Achieving Resilient Agriculture and Aquaculture:

A national policy for strengthening **food security** in Palau as a priority **climate change adaptation** measure

2015

This policy was prepared for the Republic of Palau (ROP) through the Palau Pacific Adaptation to Climate Change (PACC) program, with support from the Secretariat of the Pacific Regional Environment Program (SPREP), by:
Ann Kitalong, PhD, The Environment Inc. (TEI)
Maireng Sengebau, Belau Environmental and Health Solutions and Technologies (BEHST)
Tiare Holm, Sustainable Decisions (SD).
Cover photos: Micronesia Shark Foundation (abai), Tiare T. Holm (taro patch, and local fish soup)

Contents

Acronyms

BMP	best management practice
CBO	community based organization
CC	climate change
CCA	climate change adaptation
CCPF	Climate Change Policy Framework
DEH	Division of Environmental Health
DRM	disaster risk management
EDF	European Development Fund
EQPB	Environmental Quality Protection Board
FG	focus group
GHG	greenhouse gas
IPM	integrated pest management
ILUP	integrated land-use plan
JNAP	Joint National Action Plan
KII	key informant interview
MNRET	Ministry of Natural Resources, Environment and Tourism
MOE	Ministry of Education
MOH	Ministry of Health
MPIIC	Ministry of Public Infrastructure Industries and Commerce
NAP	National Action Programme
NAPA	National Adaptation Programme of Action
NBSAP	National Biodiversity Strategic Action Plan
NEPC	National Environment Protection Council
NEMO	National Emergency Management Office
NGO	non-government organization
NSAP	National Strategic Action Plan for Climate Change and Disaster Risk Management
OERC	Office of Environmental Response and Coordination
PACC	Pacific Adaptation to Climate Change
PALARIS	Palau Automated Land and Resources Information System
PAN	Protected Areas Network
PCAA	Palau Community Action Agency
PCC	Palau Community College
PCC – CRE	Palau Community College – Cooperative Research and Extension
PIFACC	Pacific Islands Framework for Action on Climate Change
PPLA	Palau Public Land Authority
ROP	Republic of Palau
SLM	sustainable land management
SNC	Second National Communication
SPC	Secretariat for the Pacific Community
SPREP	Secretariat for the Pacific Regional Environment Programme
UAK	Ulkerreuil A Klengar
VAA	vulnerability and adaptation assessment

Introduction and Background

As commonly emphasized by the President of the Republic of Palau, "the economy of Palau is Palau's environment and Palau's environment is Palau's economy". There are no economic transactions more basic to any economy than those that involve food. Food security is a critical element of local, national and global climate change resilience. In Palau, optimal local food production anchored by thriving, sustainable agriculture and aquaculture sectors is essential to building resilience to the impacts of climate change. In the Republic of Palau, main crops and livestock include taro, tapioca, tropical fruits (such as banana, pineapple, citrus, guava, and mango), and vegetables (such as cucumber, corn, eggplant, kangkum, some lettuces, etc.). Livestock activities includes mainly poultry (chickens and eggs), pork (piggeries). A small number of cows and goats have recently been introduced with varying success. Aquaculture products include several species of giant clam, mangrove crabs, Milkfish, Rabbitfish, and some species of Grouper.

The Food and Agriculture Organization (FAO) defines food security as a ''situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life''[1]. The impacts of climate change, which include sea level rise, changes in temperatures and rainfall, and increased frequency and intensity of extreme weather events (such as category 4 and 5 typhoons), pose some of the greatest threats to food security in Palau. *Threats* from climate change to food security can aslo include the spread of disease to crops and livestocks as well as the introduction of, and increase in, invasive species.

Background

In 2009, the Secretariat of the Pacific Regional Environment Program (SPREP), in partnership with the national government of the Republic of Palau (ROP), launched Palau's activities to participate in the implementation of the regional Pacific Adaptation to Climate Change (PACC) program. Housed at the Palau Community College – Cooperative Research and Extension (PCC-CRE) program, PACC is implemented in Palau through a national Core Group and coordinated by a national PACC Coordinator. Through a process of consultations, the PACC Core Group identified food security as a key area for focus in building climate change resilience in Palau. As strategic priorities, the PACC Core Group further identified building resilience in Palau's agriculture and aquaculture sectors as essential to strengthening Palau's food security. Additionally, in June 2013, the Republic of Palau through the Office of Environmental Response and Coordination (OERC), in partnership with the Secretariat for the Pacific Community (SPC), launched a process to develop the national climate change policy framework (CCPF) for Palau. This process began with a stakeholder assessment, regional policy review, and gaps and needs analysis[2]. The process is further summarized with recommendations for next steps prepared and compiled in a "bridge document" linking the aforementioned process with the development of the CCPF[3]. The OERC and SPC aim to complete the CCPF by June 2015[4].

[1] (Tubiello 2007)
[2] (TEI and Partners 2014)
[3] (Sustainable Decisions 2014)
[4] Based on conversations with OERC staff

With this in mind, SPREP contracted a team of local and national experts including The Environment Inc (TEI), Belau Environmental and Health Solutions and Technologies (BEHST), and Sustainable Decisions (SD), to work with the PACC Core Group and Coordinator to implement a project to prepare a national policy, to include an institutional framework, strategy, and action plan for building resilience in Palau's agriculture and aquaculture sectors. This project involved:

1. **a stakeholder consultation process** using focus groups, key informant interviews, stakeholder survey and workshop sessions;
2. **a literature and technical review**; and,
3. **a series of workshops** to
    a. present outcomes of stakeholder consultations and technical review;
    b. develop the institutional framework, strategy, and action plan; and,
    c. present the draft institutional framework, strategy, and action plan for final review and endorsement by stakeholders and policy makers.

The projects outputs include:

1. A stakeholder consultation report;
2. A report on the technical and literature review;
3. A workshops report; and,
4. The national policy, which includes an institutional framework, strategy, and action plan.

How to use this policy document

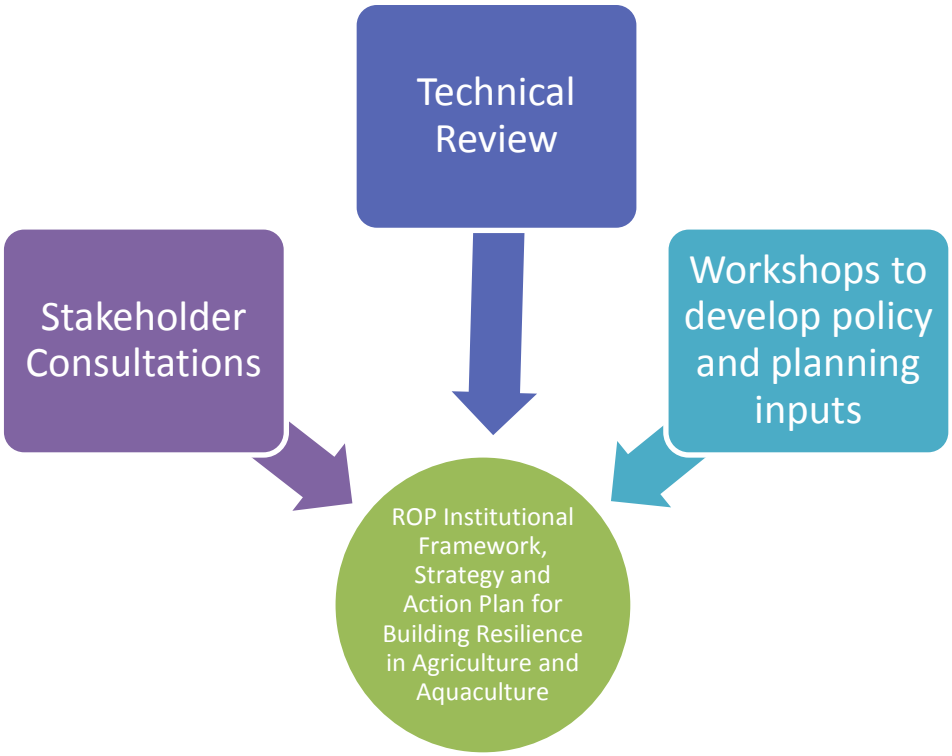
This policy document is written and compiled in four sections. The first section presents information on the background and mandate for this project and suggests how this policy document can be used. The second section presents the vision and cornerstones of the policy:

1. Institutional resilience;
2. Community resilience;
3. Ecosystem resilience; and,
4. Economic resilience.

The third section presents a strategy and action plan for implementing the policy. Finally, the fourth section presents an institutional framework for achieving goals of the policy, as well as a matrix of priority actions.

