

Department of Resources and Development

Pohnpei State Federated States of Micronesia Food Security Policy & Food Production Master Plan 2025



Acknowledgements

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Stevenson A. Joseph
Governor

Pohnpei State has enormous potential to strengthen our economy, improve our overall health and nutrition and build upon our culture through the production of local food. This Food Security Policy serves as a living document to guide us as we take urgent, targeted steps to strengthen our local food system. There is much we can do to together to incentivize and stimulate local food production for the benefit of our people.

On a regular basis, Pohnpeian families are spending more than 50% of their hard-earned cash on imported food such as rice, wheat flour, vegetable cooking oil, cow's milk, cane sugar, potato chips, imported pork, chicken, eggs and baked goods much of which can be replaced by food produced in our state. With each purchase of imported food, Pohnpeians are in fact paying for food production and processing jobs in other countries. We have become reliant of food grown and processed overseas that is then transported thousands of miles to us by cargo ship. This is food production and processing work that should be done in Pohnpei state to support local jobs and build our own resilient food system.

Taking the united and required steps to build our local food production and processing capacity requires commitment from all stakeholders. Creating a robust local food system requires stabilizing our food production inputs especially poultry and pig feed that can be produced locally to support the production of affordable and reliable chicken, eggs and pork.

Policymakers have their part to play. We should consider requiring that food prepared for government functions and hospital and school meals be primarily made from local produced ingredients. This would create a market for our farmers and fishers and would also inspire our people to creatively imagine new ways of preparing local foods as import substitutions.

I thank the prior Oliver/Ioanis administration, including former director of resources and development Hubert Yamada, for initiating this Pohnpei State Food Security Policy and Food Production Master Plan 2025. Together, we are moving forward with the ambitious goal of increasing local food production by 50% in the next five years.

Honorable Stevenson A. Joseph
Governor, Pohnpei State, Federated States of Micronesia

Wahu Pahrekie Sapwekeika

Foreword

Pohnpei State is blessed with a rich natural environment that has for centuries sustained and nourished our people. Our bounty of local, nutritious foods have long been fundamental to our health just as our culture, our families and our communities are fundamental to our spirit.

Recognizing Pohnpei's urgent need for food and nutritional security, job creation and environmental protection, the Department of Resources and Development has prepared this policy document for our State to support new sustainable food production activities that are based on science while upholding our cultural values and meeting the needs of our people and community.

As a state, we have tried many targeted efforts to increase local food production with little improvement. Along the way, we have learned that to tackle our food system challenges, which have so many different aspects and interconnected components, we must think holistically and systemically and with a sensitivity to ensuring our cultural, environmental and economic sustainability. Thus, this policy takes a holistic food systems approach that begins by understanding the interlinked activities that makeup Pohnpei's food system.

A key policy objective proposed is to engage all members of Pohnpei's food system from those in production through farming and fishing to our society's many sub-systems in water management, waste management and supply/value chain distribution. Our goal is to facilitate multi-stakeholder collaboration and policy coordination at all levels. In this way, this policy document's holistic approach recognizes and addresses the limitations of our many earlier food security efforts that were narrowly defined and/or limited to sub-systems.

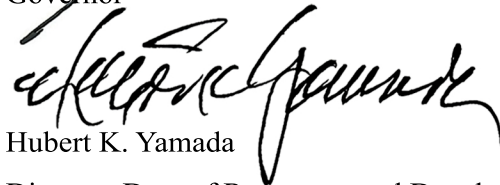
We seek new innovative partnerships that can provide training and access to modern, low-cost climate smart technologies to strengthen our agriculture, agroforestry, fishing and aquaculture yields, post-harvest handling, distribution, marketing and commercialization while at the same time protecting our environment. Access to new cultivation and distribution tools with associated capacity building will considerably aid in our local food system development. In addition, establishing partnerships with professional food system scientists and experts around the world will provide Pohnpei with a broader knowledge base to support our transition from significant dependence on imported food to increased food independence and thus increased food security in this time of global climate change.

Food production and distribution policies can facilitate significant improvement in Pohnpei's food security and economic growth. Policies set forth are intended to encourage increased public and private economic investment, job creation, improved extension services and enhanced infrastructure and educational awareness and engagement by all. In addition, policy reforms will be used to improve land-tenure arrangements, access to credit and increased economic incentives in agriculture, agroforestry, fishing, aquaculture, food processing, distribution, marketing and commercialization. Ultimately, it is our objective to implement this policy in a manner that will lead to an increase in local food production by 50 percent in the next five years.



Honorable Reed B. Oliver

Governor



Hubert K. Yamada

Director, Dept of Resources and Development

Defining Food Security for Pohnpei State

Building upon the 1996 FAO Declaration on World Food Security, Pohnpei State's Food Security Policy recognizes food security as *ensuring that all residents of Pohnpei are free from hunger and thirst and have regular and reliable access to affordable, available, safe and nutritious food and clean drinking water in order to lead active and healthy lives.*

Mission of Pohnpei State Food Security and Food Production Master Plan

Pohnpei State's Food Security Policy recognizes that food security development requires a **food system approach** that engages all stakeholders with all the elements and activities related to producing, distributing and consuming food including economic, health, and environmental outcomes.

Taking a Holistic and Sustainable Food System Development Approach, ensure that all Pohnpeians have access to affordable, available and acceptable nutritious food and clean drinking water.

The Pohnpei State Food Security Policy builds upon the four pillars of food security:

- ⊕ Availability
- ⊕ Accessibility
- ⊕ Affordability
- ⊕ Acceptability

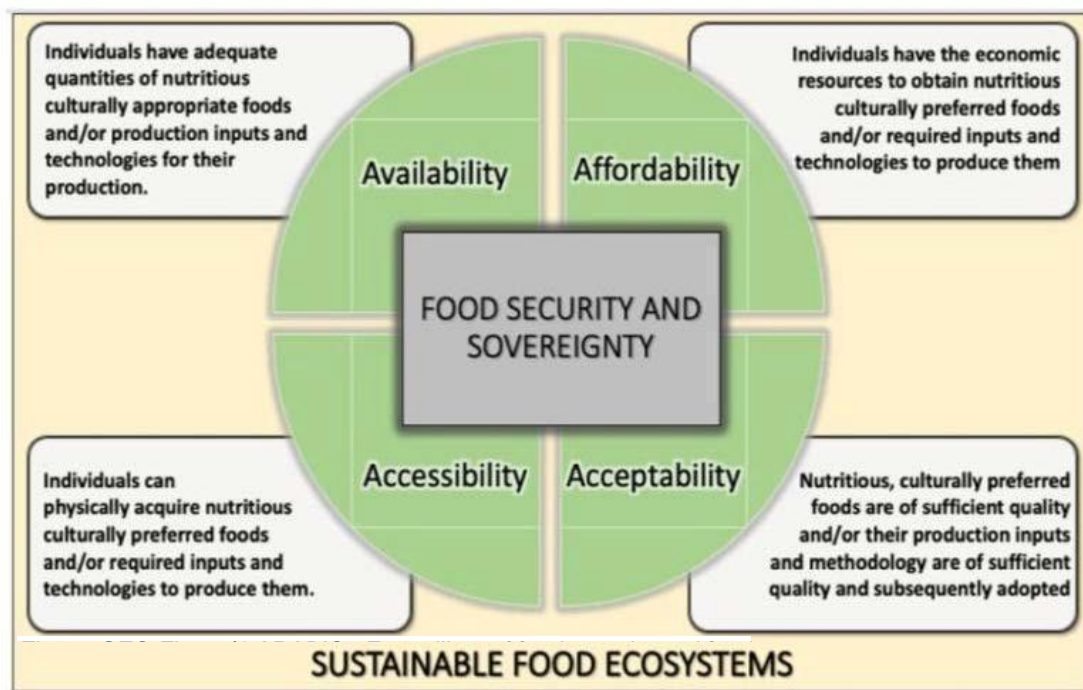


Figure 1: Four pillars of food security and food sovereignty, Merchant and Simon (2022)

Executive Summary

For Pohnpei State, food security means local food production.

The recent COVID pandemic was a stark reminder of our state’s food system vulnerability resulting from our dependence on foods produced in other countries.

Upheavals in the world including climate change will continue to threaten our already inadequate local food supply. **We must take action.**

Recognizing Pohnpei’s urgent need for food and nutritional security, job creation and environmental protection, the Department of Resources and Development seeks to implement a sound policy framework that respects our precious environmental heritage while encompassing sustainable development, conservation and management of our natural resources including spearheading new policy based on our values of people, culture, land, and sea.

To meet this goal, this policy is intended to stimulate an **“enabling environment” for private sector-led sustainable food production.** We seek to stimulate **commercial agricultural** activity by creating enabling policies and a regulatory environment for investment in this sector to increase local production, mitigate investment risk, reduce our dependency on external food supply and our vulnerability to price shocks.

We also seek to **empower our citizens** with appropriate training that includes new innovations and technologies, effective business development support, essential food system infrastructure and information on, and linkages to, food-related markets.

This Food Security Policy also seeks to develop pathways for the **commercialization of smallholder farms** that build upon traditional systems and practices, providing cash-generating opportunities for rural households and ultimately food security.

Limited investment capital, limited technical, entrepreneurial and business skills, together with expensive and unreliable utilities and transport all must be addressed concurrently to jumpstart our local food production. Our foreign investment laws must be reviewed and revised to allow for some targeted foreign investment in the agriculture sector.

Pohnpei State is also committed to supporting **enterprise development** in commercial aquaculture, organic and high-value niche products, agritourism, ecotourism and microenterprises in livestock feed and composting and other commercial enterprises to fill in gaps in our food system.

We are taking a whole food systems approach that involves all stakeholders and includes all stages of local food production. An **economically, environmentally and socially sustainable food system** is one that enables farms and food production businesses to be profitable and contribute to our local economy. Such a system supports the next generation of farmers and food producers and creates healthy food for all.

Guiding Principles

This Pohnpei State Food Security Strategy is based on the following guiding principles:

- Recognition that all Pohnpeians deserve ongoing access to healthy, affordable and available food;
- Recognition that all Pohnpeian households deserve ongoing access to clean drinking water;
- Recognition that this must be accomplished through respect for and inclusion of local, cultural and traditional values;
- Recognition that a sustainable local food system must respect and promote biodiversity, cultural diversity, conservation and environmental sustainability;
- Recognition that a changing climate will require a strategy to ensure success today and into the future, and as climate changes, the strategy will adjust as needed.
- Recognition that a sustainable local food system must respect and include the voices of all members of the community including the most vulnerable (women, youth, and those with disabilities), regardless of where they live;
- Recognition of the effectiveness of a multi-stakeholder and multi-sector approach in addressing issues related to food security;
- Recognition for the need to strengthen and increase food security training, education, and communication to better include all members of our society;
- Recognition of the need to secure importation of essential food items and agricultural inputs

The implementation of strategic actions under this policy will be guided by these principles.

Pohnpei Food Security Policy Principal Goals

- Increasing dietary nutrition and health for all Pohnpei residents, including those on the outer islands, by increasing regular access to affordable and available nutritious foods;
- Ensure clean drinking water for all Pohnpei residents including remote outer island communities;
- Develop a sustainable local food system that protects natural resources and ensures environmental longevity for future generations;
- Provide policy and resources to enable private sector-led climate-smart local food production and pathways for smallholder farming commercialization;
- Provide food production capacity building and resources for all Pohnpeians including remote outer island communities;
- **In the next 5 years, increase local food production by 50% of what is currently grown and/or imported for those foods that can be produced in Pohnpei State.**

Key Actions to Implement the Goals

- Improve food production policy governance and management through interagency cooperation and coordination;
- Strengthen and develop supply chains for locally produced foods;
- Develop processing and value additions of local food products;
- Consider import tax on imported foods known to cause food related diseases;
- Implement policies and measures to secure reliable importation of essential foods and supplies that cannot be produced domestically due to environmental and economic constraints;
- Review and revise Pohnpei State’s foreign investment policy to allow for some targeted foreign investment in agriculture production;
- Strengthen education on local food cultivation and preparation in schools, hospitals and other public institutions;
- Establish a seed bank that include climate resilient local and regional crops;
- Support climate smart agriculture including optimization of traditional knowledge adaptation strategies, nutrient cycling and composting;
- Waste management to support a circular economy and protect the environment;
- Increase the amount of locally farmed aquaculture foods for domestic and export markets;
- Improve dialogue and information sharing among food systems stakeholders (local, public, private and development) for effective implementation of increased local food production;
- Improve infrastructure and transport to support agriculture collection and distribution for rural communities especially those living on the outer islands;
- Increase the number of commercial greenhouses producing fresh produce for the market;
- Improve farmers’ access to production inputs such as seeds, seedlings, fertilizer, tools, information, vaccinations and insemination, etc;
- Establishing food system protections from natural disasters and climate change;
- Explore renewable and affordable energy sources for food production and post-harvest handling;
- Increase access to clean drinking water;
- Strengthen and support development of local farmers associations;
- Provide training and resources to increase the number of local farmers (terrestrial and land) producing food for the market;
- Improve extension services for commercial and traditional farmers;
- Increase the number of rural community/farmer groups and associations;
- Strengthen food production research and knowledge links with regional/international partners;
- Increase low-interest micro-financing for all areas of local food production;
- Increase micro-financing to support small farm business enterprises and development, such as for post-harvest handling or storage facilities;
- Commit and allocate a portion of annual domestic revenue to local food production;

- Increase export markets for Pohnpei agriculture and aquaculture products;
- Supplement imported foods with locally produced foods to reduce dependence on unhealthy imported foods;
- Implement a local food and healthy eating public awareness campaign: and
- Implement policies that impact food imports and investment.

We realize this is an ambitious list of goals and action points. But, a bold approach is needed to see transformative change on the ground.

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1. Introduction: Pohnpei State’s Food Security Policy

This Food Security Policy is intended to support development of a sustainable, locally based food system that can deliver nutritious, safe, and available food and reliable clean drinking water for all of Pohnpei State’s citizens, ensuring that the health and environmental well-being of present and future generations is secured.

This policy prioritizes development of pathways for commercialization for smallholder farming systems building on traditional systems and practices, which allow increased employment and cash-generating opportunities for rural households. Within this Policy, we define farming to include local production of food by way of agriculture, agroforestry, fishing, aquaculture, or the raising of poultry and livestock.

This policy will be used to help facilitate an “enabling environment” for private sector-led sustainable food production and remove private sector production constraints by providing Pohnpei’s citizens with food production capacity building and training, effective business development support, essential food system infrastructure and information on and linkages to food related markets. Stimulating commercial agricultural activity by creating an enabling policy and regulatory environment for investment in the sector will increase local production, mitigate risk involved with investment in the agriculture and marine food sectors and reduce vulnerabilities to external food supply and price shocks.

The development of a sustainable food system within Pohnpei will provide our citizens with healthy foods for improved diets and well-being while reducing food waste and carbon emissions from shipping and transport of imported foods.

The development of a locally based food system will also offset Pohnpei’s trade imbalance. The success of progressive and proactive policies will lead to increased food production, job creation, increased public health, and is designed to allow the State to reinvest in the local economy.

This policy considers food system development as defined by the FEEDS (Food-systems for Empowerment, Economic Development and Sustainability) Model that offers a culturally and environmentally grounded market-first approach to support and stimulate local capacity building, private sector and economic development and independence.

The FEEDS model has been applied successfully to support and strengthen local food system production development in other developing nations (Simon et al 2021, Scientia).

A Holistic Food Systems Approach

Taking a Holistic Food Systems Approach that considers both terrestrial and marine food sources, this food security policy offers a strategy to strengthen Pohnpei State’s local circular economy to keep money and resources circulating within the State rather than sent outside the state or wasted.

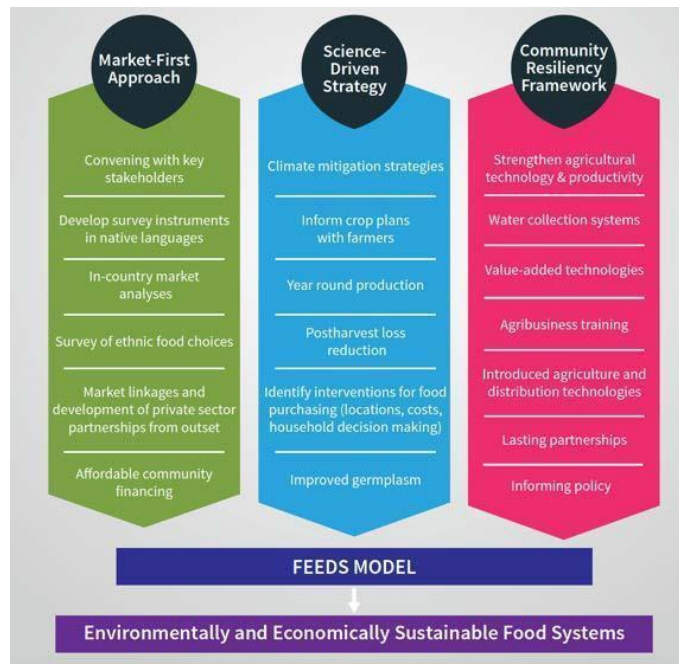


Figure 2: FEEDS Model, Simon et al (2021)

Currently, Pohnpei State is overburdened with the negative, economic, environmental and health impacts caused by a non-circular linear economy. This food security policy takes a market-first approach recognizing the food consumption demands of Pohnpei’s local markets first and then considers growth potential for export markets.

Pohnpei State’s current linear economy is not sustainable and depends on an unstable supply of natural resources, which creates volatility in pricing, leads to environmental degradation contributing to climate change and waste.

Moving toward a circular economy can better sustainably manage natural resources and reduce waste while stimulating new business opportunities and partnership and innovative market ready products.



