Republic of the Marshall Islands

AGRICULTURE SECTOR PLAN

2021 – 2031

Republic of the
Marshall Islands

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2021 – 2031

CONTENTS

Acronyms **5**

Acknowledgment **6**

Foreword **7**

Executive Summary **8**

Glossary **10**

1. Introduction **12**

1.1 Key Guiding Principles 13

1.1.1 Contribution to Food Security 13

1.1.2 Contribution to Economic Growth 13

1.1.3 Contribution to Social Sustainability 13

1.1.4 Contribution to Environmental Sustainability 13

1.1.5 Public-Private Partnership (PPP) 13

1.2 The Role of the Sector 13

1.2.1 Contribute to national income 13

1.2.2 Source of food supply 13

1.2.3 Raw materials for value-adding industries 14

1.2.4 Disaster reliefs 14

1.2.5 Employment opportunities 14

1.2.6 Addressing Regional and International Convention and SDGs 14

2. Stakeholders and their Roles **16**

3. Challenges for Agriculture Development in. **18**

4. Marshall Islands Agriculture Sector Plan 2021–2031 ..... **20**

4.1 Goal 20

4.2 Purpose 20

4.3 Outputs 20

4.4 Organizational Structure 29

5. Risks analysis and Partnerships Opportunities. **30**

5.1 Risks Analysis 30

5.2 Partnership Opportunities 31

6. Program Delivery **33**

7. Monitoring and Evaluation **34**

Appendix 1. Logical Framework Matrix **35**

Appendix 2. Organizations and people consulted with during the development of the Agriculture Sector Plan **37**

ACRONYMS

ABS	Access and Benefit Sharing
CBD	Convention on Biological Diversity
CMAC	Coastal Management Advisory Council
CMI	College of the Marshall Islands
CGRFA	Commission on Genetic Resources for Food and Agriculture
COGENT	International Coconut Genetic Resources Network
DA	Division of Agriculture of the Ministry of Natural Resources and Commerce
ENSO	El Nino Southern Oscillation
EPA	Environmental Protection Authority (also RMIEPA)
FAO	United Nations Food & Agriculture Organization
FAP	Forest Action Plan
FS USDA	Forest Service
ICC	International Coconut Community
IPPC	International Plant Protection Convention
ITGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LFA	Laura Farmers Association
LRD	Land Resources Division of SPC
MICS	Marshall Islands Conservation Society
MCT	Micronesia Conservation Trust
MIMRA	Marshall Islands Marine Resources Authority
MIOFA	Marshall Islands Organic Farmers Association
MOE	Ministry of Education
MOHHS	Ministry of Health & Human Services
MOU	Memorandum of Understanding
MNRC	Ministry of Natural Resources and Commerce
NCD	Non-Communicable Diseases
NES	National Export Strategy
NGO	Non-Governmental Organizations
NSP	National Strategic Plan
NTC	National Training Council
OEPPC	Office of Environmental Planning and Policy Coordination
PIFS	Pacific Islands Forum Secretariat
PTD	Participatory Technology Development
RBP	Regional Biosecurity Plan for Micronesia and Hawaii
RICS	Regional Invasive Species Council
RMI	Republic of the Marshall Islands
R2R	Ridge to Reef
SDG	Sustainable Development Goal
SLM	Sustainable Land Management
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environmental Programme
SWARS	State-Wide Assessment and Resource Strategy
TTM	Taiwan Technical Mission
UNDP	United Nations Development Program
UNFCC	United Nations Framework Convention on Climate Change
USDA	United States Department of Agriculture
USFS	Unites States Forestry Services
USP	University of the South Pacific

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We wish to acknowledge the efforts made by the team which formulated the plan and carried out stakeholder consultations. We are grateful to Dr. Siosiua Moala Halavatau who led the drafting and also training of our officials. We would also like to acknowledge our very own Chief of Agriculture, Ms. Risa Kabua Myazoe, and the entire Division of Agriculture staff who had taken all the efforts to finalize this plan.

Finally, we acknowledge the contribution of all those whose names are not mentioned but who have been with us throughout this work (Appendix 2).

FOREWORD

It gives me great pleasure to introduce the first agricultural strategy of the Marshall Islands - Agriculture Sector Plan 2021 to 2031. To provide a foreword to such an important document is indeed a momentous occasion for me as Minister responsible for Agriculture. The Ministry, in particular the Division of Agriculture, must attach considerable importance to this plan, as it will now serve as the principal guide to their operations over the next 10 years.

Achieving sustainable growth will depend on strengthening effective partnerships and support for private sector development and increased foreign investment. The Agriculture sector has been identified in the National Strategic Plan (NSP) as one of the priority areas for economic development. Hence, this sector plan was formulated to guide a coordinated approach in addressing the challenges to the sector and thus strengthen the contribution of the sector to economic growth and the attainment of food security.

The launching of this Agriculture Sector Plan is a historic feat by the Ministry. This is the first time that a plan is being applied to guide our efforts to address the emerging and challenging issues of agriculture production and food security. The sector plan will provide policy guidelines and direction for the Agriculture Sector to implement programs that will focus on the needs related to increasing agriculture productivity. The Sector Plan will also provide a clear direction to the sector to align its objectives in a well-coordinated and integrated approach. The use of funds and the application of appropriate technologies to address specific issues faced by the communities will be transparent. In this way, the Sector Plan will also provide an avenue for donors to complement what the Ministry is doing to maximize benefits to the community.

I wish to give my sincere gratitude and a special tribute to the mayors, farmers, women representatives, youths, government and non-government organizations and private sector stakeholders who participated in and provided guidance during the consultation. Last but not least I acknowledge the effort and sacrifice rendered by the hard-working team from the Division of Agriculture who, through their dedication and hard work have enabled the timely completion of this Plan.

Hon. Sandy Alfred
Minister of Natural Resources and Commerce
Republic of the Marshall Islands

EXECUTIVE SUMMARY

Agriculture was integral to the livelihood of the Marshall Islands and lost its status for a while but has been identified in the NSP 2015-2017 as one of the priority areas for attaining food security. The agriculture sector also contributes to achieving development sectors (2) Environment, Climate Change, and Resiliency and (4) Sustainable Economic Development.

Marshal Islands has a food security policy, a trade policy, an export strategy, a Marshall Islands Organic Farmers Association (MIOFA) Strategy and a 2010 State-Wide Assessment and Resource Strategy (SWARS), subsequently known as and soon to be updated as the 2020 "Forest Action Plan" (FAP); and to complete the package there is a need to develop an Agriculture Sector Plan and a partnership model for these plans to better integrate and address food production, food security and deliver ecosystem services for the nation.

The Marshall Islands Agriculture Sector Plan 2021–2031 is the result of participatory stakeholder consultations and desk-based reviews of relevant literature for the Marshall Islands to guide the formulation process. Participatory rural appraisal tools were also used to ensure the involvement of stakeholders in this agriculture plan and to start building partnerships at the beginning of the process which should follow through to implementation. The stakeholders were representatives of various government ministries, including the Ministry of Health & Human Services (MOHHS); Office of Environmental Planning and Policy Coordination (OEPPC), Local Government, and the Ministry of Natural Resources and Commerce (MNRC). Other bodies, such as Taiwan Technical Mission (TTM), Wellness Center, MIOFA, Marshall Islands Conservation Society (MICS), Youth Corp, and women's and farmers' organizations, were also represented.

During the consultations, the stakeholders broadly agreed on the key guiding principles, goal, purpose and the key outputs and activities to pursue over the implementation period. The key guiding principles were that the strategy will contribute to the achievement of food security, economic sustainability, social sustainability, and environmental sustainability while valuing public-private partnerships in the implementation of the plan. The plan not only recognizes the needs and aspirations of the diverse stakeholders but also requires the involvement of all relevant stakeholders in the implementation process.

There are seven key outputs defined to be achieved over the implementation period:

1. Environmental degradation minimized
2. Sustainable small-livestock production systems developed and promoted
3. Sustainable crop production systems developed and promoted
4. Increased consumption of nutritious locally-produced foods
5. Improved biosecurity and marketing
6. Improved capacity of agriculture sector stakeholders
7. Developed enabling policies/legislations

Under each output, a range of activities, which are interrelated in their effects, will be implemented over the next ten years. The implementation of any one activity will help to achieve and also be helped by the implementation of, the other activities. Some of the activities, when implemented, will contribute to achieving more than one output.

The implementation process will use a results-based approach with coordinated participation of all stakeholders, including governmental, non-governmental and community-based organizations. The Division of Agriculture of MNRC will assume the lead role in facilitating the implementation and monitoring and evaluation process. The plan includes a Logical Framework Matrix which will serve as the basis to guide the implementation process and as well as the monitoring and evaluation to determine impacts. The plan will be reviewed every six months.


CONOMY
OCAL BUSINESSES
Marshallese
MARKS A LOT

GLOSSARY

Adaptation: It is an evolutionary process whereby an organism becomes better able to live in its habitat or habitats.

Agriculture: Agriculture is the science and art of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago.