The process for developing this policy framework, strategy and action plan was driven and informed by local and national stakeholders and experts, with technical support from regional partners. The stakeholder consultations, combined with the outcomes of the technical review and workshops formed the basis for the policy's content. This policy can serve as a reference throughout the process of developing the Palau CCPF as well as agency work-plans, and as needed by stakeholders.

Diagram A: Inputs to the Institutional Framework, Strategy, and Action plan



The Policy Vision Statement and Cornerstones of Resilience

Vision (Policy Statement)

The primary purpose of this policy is to achieve the Palau stakeholders' vision for:
"A resilient, sustainable and food secured Palau."

Policy Cornerstones

The issue of resilient agriculture and aquaculture as a means for strengthening food security cuts across all sectors. The types of stakeholder assets that require strengthening include:

- Institutional capital: governance and management, infrastructure, equipment;
- Social capital: societal relationships and culture;
- Human capital: labor and skills;
- Intellectual capital: knowledge and ideas;
- Economic and Financial capital: cash, income and funding, transactions for goods and services (commercial and subsistence); and,
- Natural capital: healthy ecosystems and functional ecosystem services.

These assets are addressed through the four corners stones that make up the foundation for the institutional and substantive structure of this policy:

1. Institutions and institutional processes: institutional resilience
2. Communities and community processes: community resilience
3. Ecosystems and natural processes: ecosystem resilience
4. Economy and economic processes: economic resilience

To enable progress towards achieving ***a resilient, sustainable and food secured Palau***, it is agreed that four cornerstones serve to anchor this policy, ensuring that all sectors and assets are effectively strengthened.

1. Institutional resilience

Stakeholders rely on effective institutions and institutional processes to enable and support success in developing agriculture and aquaculture projects that enhance Palau's food security. Effective institutions provide needed services at optimal costs. Governance, planning, management, capacity, and maintenance of infrastructure and equipment are key areas that need strengthening to improve local food production, enhance food security and build resilience to the impacts of climate change in Palau.

Institutional resilience begins with transparency in governance. Transparency is enabled through effective stakeholder-driven strategic planning processes at policy-making, ministerial, and agency levels as well as state, national and international.

Evidence-based decision-making is essential at all levels. Effective information and data collection, management, analysis, reporting, availability and access are priority areas for action in building resilience to the impacts of climate change. Stakeholder-driven evidence-based decision-making combined with effective management are key to ensuring institutional resilience.

At national levels master-planning is imperative. At state levels master-planning and integrated land-use planning is essential. Current and aspirational land uses can often seem to conflict (such agricultural activities and commercial development or waste management), while also posing opportunities for synergy (such as traditional taro farming and promoting the conservation of wetlands). Integrated land-use planning is a critical component of building resilience. Strengthened collaboration at all levels, between all sectors and communities, can enable more effective planning processes and effective implementation of plans.

This policy aims to address traditional and elected governance systems and synergies. Examples of strategies that may be used in strengthening resilience in this cornerstone include leadership training for traditional and elected policy makers, management training for heads of ministries, agencies and cheldebechel (CBOs and NGOs) , and training on fiduciary and elected roles and duties for board members and elected leaders.

Assets, values and opportunities are lost when public infrastructure and equipment is incomplete, poorly built, or poorly maintained. Stakeholders and institutions that promote and implement aquaculture and agriculture policies, programs and activities rely on reliable public infrastructure and equipment. This is especially true during extreme events that are becoming more frequent and intense as a result of the impacts of climate change. Access to food is a critical first response to extreme events. It is essential that public capital improvement projects that are essential to resilient agriculture and aquaculture programs and activities be completed and well-maintained. Such projects may include improving buildings, roads and transportation equipment and infrastructure.

2. Community resilience

Community resilience to the impacts of climate change is profoundly linked to local food production, particularly agriculture and aquaculture. In Palau, strong community and consumer support for local food production and consumption is needed to achieve community resilience that enable resilience in agriculture and aquaculture at basic levels.

One key objective towards achieving goals in this cornerstone is to enhance surveillance on the links between local food consumption and production, and health and economy. This will involve analyzing current data and assessing the impact of local food production and consumption on health and the local economy. An initial step to enhancing surveillance on the impacts of changes in local food production and consumption on health and the economy will focus on linking agriculture and aquaculture data with economic and health data.

Community resilience is further achieved with the objective of increasing consumption of locally produced food in schools and the Belau National Hospital by 5% in five years. Schools and Hospitals are urged to serve local menus at least three times a week. The PCC-CRE can provide training on local food preparation, processing, and handling. The Ministry of Education can establish and expand school garden programs in all schools, as well as integrate climate change and food security topics into existing curricula through supplemental materials and activities.

Strong community awareness about climate change and food security is essential. At least 25% of the general population should be aware of basic food security issues as well as the links to the survival of Palauan communities within the context of climate change. Targeted social marketing campaigns, taro festivals and activities that celebrate local food production, particularly agriculture and aquaculture, will be used to change attitudes, preferences, and behaviors. Using existing platforms and events such as the Bethlehem Night Market and school workshops as well as utilizing mainstream media can also greatly enhance awareness of food security issues and programs.

Key implementing agencies and organizations within this cornerstone include BOA, BMR, PCC-CRE, PCAA, MOF, MOE, MOH, MCCA, UAK, and PVA as well as community groups (cheldebechel). Collaboration, sharing resources, and utilizing existing programs and activities, while working in partnership with communities can achieve the objective of promoting the concept of food security in Palau to become a household term.

3. Economic resilience

In addition to maintaining a strong subsistence economy for local food production in Palau, economic resilience within the context of enhancing resilience in agriculture and aquaculture requires a greater enabling environment for farmers to effectively commercialize. This can be achieved through financial incentives and entrepreneurial training and services. **One objective is to develop and strengthen partnerships between farmers, private sector and the government** to enhance supply chain opportunities that incentivize local food production. By building upon existing programs offered through NDBP, SBCD, PCC that specifically help local farmers through low interest and insured loans as well as accessible mentoring services, this objective can be met.

Another objective is to explore the potential for the development of a new sustainable finance mechanism through the PANF. The PANF can enable and support sustainable food production within protected areas and surrounding buffer zones at PAN sites that provide a sustainable income generating opportunities for communities and farmers while reducing potential negative impacts from unsustainable land use practices to PAN sites. For example, well managed traditional wetland taro patches (mesei) can enhance wetland ecosystem services in protected areas that include wetlands.