Figure 3: Current Linear Economic Model



Figure 4: Transition to Circular Economic Model

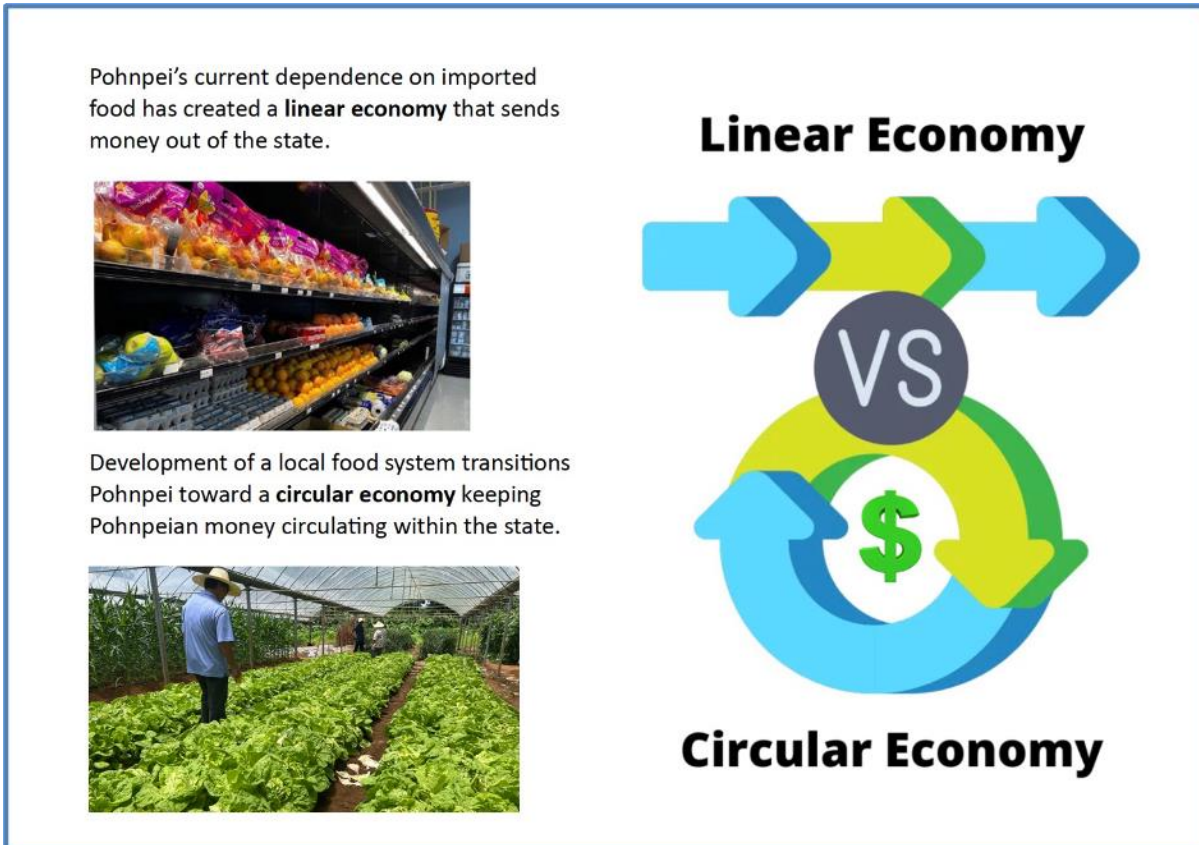


Figure 5: A circular economic model supports local food production businesses keeping more money within Pohnpei State and thus benefitting more residents and local business.

Realizing Pohnpei State's potential to establish a robust and reliable local food system is especially important as the Federated States of Micronesia seeks increased food sovereignty (Federated States of Micronesia, 2010). Achieving sustainable food system development will depend on bold new initiatives and reforms that attract private sector investment and increased foreign investment. This policy will need to expand existing policy legislation, such as the Pilot Agricultural Projects, which prioritizes agricultural initiatives such as poultry production, fresh fruit and vegetable production, aquaculture and more. Export earnings need to be increased driven by ecotourism, fisheries, agriculture, and aquaculture which have been identified to have real economic development potential (Federated States of Micronesia 2012-2016).

Sustained investments in Pohnpei State's commercial agriculture and marine/fisheries and aquaculture have been limited (FAO 2021). Public policies that tax certain types of imported goods are controversial, and the flexibility and/or the ability to reduce or waive taxes on selected products needed for agricultural and engineering inputs such as equipment and supplies is not easy to accomplish without significant political will. Yet, public policies that enable favorable private sector investment and commercial growth coupled to strategic government investments in such infrastructure are urgently needed.

The urgency for developing a food security framework was driven home by the COVID pandemic that severely disrupted global supply chains leading to significant inflationary spikes in the cost of importing goods and services to Pohnpei.

This policy offers a roadmap to support local food production through improving the capacity of domestic agribusinesses and sustainable aqua businesses to process, prepare and market safe and nutritious food products. In addition, it explores steps to adopting **food pricing policy reforms** designed to incentivize consumers to reduce their purchase of imported food products damaging to their health and increase their purchase of local healthy foods (marine, fisheries, plants, animal, and livestock). Moreover, the strategies recommend a review and, as needed, a revision of current policy for issuing **foreign fishing licenses** with the goal of ensuring sustainable catch by foreign fishing vessels, and requiring them to service the local market first before selling their fish catch to foreign markets.

In collaboration with international partners, this policy strategy introduces new low-cost climate smart green technologies to increase innovation such as greenhouses, solar dryers, cold storage, and sustainable aquaculture, especially shellfish aquaculture which is one of the greenest industries on the planet since grow out relies on naturally available food sources and provides beneficial ecosystem services that help improve water quality and provide habitat for fish and crustaceans. Establishing partnerships with specialists in agriculture and aquaculture can provide Pohnpei with expertise that can contribute to commercialization of local food production and postharvest handling. These types of partnerships can stimulate new agri-based businesses and micro-enterprises that create jobs and generate income.

Pohnpei State's food systems approach provides a web of interlinked activities and encourages the State's food development practitioners and policymakers to see the full complexity of the food production and consumption pathways thus facilitating multi-stakeholder collaboration and policy coordination. The network of sustainable food system partners includes local and international expertise using modern science and technologies as well as traditionally successful systems to support cultivation of indigenous crops and development of climate-resilient local foods.

This Pohnpei State Food Policy is designed to successfully link the health, education, agriculture, biodiversity, and cultural policy goals. Pohnpei State's agriculture sector must refocus on improving its competitiveness and capacity to supply the domestic market with nutritious food products. This will require policies that both improve the availability and competitiveness of local nutritious food and discourage the importation of unhealthy food items.

Community engagement should be a cornerstone of efforts to develop a roadmap to food security for Pohnpei State, and of efforts to put food production plans into action. Community engagement means incorporating mechanisms for local-level democratic decision-making into efforts to improve and change food systems. Community engagement also means securing robust involvement from local-level non-governmental organizations and informal social groups in how food security initiatives are designed and implemented. The principle of community engagement can be justified on both normative and instrumental grounds. Social justice and respect for people's rights of self-determination call for programs to be developed with the input of people whom these programs will directly affect. Justice also requires that food security programs be implemented, to the extent possible, by knowledgeable members of communities themselves. Community engagement is also critical to the real-world success of food security initiatives. People are more likely to participate in and actively support programs in whose development they played a part, and whose implementation is being carried out by individuals and organizations which they know and respect (Winne 2004; Smith et al. 2018).

The strong village-level social networks and deep commitments to clan and place that characterize Pohnpei State constitute a valuable resource for efforts to strengthen food security policy in the State overall. As the policy vision is elaborated in this document, it is important to keep in mind that the principle of community engagement is central in how specific policies are decided upon and ultimately implemented on the ground.

The overarching food security policy framework will be the means for coordination of investments from State budget revenue together with all other sources of public funds for this sector’s development. The government will also use this framework to facilitate and guide private investments in the sector.

1.1 State Profile

Pohnpei State, within the Federated States of Micronesia, is home to richly diverse terrestrial and ocean ecosystems making it well suited for the sustainable development of agriculture and aquaculture sectors that will enhance food security, economic growth, societal resilience while promoting job creation and a shift toward a circular economy that keep resources and funds circulating within Pohnpei State.

Pohnpei State had an estimated population of 35,981 in 2021 and total land mass of main island Pohnpei is 345 km², the largest island in the FSM. Real per capita GDP in 2018 was estimated at USD \$3,568. Pohnpei State comprises 94,200 acres with approximately 40 percent of that land, or 37,954 acres, used for land-based agriculture. Pohnpei State contains wide ranging habitats, many of which are highly suitable for aquaculture and agriculture (FSM Agricultural Census 2016). The state also has high marine and terrestrial biodiversity indexes with many endemic species (FAO 2022).

Pohnpei State includes 6 inhabited low-lying atolls (Pingelap Atoll, Mwoakilloa Atoll, Sapwuahfik Atoll, Nukuoro Atoll, Kapingamarangi Atoll, Oroluk Atoll). The State’s outer atolls all have large, sheltered lagoons with complex and diverse marine ecosystems that support a culture of reef fishing and marine food harvesting. The atolls have enclosed or semi-enclosed lagoons with calm water bodies that are suitable for many varieties of marine aquaculture.

Pohnpei’s main island is one of the wettest places on earth with annual rainfall recorded exceeding 300 inches (2012, Univ of Guam). On the main islands, there is ample fertile land for agriculture and freshwater aquaculture. Pohnpei’s remote islands, however, are vulnerable to freshwater shortages and access to clean and reliable sources of drinking water is an urgent priority that must be addressed within the state’s food security policy.

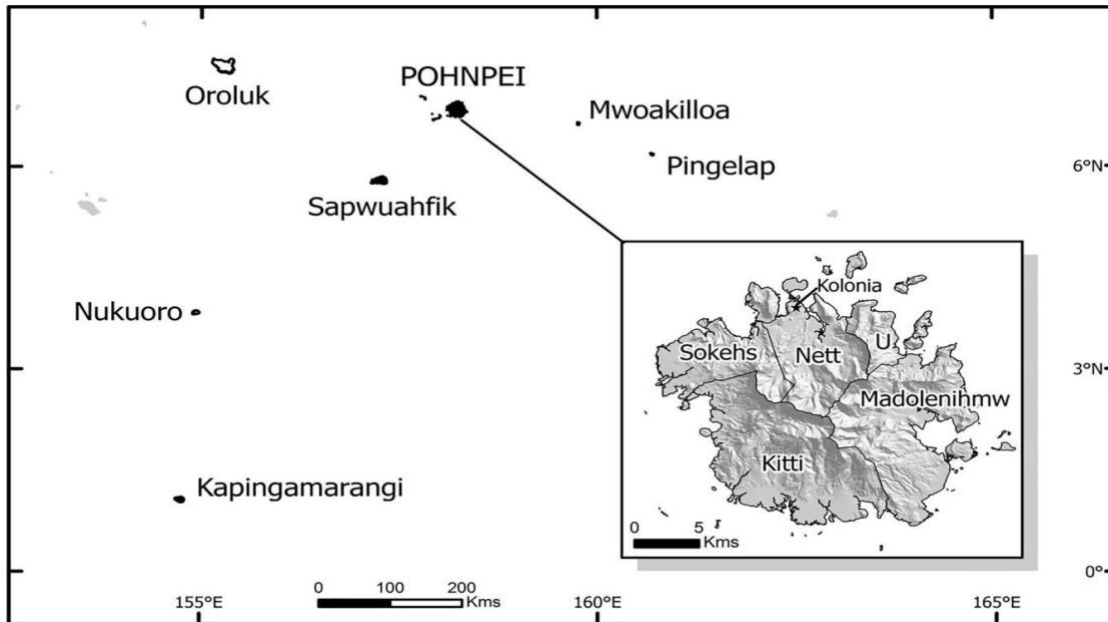


Figure 6: Map of Pohnpei state including surrounding atolls. The inset image shows the five municipalities of Pohnpei and the capital, Kolonia. Map courtesy of The New York Botanical Gardens.

1.2 History

For centuries, Pohnpeians, whose ancestors settled on these islands more than 4,000 years ago, consumed a diet of only local foods such as taro, breadfruit, yams, coconut, bananas, and marine foods (Balick 2009). Foreign influence ultimately changed Pohnpeians' traditional diet. Beginning in the late 1800's, Micronesia saw almost a century of colonial dominance, starting with Spain and ending with the United States. The Spanish introduced maize, cassava, sweet potatoes, chickens and pigs and after Japanese occupation, rice became a Pohnpeian staple. But there was little evidence of malnutrition in Pohnpei until the American occupation. (Yamasota 2014)

The introduction of imported foods by the US in the 1940's was intended to relieve short-term food shortages or hunger. Instead, a dependency on imported foods gradually replaced the traditionally self-sustaining food systems of Pohnpei (Englberger et al. 2003);

In the 1960s, a supplementary feeding program supported by the United States Department of Agriculture (USDA) significantly influenced Micronesians' eating habits. This program provided school lunches of rice and canned foods for up to 30% of Pohnpeians which ultimately shifted food tastes, and contributed to local, healthy foods being replaced with rice, refined carbohydrates, and tinned foods. Today, rice, wheat flour, sugar, refined foods, and fatty processed meats are commonly eaten in the FSM due to many interrelated factors such as convenience, affordability, taste and prestige.

The cash-based economy introduced by the US triggered a significant shift in lifestyle that made unhealthy imported foods more accessible and affordable. Micronesians no longer needed to work the land for food because money obtained from government jobs and other sources could purchase food at the store. People became sedentary and the combination of a poor diet and less exercise resulted in a rise in obesity rates. Pohnpei's rise in obesity began at the same time as U.S. subsidies and today's FSM's Compact of Free Association now continues Micronesia's dependence on US aid and subsidies (Yamasota 2015, 2018, 2019).

1.3 Traditional Subsistence Farming and Fishing

The majority of agricultural production in Pohnpei is for domestic and family consumption. Most of Pohnpei's land used for agriculture and agroforestry is freehold land or held with customary titles. Just over 90 percent of households recorded in the 2016 Federated States of Micronesia Integrated Agriculture Census had access to land they used in part to meet their specific agriculture needs. Much of Pohnpei's land is used for agroforestry and tree crops, with 80 percent of shared parcels of land mainly under tree crops or agroforestry. Land that is not shared is more often used for garden crops, farm buildings, and non-agricultural purposes, while shared land is more likely to be agroforestry or tree crops.

Traditional agricultural production sustained Pohnpeian families for hundreds of years through many types of outside influence and disruptions and remains crucially important. Respecting traditional farming practices must be addressed through a socio-culturally sensitive community-based approach which addresses Pohnpeians' different priority needs (FSM 2012-2016).

Pohnpei's traditional agriculture systems are based on biotic diversity and the practice of polyculture (e.g., such as agroforestry) rather than larger-scale monoculture. This historic approach has sustainably supported subsistence livelihoods, community obligations, and food security over generations while also preserving the soil and forests. Properly managed, these home garden/agroforestry systems can be highly productive while also contributing important environmental services such as soil stabilization, carbon sequestration, clean water and air.

On small islands and low atolls, marine food sources extracted through local harvesting are often used for household sustenance and production since agriculture and freshwater resources are limited. Pohnpei's main island has a well-developed barrier reef surrounding a narrow lagoon with an area of about 181 km (TNC 2023). Subsistence fishing, both reef and open ocean line fishing, is practiced by many families and is critically important to the food security of Pohnpei's outer island communities. Coastal fishing is conducted for family subsistence as well as sale to local markets with some catch shipped to relatives in Guam, Saipan and Hawaii (FAO 2023).

1.4 Dependence on Food imports

Pohnpeian diets have changed significantly in the last 50 years from one based on traditional, locally grown nutritious foods to increased consumption of imported, highly processed foods, such as rice, ramen, canned goods, low-grade fatty meats, turkey tail, high sugar content soft drinks, and snacks. During this same time, the population has experienced a decrease in quality and length of life, an increase in expensive health care treatments and higher mortality rates associated with non-communicable diseases (NCDs) that are related to the lesser quality of the food consumed (Connell 2015).

The reduced consumption of local, nutritious culturally preferred foods lowers demand and leads to lower production of these foods, making it increasingly harder to compete with lower cost imported foods.

Pohnpeians currently spend up to 40% of their earnings on food (HIES 2014), most of which is imported, resulting in a major outflow of money outside of the State. A circular economic approach could provide locally produced food substitutions, when possible, for imported items such as chicken, pork, eggs, fresh vegetables, cooking oil, snack chips and flour and others, allowing more funds to circulate within communities and remain within the State.

This policy recognizes that the State of Pohnpei will always rely on the importation of foods and supplies, and thus, is not intended to eliminate imported foods but rather to find an improved balance and strengthening of local food production.

2. Pohnpei State's Current Food System Challenges and Potential for Growth

2.1 Challenges to Local Food Production and Distribution

Lack of sufficient coordination

Although there is a single governing body for all of Pohnpei, the 5 municipalities of the main island and the 6 outer island communities each have differing customary practices that make a coherent regulatory framework for agriculture production and distribution challenging. Support for state-wide farmer and marketing associations can help standardize farming and retailing practices.

Lack of sufficient diversification

Many citizens of Pohnpei rely on gathering produce through agroforestry, including bananas, breadfruit, coconuts, and taro (GCF Baseline Survey 2023). Without proper regulation on the harvesting of these staples, there is a risk of over-exploitation that may lead to forest depletion and a reduction of future harvests. Increasing local production of desired cultivated crops with diversified nutritional content as well as poultry and eggs will help increase food and health security.

Lack of sufficient market linkages

Many staple foods, like chicken, eggs, canned fish, flour and even water are imported into Pohnpei due to a lack of 'commercial' growers and a lack of clear market linkages from farmers/fishers/food producers to consumers. The majority of food grown and harvested in Pohnpei is used for a single family, with limited paths for commercial scale. Currently, 38% of vegetable produce sales are direct to consumers, followed by 35% going to a public market, 19% to a local shop, and less than 2% going to restaurants and hotels (FSM 2014, 2019). To create a more circular economy in Pohnpei, it is essential to increase market infrastructure in agriculture, fishing and aquaculture and increase agricultural inputs and supplies including animal feed, seeds, and fertilizer.

Cost of fuel limiting supply chain and food transport

The financial burden on Pohnpeians due to their large dependence on imported foods is exacerbated by the cost of fossil fuel needed to transport these goods. The global oil market is extremely volatile due to geopolitical instabilities. Currently, fuel in Pohnpei costs on average \$5.00 a gallon (Vital 2022), while the current minimum wage for salaried workers in Pohnpei is \$1.75 an hour (FSM 2014). As the cost of fuel continues to rise, so will the cost of imported foods as well as the cost of transporting foods harvested by farming families across the municipalities and outer islands.

Lack of affordable and renewable energy sources

Pohnpei State's natural environment can support several options for renewable energy, none of which are currently operating at their full potential. Dependence on expensive imported fossil fuel hinders local food production and transportation. The FSM National Energy Policy (2012) and Pohnpei States Energy Master Plan (2018) have outlined steps to increasing local renewable energy production over the years to come.

