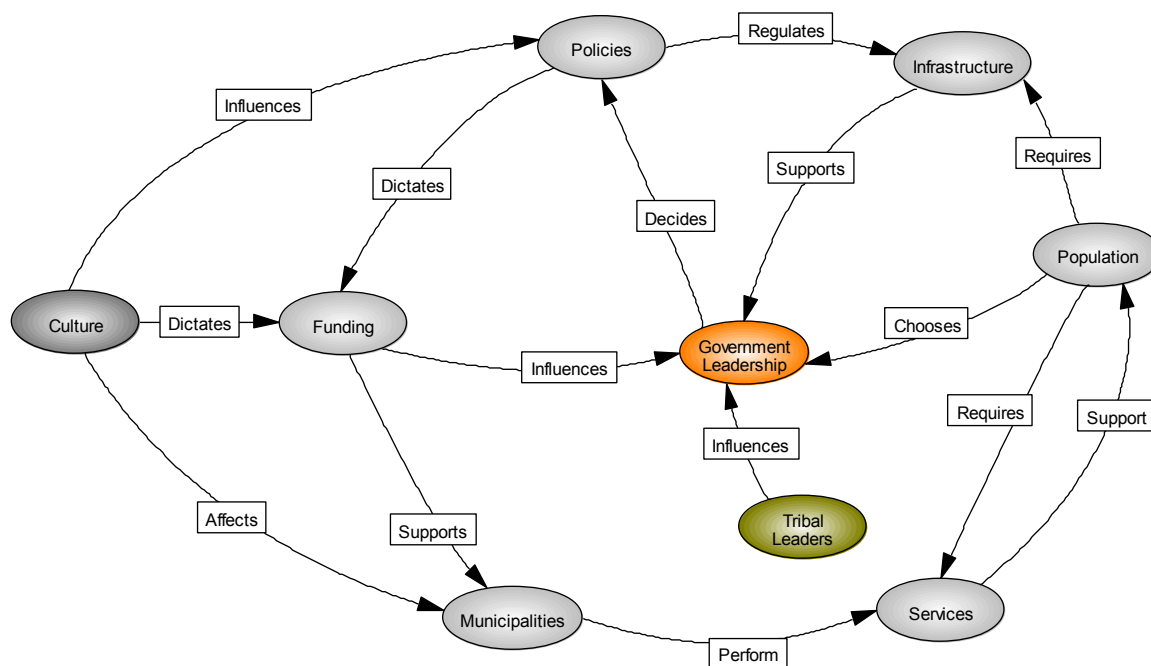
The current organizational structure depicts relationships that are not reflective of how the KALGOV operates. As Figure 2.7 shows, the council is responsible to the mayor and in charge of the directors. In most cases, a council should act in an advisory role, but as depicted here, they work directly for the mayor and control the major directories. The Chief Administrative Officer is in charge of facilitating the staff that ultimately works for the Mayor but as depicted here he works for the council.

Policies are a translation of the goals of society and should support the stated goals. The government is responsible for planning and evaluating resource use for public improvement, growth and development. An efficient government that executes policies for the improvement is the ultimate goal. To do this, every entity from the top down needs to communicate with each other and understand their roles and responsibilities. In addition, standard operating procedures for actions and decisions must be established and recognized by everyone. The necessary and imperative improvements recommended in this plan rest in the hands of the KALGOV. The government is the catalyst for actions to be taken in order to improve the conditions on the island. Currently, the KALGOV structure is shown in Figure 2.7 is adequate, but can still be improved.



**Figure 2.7 KALGOV Structure**

Figure 2.8 is a systemigram of the KALGOV. This diagram represents the cause and effect relationships of the government and community. It is important to note the role of the systems in place. These refer to the current procedures and mechanisms that assist the government in running the community.



**Figure 2.8 KALGOV Systemigram**

Table 2.1 is the baseline government data received from Ebeye. This breakdown helps illustrate some of the challenges, such as the lack of a city engineer. This will be addressed in more detail later in the report. The total number of government employees on the island is positive and encouraging in that the manpower necessary for reorganization is present.

### Challenges

The challenges listed below are the result of conducting various interviews and collecting data in order to better understand the current situation. The lessons learned on the ground were valuable when creating various solutions specifically tailored for Ebeye. Numerous government employees including the mayor, Council members and the Chief Administrative Officer as well as KALGOV employees were interviewed. The data was synthesized and analyzed to develop a suitable and efficient solution.

Organizational Structure - The KALGOV organizational structure requires adjustment to increase efficiency and communication. It is unclear, at times, who is in charge of various operations within the organization. This is a significant challenge to the efficiency and effectiveness of the government. In order to be a learning organization, it is imperative that every employee knows who are his or her subordinates and supervisors. Accountability should be the primary concern with the government leadership. An example of this can be seen in the council where some members do not understand what their roles are or who they report to. It was clear that they were not certain of their duties. Also, the lack of clear structure was shown with the example of a government employee cutting off all the power just because of a fire at his house. These examples highlighted the need for an understandable organizational structure with defined roles and responsibilities.

**Table 2.1 KALGOV Data**

| Government                     |       |
|--------------------------------|-------|
|                                | Value |
| <b>Employees</b>               |       |
| Number of Government Employees | 409*  |
| Employees Trained              | Yes   |
| <b>Building</b>                |       |
| Number of Government Buildings | 10    |
| <b>Engineer</b>                |       |
| Number of Engineers            | 0     |
| Engineers Trained              | 0     |
| Number of Employees            | 0     |
| Employees Trained              | 0     |
| <b>Police</b>                  |       |
| Equipment - Vehicle            | 1     |
| Equipment - Personal           |       |
| Number of Policemen            | 75**  |
| Police Trained                 | Yes   |
| Number of Arrests per year     | N/A   |
| <b>Fire</b>                    |       |
| Equipment - Fire Truck         | 1     |
| Number of Firemen              | 9     |
| Fireman Trained                | Yes   |
| Number of Responses per year   | 10    |

\* Of the 409, 300 are employed by the RMI national government and 109 by KALGOV

\*\* 50 policemen work for KALGOV and 25 for RMI National government

**Communication** - Communication, up and down authority levels, is integral to the success of all organizations. One of the challenges is the communication between the KALGOV and the RMI government on the island. Delays in communication between the KALGOV and RMI government can lead to inefficiency with operations. Currently, it is not clear that the KALGOV has constant communication with its own employees, nor the RMI entities located on the island. This has caused confusion and inefficiencies. Communication also helps with performance. Standards and procedures must be communicated so that every employee understands their roles, responsibilities, and how to communicate up or down the organizational structure.

**Policy Enforcement** - Whether it is tax collection, building codes or immigration, there seems to be inconsistencies with enforcement of regulations on the island. In a thriving society, governments should have complete control over these operations. Part of this challenge is the varying authority between Ebeye and RMI.

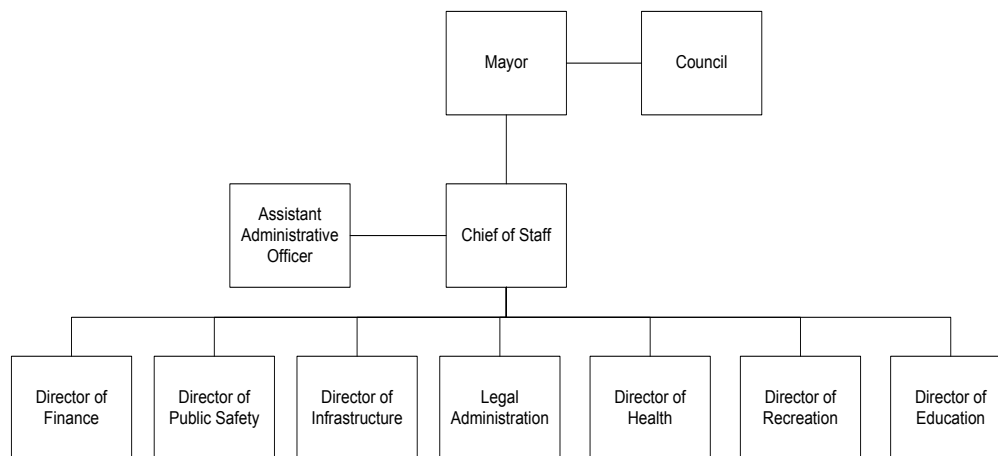
**Training and Education** - Capacity development is difficult unless the Ebeye leadership is adequately trained in city management skills. This will help develop a long-term approach that can lead to a sustainable community. Additionally, Ebeye needs trained engineers to lead its infrastructure sector.

## Solutions

Through careful research and analysis, the following proposed solutions are a starting point and not an end. Therefore, they can be adjusted accordingly as seen fit by the KALGOV and TLs. They are achievable and viable solutions to the current challenges.

**Organizational Structure** - One of the most important aspects of any organization and functioning government is a detailed authority structure. Every employee and entity should know exactly to whom they report to and who reports to them. Without this, it makes communication and courses of action difficult to execute and monitor. When a problem arises and resources are needed, a chain of authority is

a significant catalyst to finding and implementing a solution. It allows for ease of communication and reporting. The current structure is adequate but requires some refinement. Additionally the lower level structures need to be published to ensure everyone understands their role. Figure 2.9 shows a quick solution to the structural challenges. Some of the new positions are discussed in the following sections. A key feature is to have the council act in an advisory role. These elected officials will assist the Mayor in major decisions or as determined by the mayor and traditional leaders. The duties of these council members must be defined and made clear. The chief administrative officer should be converted to a chief of staff (CoS). The CoS has the role of implementing the mayor's policies and guidance down to the particular directors. He also acts as a buffer to help the directors with any issues or challenges. This allows the mayor to focus his attention on the strategic aspects of his job and leaves the minor details of the execution to the CoS.



**Figure 2.9 Proposed KALGOV's Organizational Structure**

For the director positions, roles and responsibilities should be created for every staff position within the government. This would also include how they will act and work with the CoS and Mayor. Their first line supervisor will be required to file performance reports multiple times a year, once a quarter is usually sufficient. The exact amount can be determined by the specific organization, but the intent is that each employee will be held responsible and accountable for his or her duties. In order to be evaluated, the employee must know what the job entails and what they are required to do. This includes all entities such as infrastructure, police, fire, health, education, finance, etc. There are two new positions that should be considered: Director of Health and Director of Education. These positions are discussed in greater detail in the later sections.

**Communication** - One of the most significant aspects of any successful organization is the ability to communicate up and down the chain of authority. It is imperative that the KALGOV communicate quickly and effectively within their structure as well as with the RMI government. Issues and problems will arise and there is a need to notify proper individuals. A suggested schedule proposed would mandate weekly updates for each entity. In these updates, performances, future projects, budget and current challenges are discussed as a minimum.

With open communication, a more efficient and productive environment is created. To further this, a detailed budget is essential. Every dollar that the KALGOV receives must be allocated effectively and it is imperative to the credibility of the government to show how they are providing for the community. Along with this, specific instructions to request funding are necessary. A common way is to create a form that entails all the necessary specifics of a request. The purpose of these procedures is to allow for timely response and transparency. At a minimum, the form must contain the total cost of the project, reasons for project with impacts on community, timeline and course of action, personnel needs and any other

pertinent information to the project. This will ensure that the KALGOV understands the reasons for the funds and has confidence in the execution.

The final piece of communication is emergencies. It is imperative that the KALGOV is prepared for any situation in order to protect its population. The remoteness of Ebeye and population density set the foundation for severe consequences if emergencies occur. At a minimum an evacuation plan for the island must be created as well as reporting procedures. GIS can be an effective tool for outlining and planning for these situations. These plans need to be devised by the Mayor, City Engineer, Public Safety Director and Director of Health.

1. Fire - Establish a specific evacuation route and plan that is created and published by the Director of Public Safety. The plan must be rehearsed by all necessary officials as well as the public so that the community understands the process. Currently, with the infrastructure condition and the wind, a fire could sweep across the island. There is a possibility that it could not be dissipated by the Fire Department, thus making evacuation essential. It is also a good idea to renovate the dock in order to support a large-scale movement off the island.
2. Natural Disasters - Establish a plan to shelter the population during natural disasters such as a typhoon. If evacuation is not needed, then buildings that are safe and secure for people to stay in can be designated. Every modern government has the responsibility to plan for all situations that could prove disastrous to the population.
3. Housing Number System - Establish neighborhoods with some type of identification system for tracking purposes. This system does not need to be complicated; however, it is imperative for a certain house or building to be classified and numbered accordingly. This will help with enforcement of regulations, mail, emergency situations and healthcare.
4. Census - Establish an efficient and accurate way to account for the population. There has been conflicting data with the census reports. This relates directly to the house numbering system. Establish a tracking mechanism that a government agency can use with ease.

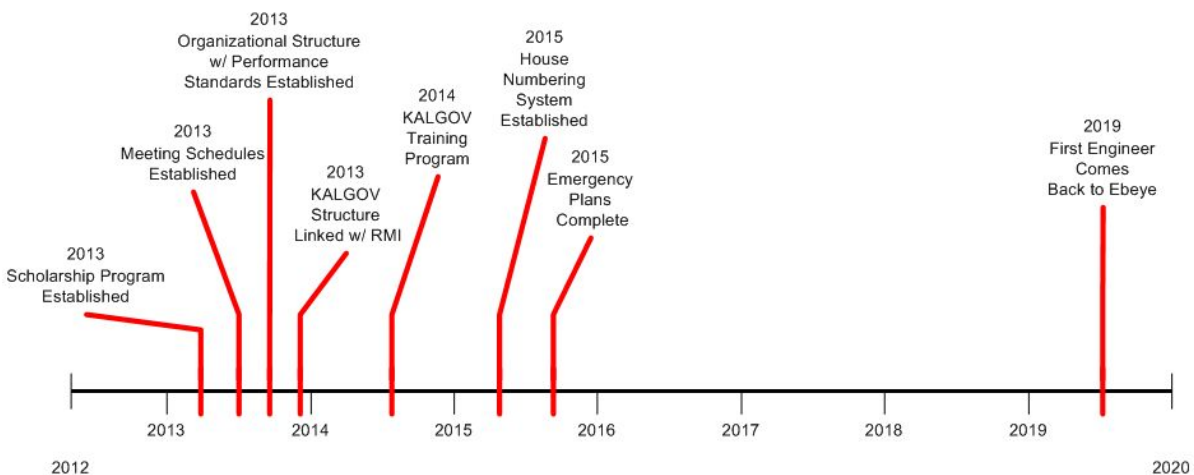
Policy Enforcement - Roles and responsibilities between the KALGOV and RMI seem clouded and unclear. This was apparent with KAJUR operations. When dealing with various issues regarding Ebeye development, there seemed to be a lack of communication. It was unclear whether or not a chain of authority is established. The KALGOV must develop and publish a hierarchy that defines all positions. This must be publicly published and shared with all entities. It is important for all citizens to understand who is in charge of making decisions and providing for the community for different situations.

A possible solution to improving operating efficiency is developing director positions that are responsible for working directly with and for the RMI organization. Specifically, there should be Directors of Education and Health. Also, the Director of Infrastructure should work as the city engineer. Changes such as these will significantly increase the operating capabilities for the KALGOV and provide the necessary services in a timely manner.

Training and Education - All government officials need to be trained in the fields of their expertise. The future of the community rests on their actions and decisions, so training is essential. It is fundamental to any organization that their employees are properly trained. There are a multitude of available classes that will help government employees be more efficient and productive. A possible solution is to develop a cooperative education program that sends them to the University of the South Pacific (USP), or other universities in the region. Examples of courses that could be taken are Development Studies and Governance, Land Use Planning, Management and Public Administration, Population and Demography, Information Systems, and Geospatial Science. The cost per credit hour at USP is estimated to be between \$200-300 (US). The effects of government employees gaining knowledge in their various fields would be great and immediate. This quick improvement could provide the use of technology such as GIS. Employees could learn how to operate the software (ArcGIS) to create data layers for housing, emergency plans, municipalities, pipelines and power lines. It is important to receive proper training and to learn the concepts and principals that can be applied to government positions.