Agroforestry is the deliberate growing of woody perennials on the same unit as crops and/or animals, either in some form of spatial mixture or sequence. And there must be a significant interaction (positive and/or negative) between the woody and nonwoody components of this system, either ecologically and/or economically.

Biodiversity: It is the shortened form of two **words** "biological" and "diversity". It refers to all the variety of life that can be found on Earth (plants, animals, fungi, and micro-organisms) as well as to the communities that they form and the habitats in which they live.

Biological Control: Biological control or biocontrol is a method of **controlling** pests such as insects, mites, weeds and plant diseases using other organisms. It relies on predation, parasitism, herbivory, or other natural mechanisms, but typically also involves an active human **management** role.

Biosecurity: They are procedures or measures designed to protect the population against harmful biological or biochemical substances.

Breed: A breed is a group of animals that is consistent enough in type to be logically grouped, and that when mated within the group reproduces the same type.

Carbon Sinks: Forest, ocean, soil, or other natural environment viewed in terms of its ability to absorb carbon dioxide from the atmosphere.

Climate Change: A change in global or regional climate patterns, in particular, a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Compost: Composting is nature's way of recycling. Composting biodegrades organic waste. i.e. food waste, manure, leaves, grass trimmings, paper, wood, feathers, crop residue, etc., and turns it into valuable organic fertilizer.

Fertilizer: A substance that is added to the soil to supply essential nutrients for plant growth. Fertilizers may be natural or artificial (manufactured).

Forestry: Traditionally defined to include the management of trees for the production of wood, but more broadly defined includes agroforestry and home garden trees, production of non-timber forest products (notably pandanus fiber), conservation of forest biodiversity, conservation and management of ecosystem services from forests (for example, coastal protection), and urban forestry (such as street and park trees).

Genetic Diversity: Genetic diversity is the total number of genetic characteristics in the genetic makeup of a species. It is distinguished from genetic variability, which describes the tendency of genetic characteristics to vary. Genetic diversity serves as a way for populations to adapt to changing environments.

Integrated Crop Management (ICM)) is a holistic approach to sustainable agriculture. It considers the situation across the whole farm, including socioeconomic and environmental factors to deliver the most suitable and safe approach for long-term benefit.

Integrated Pest Management: A system of pest control that uses a combination of most appropriate control measures including pesticides, cultural, mechanical and biological means. The monitoring of pest numbers is an important step in integrated pest management.

Land Degradation is a process in which the value of the biophysical environment is affected by a combination of human-induced processes acting upon the **land**. It is viewed as any change or disturbance to the **land** perceived to be deleterious or undesirable.

Mitigation: Mitigation to climate change consists of actions to limit the magnitude or rate of long-term global warming and its related effects.

Mulch: A mulch is a layer of material applied to the surface of the soil. Reasons for applying mulch include conservation of soil moisture, improving fertility and health of the soil, reducing weed growth and enhancing the visual appeal of the area. A mulch is usually, but not exclusively, organic. It may be permanent (e.g. plastic sheeting) or temporary (e.g. bark chips). It may be applied to bare soil or around existing plants.

Nutrients: Plant nutrients are the chemical elements that are essential to the nourishment of plant health. Some nutrients like nitrogen, phosphorus, and potassium are needed in large quantities (kg/ha) are called *macronutrients* and some like iron, zinc, and copper are needed in small quantities (g/ha) are called *micronutrients.*

Organic Farming: A farming system based on the use of natural materials for supplying nutrients and protection to plants and animals. No chemicals such as artificial fertilizers, pesticides or herbicides are allowable for a farm that is certified organic.

Pesticides: A general term for chemicals that will kill weeds, fungi, insects or other pests of plants, animals or products.

Resilience: Climate resilience can be generally defined as the capacity for a socio-ecological system to (1) absorb stresses and maintain function in the face of external stresses imposed upon it by climate change and (2) adapt, reorganize, and evolve into more desirable configurations that improve the sustainability of the system, leaving it better prepared for future climate change impacts.

Soil Degradation: Soil degradation is the physical, chemical and biological decline in soil quality. It can be the loss of organic matter, decline in soil fertility, and structural condition, erosion, adverse changes in salinity, acidity or alkalinity, and the effects of toxic chemicals, pollutants or excessive flooding.

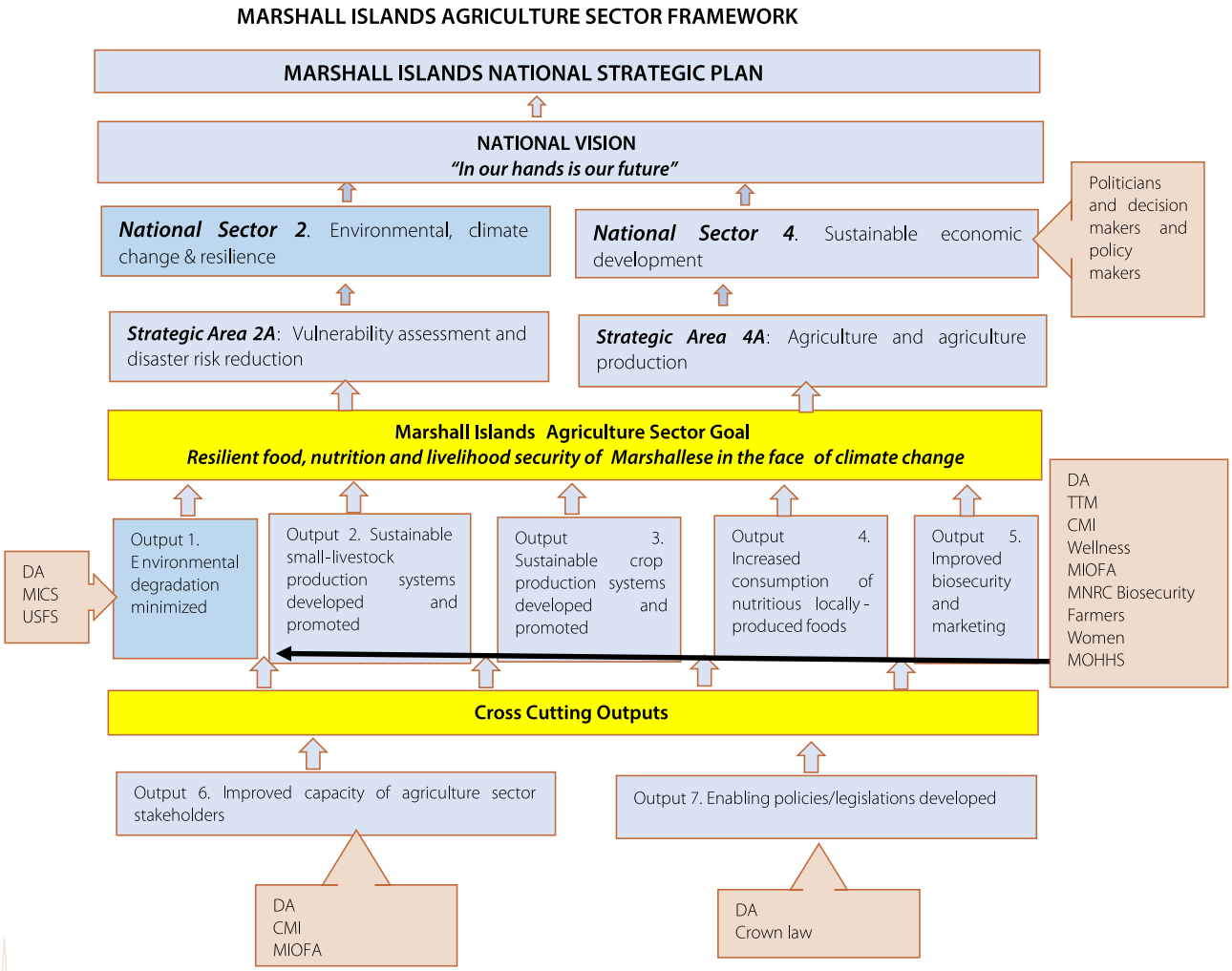
Sustainability: Sustainable agriculture is that form of farming that produces sufficient food to meet the needs of the present generation without eroding the ecological assets and productivity of life-supporting systems of future generations.

1. INTRODUCTION

Agriculture was traditionally a key component of the Marshall Islands' economy, mainly permanent crops and plantations. Nearly all families were once involved in agriculture. There has been a steady decline and loss of engagement in the agricultural sector with about less than half of households currently involved. In 2006 there was only 0.3% of the labor force engaged in agriculture and forestry activities as their main economic activity. In 2011 64% of the total land area of the Marshall Islands was considered arable. And in 2014, the agriculture and forestry export value as a proportion of the total export was only 1.2%. The country is now at a juncture where an agriculture sector plan is needed to raise the involvement of the communities and increase national domestic food production.