Lack of sufficient Post-Harvest Storage

Pohnpei's lack of sufficient post-harvest storage, cooling/refrigeration and packaging facilities makes it challenging for local farmers/fishers to stagger supply of food product to markets risking flooding markets at harvest. Shelf-stable foods are necessary to prepare the local population for emergency events which may become more frequent with the threats of climate change.

Lack of sufficient labor force

Pohnpei's dependence on imported processed foods, and lack of investment capital in agriculture infrastructure, has led to reduced agriculture-related jobs. Without a path to market and income generation, farming is not attracting younger generations which further reduces technical and entrepreneurial agricultural skills and ultimately fewer food production related job opportunities in Pohnpei.

Lack of sufficient communication systems

Food production communication systems increase efficiency, productivity, marketability, and the profitability of healthy, locally produced foods. In Pohnpei, there is currently no communication infrastructure for knowledge sharing between traditional and commercial farmers and fishers and market suppliers. Developing a food system in Pohnpei will require low-cost accessible communication platforms between many different populations of people with differing food production practices and access and relationships to land, sea and market. Pohnpei has naturally strong village-level social networks and deep commitments to clans and land that can be built upon to increase food production communication.

2.2 Food Availability and Accessibility

More than 90% of Pohnpeians surveyed for the 2023 Green Climate Fund food security baseline report said they participated in some form of subsistence farming and/or fishing. This included 85% of respondents raising livestock to feed their own family, 64% practicing agroforestry, 55% fishing and collecting marine food for their families for family consumption (Rutgers 2023).

More than 80% of the respondents to the 2023 Green Climate Fund food security baseline survey indicated that they want to consume more locally sourced foods if they were available and affordable. In addition, these same respondents said they would be more willing to buy locally produced foods if they knew local foods would be healthier than imported and processed foods. There was also a strong interest in raising chickens for meat and eggs as well as an interest in participating in aquaculture as an industry, neither of which are currently available in Pohnpei.

Domestic production

In Pohnpei, local food production is generally small-scale for local consumption or to support relatively limited export sales in regional markets, primarily Guam and the Marshall Islands with betelnut and kava being the primary exports (HIES 2013/14). The small land area and tenure systems generally limit large-scale commercial farming for export.

However, a large variety of local root crops and leafy vegetables, forest crops and marine food resources exist in Pohnpei that, if cultivated in a systematic and coordinated manner, could increase food security and health for the local population. Increased production of local fruits, vegetables and root crops could be provided to Pohnpei's school and hospital for preparation of healthy meals while also supporting the livelihoods of the local growers. Specifically, the National Plan of Action for Nutrition 2007-2012 advocates for incorporating nutrition goals into the health and education sectors.

The below 2012 survey (FAO 2014) of the availability of fruits, vegetables and agroforestry staples in Kolonia markets shows the lack of reliable production of cultivated food crops in Pohnpei.

| Fruits | Availability rating | Vegetables | Availability rating | Staples | Availability rating |
|-------------|---------------------|------------|---------------------|--------------|---------------------|
| Banana | **** | Cucumbers | **** | Taro | *** |
| Coconut | **** | Eggplant | *** | Breadfruit | *** |
| Papaya | *** | Pumpkin | *** | Yam | ** |
| Watermelon | ** | Beans | ** | Sweet potato | * |
| Mango | * | Kang Kong | ** | Cassava | * |
| Pineapple | * | Gourds | ** | | |
| Pandanus | * | | | | |
| Local apple | * | | | | |

Key:**** always available; *** frequently available; **sometimes available; * available in small quantities

Figure 7: Relative availability of selected fruit and vegetables in Kolonia markets 2012

Based on the 2019 market study published by the International Fund for Agricultural Development (IFAD), in Pohnpei, the value of estimated sales of fruits and vegetables was \$229,956; that of cooked food was \$240,000, and marine products were \$1,273,386 (Englberger 2019). In terms of volume harvested, pelagic fish ranks number one in the state totaling 214,000 lbs. per year, followed by reef fish totaling 164,400 lbs. per year. Cooked bananas along with fresh bananas account for 189,300 lbs. per year. Breadfruit (cooked and fresh) accounts for 92,400 lbs. per year. Taro accounts for 52,000 lbs. per year while mangrove crab accounts for 42,600 lbs. per year. In terms of value, mangrove crab ranks number one, fetching \$3.50 to \$5.50 per pound, followed by lobster fetching \$3.50 per pound with a volume of 7,500 lbs. per year. In terms of cultivated vegetables/fruits, cucumber ranks number one in volume followed by mango, pumpkin, watermelon, cassava, and bitter gourd. Among the vegetables and fruits, avocado, ginger, lime/lemon, and tomatoes sell for about \$2 per lb.

A large quantity of locally cooked food is sold at many different outlets. Cooked taro, breadfruit, banana, and yam amounts to 240,000 trays per year; one tray weighs about one pound, with a total retail value of \$240,060. The retail value for marine products for 2019 was \$ 803,370 and for fruits and vegetables, it was \$229,956. The total retail value for all Agriculture and Marine products for 2019 was estimated to be \$1,273,370; the wholesale price is usually 20-25 % less.

| Year | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------------------------------------------|----------------|----------------|----------------|----------------|----------------|
| Meat - poultry | \$2,171,648.68 | \$2,266,414.45 | \$2,084,316.82 | \$2,834,041.09 | \$2,269,574.88 |
| Meat - beef | \$394,423.49 | \$465,430.19 | \$548,453.42 | \$360,073.22 | \$506,260.82 |
| Meat - pork, hams etc | \$520,611.47 | \$701,643.70 | \$587,803.26 | \$814,675.26 | \$759,371.44 |
| Meat - other | \$22,647.38 | \$51,605.10 | \$80,629.22 | | \$31,731.48 |
| Fish | \$5,183.23 | \$11,693.98 | \$10,612.22 | \$19,121.07 | \$42,930.74 |
| Non-fish seafood | \$37,316.57 | \$19,422.83 | \$11,021.33 | \$42,423.46 | \$64,292.84 |
| Eggs | \$388,457.53 | \$580,377.30 | \$367,473.72 | \$536,702.87 | \$627,265.91 |
| Citrus | \$61,162.64 | \$79,629.01 | \$90,849.11 | \$80,368.89 | \$103,795.78 |
| Cauliflowers, broccoli, cabbage, lettuce etc | \$134,506.84 | \$191,965.73 | \$223,423.08 | \$248,996.70 | \$315,253.47 |
| Onions, garlic, leeks etc | \$125,242.06 | \$129,878.61 | \$148,882.09 | \$150,213.75 | \$146,967.88 |
| Potatoes | \$45,687.13 | \$58,771.79 | \$57,283.43 | \$52,260.27 | \$40,053.94 |
| Fruit and vegetable juice | \$223,826.39 | \$209,766.79 | \$242,763.39 | \$306,113.91 | \$238,394.27 |
| Other fruit and vegetables | \$216,126.93 | \$320,692.93 | \$412,248.81 | \$452,598.95 | \$548,522.85 |

Fig 8: Annual Imports of Selected Meat, Fish, Eggs, Produce into Pohnpei from USA 2014-2018 (FSM 2019 Dept of Statistics)

Trade Deficit and food imports

Pohnpei suffers from a large trade deficit making the State increasingly vulnerable to global commodity prices and macroeconomic instability.

As a nation, the FSM economy recorded a trade deficit of \$190 million in goods and services for 2021, a 9.25 percent increase from the previous year (US State Department).

Export of agricultural products from Pohnpei in 2017 was limited primarily to betel nut ranking number one with 233,198 lbs., followed by kava with 138,181 lbs., and copra with 105,519 lbs. In terms of

export value, kava ranks number one with \$827,354 followed by betel nut with \$698,127. The value of other currently exported products from Pohnpei is not significant.

The Federated States of Micronesia Agriculture Policy 2012-2016 includes opportunities for local fresh and processed produce to substitute for some imported goods. The agriculture and aquaculture sectors can provide opportunities to increase Pohnpei's export of goods.

In citing The Federated States of Micronesia Agriculture Policy 2012-2016, it was proposed that a reduction of just 20% in food importation and replacement or substitution with locally produced foods, oils, beverages **could generate up to \$5 million a year into the local economy nationally providing significant local revenue to producers and retailers throughout FSM while reducing imports and creating new jobs and micro-enterprise industries.**

2.3 Current Food System Vulnerabilities

Pohnpei's current dependence on imported food renders its citizens vulnerable to food shortages, food insecurity, malnutrition and non-communicable diseases.

Health - Malnutrition, Obesity and Non-Communicable diseases

Pohnpei State's many years of reliance on imported foods of poor nutritional value has resulted in malnutrition and significant diet related non-communicable diseases (NCDs) including diabetes, high blood pressure, cardiovascular disease, anemia, vitamin A and iron deficiencies, low birth-weight and high infant mortality. Obesity and related chronic diseases can create large adverse impacts on individuals, families, communities, and the state as a whole, and the people of Pohnpei are especially vulnerable due to the limited healthcare infrastructure. NCDs are currently the leading causes of death for Pohnpeians and mortality rates are projected to increase in the future.

The prevalence of obesity in FSM's adult population increased from 42.9% in 2012 to 45.9% in 2016 (FAO 2021). At present, almost half of all women and over one-third of all men in the FSM are classified as obese (WFP Regional Food Security Atlas of the Pacific) which has been associated with an increased risk for diet related chronic diseases, such as type 2 diabetes, hypertension, cardiovascular disease. These can result in increased absenteeism, and early mortality (FAO 2021), and lead to decreased economic opportunities, increased health care costs, and a stress on the economy that is unnecessary and preventable.

To help reverse the current trend in obesity and malnutrition, people and communities need to make changes in their life style and in food consumption. One such change is to increase their intake of fresh fruits and vegetables that are rich in vitamins and minerals that promote health, such as vitamin C, calcium, and iron and reduction in overly processed foods of high fat and high sugar. Imported processed foods are not only so often limited in these essential nutrients, they are often rich in salt, sugar, and fat, nutrients associated with obesity and nutrition-related chronic diseases (WHO 2013; Jardim et al. 2021). Therefore, local production and consumption of affordable fresh fruits and vegetables such as the karat banana (Englberger 2006) and other indigenous crops (Balick 2009) can significantly contribute to improving nutrition security and a holistic food security policy must address both the demand and the supply of healthy foods (FAO 2014).

Economic Vulnerabilities

Food expenditures now dominate household expenditures in Pohnpei, particularly for poorer families, with up to half of total household expenditures going toward food purchases and an additional amount needed to cover rising energy/fuel costs. Nationally, 70% of households have income below US\$15,000 and these households struggle financially, unable to save and incurring debt. In Pohnpei, the consumer price index (CPI) has grown at a rate of 5.5% but resident salaries and wages have only grown at 2.5%.

Although the GDP per capita increased from \$3,079 in 2007 to \$3,393 in 2018 (FSM 2016, TNC 2023), the State has faced food security challenges during the COVID-19 pandemic era in the last few years. The economy of the State depends on the funding received from the national government of FSM which is still firmly dependent on US aid and Compact funding (TNC 2023).

Environmental Vulnerabilities and Climate Change Impact on Farming Families

Pohnpei is extremely vulnerable to natural disasters and farming families are already experiencing the negative impact of climate change, extreme weather and increased temperatures on key food staples such as coconut, root crops, and breadfruit. Subsistence farmers are reporting the threats of rising sea level and king tides increasing salinity of soil and thus affecting crop production (2023 Green Climate Fund Baseline Survey).

According to the Notre Dame Global Adaptation Initiative (ND-GAIN), in 2020 the FSM was the 12th most vulnerable country to climate change and the 123rd in terms of climate change readiness in the world (FSM scored 0.58 on the vulnerability scale and 0.35 on the readiness scale).

Pohnpei State is particularly vulnerable to the combined effects of sea level rise, changes in rainfall and large-scale ocean-atmosphere oscillations (El Niño–Southern Oscillation [ENSO]), increasing tropical cyclone intensity, and ocean warming and acidification. Almost all of Pohnpei’s outer island atolls lie within the 2-meter zone of potential sea level rise, and all lie within a 5-meter zone of storm surge. Pohnpei State’s extensive coastline is prone to climate-induced coastal erosion, spring tides, and species loss / coral bleaching threatening the livelihoods of Pohnpei’s fishers who are highly dependent on marine biodiversity as their protein source.

In an effort to address this urgent issue, the Green Climate Fund (GCF) project titled “Climate- resilient food security for farming households across the Federated States of Micronesia (FSM)” seeks to develop holistic, integrated, and adaptive strategies intended to enhance food security, strengthen livelihoods, and increase the resilience of all FSM communities to future risks from a rapidly changing climate. A GCF Baseline Survey of climate resiliency among FSM’s farming households was prepared and implemented in all four FSM states to assess the conditions, problems, and goals of farming families.

In Pohnpei state, 160 Pohnpei farming families living on the main island were surveyed. The main concerns of Pohnpei residents related to the effects of climate change on food security are extreme heat, heavy rains, invasive species, and increased threats to crops from pests and disease. Respondents (78%) noticed over the last decade that the mean temperature increased, and 61% noticed that mean rainfall increased. Almost 60% of respondents believe that climate change is the biggest problem facing their farm. Nearly half of respondents relate that climate change impacted their access to clean fresh water and around 12% reported the need to have altered the crop types because of climate-related issues. When asked about foods jeopardized by crop losses, the products more frequently brought up by Pohnpei respondents were breadfruit, mentioned by 45%, yam (39%), soft taro (38%), hard taro (35%), sakau (34%) and banana (34%). Almost 30% of Pohnpei respondents worried sometimes that they would not have enough healthy and nutritious food to eat, while 6% often could not afford healthy food. Almost 30% of respondents declared that sometimes or often they could not afford to eat the food they would prefer and had to eat different types of food. Almost half the respondents experienced concerns with water quality (off-color) while others indicated concern about water taste (31%), safety and sanitation (25%) and smell (16%).

Importantly, more than 60% of Pohnpeian Green Climate Fund survey respondents expressed a desire to grow/raise/harvest more food if they could. These same respondents indicated a variety of resources needed to help them achieve their long-term food production goals in a changing climate including agriculture training, tools, affordable animal feed, greenhouses, disease resistant animals and financial credit.



Figure 9: Response from Green Climate Fund Baseline Survey in Pohnpei State, Rutgers University (2023)

2.4 Food System Development Potential

Pohnpei state has the potential to increase local food production by 50% in the next five years while reducing imports of those foods that can be grown, raised and harvested in Pohnpei by 50% in the next 5 years.

Terrestrial Food Production Potential

Pohnpei main island is a volcanic island with extremely nutrient-rich soil that has the potential to successfully grow a wide array of crops that are currently only being imported into the country.

Pohnpei's traditional agroforestry is commonly practiced, integrating economically important trees with annual or perennial crops to create a sustainable farming system. Such a practice preserves and can improve soil fertility, protect crops from extreme weather, and create new markets for timber and non-timber forest products. Traditional agroforestry can also contribute to the conservation of Pohnpei's forests and biodiversity.

Pohnpei's traditional agriculture practices also include organic and sustainable farming methods. **Establishing organic certification** of locally produced crops can support niche markets for high-quality, eco-friendly products exports. Organically labeled local foods can also support local, high-end eco-tourism. Yet, strengthening food production systems without use of pesticides, when possible, can also reduce input costs and potential adverse unintended consequences to the environment and household. **Adopting new technologies**, such as precision farming and greenhouse protected cultivation can provide year-round supply of fresh produce, improve and diversify crop yields, reduce input costs, and create new markets. New technologies can support innovation and entrepreneurship in the agribusiness sector. The introduction of low-cost coolers can support post-harvest shelf-life and solar refrigeration systems can improve food safety.

Significant market demand exists among incoming commercial fishing vessels for fresh fruits and vegetables. Presently, these vessels arrive at port without prior notification to local growers. Consequently, the crews of these fishing vessels frequently deplete the stocks of fresh produce in local supermarkets. It is imperative to establish better coordination between national and state governments

and local food producers. This coordination would ensure that farmers are adequately prepared to meet the demand, facilitating the sale of their fresh crops to this substantial market. Such efforts would not only strengthen local food production but also enhance sales opportunities for local farmers.

Adding value to crops by processing them into finished products such as juice, jams, sauces, chips, can increase their value and create new markets. This can lead to the development of cottage industries and support small-scale entrepreneurs. Establishing local collecting centers can be used for community-based processing facilities and/or transportation to larger fresh market wholesale and retail markets and also used for gathering staple local crops for drying and processing into other food products (chips, flour, etc.).

Pohnpei's agricultural sector is currently dominated by staple crops such as taro, yam, and cassava.

Strengthening the value chain of these crops as well as diversifying the crop base to include high-value crops such as fruits, vegetables, and spices can create new opportunities for agribusiness development. These crops can be sold locally and exported to other markets, including neighboring islands and regionally to US military bases and others.

The significant amount of money that is currently spent on imported poultry and eggs would be better redirected toward local poultry, egg and animal feed businesses.

Pohnpei has only a few hardware and feed stores with agricultural supplies, such as fertilizers, agrochemicals, and pig and chicken feed. Pohnpei has the means to produce its own compost, seeds and local feed.

Marine Food Production Potential

Aquaculture is a proven means to develop sustainable sources of protein to support local food security and enhance economic activity (Subasinghe et al. 2009). Globally, seafood is the primary protein for more than 3 billion people (World Wildlife Foundation 2022); however wild populations are easily overexploited and cannot meet the demand especially if it is fueling unregulated large export markets (Britten et al. 2021). Aquaculture is allowing seafood consumption to increase globally with the contribution from aquaculture ready to exceed global extraction through fishing. The success of this approach will require sustainable development methods to protect the environment and effective management to minimize environmental degradation.

On small islands and low atolls, marine food sources are often the principal means of survival and production since agriculture and freshwater resources are limited. The main island of Pohnpei State is fortunate in having a wider range of aquaculture options since fresh water, brackish and marine environments provide potential sites for aquaculture. Pohnpei has a well-developed barrier reef surrounding a narrow lagoon with an area of about 181 km². Off-shore aquaculture may also be a possibility. Pohnpei is perfectly situated to develop marine aquaculture, with some of the highest tropical marine biodiversity in the world and clean ocean waters that provide a unique opportunity for growing native marine species with an integrated aquaculture strategy.