The KALGOV needs to invest in the future by selecting promising young men and women to become engineers to work for the city. This would be a long-range goal. Promising students in high school would be identified and recruited. They would be provided scholarships to attend college and become engineers. Upon graduation they would be required to return to Ebeye and work for the city for a number of years.

The timeline in Figure 2.10 represents a suggested sequence of events that will set the KALGOV up for organizational and leadership success. It is important to note that projects are located on the bottom, while organizational tasks are on top. It is imperative that the organization be restructured in order to set the foundation for capacity development. All other solutions, in any aspect of capacity development stem from the government's operating capabilities. This is not an exact timeframe, merely a suggested course of action that can be used as a guideline.



**Figure 2.10** Government Solution Timeline

### Summary

In order for the KALGOV to become a learning organization, it must train and educate its government officials within an efficient authority structure. Long-term capacity development entails looking ahead into the future and acting upon what will support sustainability for the Ebeye community. This is driven by public policy. The KALGOV is currently below the standards for the baseline competencies, but it can improve tremendously with minor adjustments and investments. Educating and training the government to strategically plan for the future will help lead Ebeye in the right direction. The basis for all positive change in the community will stem from the KALGOV having open communication with RMI entities as well as a motivated and accountable workforce. This will allow for Ebeye to move towards a learning organization that adapts and overcomes various changes in the community and point towards self sufficiency in 2023.

### 2.2.2 Social Well-Being

The goals of these projects are to:

- Improve living conditions.
- Improve overall health conditions and the health of the population.

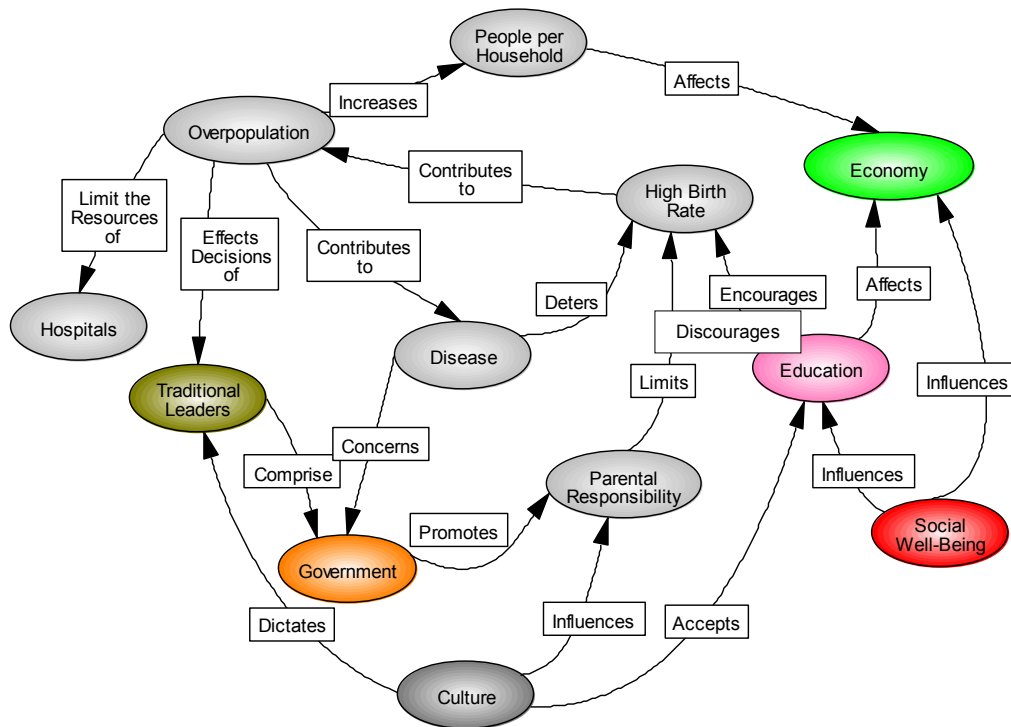
#### Current Conditions

Social well-being is defined as the quality of life of the average resident of Ebeye based on the quality of healthcare received and their ability to meet basic needs and their everyday living conditions. The aspects of social well-being are often difficult to quantify but deal directly with the satisfaction of a population with their living conditions.

The current social well-being is directly related to overpopulation and health. Overpopulation is a large problem because it affects a substantial portion of everyday life. One area where this is the most evident is the living space. Ebeye is only 80 acres and is attempting to house over 11,000 people. This has inevitably led to an average of 15 people living in each small household. As a result, the education and health systems are flooded with people and often do not have the capacity to carry out their most basic functions. In addition, Ebeye is faced with a very real threat of disease. Recently there have been outbreaks of tuberculosis and dengue fever as well as a brief epidemic of cholera in 2001.

It is also important to understand that overpopulation is caused by many different and varied factors. Immigration from other surrounding islands is an issue due to the proximity of Ebeye to USAKA. Also, the birth rate is extremely high for its small area and there is typically one baby being born each day. This trend has caused over fifty percent of the population to be represented by people under twenty years old. With the majority of the population less than twenty will cause significant problems in the future if not addressed. The island is not sufficient to support the projected population.

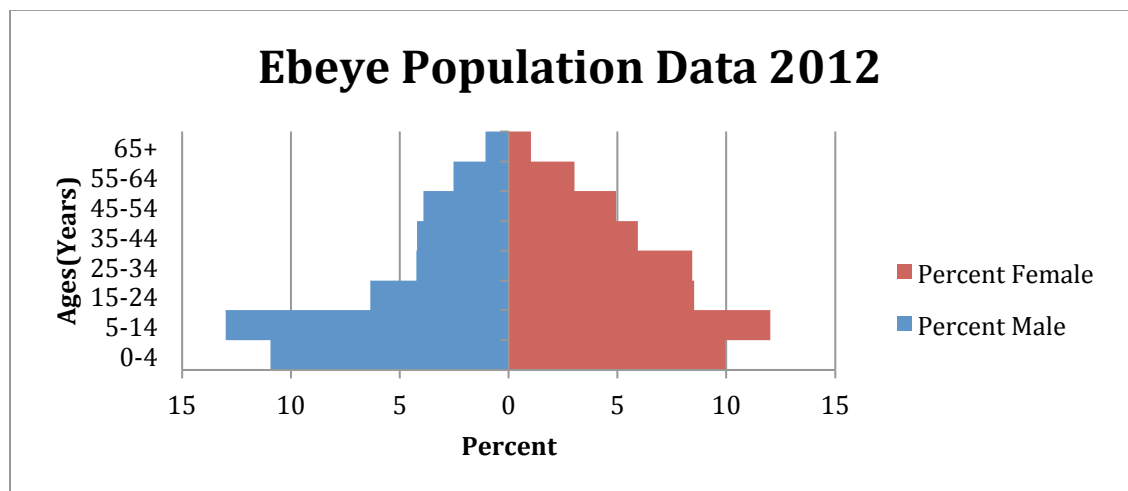
Figure 2.11 shows the correlation between aspects of society and their affect on social well-being. From the diagram, overpopulation is influenced by many areas of the Ebeye society. Also, the complex nature of the system shows that there are other aspects of society, such as government and religion, which play a significant role as well. This diagram demonstrates the complexity that the system creates and that many areas can be affected by an imbalance of another section. Each aspect of social well-being is influenced by a network of different factors that originate from a variety of systems. Through the identification of each contributing factor the systemigram allows us to identify how to influence positive change.



**Figure 2.11** Social Well-being Systemigram

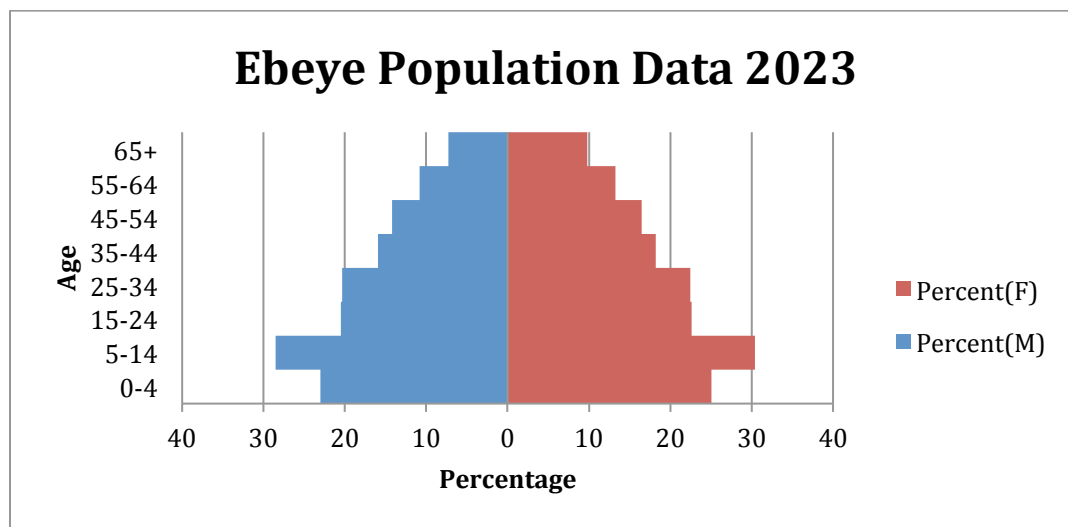
### Challenges

**Overpopulation** - The population is a significant strain on resources and facilities. The influx of people to this small community has caused an array of problems from insufficient infrastructure to overcrowding in the school system. With over half of the population under twenty (Figure 2.11), these problems will only increase if not sufficiently addressed.



**Figure 2.12** Ebeye Population Data - 2012

The population pyramid shown in Figure 2.12 portrays the current Ebeye population distribution. From this graph it is clear that the population of youth greatly outnumbers the middle aged and elderly. Based on the large proportion we can make inferences about the future need for employment and resources. The projected 2023 population ( Figure 2.13) is too large for the island to sustain and will not have enough resources to provide for the health and welfare of the population. Also, economic opportunities will be insufficient without industry growth because the working age population will grow too rapidly. Based on these projections, the overpopulation problem will only increase as the large population of youth moves into their child-bearing years. This population cannot be sustained. If left unchecked the population is projected to be 70,000 people by 2023!



**Figure 2.13 Ebeye Projected Population Data - 2023**

To create this data it was assumed that the birth rate of 337 and death rate of 49 deaths remained the same as they were in 2011. It was also assumed that emigration and immigration rates canceled themselves out in the calculations. Regardless, this simple conservative projection is probably the greatest threat to the future of Ebeye. The importance of addressing this challenge cannot be understated and it is hoped that the KALGOV and traditional leadership will act.

**Disease** - Although routine illnesses are to be expected within a high density population, there becomes a significant problem when it escalates into an epidemic. There are several instances in the last decade where disease has impacted Ebeye. Two recent examples are the cholera outbreak in 2001 and dengue fever this past year. Although these diseases are mainly caused by the prevalence of stagnant water, it is noted that the amount of stagnant water is largely caused infrastructure failure. The failing infrastructure is overwhelmed by the current population and therefore unable to remove the water effectively, thus creating unsanitary conditions. The population density provides little protection from disease and the hospital does not have the capacity if the majority of the population fell ill to disease.

**Unemployment** - The unemployment rate is an indicator for prosperity for a city. This statistic, coupled with the other determinants such as inflation, provide an assessment of a population's ability to grow and maintain self-sufficiency. There are many factors that could lead to a high rate of unemployment such as industrial and historical trends; however, in this case there is a direct correlation between overpopulation and the scarcity of jobs. More importantly, unemployment has psychological and social effects. The population that is unemployed is often idle for extended periods of time and can cause significant

psychological issues. Also, unemployment has been shown to cause depression and dissatisfaction. These health issues can take many forms based on the individual but are often related to characteristics of dissatisfaction such as depression and results in increased suicides. The high rate of unemployment is deteriorating the health of the society and will eventually cause more issues as the population increases and the opportunity for employment deteriorates.

Education - The education of children is one of the most effective ways to alter the downward trajectory of a society. If educated properly, the youth can build off the knowledge that currently exists within the culture while also using new information to overcome challenges. Children provide a hope that the current issues their city is facing may someday be resolved. They are a valuable resource that should not be overlooked. However, Ebeye currently does not have the capacity to educate its children effectively. The population of children is too large for the school system to accommodate. Although there is a network of public and private schools, these are insufficient in capacity and quality. Likewise, the education level of educators is not at the level required to promote better education. By having an insufficient education level for the educators you begin to see a cycle form where the education level of the students cannot improve and becomes worse.

Nutrition - Malnutrition is a common occurrence in many regions and is typically caused by either a shortage of food or a lack of proper nutrition. For Ebeye, it is the lack of nutrients that causes the most damage. Due to the lack of usable land for agriculture and the importation of the food supply, many of the inhabitants eat a large volume of highly processed food. Also, due to the unreliability of the water distribution there is a lack of potable water available. This type of diet leads to malnutrition and health issues such as diabetes. If this problem is not addressed it can have a significant effect on the productiveness and lifespan of the citizens.

Psychology – Due to the small island, the population is forced to live in close proximity to each other. As a result, many psychological issues occur. The high population density caused by overpopulation results in high stress which ultimately leads to physical and psychological disorders. The significant amount of isolation caused by living on an island and the closeness and lack of personal space can often lead to depression and higher rates of suicide. Additionally, high rates of suicide are often attributed to the social pressure of living in a matriarchal society. The pressure placed on the male population to please their female counterparts is often more than they can bare and causes them to reach a state of helplessness. These factors may also lead to other socially deteriorating habits such as alcoholism, smoking and drug use. The close living conditions coupled with the high rates of unemployment cause a serious threat to the overall health of the population.

Healthcare - The current healthcare system faces the challenge of providing for a large population with limited resources. Although viewed as one of the most efficient government entities, the hospital accommodates a population much greater than its maximum capacity. If the hospital is in need of supplies or assistance, they often reach out to USAKA for support. This type of support can take many forms but often deals with the treatment of critical patients and the resupply of necessary resources such as oxygen tanks.

General health care is limited as well. The number of people raises the need for a variety of health care resources to ensure a healthy population. However, the lack of resources based on only having a single hospital with a limited staff, poses serious issues. Also, despite the superior quality of the hospital compared to other infrastructure components, there are some remodeling and organizational difficulties (clinic and file organization) that must be considered. There also seems to be an insect problem in the hospital that requires effort to control.

## **Solutions**

Overpopulation - In order to manage the population, the KALGO must provide access to contraception and parenting assistance. The high birth rate requires immediate consideration if the island is going to be

able to support its population in the future. Increased awareness of population growth and sex education is needed. Currently there is family planning classes conducted periodically within the school system; however, these classes are limited and do not reach everyone. The focus of these classes should address the negative personal, health and societal affects of having a baby during the teenage years. Migration from Ebeye is also a consideration. Exactly how this should be accomplished is left to the KALGOV and TLs.

Another aspect of population control is organization. In order to solve housing issues, there must be a system devised to organize the living structures. To create a housing system each house can be numbered and zoned so that it is possible to see where there is the most overcrowding. Once this is completed it is possible to account for the number of people residing in each house and to track city population densities.

The age that women are having children in countries with a stabilized population are historically much higher than women in developing countries. This is based primarily on the ambition of the women to gain knowledge and enter the workforce. By educating women there will be a drive for the young female population to wait longer to have children, thus slowing the birth rate and bolstering a more educated society as a whole.

Disease - Currently Ebeye has one hospital which is able to treat the population on the island. However, expansion of the hospital is needed to support better treatment. The expansions should include addition of clinics located throughout so that there are medical facilities available to the population. The hospital should have branch locations at both ends of the island in order to reach the population more quickly instead of using the central location to store all supplies and equipment (Photo 1). These stations will allow quicker healthcare access.