Agriculture development was identified as one of the priority areas driving the Sustainable Economic Development Sector of the Marshall Islands (NSP 2015-17) with the overarching objectives: "Implement the RMI Food Security Policy and Agriculture Strategies Linked to Targeted Policy Goals". And together with the food security policy, the National Trade Policy, the National Export Strategy, MIOFA Strategy and the Forest Action Plan (FAP) are calling for the development of the Agriculture Sector Plan, and development of a partnership model for these plans to better integrate and address food production, food security and deliver ecosystem services. Figure 1 shows the linkages between the national sector objectives, strategic areas and the 7 outputs of the agricultural sector plan.

Figure 1. Linkages between the Agriculture Sector Plan and the Marshall Islands Strategic Plan



The sector plan was developed in a participatory manner with inputs from all major stakeholders in the country. Participatory rural appraisal tools were used to ensure the involvement of all stakeholders and to start building partnerships at the beginning of the process. This approach also ensured that the stakeholders shared a feeling of empowerment and ownership right from the planning phase, which should follow through to implementation and participatory monitoring and evaluation of the work plans.

1.1 Guiding Principles

In developing the sector plan, the stakeholders were guided by the following principles.

1.1.1 Contribution to Food Security

Investment in agriculture supports the Marshall Islands' obligations regarding the progressive realization of the right to adequate food in the context of national food security, and all intended users' responsibility to respect human rights. Responsible investment in agriculture contributes to food security and nutrition, particularly for the most vulnerable, at the household, local, and national level, and to eradicating poverty.

1.1.2 Contribution to Economic Sustainability

The sector plan must find ways to deliver real economic benefits to the rural sector and the entire economy

1.1.3 Contribution to Social Sustainability

The sector plan also must improve the economic well-being of lower-income groups and other disadvantaged groups, including women. The strategy will encourage the economic development of rural atolls to reduce the internal migration of people to Majuro and Ebeye.

1.1.4 Contribution to Environmental Sustainability

Agricultural innovations should be developed to bring about sustainable management of forests, soil, and water resources and their adaptation to climate change impacts and reduce agricultural pollution to manageable levels.

1.1.5 Public-Private Partnership

Primary production, processing, storage, and marketing are essentially private sector activities; the role of the private sector should be to take advantage of the improved enabling environment provided by the public sector for profitable primary sector investment.

On the other hand, the government and other service providers should be creating an enabling environment for effective sector performance. Hence, promoting an effective partnership amongst all stakeholders including governmental, non-governmental and community-based organizations with links to regional and international networks, where appropriate, is critical to promote agricultural growth and thus food security in the Marshall Islands.

1.2 Role of the Sector

Agriculture in the Marshall Islands may not be the backbone of the economy but still, it plays some vital roles for the overall development of the country.

1.2.1 Contribute to national income

In the Marshall Islands agriculture and forestry export was only 1.2% of total export in 2014 as reported by SPC National Development Minimum Indicators (NDMI). The National Export Strategy (NES) examined the potential for exports in the five identified sectors of fisheries, pandanus, coconuts, handicrafts, and tourism. The opportunity to raise the sector contribution to national income is huge and the Agriculture Sector Plan is expected to play a key role in this aspiration.

1.2.2 Source of food supply

It is estimated that currently 20% of the food supply is produced locally. This reliance on imported foods for the diet of Marshallese is a priority issue that the sector plan will address by increasing locally grown foods and improve the engagement of households in agricultural activities. An increase in locally produced food will ensure a healthier diet for the household and in the long term contribute to decreasing incidence of NCD.

1.2.3 *Raw materials for value-adding industries*

The agriculture and forestry products from the sector will supply raw materials to some of the value-adding industries. Examples from agriculture production are breadfruit for flour making and pandanus for the fruit juice. And from Forestry production are wood for carvings and construction.

1.2.4 *Disaster reliefs*

DA has vital roles in disaster reliefs – from assessing the degree of damages to responses to food needs after a disaster and coordination of crop and livestock rehabilitation after a disaster.

1.2.5 *Employment opportunities*

When one thinks of agriculture, farming may come to mind. However, there are other types of agriculture employment. Agriculture employments may also be in agribusiness, agricultural science, or agricultural specialists like agronomists, plant or animal breeders, or soil scientists. The opportunity, however, is not much in the Marshall Islands but the sector plan will raise the image of agriculture including employment opportunities.

1.2.6 *Addressing Regional and International Convention and SDGs*

The agricultural sector has roles to ratify regional and international conventions with initiatives related to agriculture and forestry development.

The Micronesia Challenge

The Challenge is a commitment by the Federated States of Micronesia, the Republic of Palau, Guam, and the Commonwealth of the Northern Marianas Islands to preserve the natural resources that are crucial to the survival of Pacific traditions, cultures, and livelihoods. The overall goal of the Challenge is to effectively conserve at least 30% of the near-shore marine resources and 20% of the terrestrial resources across Micronesia by 2020. The sector plan will link to the Challenge in areas related to food security, biosecurity and resilience, and invasive species.

Regional Biosecurity Plan (RBP) for Micronesia and Hawaii

Because of US Department of Defense relocation of some 4000 marines from Okinawa to Guam, the Regional Invasive Species Council (RISC) and the countries party to the Micronesia Challenge developed the RBP initially to assess the impacts of the relocation of the military personnel and has graduated to analyze the risks and coordinate enhancements in biosecurity. This initiative provides opportunities for capacity building in pests and disease management and improved biodiversity.

The DA will also ensure the Marshall Islands' contribution to the following Sustainable Development Goals (SDGs):

SDG 2 – Zero Hunger

Goal 2 seeks sustainable solutions to end hunger in all forms by 2030 and to achieve food security. The aim is to ensure everyone everywhere has enough good quality food to lead a healthy life

SDG3 – Good Health and Well-Being

Goal 3 seeks to ensure health and well-being for all, at every stage of life. The aim is to improve reproductive and maternal-child health; end the epidemics of HIV/AIDS, malaria, tuberculosis and neglected tropical diseases; reduce non-communicable and environmental diseases; achieve universal health coverage; and ensure universal access to safe, affordable and effective medicines and vaccines.

SDG 12 – Responsible Consumption and Production

Sustainable growth and development require minimizing the natural resources and toxic materials used, and the waste and pollutants generated, throughout the entire production and consumption process.

SDG 13 – Climate Action

Climate change presents the single biggest threat to development, and its widespread, unprecedented effects disproportionately burden the poorest and the most vulnerable, Goal 13 calls for urgent action not only to combat climate change and its impacts but also to build resilience in responding to climate-related and natural hazards and disasters.

In addressing SDG 13, the plan will be also guided by the Kyoto Protocol and the Paris Agreement in setting mandatory limits on greenhouse emissions, guidance on mitigation, adaptation and climate change finance. The ridge to reef or whole of an island approach will guide the design and implementation of mitigation and adaptation measures.

The DA will coordinate the Koronivia Joint Works on Agriculture (KJWA) - the global initiative from the 23rd Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC) with agricultural actions to minimize vulnerabilities of agriculture to climate change

SDG 15 – Life on Land

Preserving diverse forms of life on land requires targeted efforts to protect, restore and promote the conservation and sustainable use of terrestrial and ecosystems. Goal 15 focuses specifically on managing forests sustainably, halting and reversing land and natural habitat degradation, successfully combating desertification and stopping biodiversity losses.

2. STAKEHOLDERS AND THEIR ROLES

Agriculture in the Marshall Islands supplies local foods and other ecosystem services. The agriculture sector goods and services are distributed across the whole nation, and any issue relating to agriculture ultimately affects a large and scattered range of consumers. The complexity of agricultural land use and food production systems also means that many different organizations have commercial or regulatory interests in farming and its possible effects on health. All these organizations need to be considered as potential participants in the implementation of the Agriculture Sector Plan. Table 1 shows the interests, perceptions, resources stakeholders have and mandates they have to support agricultural development.

Table 1. Stakeholders who are potential partners to DA

Stakeholders	Interests in the core problem of the agriculture sector	Perception of the problem	Resources	Mandate
Farmers and communities	• To grow local foods • Incomes from farming	• Poor soil conditions • Climate change	• Land • Labor	• Grow enough food
Landowners	• To grow local foods • Incomes from farming • Incomes from land lease	• To grow local foods • Incomes from farming	• Land	• Grow enough food
CMI Agriculture Department	• Help local communities grow their foods • Community awareness • Economic security	• Lack of agriculture knowledge • Lack of employment in the sector	• Outreach extension program to educate the local community • Greenhouse and seedling supplies	• 3 month of yearly check-up on farmers
Taiwan Technical Mission	• Enhance food security in the outer islands - Transportation - Promotion - Adoption and marketing	• Soil management and materials (for compost, etc) • Farmer organization	• TTM projects • Budget and technical supports • Cooperation with Local Government, NRC, and MICS	• Support from Government (National and local), TTM, NRC • By-Laws
Wellness Center	To increase food security and improve nutrition in the Marshall Islands	• Poor soil condition • Dependence on imported processed foods • Rural atolls difficult to maintain sustainability	• Technical skills • Professional knowledge • Determination and passion • Existing projects	• To increase the use of fresh fruits and vegetables throughout the Marshall Islands

MNRC Agriculture Divisiont	• Capacity building • Livestock/horticulture development • Agriculture curriculum for schools • Stakeholder partnership • Increase home gardening • Soil & water management training • Hydroponics	• Capacity • Funding • Lack of interest • Poor transport systems • Weak sector • Climate change	• Staff • Technical advice • Traditional crop expertise • Farming communities • Landowners • Relevant Partners	• Food Security Policy • Promotion of agricultural development • Provide agriculture production, plant and animal health services • Develop agriculture policies and planning
Local Government	• Preservation of local foods • Health and poverty • Climate change • Transportation • Crop resistance	• NCD and poverty • Climate change • Sustainability • Imported food • Population migration	• MNRC • TTM • Council land • Women groups • Youth groups	• MOU with health and education • NSP • Food security policy
Ministry of Health & Human Services	To provide nutritious foods to communities	High incidences of obesity and NCDs	• Technical staff • Projects and program	• To address food security and lifestyle diseases

Given the multiple stakeholders involved in agricultural growth, it is vital to ensure good communication between the diverse group of stakeholders to build consensus on strategic actions and investments.