For example, green mussels represent a potential candidate for aquaculture but require areas with high productivity, such as those adjacent to fringing mangrove systems, where there is ample phytoplankton production for these filter feeding bivalves. The FSM Aquaculture Management and Development Plan 2019–2023, produced by the FSM Department of Resources and Development, provides a list of priority marine commodities developed through consultations with a range of stakeholders and resource personnel. The marine commodities listed were scored based on their aquaculture feasibility and impact. Feasibility was defined by how appropriate the technology was for the marine environment and how well the marine commodity might be grown and marketed. Impact was defined by the potential benefits of that marine commodity and how the commodity would affect local culture, society and the environment. In both categories—feasibility and impact—the giant clam received the highest priority ranking for aquaculture development potential.

2.5 A Food Systems Approach to Centralized Local Food Production

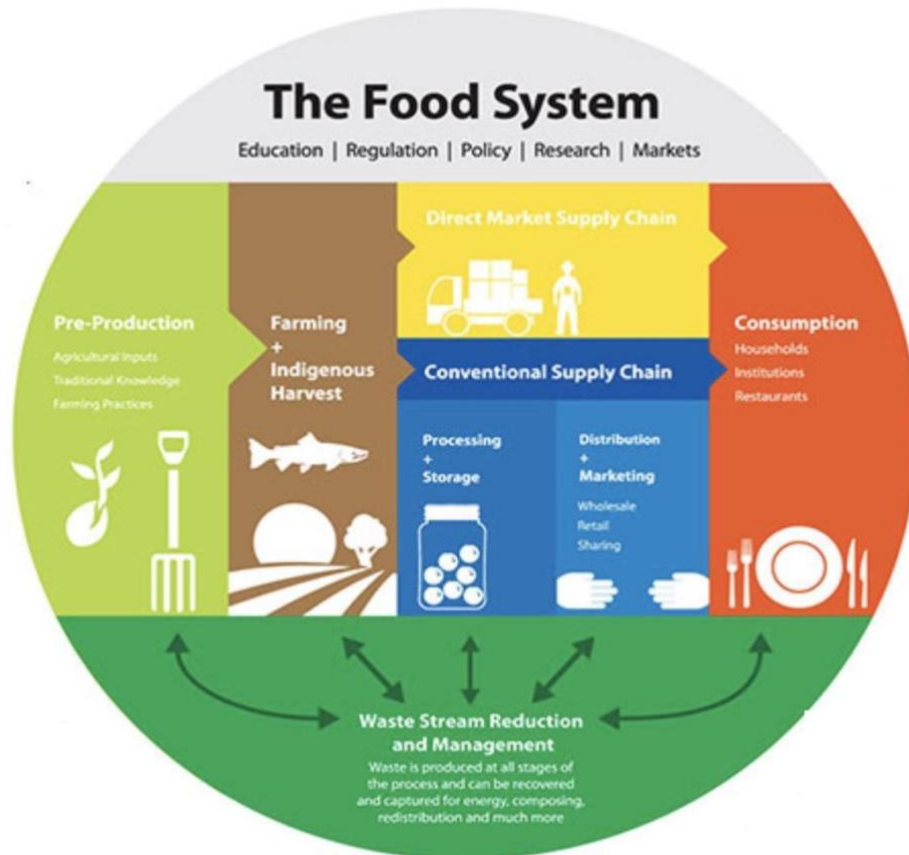


Figure 10: Integrated Food System diagram, Kwantlen Polytechnic University (2020)

Pohnpei State’s current adoption of a food-systems approach considers the shortcomings of past food production approaches which were focused too narrowly on limited and specific projects. A holistic food systems approach (FAO 2018) is intended to engage all members of Pohnpei State society from food production through farming and fishing to our many subsystems in waste management and supply/value chain distribution, each interacting with our energy and trade systems as well as our health care systems.

Centralization and coordination between food producers, consumers, and market is key to a successful food system. Pohnpei State’s lack of food system centralization does not offer farmers and fishers security when attempting to sell directly to the market. This lack of centralization leads to inefficient scheduling, high postharvest losses and the lack of a reliable food supply to market.

Increase Linkages and Coordination between Food System Sectors

Food systems encompass a range of contributing stakeholders with interlinked value-adding activities. Stable and reliable food systems are interconnected networks of activities including food production, aggregation, post-harvest handling, processing and value addition, distribution, consumption and disposal of food products, all connected to broader economic, societal, and natural environments.

Centralized food innovation centers can serve as incubators for food processing and can help small growers participate in the production of final high-value products. The Innovative Center at the College of Micronesia can serve as a model research site and also a private sector incubators/distribution facility

for commercialization of local food product manufacturing. A small incubator center for food processing and preservation could be transformative for the local processing and packaging of taro and breadfruit chips, and other food products. The skills and expertise developed would then lend itself to other fruits and vegetables.

To maximize coordination of food production resources, it is important to streamline all food production funding through the Pohnpei State Department of Resources and Development. This policy is designed to support the community’s interlinking food system sectors and their relationship to Pohnpei’s environment and natural resources.



Figure 11: Food System interactions between food producers and consumers influenced by environmental, market and political (policy) drivers. Credit I. D. Brouwer

3. Key Food Security Policy Objectives

The primary goal for this policy strategy document is for a sustainable, locally based food system that will deliver food security, nutrition and safe, reliable clean drinking water for all Pohnpei citizens, ensuring that the health and environmental well-being of present and future generations is secured and not compromised.

Given the limited local markets for fresh products, strengthening commercial food production systems can focus on expanding fresh produce to meet domestic needs and reduce imports for a number of foods while at the same time developing an effective approach to in-country agro-processing. Each of these enhancements requires a serious investment in human capacity building and training, access to land and water, favorable state policies for importation of needed inputs, and investment. Value-addition would include processing, branding, quality and safety certification and accreditation, as well as farm-level quality improvements that the market values. Processing and the value-addition of agricultural and marine food products is very limited and at a basic level of development at present. Lack of investment capital, limited technical, entrepreneurial, and business skills, lack of infrastructure, and inconsistency in supply of quality primary products, together with expensive and unreliable utilities and transport all constrain agribusiness development.

3.1 Nutritious, Affordable and Available Food and Clean Drinking Water for all Pohnpeians

Nutrition security is provided by consuming a diet comprised of safe, healthful foods rich in micronutrients. Access to reliable clean water is also essential to promoting a healthful environment for adults and children, regardless of their diet.

The price of a nutritious diet is a key factor in determining household nutrition outcomes. Therefore, improving the affordability and availability of target nutritious foods is critical to achieving behavioral change (FAO 2021).

Fresh fruits and vegetables are rich in vitamins and micronutrients including vitamin C, calcium, and iron and therefore local production of affordable fresh vegetables and increased local consumption of these foods makes a significant contribution to improving nutrition security. At the same time, foods with little or no nutritional value, including so called “snack foods,” are a significant contributor to the increased prevalence of NCDs. Revising the existing food-based state dietary guidelines to emphasize increasing consumption of local fresh fruits and vegetables, along with locally produced staple foods, is an essential step in this direction, and a priority.

Objective: Improve nutrition for the most vulnerable segments of the population including women and children

Pohnpeian women, in their role of caring for children, are central in promoting and supporting programs that provide access to affordable healthful foods. It is necessary to recognize existing challenges they face regarding access to reliable, affordable and regular healthy food and clean water for themselves, their families and their children. This includes ensuring rural women, families and children have access to affordable, available and nutrition foods at home and in the schools. It also requires attention to ensuring equal and reliable access for women and girls nutrition, health, agricultural and resource management education.

Clean drinking water

Within Pohnpei State, access to safe drinking water varies considerably within due to geologic factors, socio-economic status, technology and village-scale governance. Households in remote areas including

the outer islands are less likely to have constant access to safe drinking water and this condition is exacerbated for poorer households. This is particularly the case for outlying islands where households have access to individual or community rainwater harvest systems for drinking water, while groundwater from the islets water lens is generally unsuitable for drinking, due to poor water quality and/or salination from saltwater intrusion (Fig. 19).

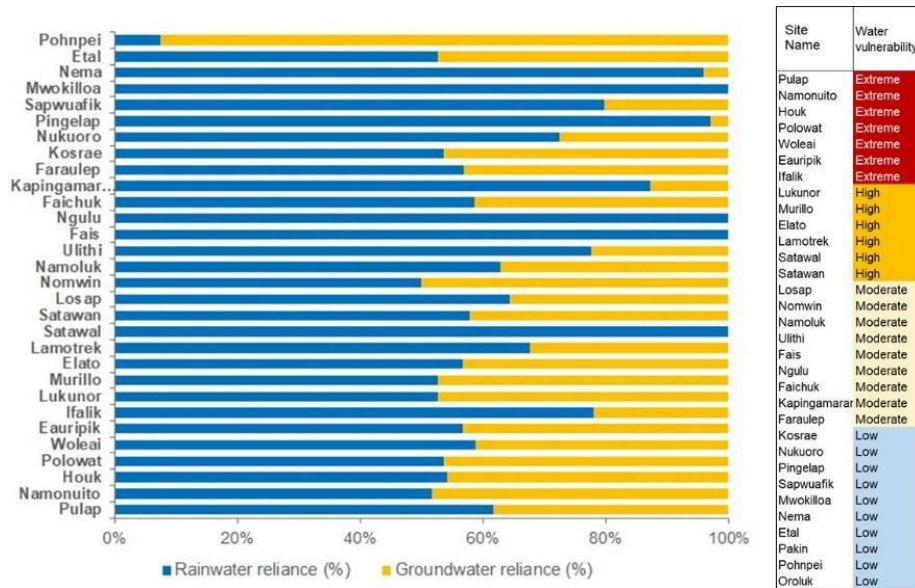


Figure 12: Percentage of households that utilize rainwater and groundwater as a water source for any of their water needs, either for potable or secondary water needs, and water vulnerability at selected sites (Source: SPC Atoll Water Inventory, 2020).

Migration to the main island from outer islands and the largely unplanned urban growth in Kolonia is increasing water resource pressure on Pohnpei’s main island, affecting water security (SPC, 2020).

The Pohnpei Utilities Corporation water system covers about two-thirds of main island Pohnpei, providing water to 61% of the island’s residents (Deloitte, 2018). However, a significant part of the population still relies on rainwater tanks, ground wells, streams and springs for their source of drinking water. This policy aims to use the latest technology, in cooperation with international partners, to improve clean water access for its population.

3.2 Develop a Sustainable, Climate Resilient Local Food System

Pohnpei State is extremely vulnerable to natural disasters and the impact of climate change. A food security policy must include steps to adapt and develop resilient food production strategies. The development of a sustainable food system within Pohnpei can provide healthy foods for improved diets and well-being as well as equitable livelihoods and resilience while also reducing food waste and carbon emissions from shipping and transport of imported foods. The success in such policies will lead to increased job creation, more opportunities for youth, increased public health, and allow the State to retain cash that can be reinvested in the local economy.

Good stewardship of the available land is necessary to maintain agricultural productivity, ensure economic growth, protect biological and cultural diversity, maintain the watersheds that provide clean water and meet the increasing food demands of a growing population. Intact forests that maintain a diversity of trees have a significant role in mitigating the impacts of climate change yet, without

protections, Pohnpei’s forests are threatened by destructive human activities associated with agricultural clearing, firewood collecting and logging.

Restorative ecological actions that preserve and rehabilitate the coral reefs, beaches and ocean fronts foster preservation and protection from environmental degradation while providing opportunities to enhance reseeded and repopulating aquatic species. Establishment of Marine Protected Areas (MPAs) is an example of a strategy that has been and can continue to contribute to the sustainability of fish and shellfish populations, foster greater biodiversity and ecosystem health and generate income through ecotourism and sustainable fishing. If managed appropriately it also provides means to protect from the over-exploitation of local resources from large export markets.

Proactive approaches are required to develop resilient management strategies that protect and conserve marine and terrestrial habitats from the impacts of climate change. Forecasting seasonal shifts in habitats and species will inform adoption of management strategies to sustain farming, fishing and aquaculture operations as well as to identify suitable future food production opportunities. Over the long-term, rising sea levels will impact the island atolls and shoreline, however “living” shorelines have been demonstrated to have beneficial impacts to minimize shoreline erosion.

According to the sustainable development goals established by the UN in 2015, “A sustainable food system is a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised. This means that:

- It is profitable throughout (economic sustainability);
- It has broad-based benefits for society (social sustainability); and
- It has a positive or neutral impact on the natural environment (environmental sustainability).”

In collaboration with international partners, this policy strategy introduces new low-cost climate smart green technologies to increase innovation such as greenhouses, solar dryers, cold storage, and sustainable aquaculture, especially shellfish aquaculture which is one of the greenest industries on the planet

Prioritize conservation of natural resources that yield food

Natural resources of Pohnpei are impacted by a host of environmental and human pressures including population growth, overharvest, habitat alteration, changing cultural practices, invasive species, and climate change. The “Micronesia Challenge” was established to conserve at least 30% of nearshore marine resources and 20% of terrestrial resources (Weeks 2015). Pohnpei has designated thirteen marine protected areas including nearshore coastal habitats and three mangrove forest reserves. Although the Pohnpei protected area network exceeds the targets specified in the Micronesia Challenge the habitats protected consist primarily of atoll reefs and lack representation of the fringing reef surrounding the island.

A design review will be conducted to ensure that existing protected areas are adequate to ensure sustainability of critical habitat to support the life history stages of important fish and shellfish, and to identify additional protected areas critical to maintain the environmental quality required for fish and shellfish production.

Site surveys exist that provide good characterizations of local habitat and should be used to inform MPA establishment, management and sustainability, and the potential establishment of zones specifically delineated for aquaculture. For example, green mussels represent a potential candidate for aquaculture but require areas with high productivity such as those adjacent to fringing mangrove systems where there is ample phytoplankton production for these filter feeding bivalves.

Food is an essential element of culture, and maintenance of culture is a fundamental right of indigenous peoples (Blue Bird et al. 2021). The cultural dimensions of food include how crops are grown and harvested, and how—and why— food is prepared and eaten in particular ways.

This policy aims to incorporate awareness of food’s cultural significance and take advantage of the opportunity to preserve culture while strengthening people’s access to healthy food (Sampson et al. 2021).

3.3 Affordable Credit for Terrestrial and Marine Farmers

Agricultural credit is regarded as an important instrument of economic policy in most market-oriented developing countries. Credit is used in efforts to stimulate development in a direction considered desirable on economic and social grounds. Unfortunately, the results of conventional agricultural credit programs have seldom measured up to expectations. Their effects have generally been overestimated by evaluations that ignore the way rural financial markets work. This is especially apparent where the agriculture sector primarily consists of small farms, as in most developing countries.

A great deal of attention is paid to imperfections in credit markets as barriers to growth in rural areas of countries that are dependent on agriculture. Income fluctuations resulting from socio-economic, climate, and other environmental risks are an important barrier to sustainable development, particularly in countries with high dependence on agriculture, vulnerability to natural disasters, and lack of efficient coping mechanisms. In the last two decades, access to financial services such as savings and credit has increased across the developing world. However, the availability and use of insurance services for financial protection against these risks has remained low across many developing countries.

Lending to small farmers is often too risky for commercial banks; consequently, extremely high-interest rates must be paid. Agricultural development banks help in some way towards solving the problem. However, default rates tend to be high, so credit must be subsidized by government grants or overseas aid.

In Pohnpei, land is managed under a complex mix of modern and traditional systems and thus individual farmer land ownership is less easily defined. Commercial banks and many other credit institutions are not well adapted to financing agricultural development especially within a system of traditional land ownership, leading many governments to create and fund state or quasi-state agricultural credit agencies to implement their credit policy. These lenders are intended to guide the scope and direction of on-farm investment. They also serve as channels for funds supplied by bilateral and multilateral development assistance agencies. Some governments also try to influence traditional informal rural financial markets and create farmers' self-help organizations to provide a better supply of credit to small farmers. This process is still at an early stage.

Since small farms dominate the agrarian structure of most developing countries, the principal task of agricultural credit policy is to provide many small farmers with credit at reasonable rates of interests and repayment terms. This task is especially difficult because the cost of providing credit is independent of the amount of the individual loan. The smaller the loan the higher the interest rate required to cover the lenders' costs. As interest rates on institutional credit are prescribed by the state in almost all countries, the banks' desire to do business with small farmers is understandably slight. In addition, small farmers often lack registered property rights and cannot secure loans by mortgages. This limits their access to medium and long-term credit, but they rarely even qualify for short-term commercial bank loans because they maintain no deposit accounts and therefore are not established bank clients. Moneylenders, state credit agencies, and/or community loan organizations have an important function in small farmer credit. They range from small to large, modern cooperative structures that include a banking system. The transition from noninstitutional to institutional credit is blurred here, as is the transition from independent private forms to state-influenced organizations.

Cooperative credit has played an important part in this process, based on the savings of cooperative members and on cooperative liability for external borrowing. The role of the state was restricted to providing a legal framework and retaining the right of supervision. Along with savings and lending cooperatives there arose input supply and marketing cooperatives, dairy, and other processing cooperatives, and multipurpose cooperatives combining several of these services. They were the engine of development in credit and marketing in the small farm agricultural systems. With industrialization, they have not lost, but rather strengthened their dominant position.

Establishing a sustainable food system requires providing reasonable credit for farmers, fishers and local aquaculture is essential. Without reasonable credit opportunities farmers are hard pressed to invest in food production infrastructure. A formal credit system suited to small-scale farming including community-based loaning systems is needed. Establishing an insurance program provides a safety net to protect farmers, fishers and aquaculturists from natural disasters such as impacts from storms, droughts, and disease that degrade food production systems and facilities.

3.4 Supporting Public Private Partnerships

Sustainable growth in local food production will depend on the capacity of a great many players interacting and cooperating. Hands-on training in all aspects of agriculture, aquaculture, livestock and marine food production (from seed to table) is necessary. A key will be to build capacity through extension programs and services to support the food production sectors and, in this approach, include greater support to College of Micronesia, the Cooperative Research Extension and other public and NGO communities and vocational training centers. For aquaculture, technical assistance will be needed to support innovations in hatchery and grow-out systems, larval feed, selective breeding, disease and predator control, and training programs for workforce development. Maintaining, and building, the technical expertise within these extension services is critical as it provides the bridge between basic research to the successful business. This may need to involve the State having a proactive leasing/loan program to support private sector and the commercial sector relative to land and a process by which state-funded projects such as the R&D aquaculture hatchery can shift into a fee-for-service facility and a stronger commitment and plans to move from research to commercialization.