Although the general cleanliness of the hospital is sufficient the infestation of insects in the hospital presents significant health risks. Insects can often lead to the spread of disease and therefore a concerted continued effort to eradicate insects should be adopted.

Unemployment - The unemployment rate is a significant factor in overall psychological health. With high unemployment, the risk of mental issues increases exponentially. However, the remedies for high unemployment are addressed in the economic section of the Economy Section 5.

Education - The KALGOV must establish an effective education program to educate the population on the numerous challenges facing Ebeye. This education system should include the effects of a growing population on wellbeing and capacity. There should be emphasis on issues such as depression and the other psychological issues that are caused by high density living as well as sex education and family planning. These programs should be accessible to all citizens and must emphasize the role that each person has in controlling the population explosion in the country.

Nutrition - A poor diet is one of the major contributors to diabetes. The current Ebeye diet consists of highly processed food that is low in nutritional value. By enriching the diet of all the inhabitants less medical conditions will arise. This can be achieved by importing healthier foods to the local businesses. The importation of fresh produce, fish and meat by grocery owners is vital to proper health. Without the access to proper food the nutritional condition cannot improve. Fish farms (to be discussed in the economy section) can also be used to improve health by adding another source of protein, which will help alleviate nutritional deficiencies.

Psychology – A person's psychological condition impacted by societal and environmental factors. The current psychological state can only be resolved as a product of other solutions. The changing environment that results from the execution of solutions surrounding health and economy will have a positive effect on mental and physical health and therefore allow the psychological problems to be

resolved. Additionally, the community needs an area for social activities and youth sports programs. The development/building of a recreational park will provide the youth a place to play sports and activities in a clean and open environment (Photo 2.1). The community will also have a formal area on which to congregate for community activities. This recreational park can go a long way in helping the island with some of the negative psychological issues that are the result of living in a confined environment.

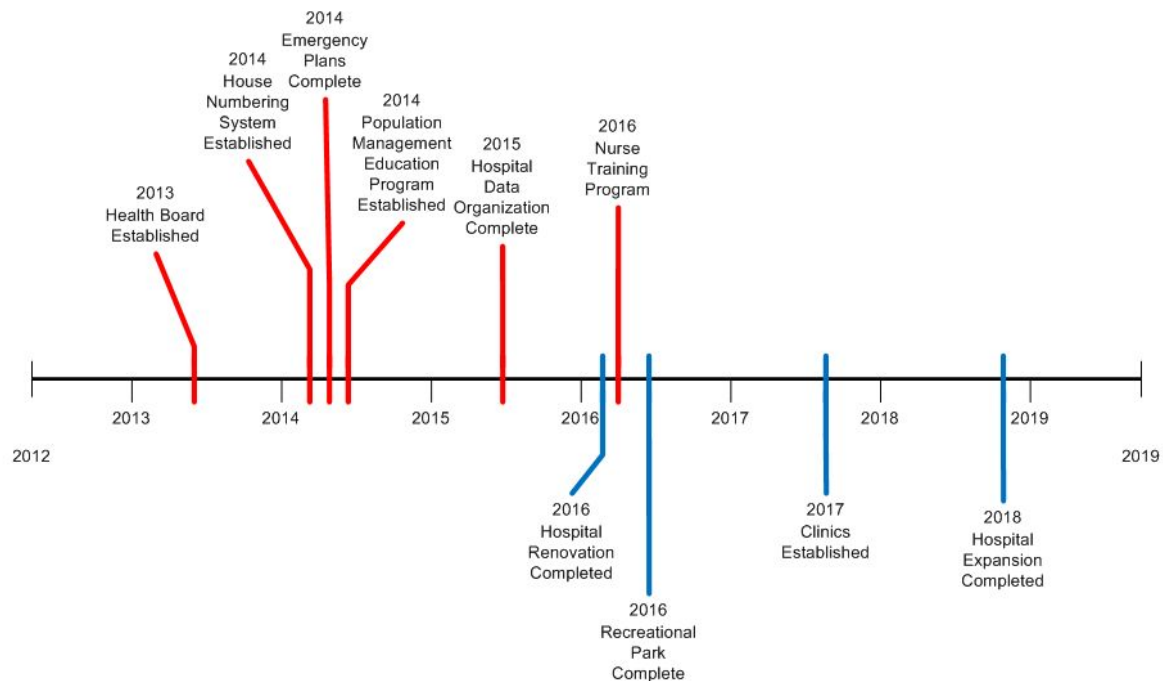
**Healthcare** - Due to the epidemics that have occurred and the need for a sustainable healthcare system to support the growing population, a health board should be established. The creation of an external entity to aid the health community is a valuable resource to help decrease the current health problems. This health board would consist of members of the community, health officials and other representatives that would aid the community in tackling current problems. This board would also address epidemics and emergency procedures for the island through a consensus on the best course of action. They would also be able to use the general knowledge in the members of the board to more efficiently solve problems and find the resourcing for their initiatives.

Nurses can reach and treat up to 98% of the population; however, they only have limited medical training. Many of the nurses have an equivalent of a high school degree and medical training from medical experts in the Ebeye hospital. However, there should be opportunities for Ebeye students to go to medical school in the Marshall Islands or abroad. Some potential schools for consideration for scholarship opportunity are the University of South Pacific and the University of Hawaii. These students could be provided scholarships and be required to return to Ebeye. The scholarship and education programs should yield anywhere from eight to ten doctors and more than twenty registered nurses. Also, to cope with the issues surrounding overpopulation there should be a pediatrics, oncology, and obstetrics and gynecology units. Also to supplement the knowledge of the nurses currently practicing on Ebeye they should have access to relevant medical updates. This should be in the form of training and reference material.



**Photo 2.1** Social Well-Being Proposed Projects

Organization of the hospital files would greatly benefit the doctors, nurses and staff. Currently the file room does not appear to have a distinct sorting system and is overflowing with patient files. Better organization would allow patients to be seen at a faster rate and treated more efficiently. This organization is most efficiently accomplished through the use of technology and online files. Many types of file organization programs are available. In its most simple form, an alphabetical filing system can be used and would require filing cabinets sufficient in size to hold all the files.



**Figure 2.14 Social Well-Being Solution Timeline**

Figure 2.14 identifies the tasks, programs and projects needed in order to promote self-sufficiency. This milestone list is not detailed and does not layout the detailed requirements for planning and implementing these projects and programs. The KALGOV and TLs should decide how to execute.

### Summary

The challenges that currently affect Ebeye will have very serious effects on the future if not address. The issues that have been raised due to overpopulation cause significant capacity problems that, according to population projections, will only get worse with time. However, by utilizing the organization and project goals outlined within this section many of these challenges can be remedied or reduced.

### 2.2.3 Economy

The goals related to the economy include

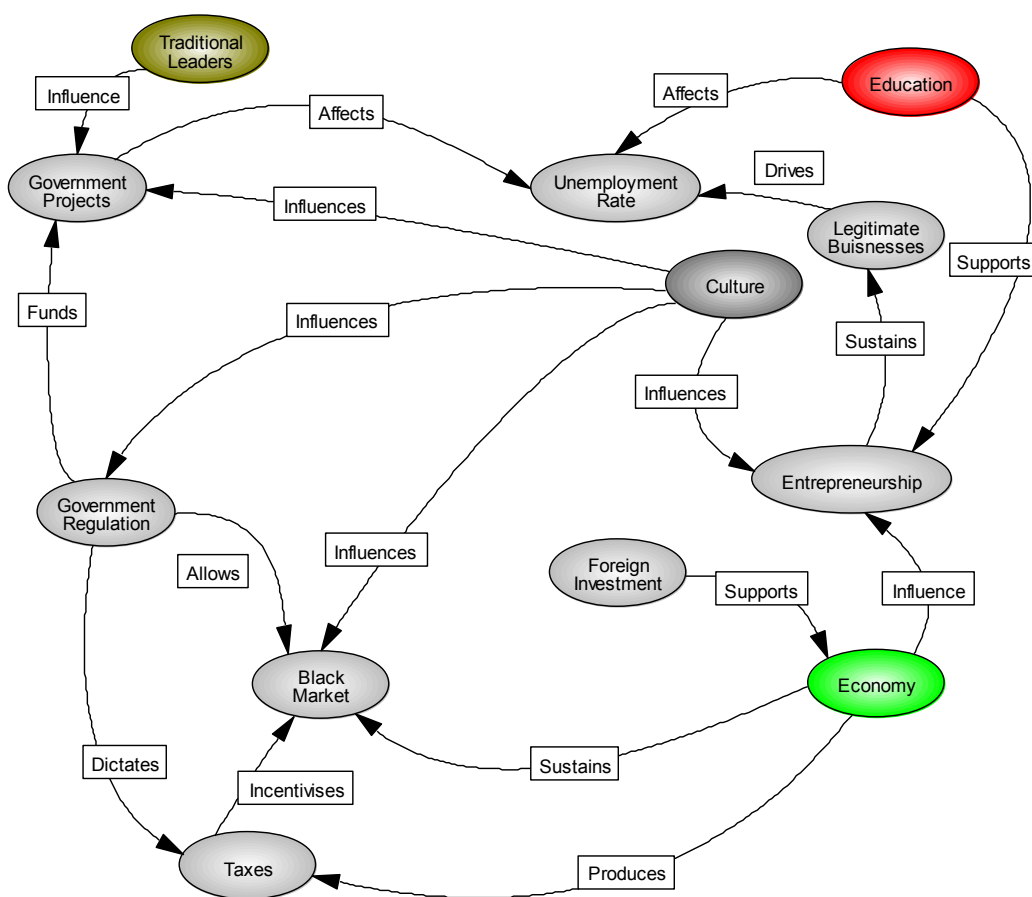
- Improve the economic foundation that will promote self-sufficiency.
- Improve the economic conditions for industries that will promote economic activity on Ebeye.

These goals were identified by stakeholders as the key to promoting a strong self-sufficient economy.

The economy represents the wealth and resources in terms of production and consumption of goods and services. The economic status of a country also serves as an indicator for other factors such as quality of life. A strong economy is a fundamental step for Ebeye on their path towards self sufficiency. Creating an economic atmosphere where businesses can flourish is the primary goal. Currently, Ebeye has several factors that inhibit this atmosphere from forming.

The relative location of Ebeye to the nearest international port causes shipping and transportation costs to be high. Therefore, black market tends to thrive due to these high costs, which further inhibits a strong economic atmosphere. This plan will recommend several government policies to promote economic development on Ebeye, both in the short and long term.

The systemigram in Figure 2.15 highlights the effect government policies have on potential business and foreign investment. By implementing policies that support entrepreneurial capitalism, the KALGOV will increase the overall performance of the economy. It is important to note that this atmosphere is also linked with having a stable infrastructure, an efficient government structure and a quality education. An efficient government is able to fund government projects that will lower the unemployment rate. Also, a quality education will make the average worker more desirable to employers, further lowering the unemployment rate. The KALGOV and TLs must adopt policies recommended to improve these features in order to see improvements in the Ebeye economy.



**Figure 2.15 Economy Systemigram**

The Ebeye private sector is represented by foreign investors establishing businesses. A member of the Ebeye Chamber of Commerce (ECC) stated that it was difficult to convince his board of directors to invest in Ebeye due to the high transportation costs and tax rates. The unemployment rate is extremely high at 30-35% of the population (Table 2.2). There are six registered businesses currently on the island, which when compared to the population of 11,000 means there is room for more. This low level of

entrepreneurship can have a negative impact on the economy. In economies with low entrepreneurship, it is easy for monopolies to form, which often lead to price fixing, higher unemployment and ultimately a higher cost of goods. In developing countries it often happens that salaried government officials, rather than private businessmen, provide leadership for economic change and innovation. The KALGOV and TLs have greater influence on the economy than private business owners. This point is crucial to understand when developing an economic roadmap because an economic stimulation plan taken on by the government is likely to be adopted by the people.

**Table 2.2 Ebeye Economy Data**

| Item                       | Value         |
|----------------------------|---------------|
| RMI Import Tax             | 8%            |
| Ebeye Property Tax         | 3%            |
| Sales Tax                  | 10%           |
| Unemployment Rate          | 30-35%        |
| Number of Major Businesses | 6             |
| Average Annual Salary      | \$4.50        |
| Minimum Wage               | \$2.50        |
| Tax Revenue                | \$700K-\$800K |

### Challenges

The major Ebeye economic challenges were identified through extensive interviews with stakeholders (Mayor, ECC, ect.) and research. Additionally, on the ground data gathered provided a realistic perspective to develop an economic capacity development plan.

**Transportation** - The transportation cost to ship products is very high. This is caused by the remoteness of Ebeye relative to foreign ports and MATSON's monopoly on shipping. Currently, business owners pay \$7,500 for a 40ft by 20ft freight and \$5,000 for a 20ft by 20ft freight. The costs are causing strain on business owners, which in turn cause them to raise the price of goods charged to the local population. This high price turn's potential customers away from buying from local business owners and encourages the black market.

**Capital** - It is difficult for entrepreneurs and business owners to succeed due to the lack of capital. Business owners are often funded by foreign investors, who are discouraged by the lack of revenue from businesses. From all indications, entrepreneurs have no means of attaining the initial capital needed to start a business.

**Black Market** - A great concern voiced by the ECC is the black market. Many people sell goods out of their homes avoid transportation costs and taxes. Evading these costs allows the black market to sell their goods at a much lower price than that of registered businesses, giving the customers a strong reason to buy from the black market. The black market takes potential revenue away from registered businesses.

**Taxes and Regulation** - The current tax collection system is often unchecked and unregulated. The ECC stated that it is often up to the business owner to turn in the taxes and that the Director of Finance (DoF) does not enforce collection very well. Also, the regulation of imports is unchecked. These two areas if left in their current state will lead to a loss of revenue for the KALGOV.

**Industry** - The industry on Ebeye is underdeveloped. There is great potential for a number of different industries to flourish but not yet developed because of the difficulty for businesses to start and succeed.

**Technology** - The technology needs updating. Investment in new technology leads to more efficient processes and reduced costs.

## Solutions

Through careful research and analysis the following solutions are proposed as means to solve Ebeye's economic challenges. These solutions are not an end all in themselves and can be adjusted for Ebeye's. These solutions are valuable and achievable.

**Transportation** – The KALGOV has a great influence on the economy. The KALGOV should develop a voucher system for reducing shipping costs. As an example, the KALGOV could offer one 40ft x 20ft freight container shipped to the island every six months paid for by the KALGOV or RMI government. The KALGOV should not reimburse business owners directly, but should reimburse the transportation company. This ensures that the money is used for the designed purpose. The expectation of the government is to see a direct reduced cost of goods by the businesses, which will have a positive impact on the economy. By taking some of the transportation costs off of business owners, the price of goods will decrease. This will have a reinforcing effect on businesses, as consumers will be more likely to purchase from registered businesses. This increase in revenue can lead to reinvestment by business owners. The details of this system are left to the KALGOV and TLs. It is important to remember that the DoF must work closely with the ECC to ensure a successful policy is implemented.

**Capital** - A micro loan is a small loan with a very low interest rate given to business owners or entrepreneurs to help their business. We recommend that the Bank of the Marshall Islands (BRMI) adopt these loans to incentivize entrepreneurship versus a direct dumping of funds. People start their business by finding their niche in the economy. In most cases, small entrepreneurs will not qualify for larger loans; therefore, the microloans are a way to allow the disadvantaged an opportunity to start a business. Again, this policy is much more desirable than direct funds into the economy. By tailoring these loans to specific business owners and entrepreneurs, the BRMI is giving people incentive to start their own business. Also, these loans will give people a sense of ownership of their business. It has been shown that people will payback these loans as ownership and personal responsibility become strong motivators. The effect of these two programs will have a direct impact on the Ebeye economy.