3. CHALLENGES TO AGRICULTURE

Arguably one of the greatest challenges the Marshall Islands now faces is how to produce enough good quality foods to feed its people in Majuro and the outer islands. Successfully addressing this challenge will require making a few hundred small farmers more productive. Food production in the Marshall Islands is influenced by many factors, amongst them are:

Poor soil conditions – The sandy carbonatic soils of Pacific atolls are considered infertile and poorly suited to agriculture. The Republic of the Marshall Islands is comprised predominantly of atolls, and there is scant information on the fertility status of the Marshall Island soils. Most Marshallese soils are limited in nitrogen (N), phosphorus (P), potassium (K), iron (Fe), copper (Cu) and manganese (Mn).

Water availability – The Marshall Islands experienced severe droughts in the last few years and with increasing sea level rise the freshwater supply is dwindling. United Nations Development Program (UNDP) has reported that the 34 islands that comprise the country are in danger of being inundated by rising sea levels and dwindling freshwater supplies. This signals a major challenge to agriculture development to develop water management strategies for producing crops in the face of this potential crisis.

Narrow genetic base – Some of the varieties of species like pandanus, taro, breadfruit, coconuts, dwarf banana, traditional fruits and sources of traditional medicines are now endangered. The major challenge is protecting the genetic diversity of the crops from introduced pests and diseases and the effects of extreme weather events like droughts and severe cyclones.

Pests and diseases: A major problem with introduced crops is their susceptibility to pests and diseases. Traditional crops like coconuts and breadfruit also threatened by pest and disease problems. The most serious of these include insect pests such as the breadfruit mealybug, coconut scale, and spiraling whitefly, which cause severe damage to many food crops and seriously affect crop productivity and overall food security. To show how serious this problem is, twenty-one new pest species were introduced to Jaluit and Majuro in 1975 of which twelve species were new to the country.

Costs of farm inputs: Farm inputs are generally costly in the Pacific Islands and more on atolls.

Challenges for livestock: There are limited choices for livestock production on atolls. The most common are smaller animals – pigs, poultry, and ducks. The traditional breeds of small animals raised on atolls are disappearing.

Erosion of traditional knowledge: Traditional knowledge of how to farm and care for domestic and traditional plants and animals is also eroding. Even traditional forms of food preparation and preservation are unknown to many young people. Loss of traditional agroforestry knowledge has accompanied the decline in engagement in agriculture activities by Marshallese households.

Climate change: Particularly the danger of sea-level rise. Sea level rise has already encroached landwards, and high tides and frequent storms continue to threaten local homes and property. Recent research indicates that sea levels have been increasing by 3.4 millimeters (0.13 inches) per year. A one-meter rise could result in the loss of 80 percent of the Majuro Atoll, which is home to half the nation's population. Besides, the underwater freshwater supply has been salinated by this influx of seawater.

Efforts will be made to improve the resilience of food production systems to impacts of climate change by improving above-ground biodiversity and below-ground biodiversity.

Trade and Marketing: Currently a shift is taking place away from the traditional copra export in favor of the export of coconut oil. There are opportunities in the domestic market for added value products like breadfruit flour and for selling fresh agricultural produce. There is an opportunity as well for organic produce.

Challenges for forestry: The major challenge for forestry is the disappearance of native forest trees and traditional agroforestry systems. The ridge to reef or whole of an island approach can support initiatives to address this challenge.

4. MARSHALL ISLANDS AGRICULTURE SECTOR PLAN

This AgricultureSector Plan directly supports the NSP with its vision, "In our hands is our future" and links to the national theme "*Ensuring broad-based growth and food security through a cross-cutting approach*" with the national target which focuses on local food security issues and reducing imports. The plan also addresses issues relating to development sectors (2) Environment, Climate Change and Resiliency and (4) Sustainable Economic Development

4.1 Goal: Resilient food, nutrition and livelihood security of Marshallese in the face of climate change

The key performance indicators for the goal are:

Contribution of locally produced foods to diets of Marshallese

Contribution of agriculture to household incomes

4.2 Purpose: Enhanced agriculture development for the Marshall Islands

The key performance indicators for the purpose are:

- Livestock production increased
- Crop production/ quality improved
- Improved biodiversity and resilience
- The appropriate structure for Agriculture Division

4.3 Outputs

The plan will aspire to achieve the goals by achieving the following outputs:

1. Environmental degradation minimized
2. Sustainable small-livestock production systems developed and promoted
3. Sustainable crop production systems developed and promoted
4. Increased consumption of nutritious locally-produced foods
5. Improved biosecurity and marketing
6. Improved capacity of agriculture sector stakeholders
7. Enabling policies/legislations developed

Output 1. Environmental Degradation Minimised

The key performance indicators are:
Number of trees planted traditional and exotic
Soil and water quality improved
The priority areas for forestry in the Marshall Islands from the "State" - Wide Assessment and Resource Strategy 2010 – 2015+ (FAP) are improving biodiversity; improving food security and sustainable livelihoods; coastal reinforcement; and reducing the loss of urban trees. The implementation of the activities under this output will also align with the Reimaanlak Conservation Plan. The activities to be undertaken to achieve this output include:

1.1 Coastal tree planting

The Division of Agriculture will lead and coordinate the planting of salt-tolerant traditional trees along coastal areas to protect the coast and to minimize current erosion along the coast.

1.2 Promote tree planting on farmlands including coconut replanting

Where there is a problem of deforestation and on barren lands, efforts will be made to promote tree plantings including coconut replanting. Surveys will also be conducted and senile coconuts will be selectively logged and replaced.

1.3 Promotion and preservation of the diversity of traditional and cultural plants

Conservation of biodiversity in the Marshall Islands concerns terrestrial native species, especially endemic species. Priority target trees and areas include breadfruit, climax forest (Pisonia grandis, Neisosperma oppositifolium), Pemphis acidula forest, and Mangrove forests.

The Forestry Section of the Division of Agriculture will collaborate with other partners to map more detailed forest ecosystem types; map forest types and conservation values on the atolls and designate 'traditional land use' conservation areas (subsistence agroforestry production and compatible income generation with sustainable practices).

1.4 Support development of appropriate agroforestry systems

This activity will include promoting and increasing the production of agroforestry including high-value market intercrops; community extension and education. The approach will also rehabilitate and replant coconut.

1.5 Promote urban forestry

The activities will include planting trees for the beautification of urban areas and promoting tree planting by schools.

1.6 Monitor potential sources of pollution by agriculture practices

The Division of Agriculture will collaborate with the Division of Quarantine and Marshall Islands Conservation Services, Environmental Protection Authority (EPA) and OEPPC in monitoring pollution by agricultural practices.

Output 2. Sustainable small-livestock production systems developed and promoted

The key performance indicators are:

- Number of improved breeds developed and distributed
- Improved feeds

The delivery of services to achieve this output will comply with the "one health approach" and will be undertaken in collaboration with the Taiwan Technical

Mission. The activities to be undertaken to achieve the output include:

2.1 Improve local breeds

There are limited choices for livestock production in the Marshall Islands. The most common are smaller animals – pigs and chicken. The traditional breeds of small animals raised on atolls are disappearing or become smaller in size because of inbreeding. The recommended strategy is to improve the local breeds by crossing with good breeds that can adapt to Marshall Islands conditions, taking into consideration also the potential impacts of climate change.

2.2 Improve feeds with local ingredients

Livestock feeds are very expensive, making the cost of livestock production too high. There is, therefore, a need for the Division of Agriculture to seek capacity building in making livestock feeds from local ingredients or making the feeds locally with a combination of local and imported materials. Recommendations should also be developed on good diets to be given to pigs and chickens using ingredients available to households.