A finance mechanism based on tax and subsidy incentives is needed to promote local food production. Incentives, such as tax exemptions for farm equipment and supplies combined with subsidies to increase production of local food, can play a key role in strengthening economic resilience within the agriculture and aquaculture sectors. Policy and regulation amendments are needed to integrate financial incentives such as taxes and subsidies into Palau's national tax code and annual appropriations.

With a small local population, labor is a primary issue in promoting local food production in Palau. The key factor of taro production in Palau that needs strengthening is labor.[5] Amendments to labor policy that enhance opportunities for local entrepreneurs to access foreign labor markets is essential to the economic resilience of the local food production sector, particularly agriculture and aquaculture.

Government and the private sector can support technical training programs for farmers to increase their business management and marketing skills and produce added value products. The objective is to build upon existing programs from PCC and SBDC provide the necessary training for farmers. An MOU can be established to require a minimal level of training in order to access funding.

Critical economic information such as existing production levels, existing market prices and demand are needed in order for loan officers and business partners to effectively assist farmers to develop a business plan. Key information gaps include:

1. Insufficient production data;
2. Insufficient data on market price determinants; and,

[5] (Timarong 2012)

3. Insufficient data on demand.[6]

A program that includes MOUs between governments, NGOs, academia, farmers and banks to collect and share data and information on supply and demand would enable all parties to have the information needed for sound investments in agriculture and aquaculture projects.

A sustainable finance and loan mechanism with adequate funds appropriated to NDBP will enable secured loans and subsidies to local start-up and commercial farmers. Capital from such finance and loan programs can be used for commercial farmers acquiring access to land, equipment and labor, as well as for necessary field extension and outreach to enable local farmers to adapt production methods to the impacts of climate change. Real time extension services can help prevent potential losses from investments. For example, the recovery period from the impacts of extreme storm surge and sea level rise should be researched and integrated into business plans as well as grant and loan agreements for local commercial food producers.

A learning center that is linked to a farmers' market and business incubator, targeted at local commercial and subsistence farmers, is urgently needed. This learning center should serve farmers through all phases of their business enterprise and focus on good record keeping (such as on production) that in turn can be shared with BOA and entered into a national food production database (possibly managed by PALARIS) to determine the effectiveness of actions taken by the center and its programs. Increased annual budgets for the BOA, PALARIS, and SBDC as well as NDBP and the PCC-CRE will be needed in order to establish and effectively manage such a facility and its associated programs.

4. Ecosystem resilience

Ecosystem resilience is the root of sustainable and resilient agriculture and aquaculture in Palau. Ecosystem health is essential to sustainable resilient local food production. Agriculture and aquaculture thrives on healthy functioning ecosystems. Farming activities can also negatively impact ecosystem health if best management practices, especially organic practices, are not employed.

Effective integrated land use and marine spatial planning is an essential first step to enhancing ecosystem resilience that enables resilience in agriculture and aquaculture. All farms on land and in marine areas should be situated in strategic locations for optimal production and ecosystem function, as well as a complementary part of the natural landscape.

Achieving ecosystem resilience requires critical information disseminated to local farmers and state planning entities (such as state planning commissions and public lands authorities) to determine the suitability of sites for farming activities. Planning for agriculture and aquaculture development requires information on land, soil types, water quality and availability as well as currents, existing habitats and species, topographical slopes, proximity to streams,

[6] (Timarong 2012)

and more. In addition, farmers and planners will need to be aware of, and address, other activities that are in conflict to farming objectives. This kind of critical information can be used to generate profiles for each state that are directly linked with integrated land use and marine spatial plans for each state in Palau. Key threats and issues for ecosystems include the introduction of invasive species and the impact of nutrient and sediment discharge into farming or pristine areas.

Objectives include the development and implementation of best management practices (BMPs) that include climate proof, organic, sustainable, integrated pest management and nutrient recovery protocols that are tested and cost effective. Farmers can adopt BMPs and protocols and increase production at no cost to surrounding ecosystems.

There is an urgent need to pass the proposed Biosecurity Act in order to develop regulations and receive national support to protect farmers from pests and protect ecosystems from invasive species. Soil conservation is critical to high crop yields. Soil conservation plans will enable farmers to keep soil on their land and reduce storm water discharge that removes good soils and pollutes nearby streams and marine ecosystems. Organic agriculture has been shown to lower soil erosion and build up soils.

Research and extension is needed that is aimed at developing and using techniques to prevent saltwater intrusion and promote climate resilient plants and plant varieties that can withstand changes in salinity, temperature and precipitation. Such "climate-proofing" approaches in local food production include the establishment of green belt buffer zones to farms and protected areas that integrate the use of agro-forests, which serve a dual purpose of filtering sediment and contributing to food production. Planting calendars based upon local knowledge can enable local farmers to plant at ideal periods for most productive crop growth and yield. Farm location, based on climate change projection models for Palau is essential to climate-proofing local food production in Palau.

Climate change must be integrated into Palau's national environmental impact and assessment (EIA) process. It is essential to mainstream climate change and food security considerations into EQPB permitting, including for earth moving, discharge, and burning activities. All farming other than traditional subsistence farming, must require an EQPB permit that includes ensuring storm water run-off is controlled. Predictions for Palau indicate more rainfall and more frequent and intense storms in Palau for the next five years.[7]

Local food production systems, particularly agriculture and aquaculture, must contribute to national and global efforts to reduce greenhouse gas (GHG) emissions. Organic agriculture has demonstrated success in lowering GHG. The use of renewable energy in farming will reduce carbon footprints as well as reduce the costs of fuel to farmers. Current NDBP programs include opportunities for integrating renewable energy infrastructure into homes. Similar programs are needed that specifically target local farmers and food producers.

Key implementing partner agencies (MNRET, State Governments, EQPB, OEK, MOF, NDBP, PCC-CRE, and SBDC) are currently implementing needed activities that require stronger support through national legislation and increased financial and human resources. Effective

[7] (Secretarat for the Pacific Community 2014)

coordination and communication between partner agencies is essential to meet farmers' needs and achieve the vision of a resilient, sustainable and food secure Palau.

Core principles and best practices

Palauan stakeholders agree that:

1. Human induced climate change is happening now and the impacts on small island developing states, such as Palau, are likely to increase.
2. Policies and activities to manage risk and address the impacts of climate change should be stakeholder-driven and informed by best available knowledge and experience.
3. Traditional wisdom and approaches are often more effective and less costly than introduced contemporary approaches.
4. When faced with conflicting information, the precautionary principle should be applied, using an adaptive management approach.
5. Government agencies are most efficient in roles that support, rather than compete with, the private sector.
6. Transparency and good governance is essential to achieving sustainable and resilient agriculture and aquaculture sectors in Palau.
7. Agriculture and aquaculture in Palau cannot become sustainable and resilient until the sectors are successfully commercialized and coordinated.
8. Healthy ecosystem services are essential to resilient agriculture and aquaculture sectors.
9. Functional social systems (such as traditional governance, customs and practices) are essential to effectively strengthening resilience in agriculture and aquaculture, and achieving food security in Palau within the context of climate change.

Policy Strategy and Action Plan

The policy strategy and action plan for building resilience in agriculture and aquaculture in Palau is driven by stakeholder inputs through individual consultations and focus groups, and informed by a technical review conducted by national experts. Stakeholders reviewed and exchanged past and current information and shared working knowledge and insights regarding lessons learned from agriculture and aquaculture activities in Palau within the context of climate change. Stakeholders also shared common concerns, issues, and priorities and identified actions, for recommended prioritization. Focus groups and individual interviews were confidential with resulting information presented in a general format to inform all stakeholders without identifying specific individuals.

