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SOW BIODIVERSITY FOR FOOD AND AGRICULTURE COUNTRY REPORTS

1.0 Assessment and monitoring of biodiversity for food and agriculture

1.1. General context:

The South Pacific small island state of Nauru is one of the smallest countries in the world – with a land area of about 22 km² and a coast line circumference of 30 km long. It is located in the dry belt of the equatorial oceanic zone and is situated 200 km East to North East of Papua New Guinea and 4450 km South to South East of the Philippines. The temperatures in Nauru range from 26°C to 35°C, and night temperatures between 22-34°C. Annual rainfall is extremely variable, and is more frequent between December and April. Prolonged droughts are common and cause severe stress on native ecosystems and species.

Nauru is surrounded by a fringing coral reef ranging from 120 m to 300 m wide, which drops away sharply on the seaward edge to a depth of approximately 4,000 m. The coastal plain is a zone of sandy or rocky beach on the seaward edge, and a beach ridge or fore-dune, behind which is either relatively flat ground or, in some places, low-lying depressions or small lagoons filled by brackish water where the surface level is below the water table (freshwater lens). There are no rivers or surface freshwater bodies but an inland brackish water lake, the Buada Lagoon, on a fertile depression at the southwest; a few anchialine ponds¹ on the north eastern and an underground lake at a Moqua Cave in the southeast coastal portions of the island

The raised central plateau (Topside) generally lies between 20-45 m above sea level with occasional elevations of up to 50-70 m. The central plateau comprises a matrix of coral-limestone pinnacles and limestone outcrops, between which lie extensive deposits of soil and high-grade phosphate rock covering approximately 1600 ha (over 70 per cent of the island). The coastal soils of Nauru in general are of thin layers and very poor in the essential minerals for healthy plant growth and agricultural development. Soil fertility therefore depends highly on organic matter from shrub and forest vegetation cover, for nutrients and water retention. Fragments of shrub vegetation and few forests are found in a few areas along the edges below the cliffs bordering the coastal areas and the topside upraised plateau and around the Buada Lagoon. The central plateau soil layers are also extremely thin on top of limestone pinnacles to sandy phosphatic rock of over 2 m deep between the pinnacles. Undisturbed plateau areas can be generally fertile, though with secondary mining, these will be altered and degraded. In general the soils of Nauru island are generally poor and require an intensive and committed rehabilitation of vegetation cover to improve organic matter and soil fertility for any agriculture or re-forestation programme and consequently for any successful expansion of population settlement on the island in the future.

In spite of out migration, the total resident population was 10,048 in 2011, which is a 9 per cent increase from 2006. It is a young and fast growing population with the highest population density in the Pacific of 478 people per km². Other important environmental population statistics include: 68

¹ An anchialine pool is an enclosed water body or pond with an underground connection to the ocean.

per cent receiving freshwater from a dispatcher or a desalination plant, 29 per cent used rain catchment with the remainder from a well and 99 per cent connected to the national electricity grid.

About 13 per cent of households maintain vegetable gardens and practice simple food cropping, and about half of all households are engaged in fishing activities on the reef flats and in the 12 mile zone for coastal fishing activities. Given the extensive phosphate mining on the Topside area, the majority of Nauru's population is concentrated along the coast with many settlements along the coastline. Excluding the 70 per cent of the island that is unusable due to phosphate mining, the population density on the remaining coastal fringe could be over 1,500 persons per km². This has considerable implications and consequences for sustainable land and water management, in terms of the availability and suitability of land and water for future settlement, health and safety, biodiversity conservation (including marine ecosystem) and the possible effects of climate change.

Agriculture, since the introduction of mining in Nauru, has played a minor role in the nation's subsistence and cash income economy, with the community reliant on imported goods. This trend has changed over the past decade, due mainly to the economic crisis in the early 2000s when mining ceased greatly reducing incomes to the populations and an resurgence and local awareness of the social and environmental benefits of productive environmental crop and livestock systems. Small family based livestock production units mainly pigs and chickens and individual home gardens including both root crops and trees are being replanted, however local knowledge and technical skills are limited. In general, Nauru has had one of the lowest per capita rates of subsistence production for own consumption in the Pacific region. . The phosphate wealth led to a huge increase in imports leading to a serious increase in the population living with non-communicable diseases. More than 40 per cent of the population has type 2 diabetes as well as other significant dietary-related problems such as kidney disease and heart disease²

Nauru's main fisheries zones are: the fresh to brackish water ponds, including Buada Lagoon and the systems of sinkholes found inland from the coast; the shallow fringing reef or intertidal zone; the sub-tidal areas and reef slope including fissures or canyons in the reef slope (to about 25 m depth); the deep reef and near-shore deep-water areas below 25 m; and the open ocean or pelagic fishery. All of these areas are of critical subsistence importance, as well as being of limited local commercial importance. The first four zones are usually considered to be part of the inshore fishery and the latter referred to as the offshore fishery.