2.3 Appropriate livestock management practices developed and promoted

The Division of Agriculture in collaboration with TTM will seek support for capacity building in the development and promotion of sustainable improved small livestock management practices, including animal pest and disease control, appropriate housing and waste management strategies. Many of the challenges facing the Division of Agriculture are interwoven, and significant benefits can be gained from closer integrated efforts with other stakeholders, including the Secretariat of the Pacific Community (SPC) and the United Nations Food and Agriculture Organization (FAO).

2.4 Livestock waste management improved

Piggery waste is a problem in the Marshall Islands, especially along with the coastal areas. This activity is linked to Output (soil management). Piggery waste should be used as one of the ingredients for composting to be used in crop production. The Agricultural Division should explore spearheading a national campaign on waste management for a cleaner environment and better crop nutrition.

Output 3. Sustainable crop production systems developed and promoted

The key performance indicators are:

- Soil quality
- Water use
- Number of crop varieties used in agriculture production
- The resilience of agroforestry systems

The following activities will be implemented to achieve this output

3.1 Improve soil conditions

The soils are calcareous, shallow, alkaline and coarse-textured. Any sustainable soil management technologies workable on soils of the Marshall Islands will need to improve the soil's physical, chemical and biological properties. This means that the efforts will be on improving soil organic matter by the use of composting, adaptable cover crops, and any other intervention that will recycle organic matter back to the soil. With the soils being multi-nutrient limiting, an effort should be made to develop targeted compost.

3.2 Improve water use

With the increasing incidence of droughts recently causing dwindling freshwater availability in the Marshall Islands and competition from other sectors, water use in agriculture will have to be very efficient. The use of bucket drip irrigation, wicking systems, and mulches will be promoted. Fullstops will be used to assess the vertical movement of water and potential polluting of the groundwater.

3.3 Develop pests and diseases control methods

There is a need to strengthen the capacity of the Division of Agriculture in the area of biosecurity so that it can manage plant and animal pests and diseases and weeds on a day-to-day basis. The diagnostic skills of both DA staff and farmers and their ability to test solutions on-farm must be strengthened. The investigation into the potential development of a new pest and disease regime addressing impacts of climate change should be undertaken with capacity support

from SPC and FAO. Since the Marshall Islands advocates no use of inorganic pesticides, it should develop organic food production systems in collaboration with MIOFA.

3.4 Crop diversity improved, conserved, and utilized

Improving crop diversity, especially among traditional crops including coconuts that are less demanding in terms of production inputs compared to improved exotic crops, will result in the production of cheaper food as well as rising incomes. Selecting varieties that are more adaptable to harsh atoll conditions and potential climate change impacts of increased temperature, drought, and seawater intrusion will ensure the development of more sustainable production systems that are more environmentally friendly. DA will initiate activities to ensure that the genetic diversity of crops is conserved.

3.5 Develop appropriate agroforestry systems

With the need to increase traditional food production and improve the biodiversity and resilience of the food production systems, there is a need to introduce trees including coconuts into the farming systems. These trees must serve productive services of producing household requirements of firewood and building materials as well as food; improve the resilience of the systems; and serve as CO_2 sinks. The DA Crop and Forestry Sections will collaborate with other stakeholders to develop appropriate agroforestry systems.

3.6 Develop a package of practices for major crops

Once the DA develops appropriate food production technologies, then a package of practices for producing each crop will be developed for extension and outreach activities.

Output 4. Increased consumption of nutritious locally-produced foods

The key performance indicators are:

- Number of home gardens
- Number of healthy recipes adopted by targeted households

To increase the consumption of locally produced foods the following activities will be carried out. Efforts will be made to link agricultural production to health and nutrition.

4.1 Promote home gardens

The DA through its Urban Farming Section will work with households in the communities, women and youth groups, and schools to promote growing home gardens. These will be a combination of starchy staples and nutritious traditional and exotic vegetables grown in the home gardens.

4.2 Develop recipes

The Urban Farming Section will work with women in households and schools in developing cooking recipes using produce from the home gardens and running cooking demonstrations.

4.3 Preservation of knowledge on traditional food preparation and preservation

The DA will work with elders in the community to collate traditional knowledge on food preparation and preservation and document them. The DA will via workshops and training pass these to the communities to avoid further losses of this traditional knowledge.

4.4 Support schools in proper nutrition

The Urban Farming Section of DA will work closely with other sections of DA, TTM, Wellness Center and Ministry of Health & Human Services in promoting home gardens, cooking balanced meals and proper nutrition to schools.

Output 5. Improved biosecurity and marketing

The key performance indicators are:

- Plant and animal protection program operational (link to Outputs 2 and 3)
- Increase domestic and export trade

The following activities will be implemented to achieve this output

5.1 Develop local and export markets

With the decline in household engagement in agriculture, DA and TTM with support of MIOFA will look at developing domestic markets for improved food access by households who do not produce foods. This will involve developing market structures while supporting current mobile markets.

This activity will be linked to activities 5.3 and 5.4 for product development for overseas markets.

5.2 Develop value chains including organics

DA in collaboration with partners like MIOFA will develop value chains for crops with potential for markets locally and export.

5.3 Source overseas market access for export

DA and partners like MIOFA will work closely with authorities mandated to do trade and international market access agencies to open up overseas markets for potential agricultural fresh produce and value-added products.

5.4 Develop animal and crop protection program

DA and the Division of Quarantine and TTM will work closely to develop an animal and crop protection program. The program will cover pests and disease identification and their control; process for development and control of a pest incursion; sanitary and phytosanitary (SPS) measures. These will also form a capacity-building component of the program.

Output 6. Improved capacity of agriculture sector stakeholders

The key performance indicators are:

- Number of training
- Number of trainees
- % of trainees using skills and knowledge

The following activities will be undertaken to achieve the output.

6.1 Conduct capacity needs assessment

The needs assessment will cover three levels

- Organizational needs which will look at the development of the strategic plan and an operational structure; policy to facilitate organizational cultural change (link to output 7); and development of a monitoring and evaluation framework
- Needs to enhance teamwork which will cover roles of partners; shared interests; planning action together (networking); reporting and evaluation of activities.
- Individual needs will cover attitude; increased knowledge; improved skills; and self-evaluation.

6.2 Develop capacity building program including support to schools (curriculum)

A capacity-building program will be developed to address the following needs identified to improve the performance of individuals from key stakeholders.

Motivation
Engagement
Participatory methods
Training
Soil fertility and water management
Pests and diseases
Diagnostic skills
Decentralization
Communication
Computer skills
Research methods
Climate change vulnerability
Monitoring and evaluation
Reporting

6.3 Conduct training and assess impacts

DA will coordinate the conduct of the training programs over the plan period and the assessment of training in collaboration with experts within the country and from overseas. DA will support CMI to develop a specific curriculum and to offer this training as a regular program at CMI.

Output 7. Enabling policies/legislations developed

The key performance indicators are:

Policy and legislation needs identified

The following activities will be implemented to achieve this output

7.1 Review current policies/legislations

DA will review current policies and legislation and their relevance to the current situations and their ease to implement to guide agriculture development. DA based on the review will assess the requirements for new policies and legislations.

7.2 Develop appropriate policies/legislations

DA might engage experts to develop the required policies and legislations in collaboration with the national Ministry of Justice.

7.3 Develop lobbying strategies and policy briefs on key issues

DA with expert support will develop lobbying strategies and policy briefs on issues like sustainable soil management, pests, and disease management and water use for agriculture.

7.4 Implement and assess impacts

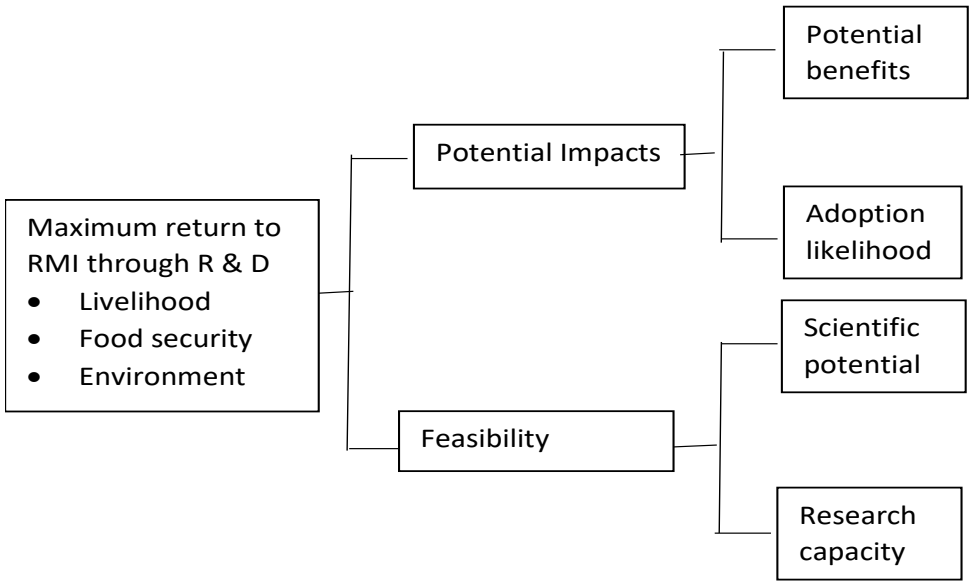
Once policy briefs, policies, and legislations are implemented DA will monitor their impacts on agricultural development, the communities, and the environment.