Based upon input from the stakeholders, the strategic goals, objectives, actions, and key implementing agencies were identified. Budgets were estimated for priority actions and indicators were also identified for monitoring effectiveness. Priority actions and objectives are achievable and stakeholder-driven.

A Strategy for building resilience in agriculture and aquaculture

This strategy calls for a more enabling environment for local farmers to produce local food as a viable profession and livelihood within the context of climate change. The strategy is streamlined into the aforementioned cornerstones: institutional resilience, ecosystem resilience, community resilience and economic resilience. Central to institutionalization is the establishment of a national food security council, the aim of which is to better coordinate and communicate the needs of the local farmers to financial and technical partners as well as policy-makers and enable local farmers to succeed in enhancing food security in Palau. The development of a communication strategy was recommended as an initial activity for a national food security council. A farmers market is also recommended, which also serves as a "one-stop-resource-center", as well as a marketplace and information clearinghouse. Local farmers need comprehensive data collection, storage, retrieval, analysis and reporting to enable al partners to monitor success in achieving goals for climate change adaptation and food security as well as resilience in agriculture and aquaculture in Palau.

The overall goal of the strategy is to attain the vision: A resilient, sustainable and food secured Palau. The strategy lays out a blueprint using four cornerstones of resilience: institutional, ecosystem, community and economic, to attain this vision. Strategic goals and objectives for the next five years are as follows:

Institutional Resilience

1. Strengthen national capacity for supporting successful local food production.
    a. Data and information is collected and available for improved decision-making through institutional networks & partnerships.
2. Promote transparency and good governance
    a. A transparent, accountable and gender balanced governance and management in local food production
    b. Increases in key food security indicators by 20% by 2020.

3. Agency Coordination & Collaboration
    a. Effective agency coordination and collaboration by 2015
4. Efficient and effective response preparedness to extreme events (typhoons, drought, global crisis, etc.)
    a. A 25% increase of reserve local food production for extreme events by 2020

Ecosystem Resilience

1. Application of Resilience Building/Climate Change Adaptation Measures
    a. Aquaculture & Agriculture that uses climate proofed state-of-the-art sustainable land management practices & organic practices & maximizes local inputs & renewable energy to produce 80% of Palau's food needs by 2025
2. Effective Natural Resource Management
    a. By 2020, 50% of Palau's Agriculture and Aquaculture farms are sustainably managed

Community Resilience

1. State government, traditional leadership, community and consumer support for local food production and consumption
2. Greater community and consumer support for local food production & consumption

Economic Resilience

1. Strategic partnerships (government, NGOs and private sector) and investment
    a. Government investment in strengthening entrepreneurialism in local food production in collaboration with technical and financial partners

The Action Plan

An action plan is attached to guide policy implementation. The plan addresses specific objectives and actions within the four cornerstones of resilience, which are further divided into eight strategic goals. Each goal has specific objectives, actions, lead agency & partners, timelines, outputs, and budget estimates designed to guide stakeholders, implementing and partner agencies, and decision-makers during the next five years in achieving goals for climate change resilience in agriculture and aquaculture in Palau.

The first cornerstone, institutional Resilience includes components one through four:

1. Capacity;
2. Transparency & Good Governance;
3. Agency Coordination & Collaboration; and
4. Preparedness Response to Extreme Events.

The first strategic goal is centered on national capacity and improving data collection as well as management and decision-making through institutional networks and partnerships. Priority actions include establishing a one-stop shop permit and resource center as well as an effective and centralized database for agriculture and aquaculture.

Component two targets transparency and good governance. The actions include the development of an interactive website of best management practices (BMPs) and a communication strategy aimed at strengthening public awareness on climate change and the importance local food production and food security.
Component three is aimed strengthening agency coordination and collaboration and focuses on collaborative actions between national and state governments, private sector and technical partners, and stakeholders. Integrated land-use and marine spatial planning, is identified as a critical step. The establishment of a food security council for improved communication and coordination on agriculture & aquaculture programs is also a priority action.
Component four is focused on efficient and effective preparedness response to extreme events. Increasing water reserves and local food production in preparation for extreme events is a priority action. Activities include increasing water catchment and storage systems and surplus local food.

The Second Cornerstone, Ecosystem Resilience includes component five and six:

5. Application of resilience building climate change adaptation measures; and,
6. Natural resource management.

Component five is aimed at agriculture and aquaculture that uses climate-proof state-of-the art sustainable land management practices and optimizes local inputs and renewable energy. Actions include management of saltwater intrusion with effective water dikes and pathways, increase in propagation and planting of salt tolerant and other climate resilient crops, green belt buzzer zones, techniques to reduce impact of solar heat and use of strategic timing in planting calendars to maximize survival and yields. At least 5% of commercial farms should be using renewable energy in their farms by 2020.
Component six aims to ensure that at least 50% of Palau's Agriculture & Aquaculture farms are sustainably managed by 2020. Actions include increasing numbers of farms in suitably located and managed landscapes, increasing aquaculture operations in suitably located and managed seascapes, increasing the use of environmentally sound integrated pest management (IPM), increasing the use of organic plant protection methods, increasing effective soil management, and increasing agriculture and aquaculture farms that comply with EQPB discharge regulations.

The third cornerstone, Community Resilience, includes component seven:

7. Community and consumer support for local food production.

Component seven is centered on greater community and consumer support for local food production and consumption and includes actions to increase surveillance of local food production and consumption, targeting schools and the hospital to increase consumption of locally produced food by at least 5% in five years, and increasing community awareness of importance of food security.

The fourth cornerstone, economic resilience includes component eight:

8. Government investment.

This strategic goal is aimed at enhancing government and private sector investments in aquaculture and agriculture. Actions include the establishment of a 15-year revolving loan fund and guarantee program for local farmers, the development of mentorships between successful

farms and start-up or struggling farms, enhancing financial management services and training as well as other capacity building activities, tax incentives for local farms, the establishment of a sustainable funding mechanism, incentive programs, the development of a flexible financing program for small commercial farmers and start up agriculture and aquaculture businesses, a subsidy program for farmers, available guaranteed loans for agriculture and aquaculture ventures, and the establishment of a family agriculture and aquaculture entrepreneurship learning, coaching and resource center that is linked to the establishment of a farmers' market. Actions are aimed at increasing technical and financial support to farmers by at least 25%.

Institutional Framework

The purpose of an effective institutional framework is to promote and enhance

- synergies and collaboration,
- learning and innovation, and
- strengthened capacities

that enable effective institutions and processes for climate change adaptation policies and implementation. Effective institutional investments and actions are essentially driven by the best interests of stakeholders.

Institutions, roles, and responsibilities

Government

Government roles and responsibilities are optimal for achieving the best interests of stakeholders when they focus on:

1. Leading policy development and adoption
2. Coordination
3. Capacity building (technical and entrepreneurial)
4. Research and information management
5. Enabling access to capital for start-up and response to extreme events
6. Mitigating threats through regulation, enforcement, and compliance
7. Education and awareness
8. Leading national response and supporting state response to extreme events

Civil Society (NGOs and academia)

Roles and responsibilities of non-government organizations and academia are most effective when they focus on:

1. Supporting and informing policy development and implementation
2. Coordination
3. Capacity building (technical and entrepreneurial skills)

4. Research and information management
5. Education and awareness
6. Project demonstration
7. Supporting state and national response to extreme events

Private Sector

Primary roles and responsibilities of the private sector include:

1. Supporting policy development and implementation
2. Coordination
3. Capacity building (technical and entrepreneurial)
4. Enabling access to capital for start-up and response to extreme events
5. Supporting national and state response to extreme events

Traditional leaders and community groups

Traditional leadership and community organizations are most strategic focusing on:

1. Leading traditional policy development, adoption and implementation; and, support state and national government policy development and implementation
2. Capacity building (traditional practices, technical and entrepreneurial skills)
3. Education and awareness on traditional knowledge and practices
4. Project demonstration
5. Leading community response to extreme events in collaboration with state and national governments

Development partners (bilateral and multilateral, foundations, international NGOs, CROP and UN agencies)

Development partner organizations are most effective when focusing on:

1. Collaboratively strengthening capacity at policy-making, agency, and community levels
2. Technical advice and support as requested by stakeholders
3. Facilitating access, and capacity to maintain appropriate access to, finance and funding opportunities for agriculture and aquaculture programs and activities
4. Facilitating greater collaboration and synergies between stakeholders and stakeholder groups.