Nauru has a unique history of fish aquaculture in the Pacific dating back hundreds of years using milkfish (*Chanos chanos*) – known as 'ibiya' in Nauru. The juvenile milkfish were collected on the intertidal reef and reared in brackish ponds. The most important areas for farming were Buada Lagoon and, to a lesser extent, the Anabar pond. The Mozambique tilapia (*Oreochromis mossambicus*) was introduced around 1961, but it was not accepted as a food source mainly because of its small size and poor flavour. Tilapia eventually infested all the milkfish ponds and competed for food. The result was that milkfish harvested from infested ponds took longer to grow to an edible size of more than 20 cm, and this caused many farmers to abandon their traditional practice of raising milkfish. In 2000, the Buada Lagoon Owners Association (BLOA) introduced 10,000

² <http://www.amusingplanet.com/2015/06/nauru-island-country-destroyed-by.html>

milkfish fry from Kiribati into Buada Lagoon, reaping 5,000 adult fish some month later. BLOA have added stock several times throughout the years with 2005 being a very active year

Role of biodiversity for food and agriculture in your country

Biodiversity for food and agriculture (BFA) is important for Nauru as the country revitalizes its agriculture sector. The National Assessment Report for the Third SIDS conference states 'Biodiversity is critical for the culture and food security of Nauru. Biodiversity in agriculture (as opposed to monoculture) is important because it can reduce the risk of plant disease epidemics'. The soils of Nauru are thinly layered and nutrient poor and heavily depend on the regrowth and development of vegetation cover for restoration and regeneration especially on mined lands, BFA can make a significant contribution to the rehabilitation process.

Traditional knowledge and practices for the cultivation and use of a relatively limited range of plants and animals on land and inshore marine resources have proven to be valuable social assets for survival in the harsh conditions of Nauru's environment in the past and have been revived more recently to support food and livelihood security during the downturn of the country's economy in modern times. Traditions such as toddy collection, bird catching, aqua-farming and traditional medicines and taboo lands still exist though much of the traditional knowledge has been lost. Reviving these practices will require significant efforts in research and education. 573 species of plants or cultivars have been recorded as present on Nauru in 2008 of which 63 (11 per cent) were possibly native species, no endemic species were located and several species were possibly locally extinct. The authors noted that half of the native flora was "severely restricted in distribution, endangered or possibly extinct, due to removal and severe habitat modification or limitation." Coconut farming, mining, and introduced species have caused serious disturbance to the native vegetation. There are no native land mammals, but there are native insects, land crabs, and birds, including the endemic Nauru Reed Warbler. The Polynesian rat, cats, dogs, pigs, and chickens have been introduced to Nauru. There are no honey bees in Nauru, and pollination of fruit trees and vegetables is a key limiting factor to high yields of crops.³

Although Nauru's range of flora and fauna species is limited to natives, with no endemic species of global value, the remaining native vegetative cover of shrubs and forests provide important local materials for rehabilitating the islands degraded central plateau.. The introduction of new species of trees for the rehabilitation program may have a negative impact on this limited yet valuable and adaptable native biodiversity.

The most recent studies on the state of Nauru's biological resources were conducted in 2013 under a UNEP-GEF funded project that was coordinated by the government of Nauru and executed by the Secretariat of the Pacific Regional Environment Programme SPREP the 'Biodiversity Rapid Assessment (BIORAP)' of Nauru's terrestrial and marine biodiversity. The BIORAP found that the reefs in Nauru have coral cover that is among the highest on the planet, at a time in which most reefs are in decline, indicating they are exceptionally healthy, including no sign of bleaching. The reefs contain globally significant species threatened with extinction including coral, white-tip shark, fish and sea turtles. A coral species was found, which was previously only known from one site in

³ <http://www.fao.org/3/a-ap540e.pdf>

Madagascar which is listed as “Endangered” by the IUCN Red List, and as one of the top 50 “EDGE” (Evolutionarily Distinct & Globally Endangered) coral species in the world.

Fisheries contribute to about 10% of the country’s Gross Domestic Product during the years of economic downturn over the last decade and can remain a continuing source of revenue for the country as long as sustainable practices are implemented. Inshore fishing by local communities has increased yearly with the closure of the mines. Inshore fisheries provide a wide and diverse range of marine resources available for sustainable harvest. The resilience of these resources is evidenced by the fact that, despite many years of daily reef gleaning, communities still glean daily protein needs from the intertidal zone and fringing reef areas. There is increasing scarcity of marine invertebrate and vertebrate organisms (e.g. turtles, gastropod snails, sea cucumbers, and predator reef fin fish). This situation underpins the need for protective action and sustainable harvesting, and management policies and plans. Nauru’s 5th National Report to the CBD highlighted concerns that require adequate attention by the government and communities of Nauru for improving the management of biological resources on land and on sea, and to strengthen the role of ecosystem services in the sustainable development of the society.

Table 1: Production systems present in the Country

Production systems	Indicate if present in the country (Y/N)	Description
Livestock grassland-based systems	Y	Livestock kept on land where government pay rent to landowners for lease of land.
Livestock landless system	Y	Livestock production is separated inland and feeds is provided for pigs and poultry
Naturally regenerated forests	Y	Records state there are no forests left in Nauru but in the pinnacle rocks, trees are starting to grow back
Planted forests	N	
Self-recruiting capture fisheries	Y	Natural ecosystems
Culture-based fisheries	N	
Fed aquaculture	Y	Farming of aquatic organism e.g. milkfish and tilapia
Non-fed aquaculture	Y	Farming of aquatic organism e.g. milkfish and tilapia
Irrigated crops (rice)	N	
Irrigated crops (other)	N	
Rainfed crops	Y	Agriculture relies on rainfall as its source of water. Fruit and vegetable for domestic consumption
Mixed systems (livestock, crop, forest and/ or aquatic and fisheries)	Y	Crop-livestock systems (pigs and chickens)