4. Priority Action Items to Fulfill Food Security Goals

4.1 Improve Food Production Policy Management

The National Plan of Action for Nutrition in FSM requires an overarching framework for setting food-based policies related to the country's nutrition and health issues. Public policies by the State, harmonized with national FSM policies, are needed to encourage the local production of food.

Key features of food system development include integration of policy across governance structures (Thow et al. 2022). Many government programs and regulations can affect food availability, cost, access and food choices. Ralston (1999) stated that policies and “Regulations, regardless of whether or not they are directed specifically at the food sector, can affect the varieties and qualities of foods available for purchase, the prices consumers face, the information consumers receive about a product, and consumer confidence in the food supply.” Ralston stated further that there are four important categories of policies and regulations that must be considered: “farm assistance programs, food safety regulations, information regulations, and regulations covering other sectors and their potential impacts on consumer dietary choices.” All of these regulatory areas influence the “food choices consumers make and, ultimately, the nutritional quality of their diet (Ralston 1999).” This can be a complex challenge that requires a mechanism to integrate actions across institutional structures to ensure that the action of one government entity does not negatively impact the policies of other entities.

Two relevant interagency mechanisms operating in the US provide good examples. The first is the US Ocean Policy Commission which includes 26 federal agencies comprising 10 committees that coordinate and address all issues associated with ocean policy ranging from defense to resource management, mapping, research and climate change. A second illustrative example is the New Jersey Aquaculture Advisory Council with representatives from several state departments (Agriculture, Health, and Environmental Protection), aquaculturists, resource managers and researchers. The Council produces a periodic strategic plan for aquaculture, reviews and proposes relevant legislation to remove barriers to aquaculture and enhance opportunities for growth of the industry. Many other examples exist throughout the world that can serve as models for FSM.

Action Item: Improve food production policy governance and management through interagency cooperation and coordination.

Price Policies

Examples of price policies to support local food production can include:

- Subsidies for farmers (agriculture and aquaculture) food crops;
- Price support policies for farmers (setting minimum price for crops);
- Subsidies to support training and/technologies;
- Subsidizing agriculture/aquaculture courses in high school to support local food production capacity building; and
- Increased excise tax applied to importation of unhealthy foods.

Pohnpei State has the ability, through arrangements with the FSM national government, to tax targeted and selected imported goods coming into the state to increase consumption of local foods. Pohnpei State can consider taxation of unhealthy imported foods as well as imported wheat flour, milk, chicken, eggs, and beef products, as needed, to incentivize consumption of local substitutes (taro flour, coconut milk and locally raised chicken, eggs and pork).

Pohnpei State can benefit from knowledge sharing with the USDA Economic Research Service that can provide data on methods used to support farm-to-consumer pricing.

Policy measures to increase local food supply and improve food security in the Federated States of Micronesia (FAO 2014) suggests an excise tax rate of 75% be applied to sugary drinks imported into Pohnpei State to discourage consumption of unhealthy beverages linked to obesity in children and adults. A tax rate increase of 75% on imported soda alone could provide Pohnpei State with an additional \$725,000 per year. A similar increase in excise tax for canned meat could be applied to reduce consumption of unhealthy foods linked to heart disease while increasing state that can be redirected to local agriculture production. Yet, should such excise taxes be applied, then such funds generated should be allocated for healthy food education and awareness programs and support local food production.

4.2 Revise and Develop Pohnpei State Import and Foreign Investment Policies

The 2014 FAO funded *Policy Measures to Increase Local Food Supply in the Federated States of Micronesia* argues for a tax reform program to disincentivize the purchase of unhealthy imported food and increase purchase of locally produced, healthy foods. Consideration to increase tax on selected foods and drinks/beverages that have been shown to create health concerns may provide sources of revenue for the state to directly invest into food security programs.

Action Item: Consider import tax on imported foods that contain high fructose corn syrup to reduce access to unhealthy food products.

Policies that reduce importation barriers for agricultural inputs, supplies and equipment including food processing equipment, greenhouses, nurseries, irrigation systems, solar power systems could be beneficial.

Action Item: Implement policies and measures to secure reliable importation of essential foods and supplies that cannot be produced domestically due to environmental and economic constraints.

Including access to staple foods such as rice, beef, milk, and other food items as part of the FSM commercial foreign fishing license agreements could help to address the high cost of imported foods. By negotiating with foreign nations interested in fishing in FSM waters, Micronesia could secure access to food items produced outside of FSM at favorable prices as part of an exchange that allows commercial fishing vessels' access to FSM's EEZ. This would create a mutually beneficial arrangement that could strengthen diplomatic and economic ties between the FSM and foreign nations that conduct commercial fishing.

Action Item: Review and Revise Pohnpei State's foreign investment policy to allow for some targeted foreign investment in agriculture production.

Currently, Pohnpei State does not permit any foreign investment in local agriculture activities.

4.3 Increase Local Food Production for Domestic and Export Markets.

Policies that provide incentives to the private sector to invest in agriculture production, processing, manufacturing and distribution (import and export) are needed.

Policy support for private sector food production development should factor in competitive, living wages for agriculture, fishers and other food producers to address declining wages. In Pohnpei, the consumer price index (CPI) has grown at a rate of 5.5% but resident salaries and wages have only grown at 2.5%. Policy that supports private sector food production businesses through subsidies, grants and loans for development of food crops (marine and terrestrial) as well as livestock, poultry and eggs will stimulate other sectors of the local economy.

Action Item: Strengthen and develop supply chains for locally produced foods.

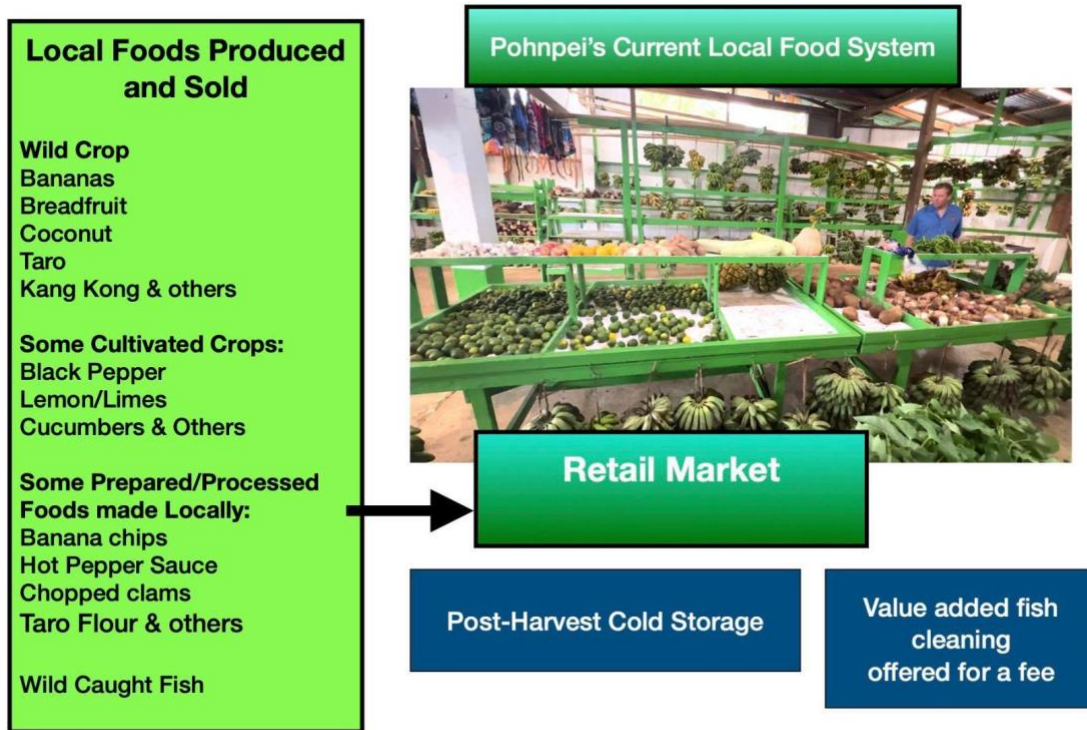


Figure 13: Current Food System in Pohnpei State

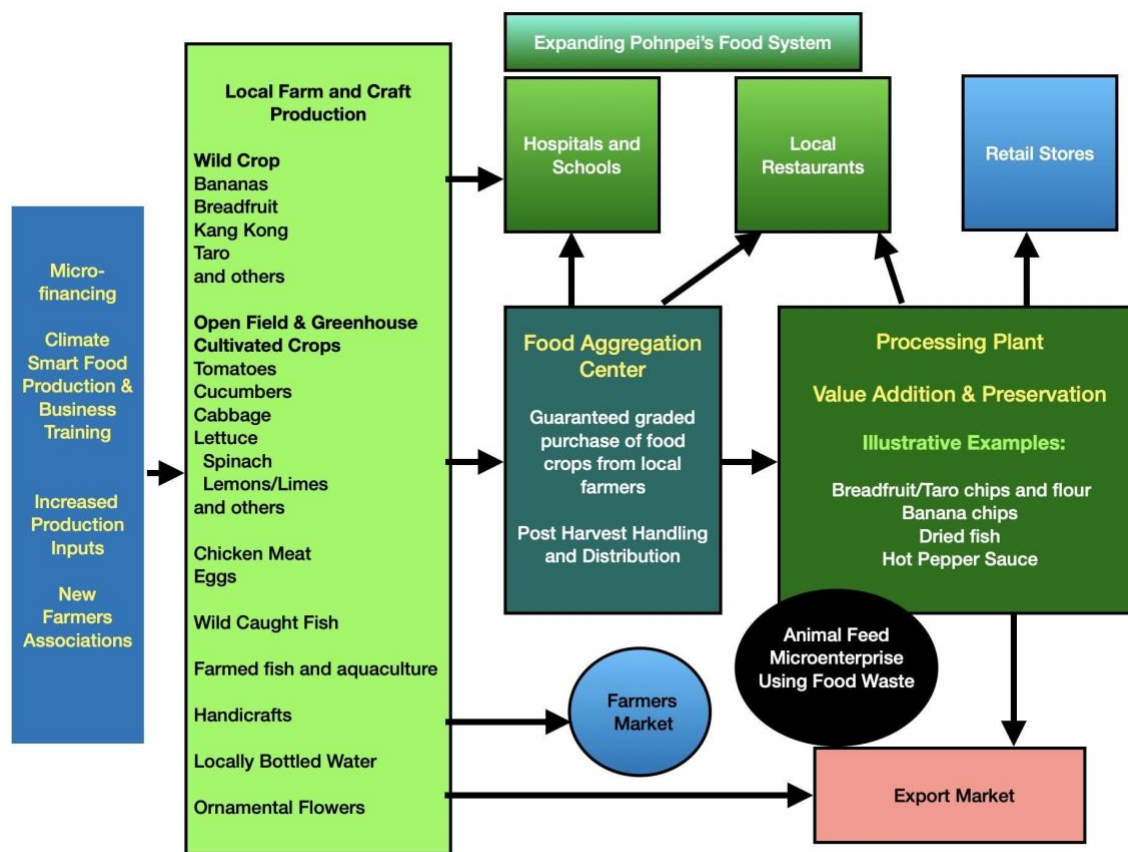


Figure 14: Proposed expanded food system in Pohnpei State

Proposed steps to increase food system centralization:

- Use a market-first approach and apply production schedule to market needs;
- Develop small-scale local aggregation and collection centers – one in each municipality - to foster farmer and community engagement, and improve product storage facilities and food safety;
- Centralized processing, packaging, grading and sorting, and distribution centers can significantly and positively impact increased food production and readiness for market and export; and
- Establish an emergency food depot.

Local processing of indigenous foods, specialization and commercialization: Establish a processing facility in Pohnpei where any farmer can sell their crops (taro, banana, breadfruit) for local processing into flour and chips. Similarly, a seafood processing plant for aquaculture products should be established.

Processing plant for local livestock feed: In coordination with Vital Coconut Oil processing plant, use copra cake byproduct as base for livestock feed microenterprise. Other coconut byproducts such as coconut fibers can be used to mitigate coastal erosion. Pohnpei State will explore the potential beneficial use of coconut fiber as erosion control strategies for hillside terrestrial crops and shoreline stabilization.

Cooperation: Pohnpei State needs to legislate the taxation of unhealthy imported foods as well as imported wheat flour, milk, chicken, eggs, and beef products, as needed, to incentivize consumption of local substitutes (taro flour, coconut milk and locally raised chicken, eggs and pork). These policies and actions need to be negotiated with the national government.

Science to provide more resilient, locally appropriate crops, pigs and chickens: Potential areas of focus include developing disease resistant food crops and aquaculture species, salt water resilient crops, disease resilient chickens and pigs and more robust egg layers.

Action Item: Increase the number of commercial greenhouses producing fresh produce for the market.

Initial greenhouse production is now underway on two sites illustrating that different styles and approaches can work and be used to produce fresh produce year-round. This can be scaled-up and future systems placed near or at new future market sites (e.g. building a fresh foods market and supply stores at the harbor where incoming fishing vessels arrive), all strategically designed for private sector commercialization.

Action Item: Improve farmers' access to production inputs such as seeds, improved varieties of crops, fish, animals for resistance to biotic diseases and abiotic stresses, seedlings, fertilizer, tools, information, vaccinations and insemination, etc.

The national government has announced a 2023 Investment Development Fund that lists agriculture development as a sector that includes exploration of private sector partnerships to establish feed mills for processing local materials for poultry, pig and aquaculture feeds. Specifically targeting support for the processing of local animal feed would provide jobs for feed processing while stimulating local livestock and poultry and egg production due to the new, reduced operations costs.

Action Item: Develop processing and value additions of local food products.

Postharvest facilities, processing, storage including cold storage and handling capacity must be developed for local storage and to enable the export of agriculture and aquaculture products. Facilities that can be shared and support multiple commodities and products using the same/similar technologies (e.g. low-cost refrigeration and more) should be explored.

Action Item: Establish a seed bank that include climate resilient local crops

Seed banks help protect Pohnpei's food system with genetic variety to create pest-resistant, disease resistant and climate resilient crops in a changing environment. Live germplasm banks for trees and other perennials to be re-established at the State Agricultural Experiment Station and botanical garden.

Action Item: Support Climate Smart Agriculture including optimization of traditional knowledge adaptation strategies, nutrient cycling and composting.

Pohnpei State's network of sustainable food system partners includes local and international expertise using modern science and technologies to support cultivation of indigenous crops and development of climate-resilient local foods. For instance, sea level rise and saltwater intrusion is affecting giant taro crops for Pohnpei's coastal farming families. Evaluating existing germplasm and developing a selection protocol for **saltwater tolerance swamp taro** including known cultivars that are able to survive the salt water could be mass propagated through plant tissue culture.

Action Item: Waste management to support a circular economy and protect the environment

Waste management from food system production includes organic wastes from agriculture, fisheries and industry that can and thus should be used to enhance our circular economy by providing opportunities for value-added products needed in the state. Creating policy that supports the efficient use of waste products can support innovative new business partnerships such as the manufacturing of local feed (from fish by-catch and from copra for example), to composting and soil amendments, to chipping and used hibiscus fiber. Policies that encourage the capture of waste from poultry and pig/livestock production to eliminate runoff into Pohnpei's streams and rivers and instead redirect fertilizer is needed to protect our environment and water supply while aiding and assisting in providing nutrients to support other agricultural ventures and operations. That is a proactive policy to encourage and support the conversion of organic waste into useful products thus reducing waste and protecting our waters and environment and while strengthening Pohnpei's local economy.

Action Item: Increase the amount of locally farmed aquaculture foods for domestic and export markets.

Small-scale aquaculture ventures are underway in Pohnpei which include reef fish (especially rabbit fish), giant clams, corals and sponges which represent an opportunity for Pohnpeians to enhance their resilience to climate change and overfishing. Additional species offer strong potential for aquaculture development including green mussels, pearl oysters, mangrove crabs and marine snails. To facilitate such development, regulatory policies must simplify and expedite access to suitable growing environments. Technical assistance must be provided by the academic community to transfer culture technology and methods, provide initial hatchery capacity, support innovation through extension programs and services, maintain selective breeding programs, and develop training programs for the future aquaculture workforce. Disease certification services must be provided by the government or the academic community.

Shared facilities can provide economic efficiencies to advance aquaculture production such as for hatchery, processing and transportation functions. Local needs can also be met by reliable delivery of agriculture and aquaculture products to local schools and hospitals, venues that also serve as mechanisms to communicate the value of locally grown nutritious food.

Action Item: Improve dialogue and information sharing among food systems stakeholders (local, public, private and development) for effective implementation of increased local food production.

An interagency or interdepartmental mechanism is needed to coordinate policies and strategies across state departments. Stakeholder representation (e.g. farmers, fishers, aquaculturists, school and public officials) in such a coordinating mechanism is essential.

Action Item: Improve infrastructure and transport to support agriculture collection and distribution for rural communities especially those living on the outer islands.

A sustainable local food system will depend upon improved transportation (air and shipping) linkages and infrastructure (e.g., roads) for food accessibility especially for remote communities.

Action Item: Establishing Food System protections from natural disasters and climate change.

The development of a local food system must prepare for the potential threats of climate change such as extreme heat, tidal surges, king tides and include climate resilient food crops and livestock as well as agricultural practices that sustain, and do not deplete, the natural ecosystem.

Action Item: Explore renewable and affordable energy sources for food production and post-harvest handling.

Reducing the energy costs currently associated with local food production is a necessary step toward food system sustainability. Pohnpei State holds several options for renewable energy, none of which are currently operating at their full potential.

4.4 Provide Necessary Technical Training for all Food Producers

There are many opportunities for capacity building and job creation related to the development of Pohnpei's sustainable food system. New expertise will be needed for the establishment of food aggregation centers, food incubator centers and food processing and preservation, and related training and capacity building. In addition, introduction of the commercialization of aquaculture, protected cultivation (greenhouses), and clean drinking water that incorporate green energies such as solar power will create new jobs and new markets. Germplasm and greenhouse management, chicken and egg farming, including environment impact and monitoring of natural resources, CO₂ emissions, composting and recycling.

Action Item: Build capacity in agriculture and marine sectors including training

Capacity building in agriculture and marine sectors through partnering university programs that provide business training in food system entrepreneurship and management would support and encourage private sector development and local food system leadership. Policy could support this human resource development through scholarships and educational grants and loans.