Institutions and processes

Institutions are most effective when they adopt and implement policies that focus efforts on organizational strengths as well as enhancing interagency strength in coordinating the efficient delivery of important services to stakeholders. The following diagrams demonstrate examples of how institutions can coordinate the efficient delivery of services to targeted stakeholders in the areas of 1) strengthening capacity; and, 2) enabling access to capital for start-up by local farmers and entrepreneurs, as well as 3) streamlining permitting.

Diagram B: Institutional Coordination for Strengthening Capacity

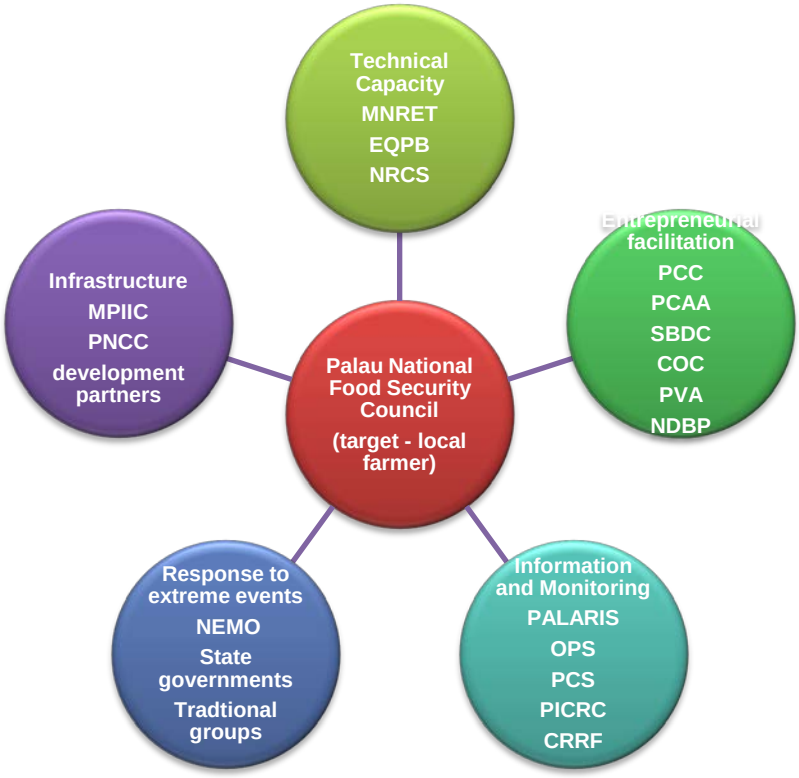


Diagram C: Institutional Coordination for Supporting Access to Capital

Streamlined permitting

There is an urgent need to streamline permitting at state and national levels in order to strengthen food security through resilient agriculture and aquaculture and effectively adapt to the impacts of climate change in Palau. Diagram D reflects the current process for permitting. Each step can take weeks and sometimes months to complete. A "one stop shop" office (or offices with designated staff) is recommended to be established where local entrepreneurs (particularly local food producers), developers and community members can go to initiate, and seek efficient facilitation to completion in, permitting. Such offices or designated can be placed at each national and state permit agency as well as state governments where they can align permitting with state master development plans and integrated land-use plans, however acknowledging that state level capacity would need to be strengthened to deliver such services. A single designated national level office may also be established with the primary role of supporting and coordinating state offices that serve as "one-stop shops" in the permitting process. A permit office can also be established at a central farmers market that also serves as a learning center, information clearinghouse and business incubator. Revenues from permit fees can be allocated for financing operations of such offices.

Diagram D: Current process for Development Permitting in Palau with five sequential steps

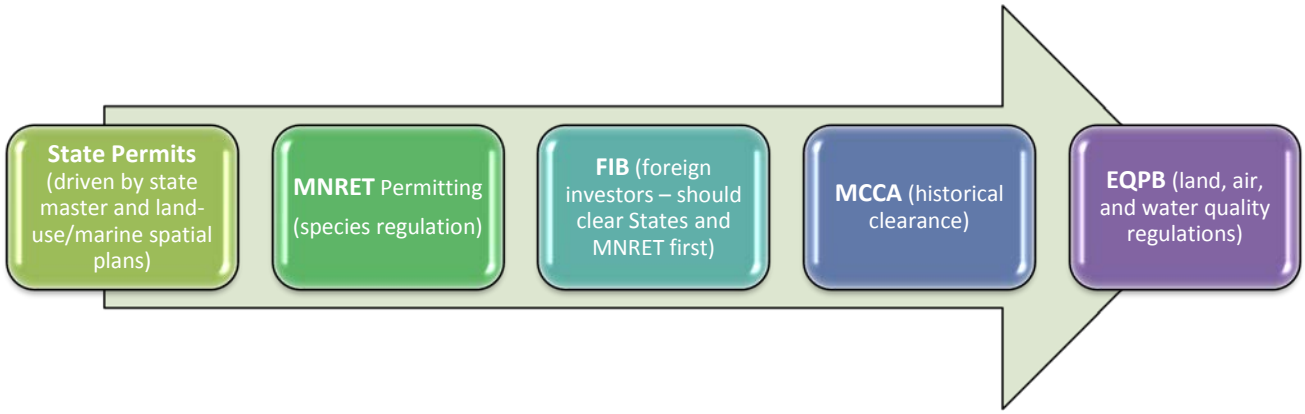
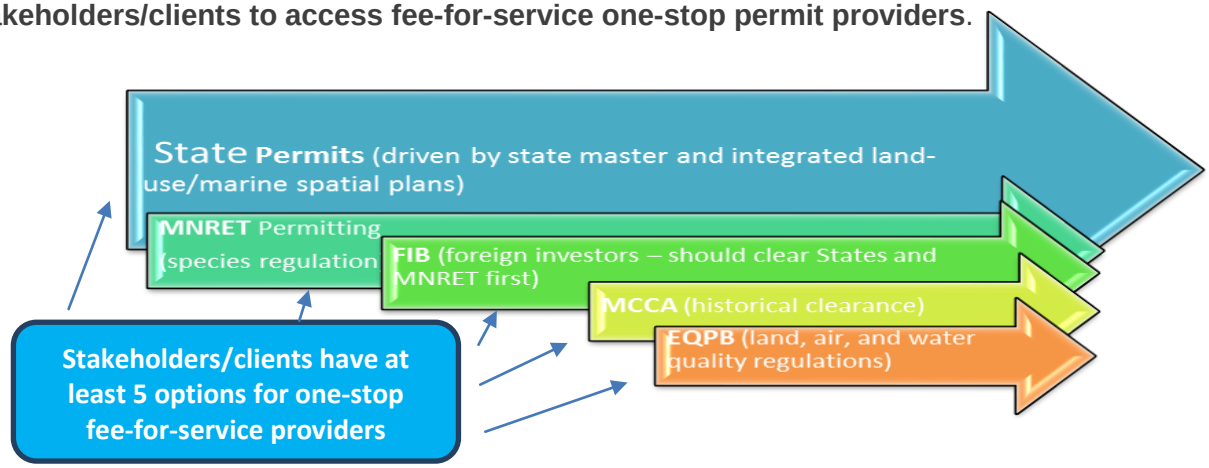


Diagram E: Increased streamlining in permitting process with at least five options for stakeholders/clients to access fee-for-service one-stop permit providers.