4.4 Assessing Status of the Outputs of the Agriculture Sector Plan

The assessment criteria for assessing the outputs of the sector plan. The outputs were prioritized using two criteria (Figure 2):

The potential impacts of the outputs are determined by the potential benefits of the outputs and the likelihood that they will be adopted by stakeholders.
Feasibility to implement activities under the various outputs which are determined by scientific potentials of the outputs and research capacity of the Division of Agriculture to facilitate the implementation of activities to attain these outputs.

Figure 2. Framework for evaluation of outputs in the strategic plan.



Potential Benefits

The potential benefits can be in terms of the extent of economic and social impact, the extent of environmental impact and enhancement of research capacity. This will refer to outputs to be addressed, size and scope of the problem /or opportunity to be addressed, and nature of benefits arising. These benefits may or may not necessarily be independent and mutually exclusive, and need to be considered in assessing the benefits and impact of possible research. Contribution of outputs to development may be:

1. increased production/expanded production
2. increased productivity of resources/inputs
3. reduced cost per unit of output
4. increased cash income
5. increased employment and utilization of resources/inputs
6. improved sustainability/reduced degradation of resources, and
7. assured food security/improved nutrition/reduced risk

Adoption Likelihood

This will cover probable users of likely outputs and services (including research results), past performances in adopting similar results, and major impediments and inducements to uptake outputs. Specific points to be covered are the appropriateness of technology, uptake events and directness of impact, the capacity to use/adapt and deliver, the capacity of extension and other service providers, and impediments/incentives to uptake. Some of the strengths and opportunities assessed earlier may become inducement for adoption, while some of the weaknesses and threats may become impediments to adoption.

Scientific Potential

This can consider the availability of tools and techniques/ scientific advances, the existence and availability of relevant disciplines/networks not only in the country but also in the Pacific sub-region, and the probability of success in achieving research results, and time to produce research outputs.

Research Capacity

This accounts for and reflects the research/technical skills/quality and breadth of skills, the critical mass of efforts, financial support and feasibility and quality of research infrastructure and support. This should take into account the capacity and ability of organizations, networks and collaborative arrangements that are/ or may be involved in the country or, to an extent, in the sub-region.

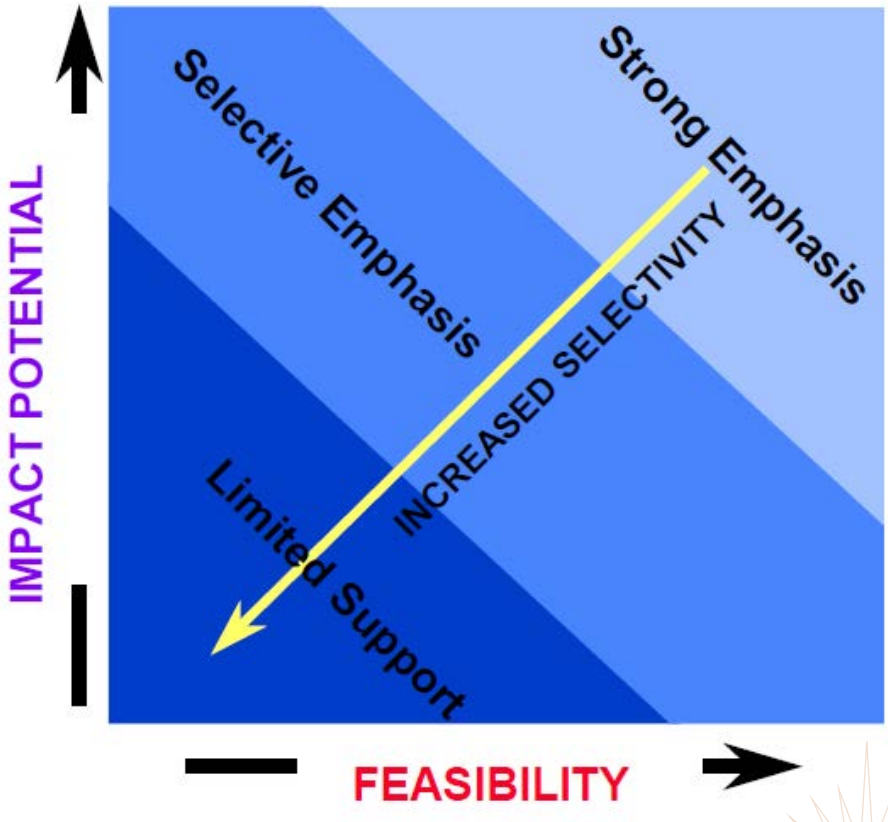
Selectivity in Output Emphasis

The following diagram (Diagram 1) shows the priority setting, as assessed based on two

main criteria, i.e. impact potential and feasibility; and their approximate relationship to the

level of selectivity and emphasis.

Diagram 1. The selectivity of outputs based on two criteria – impact potential and feasibility.



The highest priority is assigned to high impact and high feasibility outputs, and that appears in the right-hand side top corner of the diagram; the lowest priority is assigned to low impact and low feasibility output area and that appears in the left-hand side bottom corner of the diagram. A strong emphasis is then placed on the highest priority areas while more limited support is considered for the lowest priority areas. As one moves from highest to the lowest priority areas, increased selectivity is exercised in deciding on output areas and programs within these lower priority areas; lower priority does not imply lesser importance. Figure 3 gives the priorities of the sector plan as assessed by this tool.

Figure 3. Priorities of Agriculture Sector Plan Outputs

Potential Impacts	Low	Medium	High
High		Improved capacity of agriculture sector stakeholders	Sustainable crop production systems developed and promoted
Medium	Developed enabling policies/ legislations	Sustainable small-livestock production systems developed and promoted Increased consumption of nutritious locally-produced foods	Improved biosecurity and marketing Minimized environmental degradation
Low			

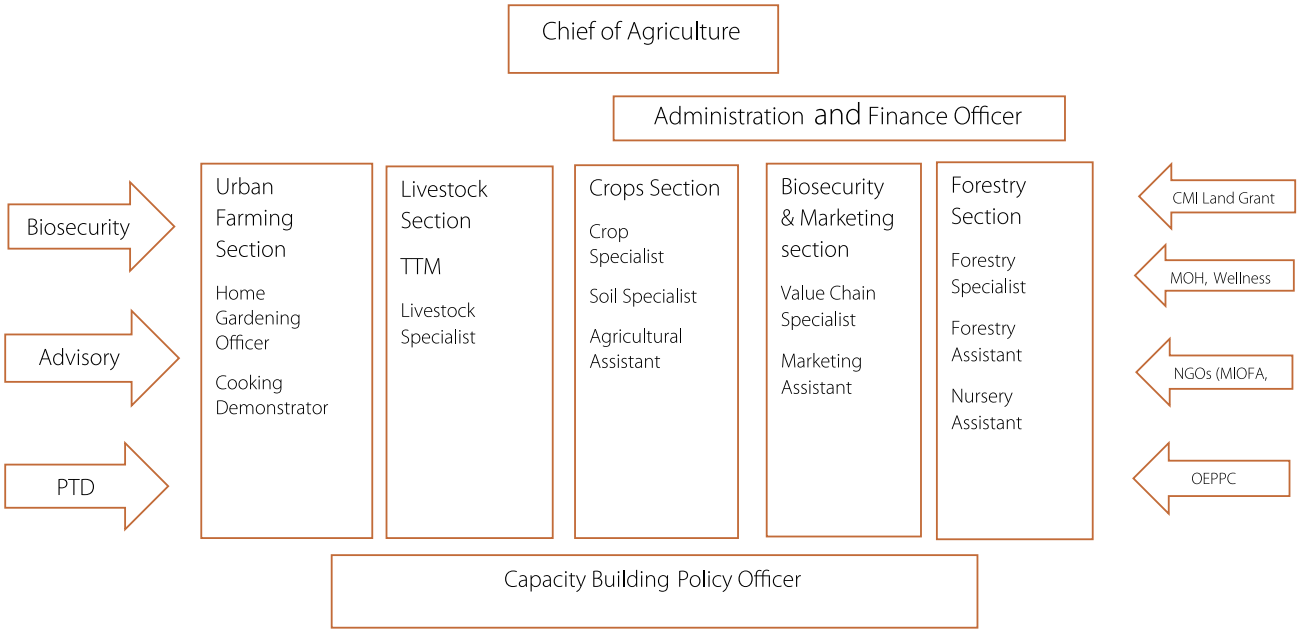
Feasibility

4.4 Organizational Structure

The Division of Agriculture to efficiently deliver its service will have an organizational structure (Figure 4) headed by the Chief of Agriculture who reports directly to the Secretary of the Ministry of Natural Resources and Commerce. The Chief of Agriculture will facilitate and lead the implementation of the strategic plan as well as the capacity building and policy development of the division and monitoring and evaluation of the strategic plan. Under the Chief of Agriculture will be 5 sections:

The Urban Farming Section: This section will be led by a Home Gardening Officer and will have a Cooking Demonstrator.
Livestock Section: TTM will continue to provide support to this section and will continue to have a DA Livestock Specialist based with TTM.