1.2 State, trends and drivers of change of biodiversity for food and agriculture

The terrestrial biodiversity on the island's raised plateau is largely removed and severely fragmented through century of mining operations costing immense loss of habitats and species populations. Phosphate mining and recent developments as well as limited socio-political capacity continue to drive the changes and threats to the management of Nauru's biological resources and ecosystem services in the foreseeable future. The natural semi-open forest on the central plateau was composed primarily of *Calophyllum inophyllum* and *Ficus prolixa*, with additional elements of *Terminalia*, *Premna*, *Guettarda*, *Psidium*, and a sparse shrub layer. *Scaevola taccada* dominated on low ridges. The average canopy height was 16 m. This forest has been almost completely removed in an effort to access the underlying organic phosphate deposits, leaving a stark landscape of residual limestone pinnacles.⁴

Surrounding Buada Lagoon, there are open areas of marshy vegetation and home gardens that grade into closed to semi-closed forests of mixed native and naturalized species. Common components of these forests are *Calophyllum*, *Terminalia*, *Ceiba pentandra*, *Adenantha pavonina*, *Mangifera indica*, and *Annona* sp. In Meneñ, Anabar, and Anetan Districts, small landlocked lagoons and ponds containing the mangrove *Bruguiera gymnorrhiza*.

The coastal fringe vegetation has been modified by human activities and settlement such that this area now is a mosaic of natural, disturbed, and cultivated vegetation. The original outer coastal zone is characterized by the presence of salt-tolerant woody species such as *Tournefortia argentea*, *Morinda citrifolia*, and *Scaevola taccada* and the herbs *Vigna marina*, *Lepturus repens*, and *Ipomoea pescaprae*. Inland from the shore, the vegetation is composed of species found in more mesic conditions. In addition to species common to the plateau limestone forest, the vegetation contains *Hibiscus tilaceus*, Coconut (*Cocos nucifera*), *Hernandia nymphaefolia*, and many pan-Pacific herbs and food and ornamental species (many species now found in this inner coastal zone are not native to the Pacific Islands but were introduced into Nauru after European contact).⁵

BIORAP found that marine biodiversity while limited in biota is largely intact and healthy but effective management policy measures are urgently needed to address the emerging issues of pollution and overexploitation of fishery resources on inshore marine ecosystems. Four major groups of algal species dominate the reef flats with brown algae dominating the high intertidal areas, green algae dominating the mid-intertidal areas and the red turf algae common in the low-intertidal to the reef crest area. Marine fouling organisms, algae and animals associated with wharves, ports and marine piling were noted as a concern and so were recently introduced marine species such as the fire-worms found mainly on abandoned structures on the reefs.

The project document for the Nauru Ridge-to-Reef project (Implementing a 'Ridge-to-Reef' approach to protect biodiversity and ecosystem functions in Nauru' reported that Nauru's loss of biodiversity is evident in all flora and fauna groups studied recently. The report stressed the importance of urgent action with regards the preservation of the remaining natural areas and their component ecosystems; to avoid the high cost and uncertainty of future revegetation programs to recreate the original ecosystems and forest types of Nauru. Preservation of examples of original ecosystems could be achieved through some form of conservation zones and these should be taken up as

⁴ <http://www.worldwildlife.org/ecoregions/oc0104>

⁵ <http://www.fao.org/3/a-ap540e.pdf>

highest priority in the rehabilitation process of Nauru. However, the continuing mining prevents the progress of any rehabilitation of the Topside.

Drivers of change:

The main drivers of change stem from human interventions which will be compounded by climate change impacts. The continued terrestrial habitat alteration, degradation and loss, principally from mining activities, coastal degradation from development and poor waste and pollution management measures, contamination of the freshwater lens through poor sanitation practices and the exploitation of inshore marine and coastal resources are significant threats that need to be addressed.

The mining industry is the single most powerful agent of change to the country's terrestrial biodiversity. It cleared ancient indigenous forests on the central plateau that comprised of about 80% of the island's total land area. The ongoing secondary mining operations will slow down the process of rehabilitation by removing the secondary scrub vegetation on formerly mined lands. Furthermore, the current mining and export of limestone pinnacles to the Marshall Islands and the start of a limestone cutting industry may reduce available boulders and aggregates for constructing the rock bases of the land rehabilitation program. The Nauru BIORAP survey of last year suggested a combination of rehabilitation and protected sites on the fields of limestone pinnacles both to restore forests for the conservation of native biodiversity and also to allow the possible development of unique ecosystems that are based on the landscape of limestone pinnacles.

The limitations in available water resources for the needs of the population and the rehabilitation program add further threats to the success of efforts to restore lands and terrestrial biodiversity. Nauru's climate and annual weather patterns include prolonged periods of droughts.

Climate change and increasing population: there is the possibility of migration of the rapidly growing population up into the central plateau, because of space constraints on the low lying coastal areas, due to overcrowding and flooding. Potentially very serious impacts on biodiversity could result from changes in climate and sea levels associated with global warming. For Nauru, increased temperatures will have devastating effects on its natural ecosystems and affect particular species in the marine sector. Nauru's biological resources will all be affected by climate change, climate variability, and sea level rise

Over-exploitation and pollution: Nauru BIORAP gave a very positive outlook for the status and trends of marine biodiversity. Although due to the geology of its island Nauru has a low diversity of corals, vertebrate and invertebrate species, the reef is considered to be very healthy and high in the abundance of marine species stocks. However as reported in BIORAP there is evidence of an emerging trend of overfishing and pollution on the narrow reef flats which will require urgent actions by the national government and local communities

(b) Indicate whether the country has any national information system in place on associated biodiversity and identify the most frequently monitored components of associated biodiversity –

There is no national information system

(c) List associated biodiversity species that are actively managed in production systems for the provision of ecosystem services in Table 2.