**Black Market/Taxes and Regulation** - The DoF is charged with the regulation of business, collection of taxes, and customs. The DoF should conduct regular meetings with the ECC as well as meetings with the Minister of Finance, RMI to ensure all policies are relevant and working. If they do not work different policies or programs should be implemented. The key is communication and vision.

- a. **Registering Businesses** - During the meeting with the ECC, several members were upset with the black market situation. They stated concern for the amount of people selling unrestricted goods and its effect on business. These black market businesses are often run out of a person's home. An individual will take goods bought elsewhere and sell them cheaper by avoiding transportation costs and taxes. Even though this is illegal, members stated that it still occurs quite frequently. By registering all businesses, the DoF will improve its ability to collect taxes. Also, registered businesses will create competition, thus lowering the cost of goods. Additionally, the voucher system mentioned earlier will help lower the cost of goods. By decreasing the difference in costs between legitimate businesses and illegitimate businesses, you can destroy the black market. By increasing the regulation on the black market, the cost of illegitimate goods will rise. When the costs of legitimate and illegitimate goods are comparable, the consumers will more likely choose the legitimate goods over the illegitimate goods. This process may take time, but by targeting black market goods and aiding legitimate businesses, the black market impact on the economy will decrease significantly and allow better prosperity.
- b. **Tax Collection and Regulation** - The DoF is responsible for regulating the tax collection of all of businesses and imported goods. The ECC stated that tax collection of businesses on the island was unchecked. Also, the process that checks the goods being imported to the island should be randomized. Members of the ECC stated that many shipments went unchecked. This process should be as random as possible to ensure that no illegal goods are being transported on the island. Tax collection is a very extensive and complicated process. To

- ensure that new businesses are buying into the tax collection process, the government should try a diminishing return policy for new businesses. The first year of tax collection, the business will receive 100% of its taxes paid back in either the form of vouchers or money. The second year, the business will receive back 90% of its taxes paid. This reduced rate continues until the government is receiving all of the tax for that business. This process has two purposes. First, it will make businesses eager to pay taxes, as they will be receiving a refund. It will help business owners buy into the tax collection process and get their businesses registered in the tax collection system. Second, it will help new businesses become established in their early years, which is often where businesses fail. The DoF and ECC need to have constant communication during the implementation of the new tax collection program. This will ensure that the program is helpful to business owners while the government is still receiving revenue from taxes.
- c. Chamber of Commerce (ECC) - The ECC provides a gauge on how the policies implemented are affecting local businesses. The KALGOV and ECC need to work together for a better Ebeye. Communication and cooperation are essential in this endeavor. We recommend that periodic meetings be established to ensure all policies are discussed. Although members of the ECC are businesses owners and are biased, their input is important for the DoF and must be taken into account.

Industry - All of Ebeye's potential industries require adequate docking facilities. Therefore, it is essential that the dock is improved and expanded. The reconstruction of the dock is further discussed in the infrastructure section of this paper. The location of these industry solutions are in photo 2.

Ebeye's remote location provides an opportunity for ecotourism to flourish. The initial overhead of ecotourism is moderately low. The largest barrier for this industry is the USAKA housing policy placed on the splash islands which states that no permanent buildings can be placed on these islands. An agreement between USAKA officials and the KALGOV can be negotiate to allow ecotourism buildings, such as bungalows or primitive housing, on these islands. Ecotourism is a form of tourism that takes the traveler to a remote area and allows them to experience a scenario where they must live off the land or at least have minimal accommodations (Photo 2). Additionally, learning and living the customs of the Marshallese is another appeal that will draw people. This type of tourism leaves little to no environmental impact because of the low volume of ecotourists at one time. This industry requires very little overhead and the potential revenue is extremely high. A department of the KALGOV should regulate this industry. One of the major tasks is an agreement with USAKA. Once established this industry can provide a number of jobs for Ebeye.

The main cost associated with ecotourism is not the infrastructure, but the flights to and from Ebeye. Many members of the ECC felt that the airport officials had restrictive of policies and would detour tourism from growing. A potential solution to the airport on Kwajalein is establishing an airfield on Ebeye. On the lagoon side of the causeway, a small airfield could be built to transport foreigners to Ebeye (Photo 2). The details of the airfield will be further discussed in the infrastructure portion of this paper. This would provide manual labor jobs as well as maintenance workers for the local population. Until the airfield is complete, the DoF should address this situation with USAKA officials to see if an expedited or quicker process to bring tourists in can be adopted.

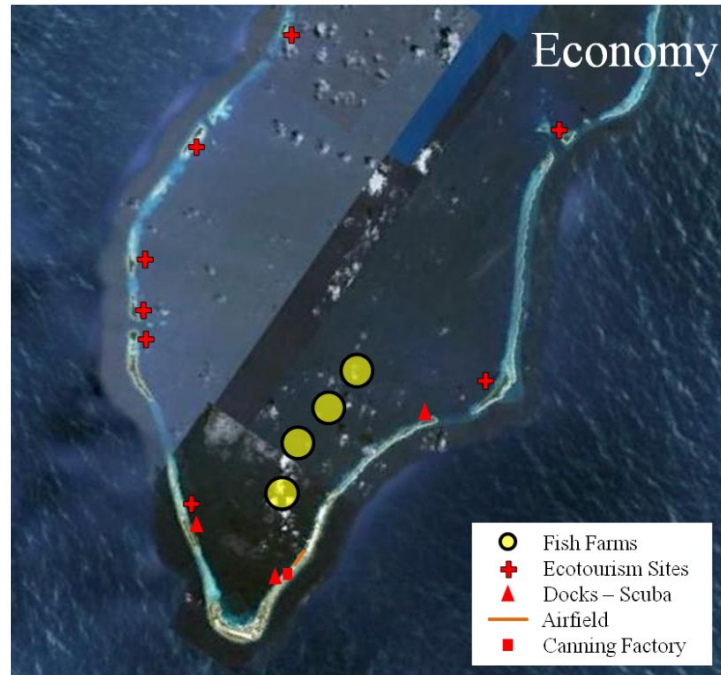
Many members of USAKA scuba dive during their free time. They stated that the diving sites near Ebeye rank among the best in the world. Ebeye's clear waters and diverse aquatic life make scuba diving a valuable industry. Scuba certification is a prerequisite for potential entrepreneurs in this field, which could be learned on Kwajalein. The microloan should be used to pay for the costs of equipment. An improvement of the dock is required as well. Ebeye offers a world class scuba experience and the potential for this industry cannot be understated.

Ebeye is rich with history. Of significance is its role during WWII, which could be an opportunity for economic growth. Foreigners interest on the history of Ebeye could be capitalize on by offering tours to ship wrecks, plane crashes, structures and other notable areas. This area could be paired with scuba tours to make the experience more exotic and desirable. A four-day trip that involves a fishing trip and scuba tours of the WWII historic sites could be quite successful. A government travel agency would need to work with foreign travel agencies to ensure flights are booked, events are planned, living arrangements are made, and a friendly atmosphere is created.

Over the past five years, fishermen have seen a drop in the fish population. A major concern with developing the fishing industry is the fishing rights are currently sold to Japan, which is a major stumbling block for commercial fishing. These rights should be renegotiated so that the RMI can fish its own waters. It is important that fishing is regulated by the government to ensure that overfishing does not occur. Fishing not only provides an opportunity for local businesses, but also an opportunity to bring foreigners in for fishing trips. Fishing and scuba paired together provides a desirable trip for foreigners (refer to Photo 2)

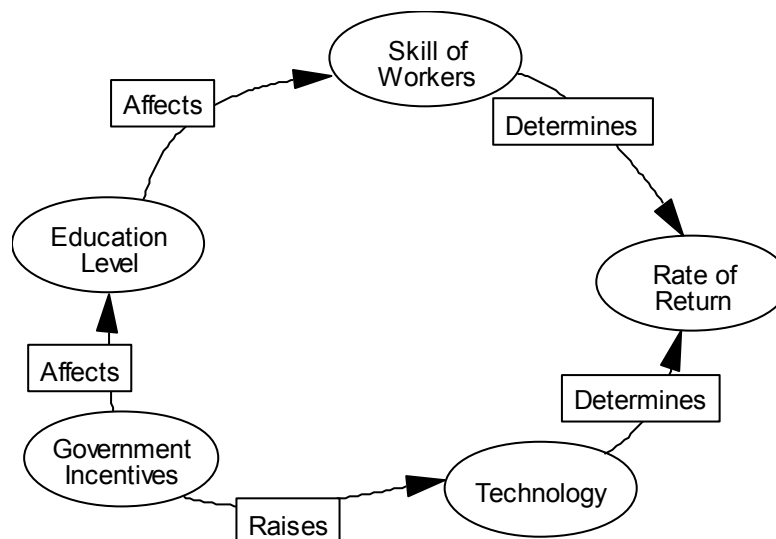
With Japanese and Marshallese fishermen fishing the same waters, it is important to consider the fish population. Fishermen on Kwajalein have complained about the population of fish decreasing drastically over the past five years. One way to mediate this issue is the establishment of fishing farms on the lagoon side of Ebeye. This is a relatively cheap process that could avoid the drastic repercussions of overfishing. We recommend that the KALGOV and TLs seek to develop movable fish farm on the lagoon side of the island. A movable fish farm will avoid the long-term environmental damage caused by having a fish farm in one location over a long period of time. This government project would enhance the fishing industries on Ebeye while providing jobs for workers charged with its maintenance. It will also provide much needed fresh food for the people. In the social well-being sections, nutrition is cited as a major problem for Ebeye. Fish farming can help here (Photo 2.2).

Ebeye has the potential to perform manual labor needed in other countries. One example of this is the canning needed by Japan for their fishing industry. The fishing rights could be re-negotiated with Japan so that a portion of their catch is taken to Ebeye to be processed. By building a canning factory on Ebeye, the Japanese could take their catch to Ebeye to be canned and then shipped back to Japan. This would provide a source of income for hundreds of workers needed to run the factory. Additionally, it could cut costs of the Japanese fishing companies because of the lower wages and lower transportation costs. We believe that this is a very realistic possible future industry for Ebeye because of its potential gains for both parties involved. The large population indicates Ebeye is a natural selection for this industry (Photo 2.2).



**Photo 2.2** Economy Proposed Projects

**Technology** - As stated before, the government has a large effect on the economic status. The KALGOV should subsidize the use of new technology on the island. The KALGOV should help registered businesses adapt to newer technology due to its lasting effect. If you refer to Figure 2.16, you can see that technology directly correlates with the rate of return of a business. If the business uses a high level of technology, then a high rate of return is typically associated with that business.

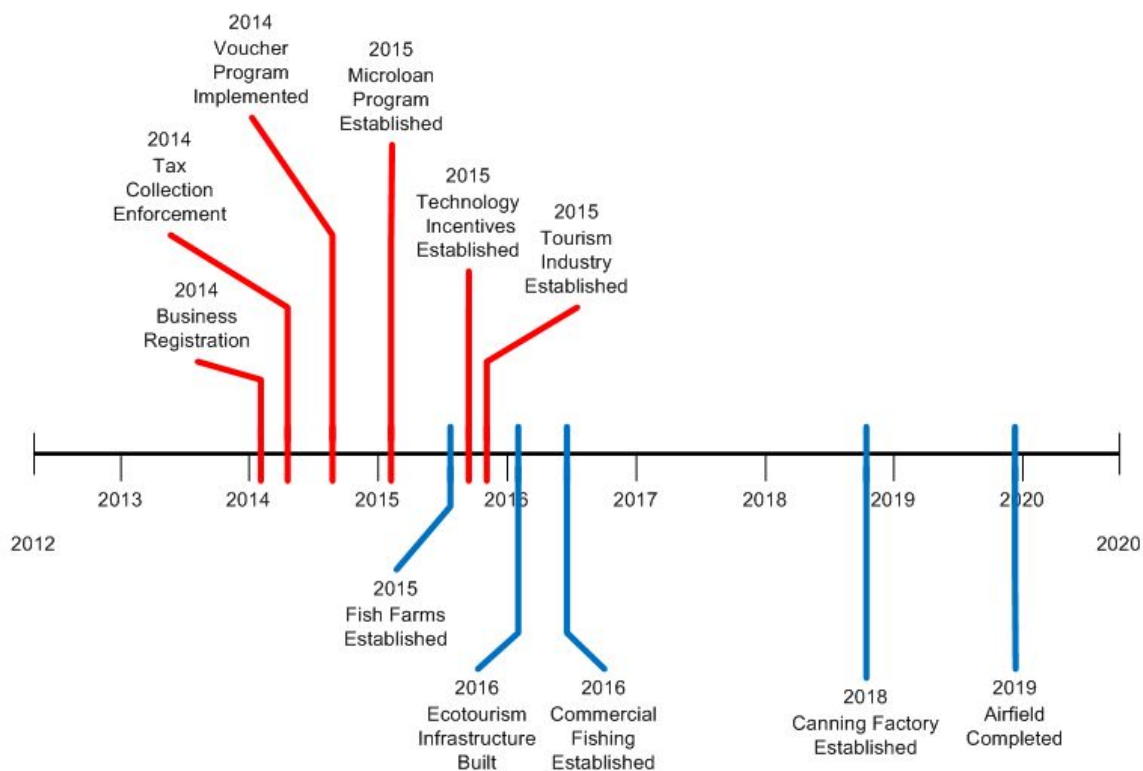


**Figure 2.16** New Technology Incentives

The KALGOV incentives placed on the use of new technology lead to a higher rate of return for businesses. Ultimately this will create a lower cost of goods for the consumers. A business could bring

their desired technology requests to the DoF. The DoF would then determine the cost of these new technologies. After a cost has been agreed upon, the KALGOV would issue vouchers or tax incentives to the business. These create incentives for businesses to bring new technology onto the island. New technology will increase efficiency and lower the cost of living and goods. It is important that the DoF reviews the request to ensure that the technologies have legitimate reasoning.

The timeline presented in Figure 2.17 provides the solutions needed for economic success. The projects recommended are placed on the bottom of the timeline, while the organizational tasks and programs are placed on the top. The organizational tasks taken by the government need to be addressed first in order to set the conditions. These solutions will have a lasting effect on establishing a strong economic atmosphere. This is not an exact timeline, but a suggested course of action to be used as a guideline. The details on how to implement these suggestions are left to the KALGOV and TLs.



**Figure 2.17 Economy Solution Timeline**

### Summary

For the economy on Ebeye to succeed, the government must create a strong economic atmosphere as soon as possible. Creating the voucher system as well as issuing microloans will have a lasting effect on the economy. Increasing the variety and amount of registered businesses on the island will lower the cost of goods while bringing in more revenue. The DoF will need to regulate businesses to ensure the government isn't losing revenue on tax collection and imports. The black market influence can be reduced once the prices of legitimate and illegitimate businesses are comparable. These features will help the economy, but to sustain the economic growth a strong government and educated population are needed. A strong government will be able to implement the policies needed to successfully create a strong economic atmosphere. An increased level of education of the population will aid in the sustainment of this atmosphere as well as reducing the unemployment rate. These factors play a serious role in the success of the economy. A strong economy will improve the quality of life and is an essential step in Ebeye's self sufficiency in 2023.

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#### 2.2.4 Education

The educational goals include:

- Provide no less than an adequate high school education to the Ebeye children.
- Provide opportunities for higher learning outside of high school.
- Increase the capacity of public schools.
- Increase qualifications and training of public school teachers.