Make local growers the principal supplier to local markets: Coordinate Pohnpei farmers association to be able to sell regularly and directly to local markets such as hospitals and schools and the government.

Action Item: Strengthen and support development of local farmers associations

Action Item: Provide training and resources to increase number of local farmers (terrestrial and land) producing food for the market

Action Item: Improve extension services for commercial and traditional farmers.

Action Item: Increase the number of rural community/farmer groups and associations.

Action Item: Strengthen food production research and knowledge links with regional/international partners.

4.5 Increase Food Production and Water Security for Pohnpei's Outer Island Communities

The outer island communities are particularly vulnerable to feed insecurity because of more limited resources, and greater impacts of climate-change related weather events. They have limited ability to grow food because of poor soil and increasing soil salinity from saltwater intrusion.

Enabling food security on the outer islands will require new agriculture technologies such as greenhouses and covered cultivation, access to salt water tolerant crops, and soil regenerative practices.

These populations rely on reef fishing for a significant part of their diet. Protection of the coastline from erosion will provide added security against loss of land, as well as preserving marine habitat for the local fish.

Action Item: Increase Access to Clean drinking water

Water security in the outer island communities depends on the availability of rainwater, the reliability of the network of rainwater catchment systems, and the availability of fresh groundwater as a source to use during periods of low rainfall. Water vulnerability is very high and increasing because groundwater is generally unsuitable for drinking due to poor water quality and/or salination from saltwater intrusion.

In the years of drought events, FSM's low-lying atolls were particularly affected since their fragile freshwater resource base can be quickly depleted when there is a lack of rainfall becoming more vulnerable to saltwater intrusion. During the 2016-ENSO event, in Kapingamarangi, one of the outlying remote islands of the state, drinking water supply was depleted and water supplies had to be delivered by ship from Pohnpei (SPC 2018).

There are examples of Water Management Plans (WMP) that are working to resolve these issues. For example, the Adaptation Fund a project implemented by the FSM government is working with the communities of the inhabited atoll islets of Nukuoro and Kapingamarangi to develop water management plans to enhance their water security (SPC 2018).

4.6 Expand Access to Low Interest Financing

Agricultural credit is regarded as an important instrument of economic policy in most market-oriented developing countries. Lending to small farmers is often too risky for commercial banks; consequently, extremely high-interest rates must be paid. Agricultural development banks help in some way towards solving the problem. However, default rates tend to be high, so credit must be subsidized by government grants or overseas aid.

Action Item: Increase low interest micro-financing for all areas of local food production.

In Pohnpei, land is managed under a complex mix of modern and traditional systems and thus individual farmer land ownership is less easily defined. Commercial banks and many other credit institutions are not well adapted to financing agricultural development especially within a system of traditional land ownership, leading many governments to create and fund state or quasi-state agricultural credit agencies to implement their credit policy. These lenders are intended to guide the scope and direction of on-farm investment. They also serve as channels for funds supplied by bilateral and multilateral development assistance agencies. Some governments also try to influence traditional informal rural financial markets and create farmers' self-help organizations to provide a better supply of credit to small farmers. This process is still at an early stage and this is where international donors can provide assistance.

Action Item: Increase micro-financing to support small farm business enterprises and development, such as for post-harvest handling or storage facilities.

Since small farms dominate the agrarian structure of most developing countries, the principal task of agricultural credit policy is to provide many small farmers with credit. This task is especially difficult because the cost of providing credit is independent of the amount of the individual loan. The smaller the loan the higher the interest rate required to cover the lenders' costs. As interest rates on institutional credit are prescribed by the state in almost all countries, the banks' desire to do business with small farmers is understandably slight. In addition, small farmers often lack registered property rights and cannot secure loans by mortgages. This limits their access to medium and long-term credit, but they rarely even qualify for short-term commercial bank loans because they maintain no deposit accounts and therefore are not established bank clients. Regarding loan repayment, small farmers paradoxically often are better payers than big farmers. This is to be explained not so much by efficiency in using credit as by the relative

political weight of these two classes of borrowers. Side by side with moneylenders and state credit agencies, farmers' self-help organizations have an important function in small farmer credit. They range from small to large, modern cooperative structures that include a banking system. The transition from noninstitutional to institutional credit is blurred here, as is the transition from independent private forms to state-influenced organizations.

Action Item: Commit and allocate a portion of annual domestic revenue to local food production.

Competitive programs are needed that provide low-cost loans and seed grants to new food-system businesses. Export earnings need to be increased, and tourism, fisheries, and agriculture provide a significant opportunity.

4.7 Increase Demand for Healthy Food- Nutrition Awareness Campaign

An annual Pohnpei State Cultural Food and Healthy Eating Awareness Campaign will be designed with the intent of inspiring behavior change around food production and consumption.

In 2010, The Island Food Community of Pohnpei (IFCP) has demonstrated success in promoting local healthy foods via their “Let’s Go Local!” campaign to promote local island food for the “CHEEF” benefits: Culture, Health, Environment, Economics, and Food Security. They used an inter-agency, community and research-based, participatory and media approach. They involved National and State government agencies, and NGOs like environmental/church/youth groups, and various media, including radio, newspaper, email, and newsletters, were used in distributing information. A 2-year intervention resulted in significant improvements to the diets, and the perception of local foods, in the target community (Englberger 2011). The challenge here is to incorporate such approaches into our annual planning and educational programs for schools, students and parents.

A Culture Food Heritage Awareness Campaign can teach traditional food preservation methods. For instance, most Pohnpeians know that *mahr* is a type of breadfruit that has been preserved underground without refrigeration. Prepared in a specific way, *mahr* can serve as a food for many years, even decades, sealed underground in leaf wrappers. *Mahr* pits are ancient ways that Pohnpeians and others in the Pacific region guarded against starvation from famine—perhaps brought on by a hurricane that destroyed traditional crops. As part of a Culture Food Heritage Awareness Campaign, *mahr* preparations methods, including knowledge of which of the 131 breadfruit names/cultivars are preferred (Ragone 2009) can be taught to children in schools and culinary food contests involving classes or families for their best recipes can be developed.

A Culture Food Heritage Awareness Campaign can teach the nutritional value of local food crops. A survey carried out in the 2000’s (Balick 2009) listed only a handful of the potentially edible famine/emergency foods, such as *mwekimwek* (*Tacca leontopetaloides*), which is not widely cultivated, but easy to grow. Species such as *Adenanthera pavonina* (edible seeds and leaves when processed correctly), *Bambusa vulgaris* (young shoots are eaten), *Asplenium nidus* (young dark green leaves containing high levels of provitamin A, lutein and zeaxanthin), *Cordia subcordata* (ripe fruits are edible), are just a few of the many species that are locally available to supplement caloric and/or nutritional needs in times of food scarcity.

A Culture Food Heritage Awareness Campaign Goals include:

- Promote food production as a desirable career choice;
- Promote pride in traditions of local food production and preparation;
- Offer training in preparation and cooking of fresh produce;
- Promote the nutritional qualities of each cultural food; and

- Foster the exchange of plants and seeds.

Action Item: Strengthen education on local food cultivation and preparation and importance of healthy eating in schools, hospitals and other public institutions.

4.8 Develop Effective Monitoring, Evaluation and Research

We recommend an external advisory board (EAB) to the State of Pohnpei to be commissioned for monitoring and evaluation (M&E) to track and provide input during the implementation of the Food Policy. Such an EAB would help the State and transparency to the implementation and impacts to the environment, economy, including impacts to the state and to the private sector and allow the food policy to be reviewed and revised as needed. In principle, the M&E is to assess how well the State is moving toward meeting its own Food Policy goals and targets.

The M&E plan could set measurable indicators of inputs, activities, and outputs to be used as milestones or performance standards for monitoring. Measurable indicators could include:

- the number of awareness campaigns within Pohnpei;
- establishment of a competitive pilot or seed project;
- the number of applications as a response to seed grant opportunities;
- the number and value of food products produced/collected and marketed;
- the number of new facilities built, established and functioning;
- the amount of leveraged private and public sector investment generated;
- the number of new or revised public policies and legislative action;
- the number of new jobs and micro-enterprises created, and
- the reduction of selected imported food products that are now being produced in state.

Appendix A. Enterprise development opportunities

A.1 Invertebrate aquaculture enterprise development

Pohnpei has a broad range of freshwater, brackish and marine waters suitable to the culture of many species. Most efforts have focused on invertebrates that have high value, can be produced as non-perishable products, and require relatively low-tech practices for grow-out (sea cucumbers, mangrove crabs, pearl oysters, top snails, giant clams). However, many of the existing aquaculture operations rely on the collection of larvae and spat from wild stocks and are conducted in critical habitats that provide valuable ecosystem services such as food/primary production, shelter, and water quality (Lindsay 2002). Much research remains to be done to optimize the culture of local species from larval rearing to nursery and grow out phases (Alberts-Hubatsch et. al 2016). Establishment of selective breeding programs for local species can reduce mortality, enhance, and maintain desirable traits for production and support grow out operations under changing climate conditions. Long term effort will need to focus on laboratory production of larvae and spat to ensure that local wild populations continue to thrive.

Sea cucumbers

Opportunities: Sea cucumber farming can provide a local sustainable source of protein, and also provide an export crop of high market value.

These aquaculture efforts have been demonstrated successfully with local communities, and as they expand, they might minimize the local extraction of wild resources. The local FSM Land-Grant scientists have the expertise needed; they now need to develop a transition plan from extension experience to commercial operators.

Hurdles and Risks: Legal issues need to be clarified for the use of resources collected from the local waters and the use of locally owned and designated marine protected regions. The development of policies that balance the need for a local sustainably produced protein source and the maintenance of a healthy coastal system is critical.

There is a need to develop a detailed business plan, given the wide range of market prices for sea cucumbers. The specific species needed to maximize income from the export market may differ from the ones needed for the local market.

The transition from research to a commercial enterprise will require sustained investment in the production, as well as capacity building to train and retain young farmers.

Optimal techniques to culture sea cucumbers have been developed in Australia and Japan and might be transferable to Pohnpei ecosystems. Training and extension expertise with this species must be developed by the government in cooperation with the university community. Handling and processing are important to ensure a high quality, high value product for existing markets. Hatchery production of larvae and seed sea cucumbers may be needed to ensure a stable supply for nursery and grow out operations.



The largest risk is that current expertise lies with an extremely limited number of faculty and technicians, which, if lost would set the whole enterprise back by potentially a decade. Retention of that expertise, and development of training pipelines should be a priority.

Mangrove Crabs

Opportunities: Mangrove crabs represent a strong candidate for aquaculture in Pohnpei, especially as a local nutritional food source as well as a high value product for sale to restaurants. Pohnpei researchers have experience with community rearing of young hatchling crabs to improve food security in Palau and to reduce reliance on imported foods.

Value added products extracted from the crab exoskeleton such as chitin and chitosan possess antibacterial and antifungal properties with applications for agriculture, medicine, pharmaceuticals, food processing, environmental protection and biotechnology (Sakthivel et al. 2015). More research is needed to optimize the extraction process and demonstrate the economic benefits associated with mangrove crab shell.

Hurdles and Risks: Mangrove crabs have a complex life cycle that currently impedes its full development as an aquaculture candidate. Present aquaculture efforts rely heavily on wild caught crabs for the supply of eggs and larvae for eventual distribution to aquaculturists, who then can grow out the crabs in enclosures in mangrove habitat (Shelley 2008). Despite the abundance of critical mangrove habitat on Pohnpei, increasing wild harvest of mangrove crabs threatens the long-term sustainability of stocks.

More research on larval rearing is required to produce a stable supply of hatchlings for grow-out (Waiho et. al. 2017) and reduce harvest pressure on wild stocks.



Bivalve and univalve aquaculture

Opportunities: Several shellfish species possess strong aquaculture potential for Pohnpei with giant clam culture already underway at a small pilot scale. A community-based grow out program, supported by a hatchery operation, is underway in the Pohnpei lagoon and holds promise both for local food production and for the marine ornamental trade. Other candidates include green mussels, black lipped pearl oysters and the top shell snail. Blue pearls produced on Pohnpei can be a valuable additional product.

Hurdles and Risks: Shipping a live product for the marine ornamental market is challenging. Green mussels require habitat and water quality associated with fringing mangrove ecosystems which provide shelter and abundant primary production for this filter feeder. Suitable mangrove habitat exists, but other competing uses for aquaculture in or near mangrove habitat may only support subsistence production operations for this species. If the goal is to provide market viability beyond local food production, the spatial needs will be studied.

Black lipped oysters are presently cultured on one of the remote outlying atolls of Pohnpei, Nukuoro. Culture relies heavily on the collection of wild spat for grow out operations (Cartier et al.



2012). Establishment of optimal larval rearing practices and a stable supply of spat from a hatchery will help advance this species as a commercial enterprise. Growing out of pearl oysters would also benefit from farms located closer to Pohnpei to facilitate technical assistance and material supply.

Turban or top shell snails (Trochus spp.)

Opportunities: Trochus are large marine snails whose meat is consumed locally and its shell is used for decorative items like buttons. The culture of this species has high market potential.

Hurdles: As with the other invertebrate species suitable for commercial scale aquaculture, a hatchery is needed to provide a stable supply of seed snails. Development of the culture of this species requires a long-term effort for all stages of the operation.

A.2 Finfish aquaculture enterprise development

Opportunities: The aquaculture of fin fish represents an opportunity given the available extensive marine regions. Local aquaculture within the atoll is showing good opportunities. Rabbit fish, starting from fish tank spawn, is showing good progress with local champions demonstrating the ability to grow 4000 fish (~1 lb/fish). Local market value is ~\$5/lb, so single field fish tanks might yield \$10,000 per tank. The advantage of these systems is they can be maintained by a family



providing potential revenue and a local protein source with only minimal additional work (a few hours per day). The long-term focus might shift to offshore larger high value fin fish which would be able to take advantage of expansive deep-water systems. This offshore potential would also minimize water quality concerns often associated with intensive aquaculture systems.

Hurdles: The scaling up of the local Rabbit fish production will require expansion of the fish tank spawning. Ideally this expanded capacity should not come at the expense of the already over extended extension agents. Developing a pool of technical expertise will be critical to developing scalable capacity to meet potential interest by local communities.

A.3 Greenhouse vegetables enterprise development

Opportunities: Fresh vegetables can be grown using a variety of production systems. Scheduling, ensuring that markets are not oversaturated, local produce pick-up, and more can improve year-round supply and provide easier access and availability to all. Technology like low-cost affordable coolers and solar dryers can also facilitate the process.

Growing for the market, such as targeting incoming ships, increases market and potential revenue.

History: The Chinese Aid Agricultural Technical Cooperation Program has been running a Pilot Farm Project in Madolenihmw, main island Pohnpei since 1998. The Chinese Pilot Farm has demonstrated the potential for Pohnpei’s main island environment to successfully cultivate several crops in open fields as well as in greenhouses. More recently, the COM has also built greenhouse for hydroponic production of leafy greens and vegetables.



Hurdles and Risks: As a food production industry for Pohnpei, greenhouse cultivation is in its embryonic stage of development. Additional expertise in horticulture, greenhouse engineering, power, disease and insect management and control, food safety and more is needed. Access to improved germplasm and seed will need to be addressed.

Growing what everyone wants and ensuring year-round availability is a challenge, but readily addressable with coordinated collection and aggregation approaches, greenhouses and post-harvest facilities.

Business Champions: Saimon’s Market, other local growers, retail outlets.

A.4 High-value niche products enterprise development

Opportunities: High value crops such as organic shade-grown coffee, black pepper, and flowers can be grown using a variety of production systems. Local Black Pepper and Coffee have already been successfully grown.

History: Pohnpei pepper used to be an important export product some years ago, but production is now low. It is alleged that in the past a government-financed and operated pepper processing plant competed with the private sector pepper manufacturer, leading to the collapse of that industry (FSM Ag Policy 2012-2014). This policy supports private sector food production management.

Pohnpei has optimal coffee-growing conditions. Most of the world’s coffee comes from North, Central, and South America; the Caribbean; Africa; the Middle East; and Asia with Brazil now the world’s largest coffee-producing country. Micronesian coffee would be a novelty and therefore a specialty crop for the regional market.

Establishing Organic Certification: Most agriculture in Pohnpei already conforms to organic standards. Establishing organic certification for these crops will raise their value and demand in the export market.



Business Champions: Saimon’s Market, other growers, retail outlets.

A.5 Taro and breadfruit flour and value-added products enterprise development

Opportunities: Postharvest processing of excess Taro and Breadfruit when in season into products for local use and export.

Local Expert & Scientific Basis: The Island Food Community of Pohnpei studied and characterized nutritional composition of flour from local taro and breadfruit.

Processing Steps:

- Chop the entire fruit, skin and all into chips
- Dry and store as chips
- Use a flour mill to convert into flour for flatbread, banana bread, gingerbread, gluten-free bread

This conveniently stores fruit in season for use year-round and is a healthy alternative to wheat flour. This has demonstrated success as an export in other countries.

Business Champion: Island Food Community and Saimon's Market, Dr Diane Ragone of the Breadfruit Institute at the National Tropical Botanical Garden has expressed interest in serving as a consultant.



A.6 Local chicken/egg production and poultry/swine feed enterprise development

Opportunities: There is enormous demand for chicken and eggs by Pohnpei residents but almost all are imported. The high cost of imported feed is the greatest obstacle to local poultry and egg production and there are clear paths to producing feed locally. In addition, swine are extremely important to Pohnpei culture and food security but swine production is also hindered by the high cost of imported feed.

The production of local feed for chickens and swine would not only aid in increasing the profitability of local chicken, egg and swine production but in creating new micro-enterprises in the production, manufacturing and processing (grinding, mixing/blending) and packaging of the feed.



Private sector investment in chicken and egg production, as well as poultry/swine feed production, will require land, infrastructure, and labor, and would create job opportunities and stimulate economic growth in Pohnpei state. The private sector would also bring in expertise and technologies to improve the efficiency and quality of production.

Assistance from the Pacific Community in capacity building, food processing, packaging, women and youth training, and organic production training can help to produce high-quality products that meet international standards. This would result in increased exports and income. Finally, the training and employment of women and youth would help to promote gender and youth equality and reduce poverty.