Policy and Planning

A national policy framework to build resilience in agriculture and aquaculture as a means for strengthening food security in Palau is essential. In addition to a stand-alone policy framework, policies should be integrated into existing and emerging policy mechanisms including the national climate change policy framework, the national sustainable lands management policy framework, EIA and EQPB permitting processes, national economic development policies, line agency policies, and state-based master planning and integrated land-use and marine spatial planning

Collaboration

It is essential to enhance multi-sector and multi-level collaboration. Effective implementation of agency mandates is enhanced by policies and directives that incentivize efficient collaboration in delivering services to stakeholders. Coordinating mechanisms, such as a national food security council, can contribute greatly to enhancing collaboration efforts. Collaboration is especially important in streamlining efforts and resources, such as in the case of streamlining permitting. Effective agency collaboration is a prerequisite to achieving successfully streamlined permitting as well as implementation of policies to build resilience, reduce risks and adapt to the impacts of climate change.

Institutions

A broad range of government and civil society institutions and groups exist in Palau with clear links to promoting sustainability and resilience in local food production in Palau. Institutions and groups that are likely to play a key role in implementing this policy include organizations and stakeholders identified in the following diagram. The establishment of a national food security council is envisioned to facilitate and support enhanced synergies through improved coordination and collaboration between partner implementing agencies and organizations.

Diagram F: policy cornerstones and key policy implementers (organizations and stakeholders)

Appendix A: Strategy and Action Plan

Action Plan for Climate Resilient Agriculture and Aquaculture
Vision: A resilient, sustainable & food secure Palau

Institutional Resilience: Component 1: Capacity
Goal: Data Improved Decision Making thorough institutional networks and development.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 1.1 By 2020, an established one stop permitting & resource center.				
OEK has appropriated funds for resource center linked with SBDC & farmers market	SBDC PCC-CRE, MNRET, PALARIS, BOA, BMR, MCAA	2016	Funds appropriated	$25,000
Objective 1.2 By 2018, an established database center where all information gathered is appropriately stored and is gender disaggregated.				
Update central database on current active & inactive farms, productions levels, food types, farming products	PALARIS, MOF BOA, BMR, PCC-CRE, PICRC, PCAA, MOH, Local Producers	2018	Database updated	$200,000 for staff, equipment, and software
Establish a Use Friendly Accessible Database Center (can be housed with OPS and PALARIS)		2018	Database center operational	
MOA and MOU developed and utilized	BOA, BMR PACA, PTFA, Farmers	2015 and ongoing	MOA and MOU signed Ongoing data collection	$50,000 per year ($5,000 x 10 sentinel sites)

Institutional Resilience: Component 2: Transparency & Good Governance
Goal: By 2020, a transparent, accountable, and gender responsive government.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 2 By 2015, Best Management Practices developed and implemented for a transparent and accountable government creating an enabling environment to increase food security.				
Develop & launch an interactive website that's designed to be a hub (one stop shop) that will accomplish the following: - Streamlined application process - Provide a Financial Road Map-info on funding availability, financial tips & How-to's in line with funding source, business plan development tips - Relevant user data (i.e. industry level) - BMR data, BOA data - Domestic/International Market Data - Real time information for website - Develop web-based strategy to increase awareness about available info – have Facts/Current Events/Social Benefits Tab that will highly promote an aggressive awareness campaign for general browsers.	MNRET, BOA, BMR	2015	1.Operational interactive 2.Website application process 3.Financial Road Map 4.Datasets	$ 75,000 TOTAL = $20,000 Servers=$10K Web Developer=$3K Webhosting=$1K Site Security=$1K Web Content=$1K Administration=$4K

Institutional Resilience: Component 3: Agency Coordination & Collaboration
Goal: Effective Agency Coordination and Collaboration by 2020

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 3.1 By 2020, all states have Land Use Plans and Zoned Marine Areas.				
The OEK appropriate funds for state planning	National Congress State Govts, PALARIS	2015	Appropriated funding	Total = $800,000 ($50,000 x 16 states)
National and state Government MOU to ensure state plans completed within 2 years of receipt of funds	National and state govt	2016-2020	Signed MOU	
Objective 3.2 By 2015, an established body of key stakeholders and experts addressing National Food Security Policy.				
Establish a Food Security Council to coordinate & collaborate on agriculture & aquaculture programs, act as a voice for farmers & assist with State Food Security Policies	MNRET/PCC-CRE MCCA-Historical, Lands &Survey, PALARIS, MOE, PACA, PTFA, MOH, POGA, NDBP, SBDC, MOF, MPIIC, COC, MOF-BPS, OERC, EQPB, PCAA, State Reps, Traditional leaders & groups	2015	Food Security Council established	Secretariat for FSC=$50,000 per year for Coordinator & Admin Assistant, & supplies ($300/mtg)
Establish policies and procedures to meet twice a quarter the first year & quarterly thereafter, set policies for NFSC		2015	By policies and procedures completed, meetings are held with full participation	
Objective 3.3 By 2020, research on the supply and demand chain is completed and present status understood.				
Develop TOR for a comprehensive study on supply & demand	MNRET	2016-2017	Study is complete	$25,000
Identify consultant to conduct required study on present supply & demand & status of food security		2016-2017		
Objective 3.4 By 2016, the present status for food security is understood by 75% of the population .				
Develop TOR for a public awareness/education campaign	MNRET	2015-2016	75% of population understands status of food security in Palau	$50,000
Conduct awareness education/campaign		2015-2016		
Objective 3.5 By 2020, a 25% increase in capacity to meet the present food demand.				
Establish a Farmers Market (with Resource Center)	MNRET, BOA, BMR PCC-CRE, State Govts, PTFA, PACA, POGA, traditional groups	2017	Farmers Market established and fully funded	$100,000

Institutional Resilience: Component 4: Preparedness Response to Extreme Events (typhoons, drought, global crisis)
Goal: Bu 2020, a 25% increase of reserve local food production for extreme events.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 4.1 By 2020, a 20% increase in water catchment and storage system capacity.				
Based on assessment of identified priority areas; Build water catchment systems	PPUC NEC NDBP, Palau Housing	2015-2020	Water Catchment Systems are built	$500,000
Objective 4.2 By 2020, a 10% increase in food production directly linked to improved national infrastructure.				
Repair Nursery Roof for Ngchesar to increase food production	BOA	2020	Nursery roof	$50,000
Improve 10% of all farm access road by 2020	BOA, MPIIC-Public Works, State Governments	2020	Improved roads	$50,000
Objective 4.3 By 2020, a 10% increase in surplus local food for extreme events.				
Set up sections of farms for surplus food for extreme events subsidized by ROP & if not used, donated to schools & hospital	BOA, Farmers' Assoc. & Trad'l grps.,PCC-CRE, PTFA, PACA, MRD, NEC, NEMO, private farmers, community groups	2017	Surplus local food is produced	$50,000/year
Develop MOUs with subsidy to farmers		2017		
Objective 4.4 By 2020, a 25% increase in the number of trials & harvests of resilient crops.				
Conduct studies for more resilient crops	PCC-CRE, BOA, PCAA, PTFA, PACA, MRD	2015 and ongoing	Studies are complete & accessible online	$100,000/year
Reports and data posted online				
Objective 4.5 By 2020, a 20% increase in subsidies for farmers planting in climate resilient habitats.				
Promote farming in climate resilient areas & species through subsidies with MOU for reporting production	OEK NDBP MNRET	2017 and ongoing	Subsidies to establish new farms w/ identified climate resilient sites and species	$50,000/year