Figure 4. The proposed structure for the operation of the sector plan.



Crops Section will be led by a Crop Specialist and will be supported by a Soil Specialist and an Agricultural Assistant
Biosecurity and Marketing Section will work closely with the Division of Quarantine, Division of Trade and Investment, MIOFA, and TTM and will be led by a Value Chain Specialist and assisted by a Marketing Assistant.
Forestry Section which will be led by a Forestry Specialist with a Forestry Assistant and a Nursery Assistant

There will also be cross-cutting services across all the 5 sections. Parallel to the Agriculture Division, the Division of Quarantine will provide pests and disease control, quarantine and Sanitary and Phytosanitary Services (SPS) to DA. The Advisory services will be provided by the Extension Officers who will be provided information by all the 5 sections and they also will provide priority issues to the 5 sections from the communities and other stakeholders. There will also be a Participatory Technology Development (PTD) Specialist who will advise across all 5 sections and coordinate the on-farm trial activities.

There will also be key stakeholders who will provide support to DA as implementation partners in shared interests. They are CMI Land Grant, MOHHS, Wellness Center, NGOs (MIOFA, MICS, LFA), and OEPPC

5. RISK ANALYSIS AND PARTNERSHIP OPPORTUNITIES

5.1 Risk Analysis

Some issues needed to be addressed or they will pose risks to the successful implementation of the plan. They are described below.

i. Limited human resource capacity for agriculture development: The technical knowledge and skills of agriculture staff are generally poor and needed upgrading to a competent level that they can competently advise farmers. The capacity of other stakeholders for staple and nutritious food crop and livestock production also needed upgrading if the Marshall Islands is to improve food production. Capacity upgrading is both formal and informal training.

ii. Technological risks: The success of this project will depend on selecting the best-adapted varieties of each crop and breeds of each animal to the harsh conditions of the Marshall Islands. To produce good crops will require that there is enough organic matter, plant nutrients and water in the soil. For animals, the best breeds of each animal must be selected and the best husbandry given including the best feed rations. All of these require good technology development and if the technologies developed are not the best then the outputs achieved will be far from what the project wants.

iii. Climate change/ weather risk: The crops and animals, as well as the communities in RMI, are impacted by changes in climate. Temperature increases are likely to change the duration of crop growing seasons; increase the amount of water to produce a unit yield, and conducive to the spread of pests and diseases. Sea level rise affects agriculture crops in two major ways: saltwater intrusion and loss of coastal land due to inundation. Climate change will also affect crops and livestock production through changes in rainfall, particularly during La Niña years when droughts are most likely to occur. To address disaster risk reduction to climate risks the strategy at the farm level is adopting climate-smart practices.

iv. Price risk: For the value chain crops, uncertainty in the market for commodities such as root crops and vegetables, and the challenges of a price move are often different, depending on whether the stakeholder is a farmer or a processor. This may also affect the demand for inputs.

v. High dependency on imported foods: The changing dietary habit of the population has resulted in a high dependency on imported foods. This has resulted in increasing levels of food and nutrition-related noncommunicable diseases and the emerging high incidences of vitamin and mineral deficiencies, which impact negatively the health system, families and national economy.

vi. Introduction of invasive species: Invasive species present significant threats to agriculture in the Pacific Islands including the Marshall Islands, although how the magnitude and distribution of the threats vary between countries and remains unclear. Invasive species are a major cause of crop loss and can adversely affect food security. With increased globalization and connectedness via world trade, the threat from invasive species arriving in countries in which they were previously absent is expected to increase. To quantify this threat and develop effective biosecurity policy requires an understanding of the sources of potential pests and pathogens, their likelihood of arriving at a particular location, their likelihood of establishment upon arrival, and an estimate of their possible impact.

vii. Transportation Systems: Transportation is vital to moving agriculture produce and products within islands and between islands. Transportation within islands can be a problem and affect the movement of agriculture inputs and produce when needed to be marketed. Inter-island ferries can be a problem and can delay supply to islands and moving produce between islands.

5.2 Potential Partnerships

It must be emphasized that the successful implementation of the sector plan will be dependent on the strength of partnerships among the key stakeholders. DA works in partnership with national, regional and international organizations to build synergies and maximize its development outcomes. In many cases, the relationships between DA and its partners will be formalized through memoranda of understanding (MOU). It is therefore essential that the key stakeholders are identified early and engaged in the development, implementation, and monitoring and evaluation of the strategic plan. Critical to the success of this plan will be engaging landowning parties through MOU and invite their support to agriculture and forestry development on their lands.

National Partnership

The followings are national partners and areas of interested partnership

CMI Land Grant on research, technology and extension services

MOHHS and **Wellness** on food and nutrition security

TTM on addressing food security and nutrition issues, livestock, and horticultural production issues.

MIOFA on the value chain and organic food production

MICS assists in the sustainable use of resources, land conservation and protection of biodiversity. Technical assistance in the production of vegetation maps (with an emphasis on crops and food trees), access to emergent technologies for food production (focused on high yield, maximization of space, water, and nutrient), and implementation of adaptive tools to support atoll communities' resilience to climate change.

OEPPC on sustainable management of agricultural production environment

Youth Corp on planting native plants and replacement of senile coconuts

Regional and International Partners

Below are just some of the important areas in which DA is working with regional and international partners:

- **SPC LRD and USP** on 'climate-ready crops' and improved crop diversity, multiplication, distribution and evaluation, and building capacity of countries on taro breeding for tolerance to drought.
- **COGENT and ICC,** on the long-term conservation strategy for safety duplication and regeneration of global and regional coconut collections
- **FAO** on national framework for agriculture development
- **CTA** on value chains, youth in agriculture, information exchange and media/ICT;
- **FAO** and **SPC LRD** on food security, plant and animal genetic resources, control of zoonotic diseases, animal waste management, agricultural data and statistical capacity improvement, agriculture and forest policy development, agroforestry development, forestry information dissemination, and community forestry development, Integrated Pest Management and biological control of agricultural pests and diseases; facilitate ratification/membership of countries to the ITGRFA and the CGRFA
- **IPPC (FAO)** on phytosanitary standards-setting processes;
- **FAO** and **PIFS** on biosecurity issues and trade facilitation;
- **FAO** and **SPREP** on invasive species, forest genetic resources, and agrobiodiversity;
- **United States Forest Services (USFS)** provides training in tree nursery management, arboriculture, inventory, and potentially other topics. The Forest Service provides direct technical assistance in the form of maintaining permanent inventory plots to quantify forest resources, and a continually updated dashboard (website) providing information about ENSO associated agroforestry recommendations. The Forest Service can potentially provide small grants, particularly for urban

& community forestry and agroforestry; forest health, including monitoring and emergency response to agroforest pests (coconut rhinoceros beetle and little fire ants); and forestry & agroforestry extension (currently awarded to CMI Land Grant). The Forest Service may also increase its assistance in the form of vegetation type mapping, and student internships at the University of Hawaii. Priorities for Forest Service assistance should be identified in the Forest Action Plan to be updated in 2020.

- **Micronesia Conservation Trust (MCT)** support through the Micronesia Challenge terrestrial indicators and measures through funding, technical support, and policy development, support for data collection and analysis for conservation areas through the Forest Inventory and Analysis (FIA) by USFS, grant writing and capacity support for USFS funding, capacity support and funding to attend trainings in nursery, data collection, enforcement for PA's and more.
- **SPREP** on the Convention on Biological Diversity (CBD)/Access and Benefit Sharing (ABS) Nagoya Protocol, perspectives and mutual implementation of the protocol in harmony with the relevant treaties, e.g. ITPGRFA

DA is committed to fully realizing its advantage in using a multi-sector, multi-disciplinary approach to address priority challenges such as climate change and food security. DA will continue to strengthen its technical partnerships with other government Ministries in programming, implementation and monitoring activities.

6. PROGRAM DELIVERY

With many agencies, both government and non-government, expected to be involved in delivering Marshall Islands Agriculture Sector Plan outputs, successful implementation will require strong leadership, good coordination, sound processes and effective use of resources. DA is the lead agency for the agriculture sector and thus the Chief of Agriculture is the senior responsible officer to ensure that the sector plan is efficiently and effectively delivered on time and within available budget resources.

The interagency Food Security Committee with the guidance of the Secretary of MNRC will provide oversight, guidance, and support for sector plan implementation.

The agriculture sector plan will use a results-based approach with coordinated participation of all stakeholders, including governmental, non-governmental and community-based organizations. DA will need to develop annual work plans through participatory consultation with relevant stakeholders to guide the implementation of priorities. Development of the sector work plans target the output intervention level and further define specific actions with set timeframes to achieve the identified outputs/strategies. Activity delivery timeframes should be clearly defined with a responsible agency/program. Each annual work plan should be carefully costed which will form the basis to leverage funding from both the Government and other donor-supported programs or projects.