Hurdles and Risks: Chickens and eggs used to be grown locally but diseases and high cost of imported feed made production unprofitable and unmanageable. It is not known if current chickens are the best for meat or eggs, whether they can be penned, and whether they are resistant to diseases.

Expertise lies with a limited number of faculty and technician experts.

Example: VITAL and Bycatch from Licensed Commercial Fishing.

Locally produced copra cake, a high protein by-product from the extraction of coconut oil from copra, is available year-round and is used almost entirely for animal feed. Entrails from fishing vessel bycatch can be added to Copra Cake to make high protein animal feed for chickens and swine. Locally produced feed at a 10-1 ratio of Copra Cake to Fish Protein would be at least 50% cheaper than imported feed.

A.7 Processing clean local drinking water enterprise development

Opportunity: Pohnpei is one of the wettest places on earth; yet the people of Pohnpei import most of their bottled drinking water. There are currently nascent water processing operations in Pohnpei that can be developed and further commercialized while protecting this precious natural resource. Local atoll communities within Micronesia, Marshals and Kiribati as well as military bases in the area are prime markets for locally bottled Pohnpei water. Public policies coupled with significant capital investment can support private sector water processing business plans. It is critical to develop local water collection and transport methods that do not accumulate, promote, or increase plastic pollution. Local water production on the atolls should also consider solar powered desalination units with proper training and maintenance protocol. This multi-pronged approach could be private sector driven or a hybrid approach with partial state (from original



capitalization and support) and private sector ownership and management with licensing agreement from the State allowing oversight and for revenue generation.

A.8 Cross-Commodity Technologies that support food production: Post Harvest- Cold Chains and Drying enterprise development

Opportunities: The introduction of leap-frog technologies to Pohnpei to strengthen the cold chain and postharvest chain are needed for many foods including cold storage of fish, meat/poultry, fresh fruits and vegetables. Such technologies and facilities would reduce post-harvest loss, extend shelf-life and permit sales and marketing of high value fresh foods. Low-cost technologies such as CoolBots can run off generators and/or solar power. The State of Pohnpei has refurbished two cold rooms in Kalona to use this CoolBot technology. Post-harvest facilities built with local materials would create new job opportunities and provide access to cold storage in off-grid locations. Specialized no-energy dryers such as solar chimney dryers are inexpensive and affordable and can be used to dry seafood, fruits and vegetables. Extending the post-harvest life of crops can lead to the development of new processed products.

Hurdles and Risks: Need outside expertise to train those in Pohnpei that can either train others or establish their own micro-enterprises in building such facilities at a small-scale for homes and a larger-scale for small producers.



A.9 Culturally Based Agritourism and Ecotourism enterprise development

Opportunities: Ecotourism is one of the fastest growing sectors in the global economy. Ecotourism tends to attract tourists of financial means seeking authentic traditional and environmental experiences. Visitors from the United States dominate tourist arrivals to Pohnpei State, and the 2014 FSM National Tourism Sector Development Framework included ecotourism with linkages to local agriculture. The FSM National Tourism Policy 2015–2019 includes the objective of promoting local traditional knowledge, expressions of culture including production and preparation of local foods, and traditional livelihood skills as part of a national tourism development strategy. In addition, the FSM 2023 Action Plan describes sustainable tourism as a driver for economic growth. Agritourism can include opportunities for visitors to pay to learn traditional agroforestry and ethnobotanical practices, visit local farms and farmers markets and learn to cook traditional meals. The FAO has been supporting agritourism in the Micronesian region as part of sustainable tourism initiatives that include local food cultivation traditions intended to empower local food producers, increase local nutrition and reduce dependence on imported foods (FAO, 2023). Pohnpei State, home to the Nan Madol UNESCO World Heritage Site, has the potential to be a global destination for high-end specialty cultural ecotourism by attracting a targeted market of educated, ecologically minded travelers that prefer to enjoy lands with rich cultural heritages and traditional local foods.

Community stakeholders are intricately involved in the development of Pohnpei tourism policies and the Pohnpei State Strategic Development Plan includes opportunities for tourism-based private sector development. This plan's development approach relies on public participation and cross-sector engagement throughout a five-stage process: Preparation to Plan, Training and Capacity-building, Public Education and Engagement, Analysis and Strategic Plan Development, and Plan Approval. Major components include cooperating with traditional, elected and community leaders; involving existing

community, NGO and other organizations already working in Pohnpei; and developing a public education program to facilitate citizen engagement. A successful ecotourism development requires that traditional resource owners and communities must be fully involved in the protection, conservation, preservation and sustainable use of the state's biodiversity for the development of ecotourism.

Suggested Next Steps for New Enterprise Development:

- Focus on Pohnpei's natural resources, what we know, and where our competitive advantage resides;
- Identify the correct business model(s) for transitioning from research to commercialization;
- Complete baseline household and commercial grower surveys, synthesize data, review insights and indicated actions with FSM Team;
- Conduct SWOT analyses on key high priority opportunities;
- Further develop business plans for most promising ideas- ensure market-first science driven approaches and always within a holistic system that preserves and protects;
- Allow the private sector to champion with back-up from state and college;
- Clarify USPS COMPAC to negotiate for reinstatement of Priority Flat Rate Shipping in advance of the ongoing negotiations;
- Compare and evaluate other models that have been established in Micronesia and the region that have fostered ecotourism;
- Develop our state policy concept paper on food security to consider those public policies that foster, facilitate and assist the commercial and private sector while ensuring focus on environmental, cultural and economic sustainability pillars as that guides your mission to reach food security and livelihood improvement for all;
- Work on strengthening specific value chains to assist with local food system coordination, centralization, and specialization;
- Assist in reviewing and upgrading curricula, mentoring, teaching and training with state and federal institutions of higher education;
- Develop short and long-term training of students, professional and scientific/business leaders for workshops, degrees and specialized training as needed;
- Assist in improving the understanding of markets- regional and international, market linkages, associated quality control expectations for products and new products and applications;
- Engage international partners to assist our in-country institutions with business management and food processing and food safety that includes low-cost post-harvest technologies to meet regional and export market requirements;

- After providing the short-term and long-term training, we will work with local authorities to identify early- and mid-career staff in government as well as industry to seek bachelors and master degrees with our collaborating partnering global and regional university partners. These would include Global Agriculture and Agriculture and Food Systems. There would be a two-pronged approach, providing degree programs online as well as scholarships for in-person foreign study.

Appendix B. Summary Food Security Policy Framework

| POLICY GOAL | |
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| DEVELOPMENT OUTCOMES | STRATEGIC ACTIONS |
| <p><i>1. Improve sustainability of food production systems in terms of safety, quality and resilience</i></p> | <ul style="list-style-type: none"> ● Review legal and regulatory framework for food. Legislation should be harmonized and strengthened to influence a clear policy framework and determine the principal enforcement agency. ● Review pricing policies (taxes and subsidies) to promote equitable, sustainable production of local farm products ● Work with the National Government Department of Health to define an appropriate Food Safety and SPS architecture and promote at the household, community and production levels. ● Encourage private sector to comply with international standards such as hazard analysis and critical control points (HACCP) and comply with good hygienic practices (GHP) for commercial based food enterprises. ● Establish market quality standards for local commercial production. ● Improve soil health, plant health, and diagnosis using an integrated pest management approach. ● Promote climate ‘smart’ and environmentally sustainable farming systems, such as organic agriculture, agroforestry and intercropping using renewable energy whenever possible. ● Support community-based management of agricultural (including marine) resources, both empowering and assisting communities to develop and enforce appropriate conservation measures. ● Ensure a well-functioning biosecurity service to ensure adequate protection of plant and animal health status from introduced exotic pests and diseases. ● Establish and if necessary, maintain commercial plant nurseries for crop production, hatcheries for aquaculture and incubators for chicken production, ensuring disease free and high-quality stock ● Maximize use and cultivation of available public farmland and additional private lands to be available for food production by |

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| | <p>owners and/or by rental to community groups and others for farming.</p> <ul style="list-style-type: none"> ● Establish a Pohnpei Agriculture Research and Development Institute (PARDI) to address agriculture needs in Pohnpei, where the focus will be introducing, maintaining, selecting and evaluating climate and disease resilient cultivars, conducting variety trials for new crops, and leading production systems research. ● Restore the living nursery, botanical garden and seed bank for all food crops (including commercial and indigenous tree) crops grown to conserve crop biodiversity on Pohnpei, especially for traditional crops. ● Encourage traditional subsistence and commercial farming practices, and when applicable, integrate with science-based best management practices. ● Develop a Pohnpei State agriculture water use and conservation plan ● Recognize and protect the intellectual property rights of Pohnpeians and the resulting benefits, as related to agricultural crops and products ● Increase production of home gardens, school gardens, hatcheries and aquaculture and building community resilience for food production systems. ● Support local food crop production through extending knowledge, skills and mentorship in better husbandry practices and farming systems for both terrestrial and marine ecosystems. ● Promote certification of organically produced products. ● Promote and facilitate the formation and strengthening of producer organizations (farmers and fishers). <p>Seek technical expertise to develop and introduce a holistic food systems approach to address the complexity of Pohnpei food needs which includes food production supply and value chain and market systems so that agriculture and marine and fisheries can serve as a key economic driver.</p> |
| <p><i>2. Support enterprises in agriculture and aquaculture</i></p> | <ul style="list-style-type: none"> ● Strengthen resources and capacity of small business enterprise support services, especially in business plan development training. ● Review business laws to support the establishment of cooperative associations. ● Provide tax incentives to small-scale agriculture and aquaculture businesses |

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| | <ul style="list-style-type: none"> ● Renew the Small Business Development Center to identify local and exportable products, seek technical expertise and train Pohnpeians ● Focus funding on promising enterprises for the local economy including chicken feed, meat and egg production and production and processing of local, nutritious foods ● Review laws and policies to support the export of agriculture and aquaculture related products. ● Support those involved in agriculture and fisheries with their business cases for loan applications by providing advice and assistance in business plans, including crop, livestock fisheries profiles for specific products and value chains ● Build micro-loan capacity to support agriculture and aquaculture enterprises on key technology such as greenhouses and netting structures. ● Enhance capacities to use natural resources in an environmental, cultural, and economic sustainable manner to support growth, food security and livelihoods in the agriculture and fisheries sectors. ● Conduct comprehensive market analysis of current locally produced agricultural products for domestic and export markets and identify potential high value agricultural commodities and products for the local and export market ● Building the technical and business capacities of farmer and trade organizations to enhance productivity, increase profit margins and respond efficiently to market requirements. ● Carefully review and revise policy for foreign fishing licenses to ensure sustainable catch by foreign fishing vessels with the goal of requiring foreign fishing companies to service the local market first before selling fish catch to foreign markets. ● Adopt the market-first science-driven development model of Rutgers University to assist farmers and rural enterprise associations ● Improve market structures for the transport and sale of fish and fresh produce, and promote the introduction of market centers to make fresh fish and produce more available and affordable locally. ● Ensure capacity building and training programs are inclusive for all people and all genders. ● Introduce local purchasing policies regulating use of local food produce in all government and public catering purchases and thereby introduce a market-first approach to local food investment. |
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| | <ul style="list-style-type: none"> ● Establish a labeling and enforcement system to ensure sustainable practices, especially to prevent the collection and sale of wild protected species. |
| <p><i>3. Prioritize access to and awareness of local, nutritious foods</i></p> | <ul style="list-style-type: none"> ● Seek technical support to map all communities and households that are particularly vulnerable to lack of food and water security and good nutrition and ensure that appropriate interventions are targeted to reach these groups. ● Explore ways to reduce the costs for transportation, processing, storage and shipping of food, giving priority to renewable energy sources where possible (solar, hydropower, etc.) and considering the feasibility of targeted ‘smart’ freight subsidies for local producers or traders. ● Investigate possible market/price and regulatory measures (e.g. preferential tariffs, ‘sin food’ -tax, content regulations, fortification, ad valorem excise, etc.) which promote healthy food choices such as local produce. ● Develop programs and multi-media materials promoting the values, benefits and business opportunities associated with agriculture for men, women and youth. ● Adopt participatory and community-based approaches to strengthen the “Go Local” and other public awareness campaigns to promote local food production, healthy lifestyles and sustainable diets through all segments of society (government, traditional events, church, family, hospitals and schools). ● Conduct workshops and demonstrations on urban gardening and use, preparation and preservation of nutritious local foods. ● Ensure that the public, especially marginalized and vulnerable communities, are actively involved in issues that affect food security. ● Improve access to clean and reliable fresh drinking water for all members of Pohnpei society including the outer island communities. ● Design in concert with Pohnpei stakeholders and implement a project communications network using multiple distribution platforms such as websites, radio, television, social media management, OpEds, Opinion Leaders engagement, and crisis communications as well as research, market and trade outlets. ● Feature nutrition in school curricula at every grade level to ensure students understand the meaning of healthy food and how to access and prepare it. ● Maintain and enhance school feeding programs to feature healthier menus with more local produce and nutritious foods. |

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| | <ul style="list-style-type: none"> ● Promote nutrition and health for pregnant mothers and breastmilk for infants until 2 years of age with appropriate introduction of nutrient-rich foods ● Promote and support NGOs, the farmers associations in Pohnpei. (e.g., Pohnpei Farmers Association [PFA]) and other interest groups. |
| <p><i>4. Increase educational and training opportunities in food security related fields</i></p> | <ul style="list-style-type: none"> ● Assist with continuation and expansion of degree programs at COM-FSM and other public institutions in food security related fields like agriculture, business, health and nutrition. ● Seek resources to fund scholarships for students attending agriculture and business programs at other colleges or universities (e.g., BA/BS, MA) ● Promote competitive job opportunities and available resources to support new enterprises to COM-FSM and other students to retain and recruit Pohnpeian skilled laborers. ● Facilitate mentorship opportunities for students at our centers for higher learning and vocational schools. ● Develop a comprehensive manual and educational training materials for the public and practitioners on soil, crop, livestock and fisheries health. ● Establish tailored training programs for Pohnpeian growers on how to properly test and evaluate the overall health of their soils and crops and how to implement Integrated Pest Management (IPM) strategies and apply Good Agricultural Practices (GAPs). ● Develop and conduct on-farm in production, food safety, nutrition, food security, supply chain, and pesticide safety and management. ● Develop, train, and provide a system and training module devoted to the proper establishment, operation, and management of propagation nurseries to make disease free and high-quality germplasm available. ● Develop a practical manual on climate ‘smart’ management, including heat and drought adaptation strategies. ● Develop, train, and provide system and training module devoted to the proper establishment, operation and management of hatcheries for the production and scale-up of aquaculture, particularly for sea cucumber, rabbit fish and pearl oysters ● Ensure educational and training resources traditionally appropriate and distributed equitably to include women. |
| <p><i>5. Build institutional arrangements and capacity development</i></p> | <ul style="list-style-type: none"> ● Ensure that all training programs follow a train-the-trainer model to increase capacity development and project sustainability. ● Partner with the National Environmental Health and Food Safety Department to inspect production systems for food safety. |

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| | <ul style="list-style-type: none">● Support private and commercial enterprises related to food security.● Institutionalize a Food Security Policy Council to review and provide feedback to government policy measures relative to our Food Security plan to enhance cooperation and dialogue between the public and private sectors to ensure a sustainable, healthy, and equitable food system and to give voice and public engagement to our food security policy.● Task the Pohnpei Agriculture Research and Development Institute (PARDI) to serve as centralized organization to coordinate producer-oriented research with COM, COM-FSM and other state, national and international partners.● Facilitate partnerships with international programs like the Peace Corps and Farmer-to-Farmer to increase capacity development in agri-business and other food security related topics.● Increase farmer capacity building and resilience for commercial agriculture to increase number of individuals that self-identify as sustainable commercial food producers.● Incorporate innovative platforms, as available, that allows the sharing and dissemination of information between growers, processors, and traders relative to food production, food security and weather alerts.● Develop partnerships between Pohnpei and private sectors to expand business opportunities for local producers and formalize value chains. |
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Appendix C. Correlating Existing Policy and Food Systemic Development Initiatives

The tables below represent systemic development initiatives and their specific details as outlined in national policies and strategies that are required to promote sustainable, resilient, and climate smart agricultural production in the Federated States of Micronesia as supported and identified by the Critical and Supporting Pathways.

Systemic development initiatives:

1. Improve the balance of trade through taxation of imported foods, substitutions of locally produced foods, and exportation.
2. Financial assistance to farmers (e.g., subsidies, credit, or loans) to improve, promote, and centralize production.
3. Improved accessibility and affordability to locally produced foods for consumers.
4. Improved transportation (air and shipping) linkages and infrastructure (e.g., roads) for food accessibility for both domestic and international markets.
5. Good Agricultural Production and postharvest handling technology transfer, training, and policies with particular attention paid to climate change considerations.
6. Improved market linkages between farmers and local establishments (e.g., hospitals, schools) for substitution of imported goods including value-added production of traditionally farm products.
7. Improved market linkages between farmers and foreign stakeholders for exportation.
8. Business training and gender equity for all actors along the food value chain.

Policy documents reviewed:

1. Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.
2. Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.
3. Policy Measures to Increase Local Food Supply and Improve Food Security in the Federated States of Micronesia. Food and Agricultural Organization of the United Nations. 2014
4. Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019
5. Federated States of Micronesia Integrated Agriculture Census 2016. Food and Agricultural Organization of the United Nations, Pacific Community, and Government of India. 2019.
6. Pilot Agricultural Projects. Pohnpei Legislature. 2022.