Table 2 Associated biodiversity species that are actively managed in production systems for the provision of ecosystem services

Associated biodiversity species	Ecosystem functions and services provided by the species in the production system
Invertebrates - Coconut Hispine Beetle (<i>Brontispa longissima</i>)	Control of Coconut Hispine Beetle (<i>Brontispa longissima</i>) by introducing and managing parasitoids of <i>Asecodes hispinarum</i>
Vertebrates	
Wild and cultivated terrestrial and aquatic plants	

(d) Table 3 Wild food species used for food in the country.⁶

Wild food species	Change in state (2,1,0,-1,-2, NK)
1.Mango	-2
2.Coconut	-1
3.Pandanus	-1
4.Breadfruit	0
5.Lime	0
6.Papaya	-1
7.Banana	1
8.Soursop	0
9.Sweetsop	0
10.Guava	-1
11. Noni	0
12. Sea bird	-1
13. Sea fish	-1

(e) There is no information available on the proportion of the population in Nauru that uses wild food on a regular basis for food and nutrition.

All the crops in Table 3 can easily grow inland around the island, but not on the coastal areas because of the sandy soil. Because of the rich black soil, all the crops grow naturally well in Buada district. For example, mango is one of the favourite fruit trees that grows wild in Buada and is eaten either green or ripe. Mango fruiting has been poor in recent years because of drought conditions. Picking mangoes in Buada can be done by anyone – there is no restriction/control. Wild food is shared when it is in abundance or even shared when its scarce e.g. the hunger aftermath 2004; can also be delicacy for the sick and elderly; served during national and special celebrations and rarely sold (small scale) at Saturday markets. Wild foods are natural foods existing on Nauru – increasing

⁶ Reference: question 34 of country report guidelines.

consumption of these foods on a regular basis is important for food and nutrition in Nauru. and it is up to us “ to change our lifestyle” to consume on a regular basis for food and nutrition.

(f) Briefly summarize the state and trends of and the drivers of change affecting:

- **Associated biodiversity : micro-organisms, invertebrates, vertebrates, plants**
- **Ecosystem services : regulating, supporting**
- **Wild food resources**

The impacts of hundred years of phosphate mining has brought almost total loss of native forests including flora and fauna that have once covered 80 per cent of lands on the central plateau of Nauru. Recent surveys of the environment in particular the BIORAP have provided clear evidence of the extent of the decline of these natural assets. The ongoing mining and export of limestone pinnacles to the Marshall Islands and the start of a limestone cutting industry is hindering land rehabilitation programmes. The main threats/drivers of change affecting BFA, in particular, associated biodiversity, ecosystem services and wild food resources are:

- Phosphate Mining and Limestone Industry
- Unsustainable Population Growth
- Climate Change Impacts
- Over-exploitation of land and marine resources
- Introduction of Invasive Species
- Ineffective Pollution Control and Solid Waste Management
- Loss of Traditional Knowledge

The implications for biodiversity for food and agriculture in particular, ecosystem services include:

- Loss of opportunities for the rehabilitation and restoration of mined lands;
- Water security due to poor management of water resources
- Loss of traditional knowledge and practices based on ecosystem services
- Increasing constraints for future food security in agriculture and fisheries and livelihoods which depend on viable terrestrial and marine ecosystems
- Increasing costly reliance on overseas aid and assistance and continuing over exploitation of depleting and degrading natural assets to meet social needs that with mounting competition could lead to social unrest and violent conflicts.

Box 1: Describe one or two examples of countermeasures that have been taken in the country to reduce adverse effects of drivers on associated biodiversity, ecosystem services and/or wild foods.

Box 1: The Sustainable Land Management Project

The restoration of mine lands and the sustainable use of limited space and land resources of the settled narrow coastal areas of Nauru is very essential to the regeneration of biodiversity and ecosystem services that underpins the survival of the island's population in the medium to long term (10- 50 years and beyond). All efforts therefore to promote knowledge, raise awareness and build capacities for sustainable land management is very important in achieving this noble end. The SLM project therefore was developed as a government and community initiative for addressing issues of land degradation and droughts in Nauru in relation to the UN Convention to Combat Desertification, Land Degradation and Drought. The purpose of Nauru's GEF funded SLM project was to create an enabling environment for improving ecosystem stability, integrity, functions and services while enhancing sustainable livelihoods. It was implemented from 2008 to 2012. It succeeded in providing further guidelines for land restoration, funded various capacity building trainings of government and non-governmental staff on Environmental Impact Assessments EIA, GIS and Beach Profiling, and produced a draft National Action Plan or NAP the overarching policy framework for financing future national and local sustainable land management actions. Nauru has made progress in their movement towards SLM as a result of their exposure to the concepts over the past four years but the draft SLM National Action Plan is yet to be adopted

1.3 Needs and priorities

The country's main needs and priorities in terms of the state of biodiversity for food and agriculture, and in particular of associated biodiversity, wild foods and ecosystem services would be information monitoring systems. Gathering data on BFA is a huge constraint to making assessments about state and trends. To improve this area attention must be given to the resources needed and to developing a system that is mindful of resource constraints.

The political and community support for protecting biodiversity needs to be strengthened; particularly through appropriate legislation that covers all types of biodiversity. Biodiversity is linked to the water resources, land resources, management of wastes, food security, culture and many other development issues. However, biodiversity is not consistently mainstreamed through national sustainable development strategies. The enforcement of regulations on biodiversity also needs to be strengthened, for example, the awareness and capacity of quarantine and border controls on biodiversity and introduced species is limited (SIDS, 2013).