With the current capacity of DA, the implementation of the identified priorities will need to be well-coordinated in a partnership model ensuring the engagement of all relevant stakeholders in the implementation of the plan. This means DA's capacity to facilitate the delivery of the outputs is critical. This should involve effective partnerships with the private sector, relevant NGOs and producer organizations to work in concerted efforts in achieving the desired outputs for the sector strategy. Where possible, contracting out some of the responsibilities outside the current capacity of DA to other stakeholders will also be necessary.

7. MONITORING AND EVALUATION

Monitoring and evaluation (M&E) is a critical part of the Marshall Islands Agriculture Sector Plan's management and implementation cycle. If addressed rigorously it should allow for adaptive management and improvement through the life of the sector plan to support the effective delivery of outputs and services. It will also facilitate reporting and communication of progress to partners and other stakeholders. Effective M&E will require a substantial commitment of human and financial resources, firstly, to ensure that baselines and realistic targets are established for all outputs at intervention onset and then to make sure a workable monitoring process is established and supported throughout the implementation period. Monitoring, evaluation and reporting processes under the sector plan will cover efficiency (program management and administration), effectiveness (delivery of outputs) and impact (development change over time). An appropriate level of budget for M&E, therefore, needs to be anticipated in the sector plan resource mobilization cost.

The sector plan under its policy objective should include activities to strengthen agricultural statistics systems including data collection, systematization, analysis and reporting. These activities should provide a means to supply better indicator data to strengthen the monitoring process. Monitoring will be managed and coordinated by the DA and will rely on good cooperation and support from all agencies that collect and manage data sources relevant to the performance of the agriculture sector and implementation of the sector plan.

The plan includes a detailed logframe (Appendix 1) that sets out the results to be monitored, evaluated and reported against. Key performance indicators with baselines and targets have been set in Appendix 1 which will be used for monitoring and evaluation of sector plan implementation progress.

Appendix 1. Logical Framework Matrix

Narrative Summary	OVIs	Baseline	Intermediate	End of plan	MOVs
Goal: Resilient food, nutrition and livelihood security of Marshallese	• Contribution of locally produced foods to diets of Marshallese • Contribution of agriculture to HH incomes				National Food Balance Sheet Household income & expenditure survey
Purpose: Enhanced agriculture development for the Marshall Islands	• Livestock production • Crop production/ quality • Improved biodiversity and resilience • The appropriate structure for Agriculture Division	X numbers A acres Productivity index Operational Currently USD .. budget is for operational Currently X numbers Currently, X% of extension facilities meet the requirement Currently x vehicle per island X number of nursery per island	Y% increase B% increase in acres The operational budget increased by x% by 2025 The number of staff increased by x in 2025 By 2025 all Majuro extension centers are fully equipped By 2025, x additional vehicles purchased	Z% increase C% increase in acres Improved Improved efficiency The operational budget increased by another x% by the end of the implementation plan The number of staff increased by another x number by the end of the plan By end of the plan, all Outer Islands district extension centers are fully equipped By end of the plan, at least 4 additional vehicles purchased All islands will have nursery facilities	Agriculture Division report TTM report MICS/OEPPC reports
1. Environmental degradation minimized	• Number of trees planted traditional and exotic • Soil and water quality improved	Baseline number Baseline levels	20% increase Relate to output 3	50% increase Relate to output 3	MICS, UISFS reports and AD reports
2. Sustainable small-livestock production systems developed and promoted	• Number of improved breeds developed and distributed • Improved feeds	Number of crossbreds Increase in use local ingredients	30% increase 50% of the local ingredients used	60% increase All local ingredients	TTM and DA reports
3. Sustainable crop production systems developed and promoted	• Soil quality • Water use efficiency • Number of crops used in agriculture • The resilience of agroforestry systems	Use of targeted compost Number of BIS and wicking systems Baseline established Baseline established	20% of farmers make targeted compost 30% increase 2 extra crops	70% of farmers use targeted compost 80% increase 2 extra crops Resilience improved	Soil tests AD reports USFS
4. Increased consumption of nutritious locally-produced foods	• No. of home gardens • Number of healthy recipes adopted by targeted households	Status in the communities Current status	50% increase At least 10 recipes adopted by targeted households	80% increase Extra 5 recipes developed and adopted by targeted households	Wellness Centre reports DA Focus surveys

5.	Improved biosecurity and marketing	• Plant and animal protection program operational (link to 3) • Increase domestic and export trade	Develop a control program Status of domestic markets Value chains for export	Control program operational Mobile market once a week Two crops completed	Program is efficient Mobile market once a week Two crops completed	TTM, MIOFA and DA reports
6.	Improved capacity of agriculture sector stakeholders	• No. of training • No. of trainees • % of trainees using skills and knowledge	Capacity building needs assessment and training program endorsed None None	50% of training conducted 200 trained 50% used knowledge and skills	100% training program conducted 500 trained 80% used knowledge and skills	DA, TTM, CMI, and MIOFA reports
7 .	Enabling policies/ legislations developed	• Policy and legislation needs to be identified	Report on review of policy needs to be completed	A policy brief on voluntary guidelines for sustainable use of soils and pest and diseases management developed and endorsed	Extra 2 policies supporting the delivery of agricultural services developed and endorsed	DA reports

Appendix 2. Organizations and people consulted with during the development of the Agriculture Sector Plan

Ministry of Natural Resources & Commerce (MNRC)	
Sandy Alfred	Minister
Iva R. Roberto	Secretary
Walter Myazoe Jr.	Deputy Secretary
Risa Kabua Myazoe	Chief of Agriculture
Henry Capalle	Chief of Quarantine
Randon J. Jack	Assistant Chief of Agriculture
Lajikit Rufus	Agroforestry Coordinator
Billy Edmond	Agriculture Specialist
Stephen Lepton	Crop Production Officer
Silver Wase	Agroforestry Officer
Joel Bujen	Agroforestry Officer
Thomas Thomas	Agriculture Extension Agent
Elias Isai	Agriculture Extension Agent
Ruby Tojar	Nursery Worker
George Batin	Nursery Worker
Steve Nelson	Livestock Technician
Office of Chief Secretary (OCS)	
Kino S. Kabua	Chief Secretary
Penny Kabua Nimoto	Program & Policy Coordinator
Jacot Des Combes Helene	CCA and DRM Adviser
U.S. Department of Agriculture, Forest Service (USFS)	
Kathleen Friday	Forest Stewardship Program Manager
Ministry of Health & Human Services (MOHHS)	
Francyne Wase Jacklick	Deputy Secretary
Philmar Mendoza Kabua	Director of Health Promotion & Disease Prevention
Shra Kedi	NCD Coordinator
RMI Ridge to Reef Project (R2R)	
Jennifer de Brum	Project Manager
Marissa Note	Finance & Administrative Assistant
Taiwan Technical Mission (TTM)	
David, Yen-Jen Lin	Director
Dr. Kevin, Weichih Lee	Livestock Specialist
Frank Lin, Furn-Wei	Horticulture Specialist
Public School System (PSS)	
Samuel Bikajle	School Garden Coordinator
Majuro Diabetic Wellness Center	
Tanner Smith	Director
Richard Clark	Agriculture Consultant
Gideon Lang	Weed Gardener

Office of Environmental Planning and Policy Coordination (OEPPC)	
Warick Harris	Deputy Director
College of the Marshall Islands (CMI)	
Desmond N. Doulatram	Social Science Instructor/Professor
College of the Marshall Islands – Land Grant (CMI Land Grant)	
Stanley Lorennij	Dean, Associate Director
Vincent Enriquez	Agriculture Researcher
Ted Michael Jr.	Agriculture Extension Agent
Ebon Local Government	
Ione de Brum	Former Mayor
Likep Local Government	
Veronica Wase	Former Mayor
Marshall Islands Conservation Society (MICS)	
Martin Romain	Director
Madeline Cochran	Deputy Director
Environmental Protection Agency (EPA)	
Karl Fellenius	Coastal Resource Advisor
International Organization for Migration (IOM)	
Angela Saunders	Head of sub-office
Marshall Islands Organic Farmers Association (MIOFA)	
Karness Kusto	President
Jabukja Aikne	Coordinator
Foster Lanwe	Secretary
Josepha Maddison	Member
Birney Ishoda	Member
Micronesia Conservation Trust (MCT)	
Tamara Greenstone Alefaio	Conservation Program Manager
Roseo Marquez	Terrestrial Champion
MarTina Corporation	
Fern Lehman Stege	Forest Ecologist
Mark Stege	Director
The Church of Jesus Christ of Latter-Day Saints	
Elder Hartmut Skibbe	Welfare/Humanitarian Missionaries
Sister Sylvia Skibbe	
Laura Farmers Association (LFA)	
Bokmej Bokmej	Member

Republic of Marshall Islands

AGRICULTURE SECTOR PLAN

2021 – 2031