Ecosystem Resilience: Component 5: Application of Resilience Building/Climate Change Adaptation Measures
Goal: By 2020, Agriculture & Aquaculture that use climate proofed state-of-the-art sustainable land management practices & organic practices & maximizes local inputs & renewable energy to produce 50% of Palau's food needs by 2020.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 5.1 By 2020, a 25% increase in the number of farms with managed saltwater intrusion using effective water dikes/waterways.				
Identify & map & quantify salt intruded mesei	BOA, Farmers, States, Communities, Traditional Org, PCC-CRE	2015	Hectares of Mesei rehabilitated & saltwater intrusion prevented	$100,000
Draft MOU with at least 25% of identified mesei by 2020.		2015		
Rehabilitate the mesei		2016-2020		
Monitor & evaluate		2016-2020		
Write Final Report		2020		
Hold Workshop on finding with stakeholders and other states		2020		
Objective 5.2 By 2020, 75% of existing farms with a 10% increase in propagated and planted salt tolerant & climate resilient crops/varieties.				
Identify salt tolerant crops.	BOA PCC-CRE, Farmers TTM, PTFA, Farmers' Assoc, Traditional Org	2015	Number of farms with climate resilient plants; Number & weight climate resilient crops harvested	$100,000
Propagate salt tolerant crops.		2015		
Distribute salt tolerant crops to at least 25% of the farmers.		2016		
Monitor & Evaluate production of crops		2016-2020		
Write Final Report		2020		
Objective 5.3 By 2020, commercial farms crop insurance is subsidized by government.				
Develop TOR for feasibility study for farm insurance potentially funded by imported food tax	OEK, President, OEK, MNRET, NDBP, MPIIC, MOF, PACA, Insurance Co.	2018	Feasibility study on farm insurance	$50,000
Conduct feasibility study				
Objective 5.4 By 2020, green belt buffer zones established for 4 of the 16 states.				
Spatial Analysis, Mapping & Prioritize sites for demonstration	State Govts, communities, landowners, PALARIS	2015	Green Belt Buffer Zones in 4 states	$150,000
Based on lessons learned from demonstration sites, establish green belt buffer zones in at least 4 states.		2018		
Objective 5.5 By 2018, "Planting calendars" for aquaculture/agriculture developed based upon traditional timing methods.				
Gather baseline information	BOA, PCC-CRE, TTM, Farmers Assoc, Traditional Org	2015	Planting calendar sites tested & replicated	$50,000
Develop planting calendar based upon local knowledge.				
Test planting calendar demonstration sites		2016		
Monitor production based upon calendar		2017-2018		
Replicate at more sites		2019-2020		
Objective 5.6 By 2020, impact of solar heat reduced through relocated farms or cover techniques.				
Test through experimental plots the proposed sites	PCC-CRE, Famers, BMR,	2015-2016	Tested & replicated	$100,000

Based upon results, replicate demonstration sites	NRCS, PACA, Trad'l Org	2017-2020	relocation sites	$100,000
Objective 5.7 By 2016, climate change resilience & adaptation measures including storm water control on farms are incorporated into the EQPB permitting process & state zoning & permitting.				
Review & amend Earthmoving & EIS regulations to mandate that EA & EIS preparers address climate change including storm water.	EQPB	2015-2016	EA & EIS requirements incorporate CC	$10,000
Objective 5.8 By 2020, a 20% increase in number of commercial farms using renewable energy.				
OEK provide budget for subsidy for NDBP.	OEK PPUC, Energy Office, NDBP	2016	20% of Farms have renewable energy	$200,000
Set up lottery system (for renewable energy projects) for farms.		2017		
Monitor & Evaluate		2018-2020		

Ecosystem Resilience: Component 6: Natural Resource Management
Goal: By 2020, 50% of Palau's Agriculture & Aquaculture farms are sustainably managed.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 6.1 By 2020, a 25% increase in the number of existing farms suitably located & managed in the landscape.				
Compile existing information on land suitability (soils, slopes & farming practices)	BOA State govts, PCC-CRE, BMR, EQPB, PALARIS, NRCS, Farmers Assoc, PACA, POGA, PTFA	2015-2016	State agriculture profiles	$100,000
Develop an easily accessible & understandable farming profile for each state		2017-2018		
Implement at 4 sites in 4 states based upon open & equitable selection process		2019	Number of agri farms suitably located & managed in landscape; Workshop	
Monitor & Evaluate		2019-2020		
Stakeholder workshop to share results		2020		
Objective 6.2 By 2020, a 25% increase in existing aquaculture operations suitably located & managed in the seascape.				
Compile existing information on seascape suitability (water quality, currents, accessibility, substrate)	BMR PICRC, CRRF, State govts, PCC-CRE, EQPB, PALARIS, PACA	2015-2016	State aquaculture profiles	$100,000
Develop an easily accessible & understandable aquaculture profile for each state		2017-2018		
Implement at 4 sites in 4 states based upon open & equitable selection process		2019	Number of aquafarms located & managed suitable to the seascape	
Monitor & Evaluate		2019-2020		
Stakeholder workshop to share findings		2020		
Objective 6.3 By 2015, an adopted & implemented Palau's Bio-security bill.				
Develop a Communication Strategy to get the bill passed.	MNRET	2015-2020	Bio-security bill passage	$15,000
Implement Strategy Prioritize top species for action Control or Eradicate top species			-Bio-security law implemented -Controlled or Eradicated Species	$5 Million (monkeys, fruit flies, coconut beetles)
Objective 6.4 By 2018, a 25% increase in existing farms practicing environmentally sound Integrated Pest Management (IPM) & organic plant protection methods.				
Survey farms	PCC-CRE State govts, BOA, BMR, EQPB, PALARIS, Farmers Assoc, PACA, POGA, PTFA, PCS	2015	Assessment Reports	$15,000
Write Assessment Report for each farm		2015		
Prioritize plant pests & diseases		2016	Number of farms practicing sound IPM	
Develop Action Plan for top pests		2016		

Objective 6.5 By 2018, a 25% increase in farms effectively managing soils.				
Develop Soil Conservation Plan (SCP) for selected farms in 4 states	BOA, NRCS State govts, PCC-CRE, BMR, EQPB, PALARIS, Farmers Assoc, PACA, POGA, PTFA, PCS	2015	Soil Conservation Plans (SCPs)	$50,000
Implement SCP		2016		
Monitor, Evaluate, & Report SCP		2017		
Develop an outreach campaign emphasizing soil & plant health		2018	Campaign; Farms with effective soil management	
Objective 6.6 By 2018, a 50% increase in the number of agriculture & aquaculture farms in compliance with discharge regulations of EQPB.				
-Survey presence/absence of aquaculture diseases & parasites in the aquaculture enterprises in Palau -Analyze findings -Monitor & Evaluate -Enter data in database & conduct spatial analysis -Write up findings	NISC State govts, PCC-CRE, BOA, BMR, EQPB, PALARIS, Farmers Assoc, PACA, POGA, PTFA, PCS	2015-2018	-Survey completed	$ 1 Million
-Develop techniques for nutrient management on land & sea -Implement techniques thru 4 pilots in 4 states -Evaluate & monitor -Report on findings -Expand based upon findings	PCC-CRE State govts, BOA, BMR, EQPB, PALARIS, Farmers Assoc, PACA, POGA, PTFA, PCS	2015-2018	Report on findings	$150,000