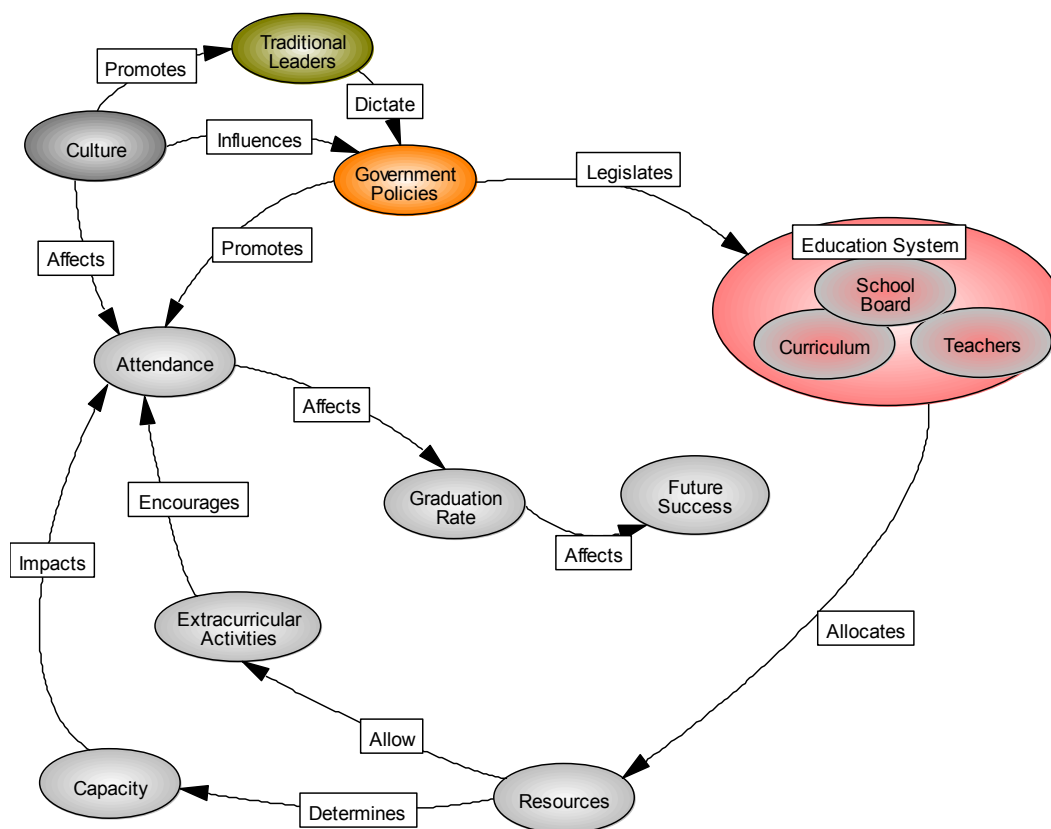
These goals were formed as the basis for a quality education. They are not complicated or unachievable and can be accomplished within a generation. The end state is to educate every child in the community and provide them the opportunity to excel afterwards.

Education is one of the primary components of a successful society. In order for a population to be self-sufficient, it must be able to properly educate its youth. Education plays a vital role in economic, cultural and industrial development of a society. A child receiving a quality education is imperative for long term growth. Table 2.3 shows the current condition of the Ebeye education system. Quality education includes many different factors, the most significant being the curriculum. A capable teaching staff, productive learning environment and fair evaluation are other supporting elements to a quality education system. Figure 2.18 illustrates the systemigram for the functioning education system of Ebeye.

This Systemigram seeks to highlight what drives and what supports the overall goal of educating the youth, which in turn will lead to future successes. Attendance rate drives overall academic success of students and should be focused on in order to improve overall education. KALGOV policies influence these as well as extracurricular activities. It is noted that the addition of a school board can help lead the system and make effective decisions. This entity must be composed of officials as well as community members with the overall focus on the future success of the children.

**Table 2.3 - Education Data**

| Education                                     |              |           |
|-----------------------------------------------|--------------|-----------|
|                                               | Value        | Condition |
| <b>High School</b>                            |              |           |
| Number of Schools                             | 1            | poor      |
| Number of Students                            | 420          |           |
| Percentage of Students with Textbooks         | 85%          | poor      |
| Number of Teachers                            | 16           | average   |
| Trained Teachers - College Degree             | 14           | average   |
| Average Number of Years of Teachers Education | 4 (college)  | good      |
| Average Salary of Teacher                     | \$18,000.00  | good      |
| Number of Classrooms per School               | 12           | poor      |
| Average Attendance Rate                       | N/A          |           |
| <b>Middle School</b>                          |              |           |
| Number of Schools                             | 1            | poor      |
| Number of Students                            | 406          |           |
| Percentage of Students with Textbooks         | 90%          | average   |
| Number of Teachers                            | 15           | poor      |
| Trained Teachers - College Degree             | 50%          | poor      |
| Average Number of Years of Teachers Education | 10 yrs total | poor      |
| Average Salary of Teacher                     | \$7,000.00   | poor      |
| Number of Classrooms per School               | 8            | poor      |
| Number of School Buses                        | 0            | poor      |
| Average Attendance Rate                       | 80%          | poor      |
| Maximum Capacity                              | 300          | poor      |
| <b>Elementary School</b>                      |              |           |
| Number of Schools                             | 4            | good      |
| Number of Students                            | 1000         |           |
| Percentage of Students with Textbooks         | 70%          | poor      |
| Number of Teachers                            | 35           | average   |
| Trained Teachers - College Degree             | 70%          | poor      |
| Average Number of Years of Teachers Education | 10 yrs total | poor      |
| Average Salary of Teacher                     | \$8,000.00   | average   |
| Number of Classrooms per School               | 34           | good      |
| Number of School Buses                        | 0            | poor      |
| Average Attendance Rate                       | 85%          | poor      |
| Maximum Capacity                              | 750          | poor      |
| <b>Private Schools</b>                        |              |           |
| Number of Elementary                          | 6            | good      |
| Number of High School                         | 4            | good      |
| Number of Students                            | 1211         |           |
| Percentage of Students with Textbooks         | 45%          | poor      |
| Number of Teachers                            | 76           | good      |
| Trained Teachers - College Degree             | 39           | average   |
| Average Number of Years of Teachers Education | 12           | average   |
| Average Salary of Teacher                     | 4,693        | poor      |
| Number of Classrooms per School               | 11           | average   |
| Number of School Buses                        | 1            | poor      |
| Average Attendance Rate                       | 82%          | poor      |
| Average Capacity                              | N/A          |           |



**Figure 2.18 Education Systemigram**

One of the top priorities of all the Ebeye stakeholders is education. The Ministry of Education (MoE) expressed major challenges with attendance rates, textbooks, capacity, and a lack of qualified teachers. All of this is reinforced in the current data. The problem is not a facility or lack of teacher; rather it is one of transportability. The public high school is located on Gugeegue. The causeway to Gugeegue's condition renders it impassible by school bus, hindering attendance at the public high school. The bottom line is that there are a multitude of children that are not being properly educated by enough qualified teachers. This is a huge concern for the long-term sustainability and self-sufficiency.

### Challenges

The severity of the education situation cannot be understated. Interviews with the Mayor, MoE and ECC expressed major concerns with the education system, and after seeing the amount of children that were not attending school, it was clear that there are unique challenges. However, it was also evident that the leaders of the community were on board to address the issues and help develop a workable plan.

Curriculum - Education is one of the most important aspects of any thriving community. Simply put, an educated youth leads to a competent workforce. In order to accomplish this, the children must be prepared for all facets of future work. With this, a school board and a curriculum must be established that will set them up for success. Currently, there are discrepancies in the material that is being taught as well as the resources needed. There are also varying opinions between community leaders on whether English is being taught in the school system early enough. The MoE expressed a plan to limit the English instruction in order to allow for the proper development of Marshallese literacy. On the other hand, business owners and other industries expressed a need for young workers to be taught English earlier so

that they can be employed more efficiently. It will be up to the community leaders, the school board, KALGOV and TLs to decide the proper timeframe for English education.

Attendance - In order to receive a quality education, children must attend school. It is clear that attendance is a challenge. It should not be acceptable to consistently miss school and something must be done.

Extracurricular Activities - Currently, there are not sufficient extracurricular activities in which children participate. Programs such as sports, art, theater, etc are critical to a child's development and sense of belonging. They learn qualities such as leadership, teamwork, competitiveness and work ethic. This can enforce attendance rates, since kids can only participate if they attend school. Quality recreational facilities need to be built in order to facilitate various sports and activities that can include all children.

Qualified Teachers – Another aspect of a quality education is qualified and trained teachers. Feedback from those interviewed indicated teachers do not know the material and are not properly equipped to teach the children. There is a lack of programs available to continuously bring in new qualified teachers which lead to a cyclical deterioration of quality education.

Resourcing - A major challenge is supplying all the children, faculty and facilities with the proper resources and materials. Part of a quality education is providing the necessary tools and equipment to help set the foundation for learning. The lack of textbooks, technology and classroom equipment poses a major threat to the education of the children. Part of the issue lies within the acquiring the resources since there is no set of procedures for requesting funds or materials.

## **Solutions**

After analyzing the current data and the concerns addressed by community leaders, the following short and long term solutions are presented to help solve these challenges. These are not an “end-all” list and should be viewed as a general roadmap. However, they are potential solutions that can be instituted in order to help Ebeye establish a quality education system. It is up to the KALGOV and TLs to implement these solutions.

Curriculum – Establish a functional school board. This is a common practice that successful school systems use. A school board seeks to monitor and ensure the schools are providing a quality education as well as solving problems. It should represent government officials, school employees, business owners and members of the local community. This would diversify the group and ensure that the children of Ebeye are receiving a proper education. The ESB should provide oversight to all public and private schools in Ebeye. In order to make sure that all children are getting the education they need, it is imperative that schools cooperate and follow the guidelines presented by the ESB. The responsibilities and duties of the ESB, at a minimum, are to review the current curriculum, determine necessary resources needed for the schools, and request funding and to provide input to the MoE, KALGOV and TLs. The ESB should also select graduates for various programs as well as any major rewards that are given. The institution of the ESB will provide the necessary oversight to ensure that a proper education is given to the children of Ebeye. The details of the roles and responsibilities of the ESB are left to the KALGOV and traditional leaders.

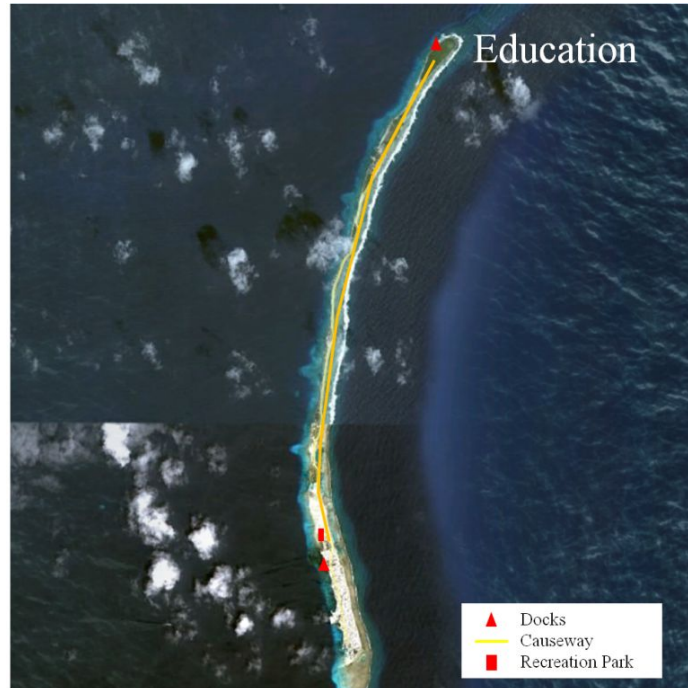
It is necessary to create vocational education programs that will seek to instruct the youth in fields that are directly applicable to their futures. Examples of different fields include welding, electrical, plumbing, carpentry, mechanic operations, and fishing. This will help to provide Ebeye with skilled workers right out of high school if they choose not to seek further education. Local workers can be hired to teach in their field as well as USAKA volunteers. These programs will provide the children with skills that can lead to a more self-sufficient community.

If the KALGOV, TLs and ESB feel that English needs to be taught early, then the Head Start program should be instituted. English classes begin as early as 1<sup>st</sup> grade. It is important for the youth to understand both the local language and English. This will ensure that they are prepared to be successful after schooling. It also opens the door to be educated in an American school, such as USAKA or in the US.

The development of a proper curriculum is not too difficult. Once set, the curriculum can help facilitate the core standards that will require transition through the Ebeye school system. Numerous resources are available that can help develop a curriculum tailored for Ebeye. Some books that can be helpful are *Schooling by Design: Mission, Action and Achievement* by Grant Wiggins and Jay McTighe, *Concept-Based Curriculum and Instruction* by Lynn Erickson, and *Mapping the Big Picture: Integrating Curriculum and Assessment* by Heidi Hayes Jacobs. Adoption of the new curriculum can be the first collaborative effort of the ESB, MoE, KALGOV and traditional leaders.

Attendance - One of the key components of a successful education system that retains qualified graduates is mandatory attendance. Elementary school through high school should be mandatory for every child. It cannot be optional and it is the KALGOV's responsibility to ensure that parents are abiding by these regulations. It is a waste of resources and hinders growth for the community if children are not adequately educated.

Another step is to campaign for perfect attendance to resonate with the population, while stressing the importance of going to school. Attendance should be taken in the morning and after lunch to ensure that children are staying in school for the entire day. Another idea is to create a reward program for the students who have superior attendance relative to their peers. Offer rewards to the child as well as the parents. The opposite spectrum would be to create punishments for those who do not attend school. Possible courses of action include fining the parents of children for missing a certain percentage of classes. Also, paving the causeway to Gugeegue, renovating the Ebeye dock and building a new dock at Gugeegue will ensure there are adequate means available for children to get to school (Photo 2.3). Either way, it is imperative to fix the attendance problem. Details of these initiatives are left to the MoE, the ESB, KALGOV and traditional leaders. Educating the youth is arguably the most significant aspect of long term sustainability of a community.



**Photo 2.3 Education Proposed Projects**

Extracurricular Activities - Another way to make it enticing to attend school, as well as build stronger relationships within the community, is to create extracurricular programs. Simple leagues, activities and games can be organized and executed without too much overhead. Examples of sports that are easily resourced are swimming, baseball, soccer and basketball. Additional school organizations can be formed such as student council, theatre, art, etc. It is possible to seek out USAKA volunteers for help with creating these programs or leagues.

In order to help facilitate these activities, a recreational park needs to be constructed. A venue that is attractive and encourages children to be active is essential. Space is limited on the island, but it is necessary to provide an area where children can participate in productive activities. The park does not need to be excessive, but it must provide an area that children will enjoy participating in various activities that keep them productive. A possible venue is the current dump site (Photo 2.1). The conversion of this site is identified and discussed in social well-being and infrastructure.

Once leagues and programs are established, teams are formed in order to participate in dynamic competitions. Private and public schools are included in order to gain maximum participation. By making it mandatory to attend school on the day or week of the competition, it will help promote attendance as well as create the camaraderie that is essential for young children. There are many social benefits from programs such as these and children learn to work together towards a common goal, which will help make them better citizens.

Qualified Teachers - It is imperative to provide schools with well-trained teachers that are prepared and equipped for producing capable graduates. A short-term solution is to keep seeking volunteers from USAKA to teach at night or on the weekends. Another possibility is to hire professionals to come to Ebeye and train the current teachers. This can be done until a long-term solution is implemented. There is also the possibility of hiring foreign teachers to come and teach on Ebeye. Both programs are decent solutions and are encouraged. The opportunity to visit a remote island and teach in a tropical paradise is

very tempting for many young educators. Continue to seek out foreign recruitment, but be weary of the costs that are associated with this plan.