Systemic Development Initiative 1: Improve the balance of trade through taxation of imported foods, substitutions of locally produced foods, and exportation.

| Policy and Strategy Document | Specific Policy Detail |
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| <p>Healthy Eating, Healthy Living for Heathy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.</p> | <p>Challenges and Priorities: Since the beginning of the Compact of Free Association 1 funding, there has been increasing levels of imported food because Pohnpeians have become increasingly accustomed to the convenience of cooking processed foods (dominated by imported rice), and more western appetites. Pg. 5</p> |
| | <p>Threats to agricultural development in FSM: imported products. Pg. 13</p> |
| | <p>Contribution to food and nutritional insecurity as depicted in a problem tree: low nutritional value of imported foods and increased consumption of imported foods Pg. 14</p> |
| <p>Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.</p> | <p>Convenience starch foods including rice, ramen, noodles, flour and bread have been the major food items imported and this group has shown a steep rise over the last 10 years reflecting a change in diets away from traditional staples. Pg. 7</p> |
| | <p>Key issues, constraints, and opportunities for agriculture development: Large trade deficit. Pg. 14</p> |
| | <p>Total food imports have shown a steep increase from around US\$17 million in 2000 to US\$43.6 million in 2009. Pg. 41</p> |
| | <p>Being heavily dependent on imported food and fuel and having very few exports the current high and volatile international petroleum and commodity prices have serious implications for FSM's terms of trade. Pg. 41</p> |
| | <p>Local commercial production relies heavily on imported feed and thus struggles to be price competitive with imports. Pg. 42</p> |
| <p>Policy Measures to Increase Local Food Supply and Improve Food Security in the Federated States of Micronesia. Food and Agricultural Organization of the United Nations. 2014</p> | <p>The proposed comprehensive tax reform program now under consideration proposes eliminating all import duties and state sales taxes and implementing a uniform 10% Value Added Tax (VAT)...The tax reform program could...expand the use of 'sin' excises on food and beverage products that are linked to negative health outcomes, and use additional revenue generated to make local nutritious food more available and affordable. Pg. 5-6</p> |
| | <p>The import tariff regime is fairly liberal with most foodstuffs subject to a 3% ad valorem tariff levied on the Cash, Insurance & Freight (CIF) value. However, fresh fish and seafood products...are subject to a higher 25% tariff with the aim of providing some protection for the domestic fishing industry... Pg. 17</p> |
| | <p>Promoting local food supply and food security through price policy. Pg. 14</p> |

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| | <p>Recommendation 1: The application of ‘health’ levies on food and beverages contributing to NCDs. Pg. 21</p> <p>Recommendation 4: Co-ordination of policy and regulatory reform. Pg. 32</p> |
| <p>Pilot Agricultural Projects. Pohnpei Legislature. 2022.</p> | <p>Given the resources and capabilities of the islands of the state of Pohnpei to produce agricultural products and to reduce our reliance on expensive agricultural products imported from abroad, the following categories of agriculture are hereby identified as pilot projects categorized to be undertaken by the Division of Agriculture of the Department of Resources and Development: Poultry egg farming projects. Pg 1-2</p> |

Systemic Development Initiative 2: Financial assistance to farmers (e.g., subsidies, credit, or loans) to improve, promote, and centralize production.

| Policy and Strategy Document | Specific Policy Detail |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.</p> | <p>Key issues and priority areas: Lack of funding to support sector activities. Pg. 6</p> |
| <p>Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.</p> | <p>Key issues, constraints, and opportunities for agriculture development: Limited capital and access to affordable credit. Pg. 16</p> <p>Key Strategy 3.1.3: Review Pricing Policies (taxes and subsidies) to promote equitable, sustainable production of local farm products and to deter environmentally degrading and polluting activities. Pg. 23</p> <p>Key Strategy 4: Also possible use of targeted subsidies to address market failures may need to be considered (examples could be for inputs, transport and information). Pg. 24</p> <p>Key Strategy 5.1.1: Government will support with appropriate economic incentives and capacity building an adequate degree of processing of primary products to increase in-country value addition prior to marketing. Pg. 26</p> |
| <p>Policy Measures to Increase Local Food Supply and Improve Food Security in the Federated States of Micronesia. Food and</p> | <p>Agriculture price policy is used to alter prices of agricultural outputs or inputs. Price policy instruments include: quotas, tariffs, or subsidies on imports; quotas, taxes or subsidies on exports; and consumption taxes or subsidies for domestic products. These policy instruments aim to directly decrease or increase domestic prices, in order to adjust the relative price incentives faced by consumers and change consumption habits.... Pg 14</p> |

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| <p>Agricultural Organization of the United Nations. 2014</p> | <p>Recommendation 3: Finance and business development services for agriculture. Pg. 29</p> |
| <p>Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019</p> | <p>Objective 3: Improve the investment climate for aquaculture in the FSM.NB This objective will need to be carried out in close collaboration with the states, who control investment and regulation of aquaculture within the 19km limit.</p> |
| | <p>Objective 11: Enhance access to capital and funding for aquaculture through capacity building for banks and farmers. Pg. 12, 33, 47</p> |
| | <p>Objective 3: Well-trained stakeholders that have the ability to access and mobilize funds for aquaculture projects. Pg 22, 32, 58</p> |
| | <p>Income sources and loans for households with land used for agriculture by state. Pg. 15</p> |
| | <p>Objective 3: Increase the capacity of stakeholders to access funding for aquaculture. Pg. 33</p> |
| <p>Federated States of Micronesia Integrated Agriculture Census 2016. Food and Agricultural Organization of the United Nations, Pacific Community, and Government of India. 2019</p> | <p>Reported barriers to further development: Lack of source of finance. Pg. 47</p> |

Systemic Development Initiative 3: Improved accessibility and affordability to locally produced foods for consumers.

| Policy and Strategy Document | Specific Policy Detail |
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| <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.</p> | <p>Key issues and priority areas: Lack of farmers markets and poor pricing of local produce. Pg. 6</p> |
| | <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia. Objective 2: Sustainable crop and livestock production increased. Pg. 8</p> |
| | <p>Output 3.2 Domestic marketing structures improved; Viable local markets; Increased supply of and access to locally produced crops and livestock. Pg. 8</p> |
| | <p>Output 4.2: Capacity of information services to public improved. Pg. 8</p> |

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| <p>Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.</p> | <p>Key issues, constraints, and opportunities for agriculture development: Vulnerability to global food and commodity prices. Pg. 14</p> |
| | <p>Key issues, constraints, and opportunities for agriculture development: Increasing incidence of diet and lifestyle related non communicable diseases. Pg. 15</p> |
| <p>Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019</p> | <p>Objective 10: Improve awareness of aquaculture within Kosrae State. Pg. 36</p> |
| | <p>Objective 4. Raise awareness of aquaculture among communities, private sector and leadership of Pohnpei. Pg. 46</p> |

Systemic Development Initiative 4: Improved transportation (air and shipping) linkages and infrastructure (e.g., roads) for food accessibility for both domestic and international markets.

| Policy and Strategy Document | Specific Policy Detail |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.</p> | <p>Key issues and priority areas: Lack of transportation. Pg. 6</p> |
| <p>Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.</p> | <p>The Public Sector main roles will be to invest in core public goods such as...infrastructure (e.g. rural roads). Pg. 8</p> |
| | <p>Key Strategy 6: Strengthen domestic and international transport linkages. Pg. 27</p> |
| <p>Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM</p> | <p>Objective 8: Improve standard and cost of transportation. Pg. 36</p> |

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| <p>National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019</p> | |
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Systemic Development Initiative 5: Good Agricultural Production and postharvest handling technology transfer, training, and policies with particular attention paid to climate change considerations.

| Policy and Strategy Document | Specific Policy Detail |
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| <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.</p> | <p>Key issues and priority areas: Lack of crop and livestock production systems, lack of access to improved varieties, lack of nursery and/or gene banks, poor soil fertility, increased incidence of pests and/or diseases and lack of capacity in pest management, lack of guidelines for sustainable production practices and loss of traditional knowledge, poor dissemination of information, poor communication between farmers and extension agents. Pg. 6</p> <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia.</p> <p>Output 2: Sustainable crop and livestock production increased. Pg. 8</p> <p>Output 4.1: Capacity of research and extension outreach strengthened. Pg. 8</p> |
| <p>Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.</p> | <p>To achieve the agriculture sector policy goals government will focus on maintaining a sound and consistent policy and legal framework and ensuring the delivery of services to remove production constraints for the private sector, such as providing information on markets, increasing know-how... Pg. 8</p> <p>Key issues, constraints, and opportunities for agriculture development: Threat of invasive species and trans-boundary pests and diseases. Pg. 15</p> <p>Key issues, constraints, and opportunities for agriculture development: Vulnerability to the adverse impacts of natural disasters and climate change. Pg. 16</p> <p>Key Strategy 1.2: Adequately resource the agriculture sector. Pg. 21</p> <p>Key Strategy 2.1: Improve access to technical and vocational training opportunities in agriculture. Pg. 21</p> <p>Key Strategy 3.1: Increase sustainable production (and productivity) of traditional farming systems. Pg. 22</p> |
| <p>Policy Measures to Increase Local Food</p> | <p>Recommendation 2: Importance of a stable structured market demand to commercialization of farming in FSM. Pg. 26</p> |

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| <p>Supply & Improve Food Security in the FSM. Food and Agricultural Organization of the United Nations. 2014</p> | |
| <p>Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019</p> | <p>2.2 Challenges to the development of aquaculture at the FSM National Government level and strategies for success: Capacity and technical skills</p> |
| | <p>Objective 4: Protect the biodiversity of the FSM and the environment and traditional livelihoods practices from harmful disease. Pg. 9</p> |
| | <p>Objective 5: Incorporate climate change considerations into national aquaculture activities. Pg. 9, 24</p> |
| | <p>Objective 1: Provide aquaculture technical skills training and facilitate access to aquaculture technical assistance for stakeholders in Chuuk/Yap. Pg. 20, 56</p> |
| | <p>Objective 6: Secure a reliable source of seed stock for aquaculture production. Pg. 25</p> |
| | <p>Objective 5: Increase the technical capacity of stakeholders in aquaculture techniques. Pg. 34</p> |
| <p>Federated States of Micronesia Integrated Agriculture Census 2016. Food and Agricultural Organization of the United Nations, Pacific Community, and Government of India. 2019</p> | <p>Most households reported using the most basic tools....Nearly all of those using these tools owned their own tools. Pg. 45</p> |
| | <p>Agriculture extension services had visited 19 percent of households in the census year, half of them twice...However, the main sources of information about agriculture were the radio (31 percent), other farmers (24 percent), or agriculture extension services (13 percent). Pg. 46</p> |
| | <p>Reported barriers to further development: lack of production inputs (particularly for agriculture) and lack of new tech and infrastructure was a barrier particularly for fishing and livestock. Pg. 47</p> |

Systemic Development Initiative 6: Improved market linkages between farmers and local establishments (e.g., hospitals, schools) for substitution of imported goods including value-added production of traditionally farm products.

| Policy and Strategy Document | Specific Policy Detail |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei</p> | <p>Key issues and priority areas: Increased consumption of imported foods. Pg. 6</p> |
| | <p>Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia. Output 3.1 Suitable domestic and export market support systems strengthened. Pg. 8</p> |

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| <p>State, Federated States of Micronesia.</p> | <p>Output 3.2 Domestic marketing structures improved. Pg. 8</p> |
| <p>Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia.</p> | <p>Key issues, constraints, and opportunities for agriculture development: Weak market linkages and low competitive advantage of local agricultural products. Pg. 15</p> |
| | <p>Key issues, constraints, and opportunities for agriculture development: Limited in-country capacity for agro-processing and value adding of agricultural products. Pg. 15</p> |
| | <p>Key issues, constraints, and opportunities for agriculture development: Inadequate domestic and international transport linkages. Pg. 17</p> |
| | <p>Key Strategy 4.1: Develop robust domestic and export market supply chains. Pg. 24</p> |
| | <p>Key Strategy 4.2: Improve quality, safety, and consistency of supply. Pg. 24</p> |
| | <p>Key Strategy 5.1: Increase opportunities and capacity for processing and value addition of traditional farm products. Pg. 26</p> |
| <p>Policy Measures to Increase Local Food Supply and Improve Food Security in the Federated States of Micronesia. Food and Agricultural Organization of the United Nations. 2014</p> | <p>Recommendation 2: Importance of a stable structured market demand to commercialization of farming in FSM. Pg. 26</p> |
| | <p>Recommendation 2: Capacity if local food producers to supply the school feeding program. Pg. 27</p> |
| | <p>Recommendation 2: Aggregating supply to meet market demand. Pg. 27</p> |
| <p>Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019</p> | <p>2.2 Challenges to the development of aquaculture at the FSM National Government level and strategies for success: Capacity and technical skills</p> |
| | <p>Objective 7: Improvement of local and export marketing of aquaculture products. Pg. 35</p> |
| | <p>Objective 6: To improve markets and trade of aquaculture products. Pg. 48</p> |
| <p>Federated States of Micronesia Integrated Agriculture Census 2016. Food and Agricultural Organization of the United Nations, Pacific Community, and</p> | <p>There is little access to international markets and limited tourism, reducing the market opportunities for farmers. Pg. 19</p> |
| | <p>Under half (48 percent) of the households with land for agriculture reported engagement in markets for their produce. Pg. 46</p> |
| | <p>Reported barriers to further development: Lack of market to sell produce. Pg. 47</p> |

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| Government of India. 2019 | |
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Systemic Development Initiative 7: Improved market linkages between farmers and foreign stakeholders for exportation

| Policy and Strategy Document | Specific Policy Detail |
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| Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia. | Output 3.1 Suitable domestic and export market support systems strengthened. Pg. 8 |
| Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia. | Key issues, constraints, and opportunities for agriculture development: Inadequate domestic and international transport linkages. Pg. 17 |
| | Key Strategy 4.1: Develop robust domestic and export market supply chains. Pg. 24 |
| | Key Strategy 4.2: Improve quality, safety, and consistency of supply. Pg. 24 |
| Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries Section and the Pacific Community. 2019 | 2.2 Challenges to the development of aquaculture at the FSM National Government level and strategies for success: Capacity and technical skills |
| | Objective 6: Improvement of trochus and sea cucumber export marketing. Pg. 35 |
| | Objective 7: Improvement of local and export marketing of aquaculture products. Pg. 35 |
| | Objective 6: To improve markets and trade of aquaculture products. Pg. 48 |
| Federated States of Micronesia Integrated Agriculture Census 2016. Food and Agricultural Organization of the United Nations, Pacific Community, and Government of India. 2019 | There is little access to international markets and limited tourism, reducing the market opportunities for farmers. Pg. 19 |
| | Under half (48 percent) of the households with land for agriculture reported engagement in markets for their produce. Pg. 46 |
| | Reported barriers to further development: Lack of market to sell produce. Pg. 47 |

Systemic Development Initiative 8: Business training and gender equity for all actors along the food value chain

| Policy and Strategy Document | Specific Policy Detail |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Healthy Eating, Healthy Living for Healthy Families. Agriculture Strategic Action Plan 2011-2015 Pohnpei State, Federated States of Micronesia. | Key issues and priority areas: Lack of farm management and marketing skills and lack of training opportunities pg. 6 |
| Federated States of Micronesia Agricultural Policy 2012-2016. Department of Resources and Development, Federated States of Micronesia. | To achieve the agriculture sector policy goals government will focus...providing effective business development support and essential infrastructure. Pg. 8 |
| | Key issues, constraints, and opportunities for agriculture development: Burgeoning youth population lacking adequate livelihood skills and opportunities. Pg. 17 |
| | Key issues, constraints, and opportunities for agriculture development: opportunity for stronger linkages and synergies between the agriculture and tourism sectors. Pg. 18 |
| | Key Strategy 2.1.3: Strengthen small business enterprise support services. |
| | Key Strategy 2.1.4: Ensure gender balance in recruitment of training staff and enrollment of students on training courses. Pg. 22 |
| Policy Measures to Increase Local Food Supply and Improve Food Security in the Federated States of Micronesia. Food and Agricultural Organization of the United Nations. 2014 | Recommendation 3: Finance and business development services for agriculture. Pg. 29 |
| Federated States of Micronesia Aquaculture Management and Development Plan 2019-2023. FSM National Government Department of Resources and Development Fisheries | Objective 1 Activity: Continue to provide business, grant writing and basic aquaculture assistance to farmers. Pg. 32 |
| | Objective 3 Activity: Conduct business planning training with potential farmers. Pg. 33 |

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| <p>Section and the Pacific Community. 2019</p> | |
| <p>Federated States of Micronesia Integrated Agriculture Census 2016. Food and Agricultural Organization of the United Nations, Pacific Community, and Government of India. 2019</p> | <p>Reported barriers to further development: Lack of management skills (particularly for handicrafts and livestock). Pg. 47</p> |
| <p>Pilot Agricultural Projects. Pohnpei Legislature. 2022.</p> | <p>The object of the poultry egg farming pilot project is to determine the feasibility of the development of poultry egg farming as a viable component of the agriculture business sector of the state. Pg. 6</p> |

Appendix D. Food Security Policy Alignment with United Nations Sustainable Development Goals

SDG 1: No Poverty



This food policy aims to reduce, and eventually eliminate poverty by developing local enterprises that provide income opportunity for all segments of the population.

SDG 2: Zero Hunger



This food policy aims to eliminate hunger by providing affordable and accessible nutritious food for all segments of the population.

SDG 3: Good Health and Wellbeing



By focusing on local nutritious foods, clean water and enterprise development, as well as creating awareness and pride in local traditions and customs, this policy promotes overall wellbeing in addition to physical health.

SDG 5: Gender Equality



This policy recognizes the challenges women in Pohnpei face, and targets specific programs to reduce gender inequality.

SDG 6: Clean Water And Sanitation



Providing clean drinking water to every part of the state, including the Outer Islands, is a primary goal of this policy.

SDG 8: Decent Work and Economic Growth

Developing a local sustainable food system using innovative sustainable technologies will provide employment, and create opportunities for long-term economic growth in the State.

SDG 9: Industry, Innovation and Infrastructure

This policy aims to use the latest innovative green technologies like solar dryers and low energy cooling systems to enable local industry. State government policy will incentivize and support these projects, and building the necessary infrastructure.

SDG 12: Responsible Consumption and Production

This policy recognizes the importance of a circular economy, where every step of production and consumption can reuse and recycle the valuable limited resources of the state and the country, while also reducing to a minimum the expense of importing inputs.

SDG 14: Life Below Water

this potential.

The marine ecosystem is a critical resource of the state and provides food, ecosystem services such as coastline protection, and valuable ecotourism potential. There is tremendous potential to preserve and improve this resource. By focusing on specific industries like reef aquaculture that preserve the marine ecosystem, while providing food and income, the policy aims to capitalize on

SDG 15: Life on Land

policy.

This policy recognizes the importance of preserving and protecting the natural terrestrial resources of the state. The ecosystem services provided by the remaining intact forests, such as protecting the state from the increasingly severe weather caused by climate change, and providing water purification services, are a critical part of the circular food system economy that is a primary goal of this

SDG 17: Partnerships For The Goals

This policy aims to enable and enhance partnerships between government and non-government organizations, as well as global industry, research and technology partners to create a resilient network of support and innovation. This will bring the latest information, education and technology to the State to facilitate efficient implementation of the goals.

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