Community awareness of the link between biodiversity and culture is limited. Promoting traditional ethnological knowledge could result in an increase in traditional agriculture and indigenous crops.

There is a general lack of understanding as to the importance of biodiversity and the role it plays in food security. For implementing projects associated with biodiversity – there is a lack of skills, limited resources and no agency or organisation has the mandate for this specific area of work. Land is a constraint when implementing any policies and/or strategies regarding BFA with limited land availability for allocation as a result that 80 per cent is degraded due to mining.

Priority actions include more public consultation, promotion, collaboration, awareness and education and clarifying which agency has the responsibility for BFA, including associated

biodiversity, ecosystems and wild foods. For wild foods, current practice is that wild foods in the forest can be accessed by anyone anytime – there is no system in place to monitor the extent of harvesting

II. Sustainable use and conservation of biodiversity for food and agriculture

2.1 Sustainable use

(a) Table 4 Management⁷ and diversity based⁸ practices that support the maintenance and use of biodiversity for food and agriculture in production systems.

Management practices supporting the use and conservation of biodiversity for food and agriculture	Description/examples of management practices	Increase/Decrease
Water management practices and water harvesting	Water harvesting and management through rain water retention. e.g, Water tanks and gutters installation to households	increase
Agroforestry	Land-use systems where woody perennials (trees, shrubs, palms, etc.) are integrated in the farming system	decrease
Home gardens	There is still some active farmers who have home gardens around the homestead, including staple crops, vegetables, fruits, medicinal plants, livestock and fish both for home consumption	Decrease

Box 2 The Grow and Green Project was a government funded initiative to promote the planting of local fruit trees in the communities for food security, soil fertility improvement and building local capacity in tree planting. Target tree species include lime, breadfruit, soursop and coconut. The project was successful in the production of planting materials; the setting up of family fruit tree plots; collaboration with the Taiwan Technical Mission Horticulture and raising awareness and providing training and technical support to individual households and schools in the planting and care of fruit trees. Improving organic matter and improving soil fertility is essential to any efforts to restore green cover and consequently assist the re-establishment of forest cover and its associated native flora and fauna on the island of Nauru. Any initiative therefore to promote a culture of tree planting and soil improvement in Nauru will contribute a long way to achieving these ends. Grow and Green is one such initiative. However, it appears the participation from householders was not sustained however the new agricultural management are keen to revisit this programme. According to RONAdapt 13% of households (250+ total) grow food of some kind though diversity is low.

⁷ Annex 5 of the country report guidelines describes a list of management practices supporting the use and conservation of biodiversity for food and agriculture.

⁸ Annex 6 of the country report guidelines describes a list of diversity based interventions supporting the use and conservation of biodiversity for food and agriculture.

b) Provide examples whereby the biodiversity per se, or its lack, had a direct effect on productivity; food security and nutrition; rural livelihoods; ecosystem services; sustainability; resilience; or sustainable intensification.

As previously outlined the years of phosphate mining severely degraded the environment of Nauru and had a detrimental impact on biodiversity. The impact from the lack of local food production and therefore the use of BFA is evident by the level of Type 2 diabetes and obesity in the country - Nauru has the highest rates of Type 2 diabetes in the world, with 40 per cent of its inhabitants affected by the condition. 71 per cent of the population is obese. 97 per cent of the men are overweight, a figure which is only marginally smaller for women⁹. Numerous assessments have been made regarding BFA and strategies proposed for developing the agriculture sector and strengthening local food production – a strategy that would address the level of NCDs and also help with climate change adaptation. Some interventions are taking the right approach:

For example the Taiwan Technical Mission and the Department of Commerce, Industries & Environment's Horticulture and Livestock Breeding Project (TTM-DCIE): The overall goal of the TTM-DCIE projects is to promote horticulture (vegetable gardening and local fruit tree growing) and livestock (poultry and piggery) development to improve food security in terms of greens and proteins. The government of Taiwan funded most of the project needs including materials, equipment, and overseas experts in horticulture and livestock development. The government of Nauru provides in kind support in terms of the land plots for the project's main cultivation and breeding stations and counterpart staff from the Division of Agriculture. This project has developed methods of composting using manure from the livestock project combined with topsoil from the secondary mined areas, to improve soil fertility and organic matter.

While these projects deal mainly with agriculture, they do stress the importance of enabling environments for supporting biodiversity conservation and the rehabilitation program of the country. For example, the horticulture nursery and composting methods create opportunities for local farmers to include the cultivation of native species trees that are needed for re-afforestation programs.

Started in 2009 the TTM-DCIE was successful in setting up vegetable gardens with 50 farmers and 3 schools; at supplying vegetables to the Nauru School Feed Program for 800 school children and holding several vegetable cooking demonstrations for most of the district communities. The poultry and piggery projects have also achieved success at establishing small piggeries and poultry farms with 30 local farmers. In 2013, 1,500 egg-layers were supplied to local poultry farmers, significantly increasing local egg production. And in terms of composting from livestock manure TTM-DCIE has successfully trained and engaged 10 households to establish their own composting pits.