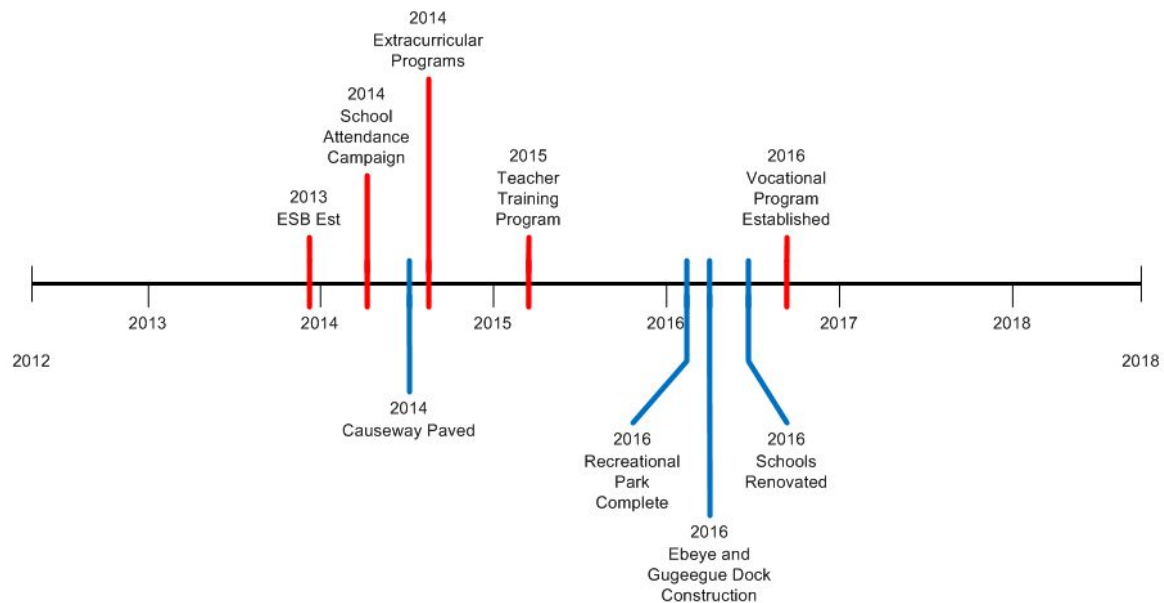
A long term solution that accomplishes educating and employing local graduates is the optimal plan. To do this, recent graduates that demonstrated a motivation to succeed would be sent to receive a college education and then brought back to teach. There are education programs offered by USP. Every year, graduates could be selected and sent to be trained for various levels of education. Scholarships could be given by the KALGOV and TLs or the RMI Government. Upon completion of the necessary training, 5-8 years of service should be mandated in order to fulfill the obligation under the scholarship. After their service, they would be free to continue teaching or seek other careers. This simple program would create a continual pipeline of qualified teachers that are from Ebeye and would also set the foundation for a productive, working career.

Resourcing - The ESB will work with the MoE, KALGOV and TLs to develop a comprehensive list of required resources. Once developed, the ESB can officially request resources. A complete system for determining and allocating resources is needed. The more efficient the process becomes, the quicker problems can be solved and projects can be executed.

There is an issue with the school structures on Ebeye. One of the top priorities for the ESB is to work with the Ebeye city engineer and establish a plan for renovating old and building new schools. The causeway to Gugeegue must be repaired and maintained in order to allow easy access to the high school.

Currently, there is roughly a 21:1 student-teacher ratio and 12 children per classroom (Table 2.3). These numbers indicate that the current issue does not necessarily fall into the number of facilities or teachers available. The more imperative aspect is making sure that the conditions are set for a proper education. Specifically, this refers to the classroom materials and qualified teachers available for each student. Each child needs to be properly equipped with sufficient materials, technology and classroom conditions in order to take full advantage of their education. This should be the top priority.

Figure 2.19 highlights the various program solutions (red) as well as the projects (blue) that should be completed in order to create an environment that educates the Ebeye children. It should be noted that this is not an exact solution, but a guide to implementing the necessary courses of action. The establishment of the ESB is a top priority so that the proper leadership and efficiencies can be instituted. This will set the conditions for all the other solutions to be executed in a timely manner. How and when these programs and projects are implemented is left to the KALGVO and TLs.



**Figure 2.19** Education Solution Timeline

### Summary

The Ebeye education system is one of the top concerns of everyone interviewed because it is not adequately preparing the youth for a successful future. There are several aspects to providing children with a proper education: proper curriculum, attendance, extracurricular activities, qualified teachers and proper resourcing. All of these issues can be fixed with some reorganization and funding. The top priority should be to establish the ESB in order to lead the system and make the necessary decisions that will give the Ebeye children an opportunity to set the foundation for future success. Following this, children must attend school and be taught by qualified teachers. With these facets accomplished and the support from the KALGOV and TLs, Ebeye will be able to educate its children and provide a skilled workforce.

### 2.2.5 Infrastructure

The infrastructure goals include

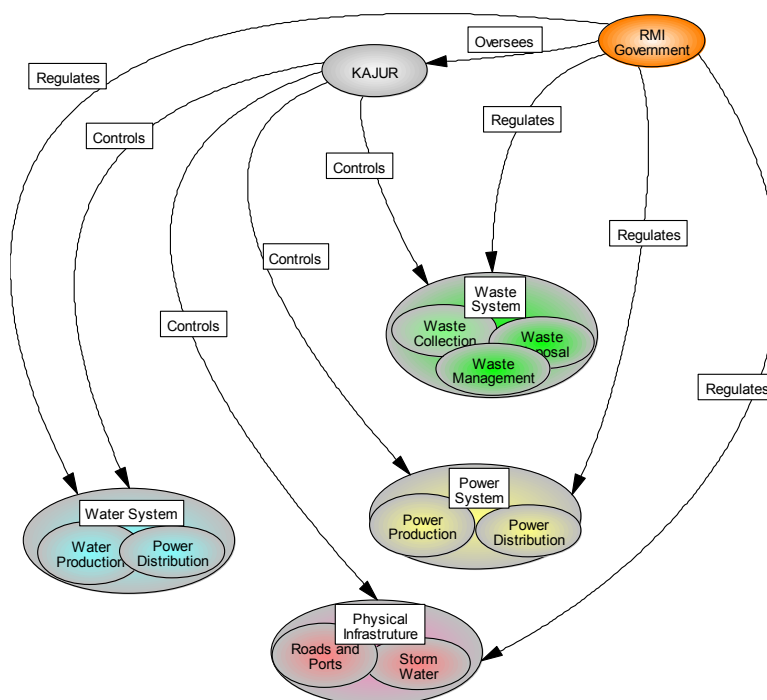
- Improve infrastructure to a functioning level.
- Establish a sustainable maintenance programs for facilities.
- Develop solutions for infrastructure self sufficiency by 2023.

A primary goal for the infrastructure is to improve to the point where the population is provided with satisfactory service. Some existing utilities like the sewage treatment plant are not operational, so strategic investment in these systems is an important first step. Additionally, maintenance is a constant challenge due to the corrosive nature of the environment. A systematic maintenance program is essential to the long term health of infrastructure systems.

The term infrastructure refers to physical structures and facilities. Infrastructure consists of: sewage, water, electricity, solid waste and roads and grounds. The quality of a community's infrastructure significantly affects the quality of life of its inhabitants. Economists that specialize in the economic growth of developing nations find that investment in infrastructure components such as electric power, water supply, and sewerage generates rates of return between 16 and 70%. This means that every dollar invested in infrastructure raises the overall economic output of the country by \$1.16 to \$1.70. In other words, a working infrastructure is key to the economic viability. Additionally, the importance of infrastructure is based on human psychology. Maslow's Hierarchy of Needs states that basic biological are the lowest level of desires that affect human motivation and must be addressed before other issues like health, property, or even love and friendship can be addressed. Infrastructure is important because it directly addresses the most fundamental human needs. Infrastructure is a key component of this comprehensive plan whose importance cannot be understated. To provide a valuable product to the people of Ebeye that addresses their important needs, this comprehensive plan must include a focus on infrastructure.

Figure 2.20 is a systemigram of the current infrastructure systems on Ebeye. The systemigram shows the relationships between the different infrastructure areas on Ebeye and the infrastructure divisions that control them. The RMI government oversees the work of the Kwajalein Atoll Joint Utility Resource (KAJUR), which controls each of the five major infrastructure systems: sewage, water, electricity, solid waste, and roads and grounds. The diagram shows the causes and effects as well as the interrelationships that each infrastructure system has on the others. For example, the electrical system is used directly by the population but is also an input to the fresh water production system.

In April 2010, a team of engineers from the U.S. Army's 565<sup>th</sup> Engineer Detachment analyzed the major utility systems of sewage, water, electricity and trash (SWET) on Ebeye. The SWET report summarized the current conditions on the island and proposed 34 recommendations to bring Ebeye's infrastructure systems to operational status. While the SWET report is a valuable resource that provides the technical details necessary to improve many areas of Ebeye's existing infrastructure, for the purposes of this plan it is incomplete. In addition to the current physical infrastructure, there are several other aspects of the infrastructure that require attention. This plan assumes that the SWET report recommendations will be implemented by the KALGOV.



**Figure 2.20 Infrastructure Systemigram**

## Challenges

The challenges presented in this section come from interviews, research, and official documents related to Ebeye's infrastructure situation. Infrastructure failure was a major topic in several interviews with stakeholders. Additionally, the Improvement Needs for the Kwajalein Atoll's Residents and Environment (INKARE) report was created by the RMI Ministry of Foreign Affairs in August 2010 that lists and describes various requests. This document is referenced and provides solutions to the several needs of our stakeholders. Last, the SWET report is a valuable resource for information related to Ebeye's sewage, water, electricity and solid waste systems and the Ebeye 2023 Master Plan supports the projects and programs suggested in the report.

This plan seeks to supplement the findings of the SWET report in three ways: 1. Recommend changes in the organizational structure of Ebeye's infrastructure management; 2. Synthesize the recommendations of the SWET report by isolating the most important projects and providing a feasible timeline for completion; and 3. Provide additional suggestions for infrastructure projects that are geared toward Ebeye self sufficiency by 2023.

**Organizational Structure** - The infrastructure systems on Ebeye demand the oversight of a City Engineer and organized staff. Currently, the local government does not have effective control and management of the main infrastructure authority, KAJUR, which is controlled by the national government. Infrastructure management reacts to problems as they arise. There is no maintenance plan that focuses on preventive measures to ensure infrastructure viability. This absence of long term planning is an outcome of poor organizational structure. Currently, Geographic Information Systems (GIS) is not used to control and monitor the infrastructure systems.

**Water** - The salt-water system on Ebeye is insufficient to meet peak flow demand. The current system is capable of about 700 gallons per minute (gpm), which is one quarter of the required 3,020 gpm. The fresh water production capabilities are also insufficient. The population requires 773 gpm of fresh water production to satisfy peak flow demand, while the system produces at most 243 gpm. The distribution of water to the population is inadequate, due to low line pressure. The data that summarizes the current condition of Ebeye's water production and distribution is displayed in Table 2.4.

**Table 2.4 Water System Data**

|                                                 |                 |
|-------------------------------------------------|-----------------|
| Daily Demand                                    | 100,000 gallons |
| Storage Capacity                                | 750,000 gallons |
| Maximum Production                              | 350,000 gpd     |
| Peak Demand                                     | 3,020 gpm       |
| Percentage of houses with rain collection       | 35%             |
| Number of drywells                              | 40              |
| Percentage of houses with potable water service | 73%             |
| Average Water Pressure for Households           | very low        |
| Percentage of homes with saltwater distribution | 65%             |

**Sewage** - The sewage treatment plant has not been operational since 2005. As a result, sewage is released into the lagoon about 500 feet off of Ebeye's shore, which poses significant health risks related to E Coli bacteria. The health of the population is an important component of social well-being and is addressed in the social well-being section. Lack of maintenance on key parts of the sewage treatment system has led to the need for a complete overhaul of the system. The oxidation ditch is still in good condition, but brush rotors, motors, mounts and rotor seats need replacement. Each of the four lift stations are in need of some form of improvement. Another component of the sewage system that is in need of repair is the storm water system. The storm water system consists of trench drains, dry wells, and ocean outfalls that divert surface water into the ocean in the event of a storm. The findings of the SWET report indicate that none of the inspected trench drains and dry wells are operational because they are clogged with sand. The ocean outfalls are either clogged or eroded due to corrosion. The data that summarizes the current condition of the sewage system is displayed in Table 2.5.

**Table 2.5 Sewage System Data**

|                                             |                 |
|---------------------------------------------|-----------------|
| Treatment Plant Status                      | Non-operational |
| Percentage of Sewage Treated before dumping | 0%              |
| Typical Retention Time                      | 0 hrs           |
| Population Capacity                         | 0 people        |
| Oxidation Ditch Capacity                    | 650,000 gal     |
| Number of lift stations                     | 4               |
| Condition of lift station pumps             | Insufficient    |
| Infrastructure Pipe                         | Unknown         |

**Solid Waste** - The solid waste management system on Ebeye is lacking in several areas. The single truck used for trash collection is in poor condition and about half of the trash containers need replacement. The medical waste on Ebeye is currently disposed of in an unsafe manner. The dump located at the north end of the island poses safety, health and environmental concerns. While the collection of trash is done in an effective manner, the disposal of trash is disorganized and inefficient. The solid waste data is in Table 2.6.

**Table 2.6 - Solid Waste Management System Data**

|                                            |                    |
|--------------------------------------------|--------------------|
| Square Footage of Landfill                 | 5.3 acres          |
| Amount of Waste Dumped per day             | 13333 lbs (tons)   |
| Average Amount of Waste per person per day | ~ 1 lbs/day/person |

**Electricity** - Electricity generation and distribution is the most functional utility system on Ebeye with generator capacity sufficient to meet population demands. Minor improvements are needed, as well as an effective maintenance education and training program to protect against the corrosive environment. The main challenge related to electricity is developing energy independence through alternative sources of power. The data that summarizes the current condition of Ebeye's electricity system is displayed in Table 2.7.

**Table 2.7 Electric System Data**

|                                                       |                                                  |
|-------------------------------------------------------|--------------------------------------------------|
| Generators                                            | (3)1.2 MW generators                             |
| Distribution Network                                  | 8.5 miles of underground cables & overhead lines |
| Substation                                            | 1                                                |
| Percentage of Public Facilities with Electrical Power | 100%                                             |
| Number of Blackouts per Year                          | 2011 (9) Blackouts                               |
| Average Length of Blackouts                           | 25 mins                                          |
| Average Peak Demand                                   | 2100 kW                                          |
| Average Output Capacity                               | 3600 kW                                          |
| Percentage of Houses with Electrical Power            | 98%                                              |

**Roads and Grounds** - The causeway that connects Ebeye to Gugeegue is important not only for general transportation between the islands, but for the commute of children to school every day. The disrepair of the causeway is a major challenge, given the long-term importance of education to Ebeye. Additional challenges in the area of roads and grounds include the main road on Ebeye, public lighting, and docking.

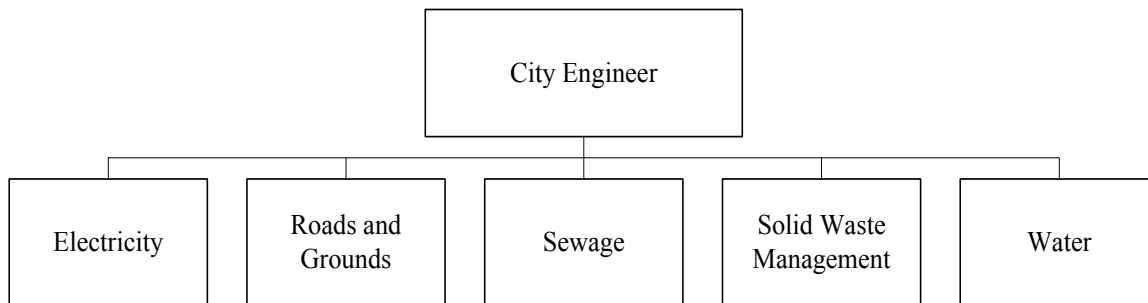
### Solutions

Through careful research and analysis, the following solutions are proposed. These solutions are not an end all in themselves, they can be adjusted as the KALGOV and TLs see fit. The ideas presented here are achievable and viable solutions to Ebeye's infrastructure challenges.