Community Resilience: Component 7: Community & consumer support for local food production

Goal: Greater community and consumer support for local food production & consumption.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 7.1 By 2015, linkages on the impacts of local food consumption/production on health and economy are monitored.				
Assess existing data (HIES, STEPS) to determine gaps and collect needed data on the impact of local food production/consumption on health and local food economy	BOA BMR, MOF, MOH, Budget & Planning	2015	Local food consumption study	$25,000 initial cost $15,000 every year after
Develop/Enhance surveillance system for impact on health & economy		2015	Operational Surveillance System	
Objective 7.2 By 2020, a 25% increase in provision of locally produced food in schools, hospital and government functions.				
Mandate serving of locally available food in schools/hospital (e.g. at least 3x/week with local menu)	MOE, MOH	2016	Local food served 3x/week	$2,500 for drafting law
Mandate serving of locally available food in all government functions (workshops, trainings, party)	OEK, Office of the President, Local Vendors	2016	Local food served at gov't functions	$2,500 for drafting law
Assess cost of serving local foods 3x/week	MOE, MOH, MOF	2016	True Cost of serving local food 3x/week	$25,000
Provide training on local food processing, handling, and preparation	PCC-CRE, DEH	2016	Training conducted	$25,000
Establish and/or expand school gardens for all schools	MOE, PCAA, UAK	2015-2020	More school gardens	$25,000 per year
Develop a Curriculum Module for Climate Change, Food Security and Health	MOE, PREL, PCC-CRE, RELL, MOH	2017	Curriculum Module	$50,000
Objective 7.3 By 2016, a 25% increase in Community Awareness on the importance of Food Security.				
Develop & implement targeted food security campaigns (taro festival, seafood festival)	MCCA BOA, BMR, MOE, MOH, PCC-CRE, PCAA, UAK, PVA, Community groups	2015-2016	Campaigns implemented	$5,000 for resource development
Use existing platforms/events to highlight food security issues (Night Market/School Workshops)			Community Awareness increased	$5,000 per year
Utilize mainstreaming & media to market existing programs	BOA -Partners same as above-	2015-2016		$10,000 per year
Expand existing social marketing campaigns focusing on school-aged children	UAK, MOE, MOH, PNOC	2015-2016	Community Awareness increased in children	$50,000 per year

Economic Resilience: Component 8: Government Investment

Goal: Government and private sector investment in local aquaculture & agriculture producers and products are strengthened and enhanced.

Action	Lead Agency & Partners	Timeline	Output	Budget
Objective 8.1 By 2020, to raise at least $500,000 for MNRET's Agriculture and Aquaculture Revolving Funds.				
Acquire necessary data on agriculture and aquaculture production, supply, demand and existing market for revolving fund justification to OEK.	MNRET, BOA, BMR	2020	Completed & accessible report Revolving Fund increased	$500,000 for Revolving funds
Objective 8.2 By 2015, establish a Guarantee Program for loans to local commercial farmers.				
Develop Application Process for Low Interest Loan including MOU for minimal requirements including training dependent on applicant and size of farm.	NDBP, SBDC, MNRET, BOA, BMR, State Governments	2015 and ongoing	Annual report of food production, # of business loans acquired, # of jobs created/retained.	$100,000 to guarantee riskier loans (no steady income)
Objective 8.3 By 2015, establish Mentorship/Financial monitoring services.				
Identify existing & successful business people in the industry for mentoring services.	SBDC NDBP, BOA, BMR, State Governments	2015 and ongoing	Available Mentoring services	$50,000 to support activities
Develop partnership with signed MOU between mentor and mentee.				
Objective 8.4 By 2015, capacity building training is offered every quarter.				
Train & build business (financial management) knowledge & skills	PCC SBDC, MNRET, BOA, BMR	2015 and ongoing	Number of certificates issued	$80,000 per year
On-site training and one-on-one training				
Develop certification program based upon training				
Objective 8.5 By 2015, grants are available for eligible agriculture & aquaculture programs through the PAN FUND.				
Pan Fund Office to create mechanism for program	State Govts/Pan Mgmt, PANF Office	2015	-Established PAN mechanism -Successful campaign -Grant funding in place	$50,000 to create mechanism and for awareness campaign $100,000 /year for grants
Develop awareness program				
Implement program				

Objective 8.6 By 2015, establish more efficient government procurement processes and payments to local food producers.				
Mandate timely government payment to local food producers' within10 working days, with financial penalties for late payments.	MOF	2015	Payments to local food producers disbursed within 10 working days	$5,000 to revise current regulations and processes
Objective 8.7 By 2016, establish tax incentives for farms				
Review and revise tax regulations to address tax exemptions for agriculture & aquaculture supplies & local produce	MOF BOA, BMR	2015	Amended/revised regulations	$25,000

References

Cutts, Maureen M. Black, Nieves Zaldivar, Suzette Levenson, Tim Heeren and Alan Patrick Casey, Susan Goolsby, Carol Berkowitz, Deborah Frank, John Cook, Diane Meyers. 2004. "Maternal Depression, Changing Public Assistance, Food Security, and Child Health Status." *Pediatrics* 298-304.

Ministry of Health. 2010. *Palau National NCD Strategic Implementation Plan 2010-2015.* Strategic plan, Koror: ROP.

Ministry of Natural Resources, Environment and Tourism. n.d. "Bureau of Agriculture Strategic Plan." Agency Strategic Plan.

Nakano, Kazutaka. 1996. *A Note on Taro Cultivation in Palau.* Progress and survey report, Kagoshima: Kagoshima University.

Ngiraingas, Madelsar. 2012. *Food Security and food production in the Republic of Palau: Findings of a socioeconomic assessment by the Pacific Adaptation to Climate Change (PACC) Project.* socio economic assessment report, Koror: PALARIS.

Ngiraingas, Madelsar. 2012. *MPIIC Report to NCD Crisis Summit, Palau.* Powerpoint presentation, Koror: PALARIS.

Ngiraingas, Madelsar. 2012. *Sustainable Lands Management: What is the relationship with NCDs?* Powerpoint presentation, Koror: PALARIS.

Palau Conservation Society. 2013. *A synthesis report of "successful" community based resource management in Palau .* Review, Koror: OERC.

Paul, Neil C A. 2008. *Options for a Food Replacement Strategy in the Context of Rising Food Prices and Food Security.* Powerpoint presentation, Barbados: UWI.

Republic of Palau. 2014. *Second National Communication to the United Nations Framework Convention on Climate Change.* Country Report, Koror: Republic of Palau.

Secretariat for the Pacific Community. 2014. *Pacific Climate Change Science Program - Country Report: Palau.* Country report, Koror: Secretariat for the Pacific Community.

Sustainable Decisions. 2014. *Bridging the Gaps for Climate Change Policy in Palau.* Analysis, Koror: Sustainable Decisions.

TEI and Partners. 2013. *Climate Change Policy Review.* Technical review, Koror: OERC.

TEI and Partners. 2013. *Community Issues for the Development of a Climate Change Policy Framework: Summary for Policy Makers.* Consultation report, Koror: OERC.

TEI and Partners. 2014. *Gaps and Needs Analysis for Climate Change Adaptation in Palau.* Gaps and Needs Analysis, Koror: OERC.

Timarong, Motil. 2012. "The Economics of Taro Production in Palau." Powerpoint presentation, Koror.

Tubiello, Josef Schmidhuber and Francesco N. 2007. "Global Food Security Under Climate Change." *Sustainability Science* 19703-19708.