⁹ <http://www.diabetes.co.uk/in-depth/i-have-seen-so-many-funerals-for-such-a-small-island-the-astonishing-story-of-nauru-the-tiny-island-nation-with-the-worlds-highest-rates-of-type-2-diabetes/>

(c) Table 5 Examples whereby the use of biodiversity for food and agriculture (BFA) contributed to cope with climate change, invasive alien species, and natural or human-made disasters

Objective	Description
Use of BFA to adapt to and mitigate climate change	The TTM-DCIE project through promoting diversification in food gardens – diversification will enhance the resilience of the food production system
Use of BFA to manage the spread of/control of invasive alien species	Nauru is a partner country in the GEF-PAS Prevention, control and management of invasive alien species in the Pacific islands". The project will utilise the "Guidelines for Invasive Species Management in the Pacific".
Use of BFA to prevent natural or human-made disasters and or/reduce their effects on livelihoods, food and nutrition	

d) List and briefly describe ecosystem/landscape/seascape approaches that have improved the management and use of biodiversity for food and agriculture in the country.

Nauru is one of 4 countries participating in the Island Biodiversity project launched in 2012. The project is a three year initiative in which the island nations will carry out a range of activities with their local communities to produce and strengthen management actions to save threatened species and ecosystems; and to help ensure sustainable use of natural resources. The Integrated Island Biodiversity project is funded by the Global Environment Facility, Pacific Alliance for Sustainability (GEF-PAS), implemented by UNEP and executed by SPREP. This project will help ensure the Cook Islands, Nauru, Tonga and Tuvalu can have activities on the ground that uses an integrated Ecosystem-based management approach which entails emphasizing the connectivity between systems such as between land and sea and people.

Nauru is also implementing a R2R programme ‘Implementing a ‘Ridge-to-Reef’ Approach to Sustain Ecosystem Functions’. The objective of this programme is ‘to preserve biodiversity, ecosystem services, improve climate resilience and sustain livelihoods in Nauru using a R2R approach’. There are 4 components – (a) conservation of marine biodiversity (b) sustainable land and water management (c) governance and institutions and (d) knowledge management. This project is in the implementation stage.

(e) Provide examples of activities undertaken to maintain and use traditional knowledge of associated biodiversity and wild foods

Traditional knowledge and practices for the cultivation and use of a limited range of plants and animals on land and inshore marine resources have proven valuable social assets for survival in the harsh conditions of Nauru’s environment. There would appear to be a significant loss of traditional knowledge largely due to the mining and the immediate though short-lived wealth that it created. There are limited records of the traditional knowledge for nature conservation and healing using native plants and with the demise of the older generations that knowledge is being lost. However the taboo lands that are out of bounds and out of sight still exist. These lands include fragments of

forests around the coast and on the central plateau and are thought to be places of sacrifices and worship in ancient times

(f) Identify possible needs and priorities in terms of the sustainable use of biodiversity for food and agriculture, and in particular of associated biodiversity and wild foods.

The Nauru Rapid Biodiversity Assessment (BIORAP) carried out under the Integrated Island Biodiversity project provided a number of recommendations

- Implement an agroforestry programme for replanting rare and endangered plant species most of which are culturally-useful tree species, which provide coastal protection and serve as a basis for food and livelihood security.
- Establish a system of village reserves and nurseries, including household gardens as part of the integrated protected areas network.
- Establish regular monitoring and assessment of plant, animal and marine resources.

As part of this assessment and because you have to know what you have before you develop a strategy for use – the BIORAP recommended conducting a marine and terrestrial spatial planning exercise, with a ridge to reef approach, with all stakeholders to identify key areas for protection.

For marine resources the BIORAP highlighted the need to set up marine managed/protected areas as a matter of urgency, including no-take areas in consultation with all local stakeholders, targeting fish breeding and spawning sites. In line with this - individual communities would be helped to monitor their natural resources including fishes, noddies, vegetation types, intertidal reef flats and fringing reef

Under governance the following recommendations were made which would support sustainable use of BFA:

- Establish a community culture, as well as legislation, to manage and sustainably utilise the marine and terrestrial resources of Nauru.
- Ensure compliance with new regulations and laws – raise awareness, and enforce consequences for non-compliance.

Under awareness, education and traditional knowledge the following recommendations were made which would support sustainable use of BFA:

- Working with local communities, especially those having ownership over land or marine resources, as well as developing constructive relationships with other land managers including the mining company and immigration centre.
- Providing training to improve knowledge on conservation issues and effective strategies to protect key resources that are crucial to biodiversity.
- Rejuvenating and strengthening traditional environmental knowledge systems that were once an integral part of Nauruan's connection to the land and sea
- Developing a public awareness campaign on the importance of healthy ecosystems. Nauru has acute water and soil challenges and addressing these through ecosystem management will bring many benefits to the community.

Importantly the link between sustainable use of BFA and both health of the environment and healthy communities needs to be made and progressed through supportive policies and strategies.

2.2. Conservation

a) Describe the status of *in situ* conservation of associated biodiversity and wild food species in your country:

There is no national *in situ* conservation initiative in Nauru

Sub-regional/regional *in situ* conservation initiative(s) the country is involved in.

The Framework for Nature Conservation and Protected Areas in the Pacific Islands region, 2014-2020 will provide guidance for the region on key priorities for biodiversity conservation and ecosystem management with clear linkages to NBSAPs and the Aichi Biodiversity targets. Strategic goal C is 'to improve the status of biodiversity by safeguarding ecosystems, species and diversity'¹⁰

The goal of the GEF-PAS Integrated Island Biodiversity project is 'to conserve ecosystems, species and genetic diversity in the Pacific region. The project is focusing on improved systems and processes including resource assessment and monitoring, legislation, capacity and awareness building. Other countries involved in this project include Cook Islands, Tonga and Tuvalu – therefore it is a sub-regional initiative. Through this project the rapid biodiversity assessment (BIORAP) was carried out.

b) Describe the status of *ex situ* conservation of associated biodiversity and wild food species in your country:

There is no national *ex situ* conservation initiative in Nauru

Constraints for *ex situ* conservation include limitations in, or lack of, research, national policies and strategies, funding, facilities, public education and training for staff, as well as land availability.