**Organizational Structure** - An important area of planning for the successful achievement of Ebeye's long-term infrastructure goals involves the development of a city engineer position and appropriate staff. The role of the city engineer would be oversight of both the improvement and maintenance of the infrastructure systems. It is recommended that a Director of Infrastructure be established that would oversee KAJUR. This office would be headed by a professional engineer and have a staff that would support and provide direction to KAJUR. The qualifications of a city engineer include graduation from a program in civil engineering or a related engineering program and education in Project Management. Also, the city engineer should have several years of field experience and be familiar with Ebeye laws, regulations, and culture. Due to these requirements, it is recommended that a capable individual is selected for the position and sent on a government scholarship to attain the proper management education for the job, incurring a commitment to service over a period of time following his/her return. The USP has programs in land use planning and public sector management and offers classes in project management. This education would provide necessary intellectual capital and lead Ebeye's infrastructure efforts into the future. This is a long-term goal that will take several years to accomplish. In the near term, a city engineer with civil engineering experience should be hired who meets the qualifications. Additionally an appropriate staff to support the engineer should be hired. There is a possibility of

interning with the Director of Public Works (DPW) at USAKA. The current DPW could provide the proper guidance and expertise to help in the short term.

The city engineer would manage a structured organization with oversight over several branches of infrastructure. A recommended structural organization is shown in Figure 2.21. The current infrastructure sectors of electricity, sewage, water and solid waste are well established. The new roads and grounds sector is established to take care of all necessary maintenance of roads, lighting, docks, parks, etc. The roles and responsibilities of all these sectors must be identified and codified as determined by the KALGOV and TLs. It cannot be over emphasized that the proper organization with detailed roles and responsibilities is essential to solving long term challenges.



**Figure 2.21** *City Engineer and Staff*

The city engineer would be responsible for the hiring and management of each of these divisions, as well as a team of general maintenance workers that could be used at the discretion of the city engineer to address issues that arise in any area. The city engineer would be responsible for the hiring of all workers, as well as contracting for outside expertise when necessary. The hiring process involves determining the job requirements of each type of worker, deciding how many workers in each system are necessary, determining the wages of the workers and recruiting and training workers.

A training program is required to train workers in each of their specific areas. Training is the foundation to improving and maintaining the infrastructure and an investment in people is an investment in the future. Some areas will be able to utilize the experience and expertise of more senior staff to train new employees, while other areas will require sending newly hired workers to school to attain necessary education and certification. For maintenance on high level technology like the electric power generators or the reverse osmosis units, highly capable high school students should be recruited for a program that would send them to a university or trade school on scholarship to earn an appropriate technical certification. They will have a commitment after earning their certification and returning to Ebeye.

During the initial phases of infrastructure improvement, the city engineer's efforts would be heavily focused on completion of projects and program implementation. Some of his primary tasks would include deciding which suppliers to purchase the necessary equipment from, ordering the equipment, training personnel, financing the operations, and overseeing the successful completion of the projects throughout their duration. At the same time, the city engineer and his staff must develop and manage a maintenance program for the existing infrastructure systems, so that the infrastructure systems on the island remain operational. This is probably one of the most critical aspects of infrastructure success. The effective use of GIS and MS Project Management are examples of technology that can assist with long term preventive maintenance.

Investment in infrastructure maintenance has been shown to produce returns on investment up to four times greater than investment in new infrastructure projects. An effective maintenance program is especially critical due to the salty and humid conditions that accelerate the corrosion of infrastructure

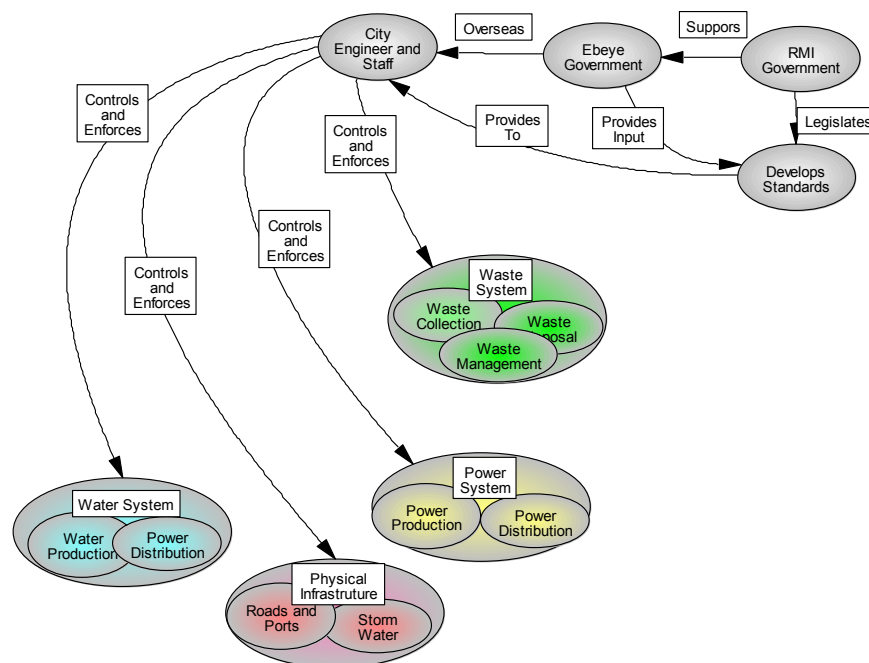
systems. This maintenance system must be developed by experts in each of the divisions of the city engineer's staff. Standards will be established for the frequency of testing and measures of performance that ensures the satisfactory performance of each system. Also, a schedule is developed for the replacement of existing parts as they wear. An investment must be made in gathering enough replacement parts to handle possible failure of each system. A tool that will aid the city engineer and his team in their maintenance responsibilities is the use of GIS technology to track deficiencies and monitor maintenance of the infrastructure systems. One such system is ARC GIS, which is a known industry standard. GIS capabilities will also allow the city engineer to monitor the service being provided to customers and government buildings. Several staff members should be trained on this technology.

An updated systemigram is shown in Figure 2.22 and models the Ebeye infrastructure systems. This differs from Figure 2.16 in that the KALGOV oversees the city engineer, who is the main authority over all of the infrastructure systems, instead of the RMI government overseeing KAJUR.

Water - Solving the water issues on Ebeye will involve executing three of the projects detailed in the water section of the SWET report:

1. Increase fresh water production to 773 gallons per minute (gpm) capacity.
2. Increase salt water production to 3020 gpm capacity.
3. Extend salt water and fresh water distribution systems.

The SWET report gives a detailed analysis of the tasks that these projects entail. Current conditions only satisfy 23% of peak demand. Completion of these projects would allow water production to meet the peak daily flow demand. Extending the water distribution systems to the north end of the island is an important goal for improving the quality of life for the population there. An alternate option for increasing water storage capacity and line pressure is the installation of elevated water storage tanks on the north, central, and south portions of the island. These systems require little maintenance and will increase the head of the water system, and thus increasing line pressure. It also provides for a less maintenance intensive solution for the future (Photo 5).



**Figure 2.22 - Updated Infrastructure Systemigram w/City Engineer**

One way of ensuring that the population will always have the necessary water for survival is increasing the use of rain water catchment systems. Research by the RMI Economic Policy, Planning, and Statistic Office (EPPSO) has indicated that only 35% of Ebeye homes have a working rainwater catchment system and many are in disrepair. The implementation of centrally organized mandatory island-wide installation of water catchment systems should be considered. Monetary incentives could also be considered to induce households to install these systems. This would provide an alternative source of water to families. Ebeye EPA workers should conduct inspections on both public and private systems to ensure water remains potable and safe.

Sewage - Fixing the sewage treatment plant will be a seven-step process, as detailed in the 2010 SWET report and is a long term goal. A more immediate and pressing need is a system to treat sewage now. A temporary solution is the installation of a packaged sewage system. It is recommended that a packaged activated sludge system be used. These systems are a viable short-term solution for sewage treatment and range in capacity from 500 gallons per day (gpd) to 100,000 gpd. Full restoration of the sewage treatment plant will take many years, so a packaged system will serve as a temporary solution until the main sewage treatment plant is completed. It is strongly recommended that the KALGOV and TLs make arrangements to install one of these packaged plants as soon as possible. The sewage system collapse is the most critical health issue on Ebeye (Photo 5).

Repairing the storm sewer system is critical as well. The first step in solving this problem is simply removing the sand from the clogged drains, drywells, and outfalls. In the long term, the storm sewer system will need to be improved by conducting a topographical survey of the island and resetting the storm sewer infrastructure so it can function properly. Combined with a proper maintenance plan, this solution will provide an adequate storm sewer system indefinitely.

Electricity - An important infrastructure task related to the electric utility system is performing regular proper maintenance. Beyond this, several improvements are suggested. First, a 1.2 MW standby generator should be installed as insurance measure against failure of the primary units. Additionally, the power plant switchgear and overhead lines must be replaced, as referenced in the SWET report. This is a short term solution to the electrical needs of Ebeye.

A long term solution to energy production is the installation of solar panels and wind turbines. Using solar energy to take advantage of the nearly constant sunlight exposure and become energy independent is an investment in the long term self sufficiency of Ebeye. The Marshall Islands receive about 2,480 hours of direct sunlight per year. Sunlight is highest in August at around 7.5 hours per day and even in November the region receives almost 6 hours per day. The geographic location of Ebeye makes it a prime candidate for economically viable solar energy.

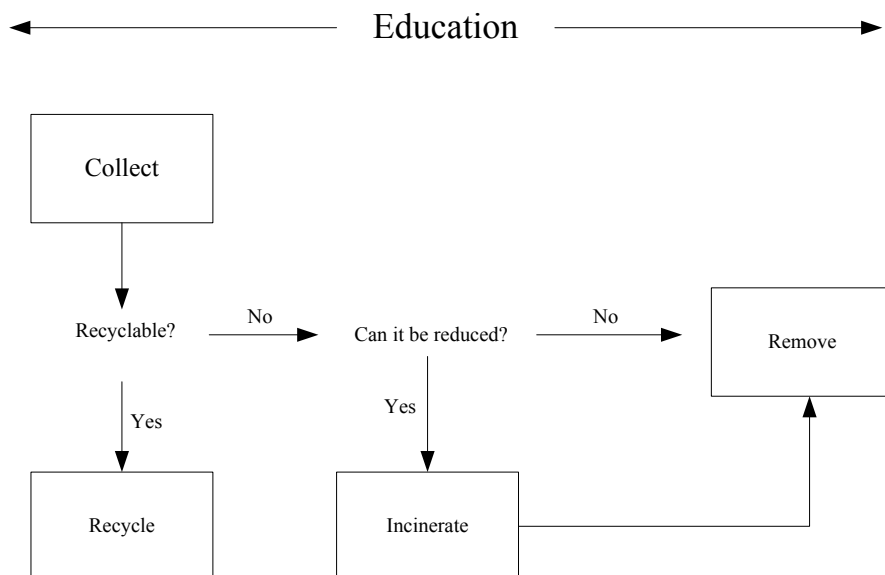
Wind turbine systems could also be utilized to gain energy independence. Wind power is a largely untapped source of energy that has been increasingly used across the world. The daily maximum wind speed ranges between a high of 16 mph in March and a low of 12 mph in October. Data from the US Department of Energy indicates that this range of wind speed would correspond with marginal to good wind energy potential. Energy grants from the RMI or US governments could help fund the initial investment in these projects. The use of solar and wind power on Ebeye will achieve the goal of energy independence by 2023 (Photo 2.4). The current generators would remain as a back-up system.



**Photo 2.4 Infrastructure Proposed Projects**

**Solid Waste** - The solution to the solid waste management problem is modeled in Figure 2.23. The first step in the process of developing an effective waste management system is the education of both the public and waste management workers. The Ebeye population should be taught the benefits of recycling and the proper way to utilize the waste management system. Waste management workers must be trained on proper recycling, incineration and waste removal. The second step in the waste management process is the removal of reusable waste for recycling. A waste recycling center should be built where recycled material is separated, bonded and stored for future removal (Photo 2.4). A proper recycling effort on Ebeye will aid its effort in self sufficiency. After the recycling process, the solid waste that can be effectively reduced in volume through incineration will be incinerated. This requires the installation of an effective incinerator. Also, medical waste should be incinerated on-site at the hospital. After incineration, the remaining material must be removed from the island instead of discarded as is the current practice. A barge should be used to transport the final waste material to a dumping site a safe distance off-shore.

Important improvements to the landfill are recommended in the SWET report; including grading and compacting the land fill area, installing a drainage system, and installing a perimeter fence. However, it is recommended for Ebeye 2023 that the current landfill be dismantled and converted into a recreational park (see social well-being and education) or the site of the canning factory (see economy). The intent here is that all waste is removed from the island.

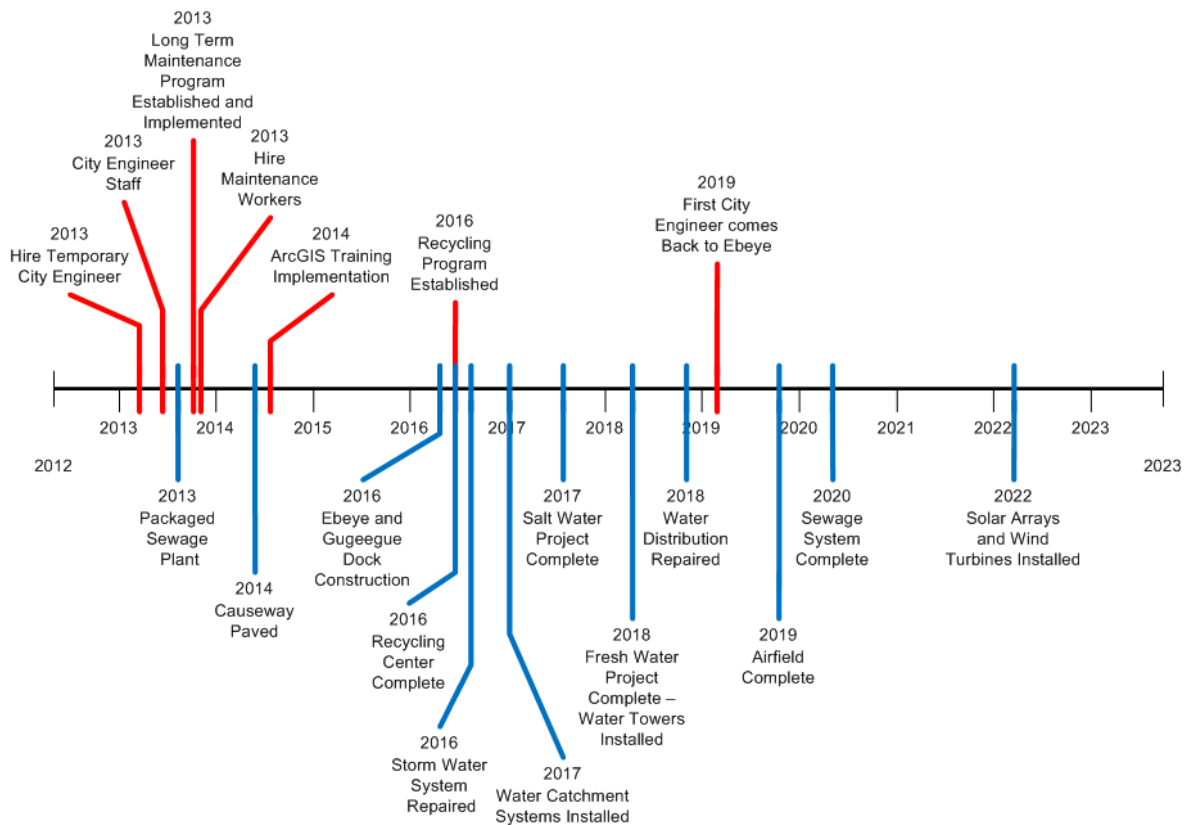


**Figure 2.23 Solid Waste Management Process**

**Roads and Grounds** - The primary focus of improving the roads and grounds system on Ebeye should be restoring the serviceability of the causeway to Gugeegue. Stakeholders have remarked on the importance of the causeway to “enable the provision of water, sanitation, and electricity” to the population of the two islands. Additionally, the local high school is on Gugeegue and the relative disrepair of the road can dissuade children from making the trip to school. Additionally, the causeway could act as an emergency airstrip if it were properly paved and maintained. Other considerations include pavement of all the roads on Ebeye as well as installation of public lighting fixtures.

Restoration of the main dock has also been mentioned by Ebeye leaders as a potential project because it would increase the access to the island. Additionally, an improved dock can also provide economic alternatives as discussed in the economic section. Pairing this main dock with a dock on Gugeegue would allow for water travel between the two islands that could help improve Ebeye’s school attendance problem. Finally, there is the possibility of building a small airfield on the lagoon side of the causeway. This would increase access to Ebeye as well as provide jobs and economic development. The rationale for this project is detailed in the economic section.

This timeline shown in Figure 2.24 represents the suggested sequence of projects and program milestones that will set up Ebeye for infrastructure success. The projects are located on the bottom, while the organizational programs are on top. The timeline is not rigid and the exact dates are not set; however, this timeline will provide a general framework for self sufficiency by 2023. This timeline does not include all the projects identified in the SWET report.



**Figure 2.24** Infrastructure Solution Timeline

### Summary

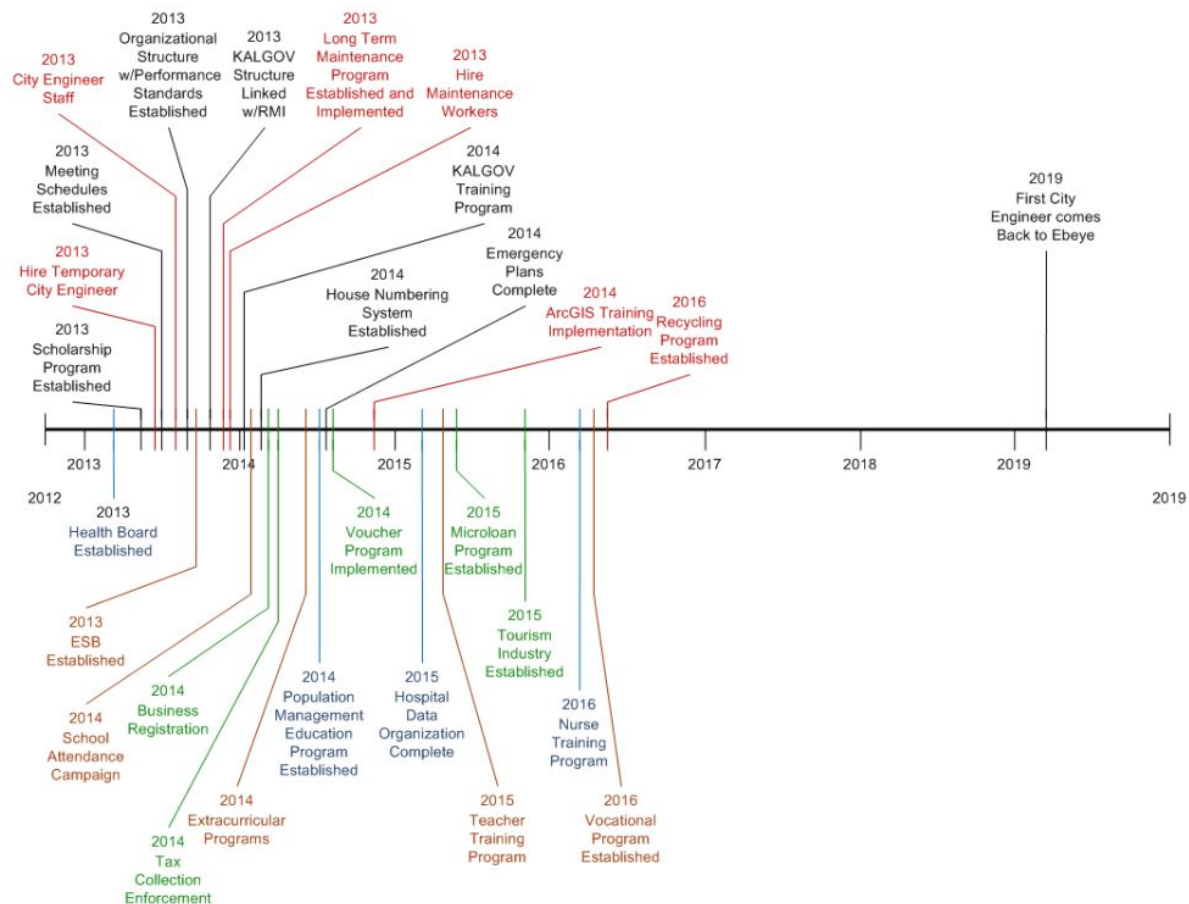
Ebeye has many infrastructure challenges. The first step to future success in this area is an organizational overhaul and hiring of a city engineer. The city engineer and his staff is responsible for implementing these solutions and monitoring their execution. The water system is revamped in order to satisfy the demands of the population. Until the sewage treatment plant is repaired, a sewage packaged treatment system will have to be installed. Ebeye will seek energy independence through wind and solar power solutions. The solid waste management system is improved through equipment repair, implementing a recycling program and organizational changes. The roads and grounds division will make the causeway to Gugeegue its main concern and work toward improving docking on Ebeye and Gugeegue. Overall the proposed solutions are achievable but require support from the KALGOV and TLs.



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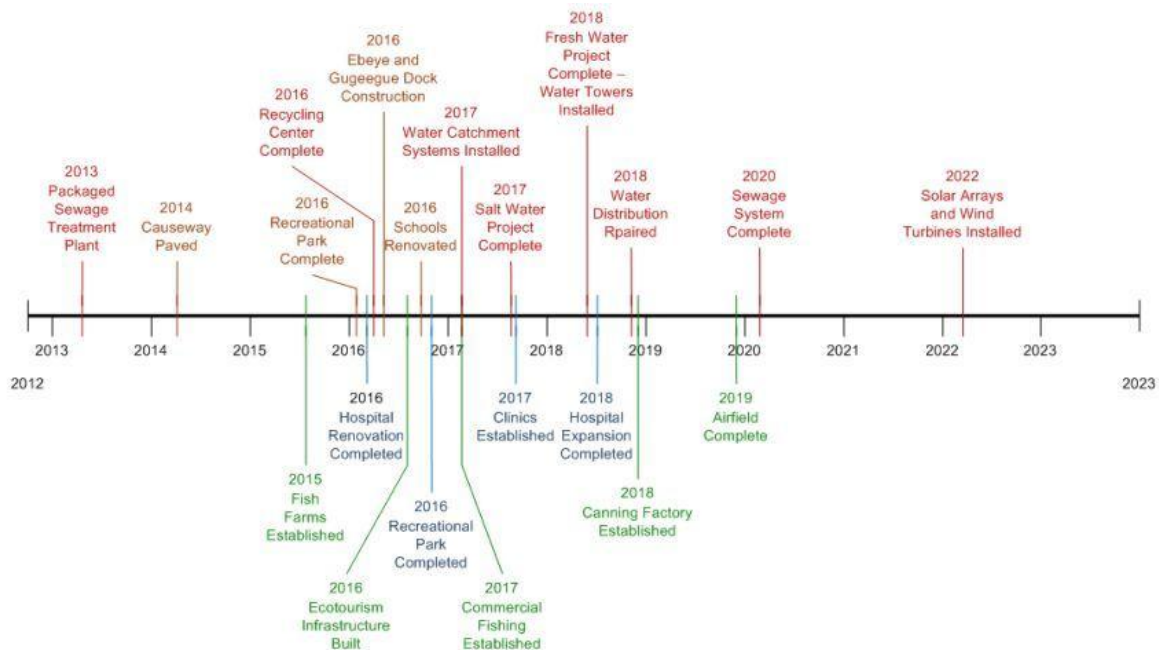
## Chapter 3 Adoption and Implementation

Ebeye 2023 is a general plan that outlines solutions to key problems identified by Ebeye stakeholders. However, the specifics of how to implement this plan are left to the KALGOV and TLs. Through the KALGOV and TLs a foundation can be laid for sustainable self sufficiency.



**Figure 3.1 Ebeye 2023 Programs Timeline**

The Ebeye 2023 program implementation is shown in Figure 3.1 and outlines the sequence of tasks/programs that must be implemented to reach self-sufficiency from an organizational perspective. These tasks/programs are color coded based on the goals (Government – black; Social Well-being – blue; Economy – green; Education – brown; and Infrastructure – red). The tasks/programs are taken from each individual section of the report and compiled here to show an overall progression of organization. Through the accomplishment of these milestones, Ebeye will become a learning society that can adapt more efficiently and provide for its population.



**Figure 3.2 Ebeye 2023 Projects Timeline**

The project timeline shown in Figure 3.2 illustrates the projects that are needed in order to establish self-sufficiency by 2023. These projects are also outlined more in-depth in the individual sections of the report; however, from the timeline shown, this order of completion is based on priority and efficiency. The initial projects are systems that are essential to the standard of living and need to be completed as soon as possible. The KALGOV and TLs may choose how to implement the plan according to their needs but it is hoped that the plan will be implemented in its entirety.

A decision is needed by the KALGOV and TLs to either adopt Ebeye 2023 (complete plan or partial) or not to accept the plan. If it is decided that the Ebeye 2023 is the vision for Ebeye, then the plan most to the implementation phase of the planning process.

In order for Ebeye 2023 to be implemented, a concerted effort must be made to properly organize and plan the implementation. In order to implement a plan a number of actions are required and it is suggested that additional expertise is sought to assist the KALGOV and TLs in this endeavor. The implementation phase requires additional planning and organizing. One of the first aspects of this plan that requires great specificity is budget. The lack of cost analysis in the plan is intentional so that a full accounting of what is needed to bring Ebeye to self sufficiency is achieved. There are many different avenues to secure funding as well as tapping into different agencies and programs that can assist in the many facets of the Ebeye 2023. For example, reorganizing parts of the KALGOV and establishing a school board and medical board does not require a tremendous amount of funds.

The needs of Ebeye are tremendous and it should not be overlooked that there is no “silver bullet” that will pull Ebeye out of its current condition. It will take time, effort and vision to achieve a better tomorrow for the people of Ebeye.

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## Chapter 4

### Summary and Conclusions

#### 4.1 Summary and Conclusions

The future of Ebeye is precarious at best if a long range plan is not developed to guide the city to self sufficiency. This research is a first step in achieving self-sufficiency for Ebeye by 2023. However, no cost estimates or funding sources have been developed or identified. Without an implementation plan with funding sources identified this research only provides a framework. A follow on effort is needed to start a dialog with the US Agency for International Development, non-government agencies, regional stakeholders, and others that can contribute financial resources to the plan presented. Also, as a first step detailed life cycle costs (not just initial construction costs) must be developed. The KALGOV and TLs must decide if this plan is what they want for Ebeye. The plan can be adjusted to meet their needs but it is noted that the challenges facing Ebeye cannot be solved without a long range plan and vision from the leadership of Ebeye.

As with all master plans, it is the follow-on work necessary to make the plan happen which becomes the hard part. It is advised that the KALGOV and TLs take the time to decide if this plan is what they want for Ebeye in total or in parts. If Ebeye 2023 is accepted, it is recommended that a conference be held which would include the RMI government, US representatives, the KALGOV and TLs. The purpose of the conference is to officially recognize Ebeye 2023 as the future for Ebeye. Additionally, initial actions would be developed to address each one of the Ebeye 2023 goals and how the implementation of these goals would be accomplished. An Ebeye 2023 “taskforce” should be established with representatives of each group that would have the overall responsibility of managing the multiple facets of this plan. This will take work, cooperation and a desire to see a better future for Ebeye.



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## Chapter 5

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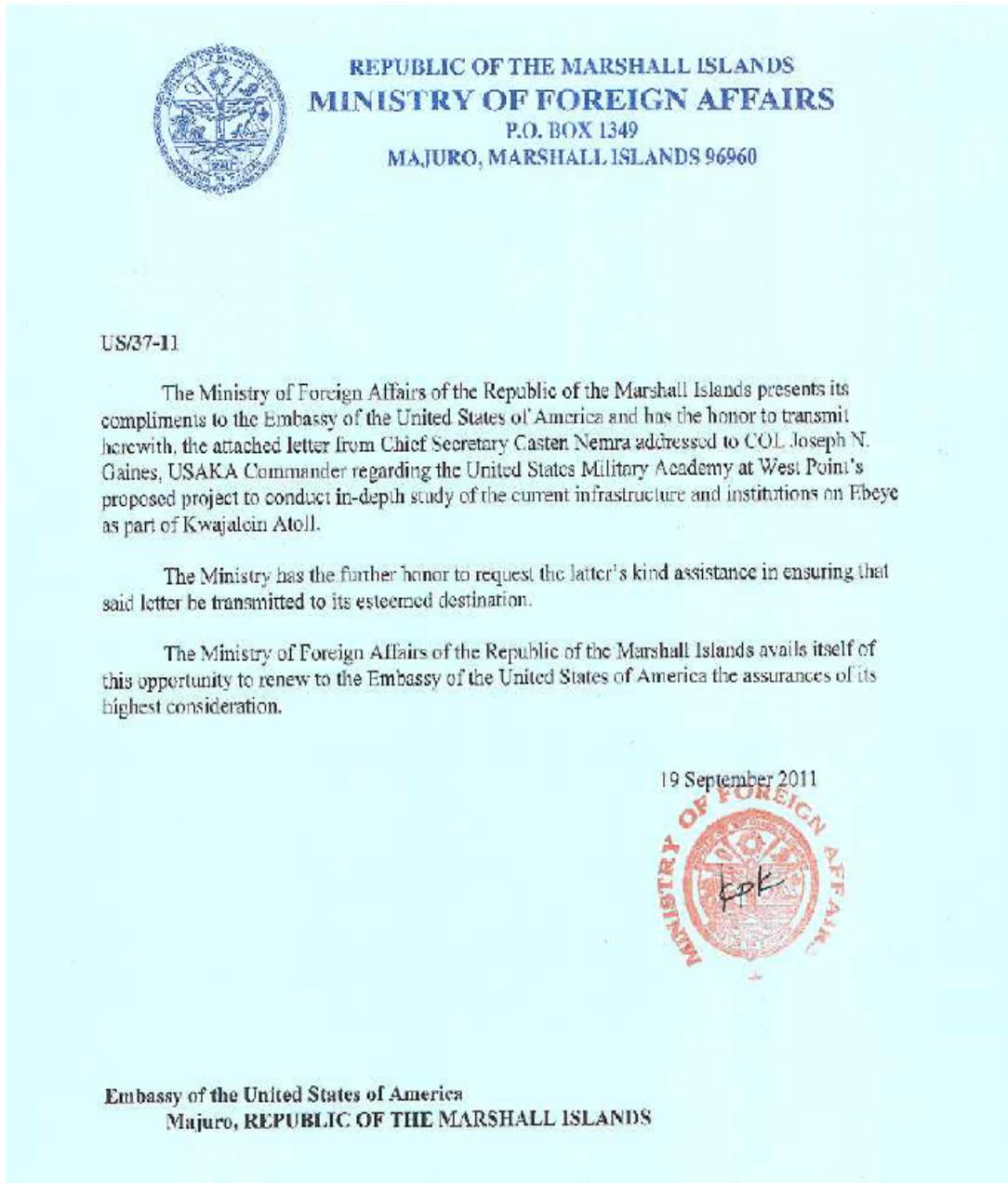
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## Appendix A Study Approval Documents



**Figure A.1 - Official RMI Government Approval Letter**



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