Sub-regional/regional *ex situ* conservation initiative(s) the country is involved in.

Nauru, as a SPC member country can participate in *ex situ* conservation through SPC and USP. In 2011, the Secretariat of the Pacific Community developed the Pacific Islands Tree Seed Centre (PITSC) to help research, conserve and disseminate seeds of socio-economically important tree species for its 22 member countries and territories, including Nauru.

In April 2014 the RBG, Kew and SPC signed a 10-year agreement to work together in supporting and implementing plant conservation activities in the Pacific region, specifically with the PITSC. The vision of the Regional Strategy and Action Plan on Forest Genetic Resources Conservation and Management is: by 2020, the Pacific Island Countries and Territories are enjoying improved livelihoods, greater food security and increased environmental protection, resulting from enhanced collaboration and coordination within and between them in the conservation, management and sustainable utilisation of forest genetic resources, while maintaining their unique Pacific cultures

¹⁰ <https://www.cbd.int/sp/targets/>

The SPC Centre for Pacific Crops and Trees can support SPC member countries in conserving agricultural biodiversity.

The Fiji Herbarium at the University of the South Pacific houses more than 50,000 vascular plant specimens in the main collection. It also has a wet collection of plant parts, bryophytes and algae from the Pacific region. The Herbarium serves as a very important resource in matters pertaining to the taxonomy, conservation and ecology of plants, forestry, land use planning, economic plants and weed problems in the region.

c) Identify possible needs and priorities in terms of the conservation of biodiversity for food and agriculture, and in particular of associated biodiversity and wild food species.

The possible needs and priorities in terms of the conservation of biodiversity for food and agriculture, and in particular of associated biodiversity and wild food species would be similar to those identified for sustainable use and of course conservation should ideally be linked to use.

In addition – again referring to the BIORAP recommendations, which state that focussing on the conservation of Nauru’s plant and animal resources would have enormous benefits for long-term food security, health and the economy of Nauru. There are a range of actions that are recommended as priorities to be addressed by stakeholders and communities:

- Develop a National Invasive Species Strategy and Action Plan, in line with the Guidelines for Invasive Species Management in the Pacific, including a prioritised list of species for targeted control within priority conservation areas, as well as listing threats for future incursions.
- Develop and implement a range of conservation interventions, strategies, management plans and programmes specifically targeting rare and endangered species (but these would have overall benefits for biodiversity) including community management programmes, species monitoring, habitat protection for terrestrial and marine protected areas, and harvesting management as appropriate.
- Establish a framework of terrestrial management areas with the overarching goal to retain and enhance a suite of representative ecosystems and species together with marine linkages. These actions should be driven from the bottom up with the goal of enhancing national identity and sustaining cultural associations.

2.3 Access and exchange

Table 6 Description of the main measures in the country (i) regulating access to; and (ii) ensuring the fair and equitable sharing of benefits arising from the utilization of biodiversity for food and agriculture (BFA)¹¹

Components of BFA	Description of measures governing access to BFA	Description of measures regulating the fair and equitable sharing of benefits arising from the utilization of BFA
<i>Genetic resources</i>	There are no measures governing access to PGRFA, AnGR, FGR and AqGR	
PFRFA		
AnGR		
FGR		
AqGR		
<i>Associated biodiversity</i>	There are no measures governing access to associated biodiversity	
Micro-organisms		
Invertebrates		
Vertebrates		
Plants		
Wild foods	There are no measures governing access to wild foods	

Nauru's NBSAP was developed in 2009 and was endorsed by government in 2013 with the following vision: Nauru's biological and genetic resources are protected, conserved and sustainably managed to emphasise the desired outcome of a future where individual, community, business and government partnerships contribute to a sustainable quality of life for present and future generations. This vision will be revised to ensure it is aligned with the CBD Strategic Plan and the Aichi Biodiversity Targets.

Nauru has not ratified the ITPGRFA.

Nauru attended training on the Nagoya protocol in 2014 but has not acceded and has not acceded/ratified the ITPGRFA. Therefore there are no measures in place regulating access to; and (ii) ensuring the fair and equitable sharing of benefits arising from the utilization of biodiversity for food and agriculture

b) Identify possible needs and priorities in terms of the policies and regulations governing the access to and ensuring the fair and equitable sharing of benefits arising from the utilization of biodiversity for food and agriculture, and in particular of associated biodiversity.

There should be a concentrated effort to assist Nauru to accede to both the ITPGRFA and the Nagoya protocol.

III. Policies, institutions and capacity

3.1 Policies, programmes, institutions and other stakeholders

¹¹ Measures facilitating access to the different components of biodiversity for food and agriculture usually vary according to the intended use of the resource (e.g. any use, research and development, commercial use). Examples of possible measures consist of the need to obtain prior informed consent (PIC), sharing benefits based on mutually agreed terms (MAT), having special considerations in place for access to resources held by indigenous peoples and local communities, etc.

a) Describe relevant policies and programmes the country has adopted and is implementing to support the conservation and sustainable use of biodiversity for food and agriculture, **and specify to which extent they address associated biodiversity and wild foods**. Relevant policies and programmes are those that aim at:

- the coordinated use and conservation of sectoral genetic resources
- addressing food security and nutrition
- the sustainable use and conservation of associated biodiversity
- the maintenance of ecosystem services
- improving resilience and sustainability of production systems
- supporting farmers, livestock keepers, forest dwellers and fisher folk to adopt and maintain practices that strengthen the conservation and use of biodiversity for food and agriculture
- the application of an ecosystem/landscape/seascape approach

Policies & Programmes	Implementor & Partner/Donor	Year
Nauru Sustainable Development Strategy	Ministry, Departments & State Owned Enterprises (SOEs)	2005-2025 (revised 2009)
Taiwan Technical Mission Programme	ROC Taiwan/Republic of Nauru (RON)	2015-2018
The Pacific Multi-Country Programming Framework	FAO/RON	2013-2017
R2R programme Implementing a 'Ridge-to-Reef' Approach to Sustain Ecosystem Functions.	UNDP/GEF/RON	2016-2019
The Republic of Nauru Climate Change Adaptation and Disaster Risk Management Framework (RONAdapt).	GIZ/BMZ/SPC/SPREP/WHO	2010-2014

b) Provide a short analysis of the strengths and weaknesses of the policies and programmes mentioned above and indicate their level of implementation.

Nauru Sustainable Development Strategy (NSDS) is a 20 Year Plan for the government institutions to use as a guideline. It is a government approach so the implementation will be fully supported but it still relies on the participation of the general public in agriculture activities, therefore the agriculture department could fail to achieve its objectives because of lack of participation. It was developed in collaboration with communities.

Taiwan Technical Mission Programme 2010-2018: The strength is that the programme is long-term increasing its potential to be sustainable and is fully supported by the Taiwan government. It aims to strengthen agriculture, in particular, sustainable practices for horticulture and livestock. Throughout the programme TTM will continue research on existing and new agriculture practices and products. The programme makes available poultry, eggs and vegetables for the community and for commercial purposes. In August 2015, the Government of Nauru under the Department of Commerce, Industry & Environment (DCIE) Agriculture Division took over the operations of the National Piggery Farm previously managed by Taiwan Technical Team (TTM). The Piggery Farm

project was initiated to support achievement of NSDS goals and to establish the livestock industry – Swine and Poultry in Nauru. The strength of this project is the interest from the community and stakeholders. The weakness will be lack of resources and capacity for implementation.

The Country Programming Framework: The Country Programming Framework (CPF) 2013-2017, is a four year programme initiated by FAO with the Government of Nauru under the Department of Commerce, Industry and Environment (DCIE) Agriculture Division to assist national outcomes in terms of technical gaps. The CPF is intended to support achievement of our NSDS goals, in relations to Food Security, Food Nutrition, Food Safety and Aquaculture. In doing so, it will improve the country's social and economic situation. The strength of this framework is strengthening the partnership between the community and other relevant stakeholders. The weakness will be the capacity for implementation

R2R programme Implementing a 'Ridge-to-Reef' Approach to Sustain Ecosystem Functions: the programme is empowering communities to manage ecosystems which will strengthen sustainability through ownership. For example, for the conservation of marine biodiversity a network of locally managed marine areas is being established; for sustainable land and water management, integrated landscape management practices will be developed with local communities living within the 'bottom-side' and applicable 'ridge' and 'topside' areas not covered by mining; and biodiversity and SLM will be mainstreamed in policy and regulatory frameworks. A possible weakness will be the capacity available for implementation.

The Republic of Nauru Climate Change Adaptation and Disaster Risk Management Framework (RONAdapt) represents the Government of Nauru's response to the risks to climate change and disaster risk reduction and is therefore aligned with the development priorities embedded in the NSDS. It is intended to support achievement of our NSDS goals, by highlighting a series of actions that will also reduce Nauru's vulnerability to climate change and disasters. In doing so, it will improve the country's social, economic and environmental resilience. The strength of this framework is its potential for linking sectors and a wide range of stakeholders. The weakness will be a possible lack of human capacity for implementation.

BOX 3. Provide up to three examples to highlight how stakeholder groups in the country, such as groups or associations of farmers, forest dwellers, fisher folk and livestock keepers, NGOs or other civil society organizations, have actively contributed to the improved sustainable use and/or conservation of biodiversity for food and agriculture and the maintenance of ecosystem services.

Box 3: The Community Based Fisheries Management Program (CBFMP): The CBFMP is a major grassroots fisheries management initiative that is supported by the Nauru Fisheries and Marine Resources Authority on behalf of the national government. Its overall aim is to empower local community populations to learn and practice the art of taking care of its coastline and inshore fishing resources, as a collective community undertaking, with the support of NFMRA and its national and international partners like SPC and FAO. NFMRA and its partners provides the information resources, the technical advisory services and some co-financing to inform, accompany and assist local communities, while local communities own and drive the policy and planning processes for the management of coastal fisheries. Some of these policy and planning processes includes the implementation of policy measures for setting limits and controls on the use of inshore fisheries resources along their districts coastlines; and the setting up institutional arrangements to mobilize the flow of financial and information resources to increase awareness and build the capacities of their populations on sustainable fishing practices and successful fisheries restocking and habitat restoration approaches. The frameworks for implementing this program are community based fisheries management plans which are gradually being explored and developed by the leaders of district communities.

c) Provide examples of successful inter-ministerial cooperation in the area of conservation and sustainable use of biodiversity for food and agriculture and describe the relevant collaboration mechanisms.

The Republic of Nauru Climate Change Adaptation and Disaster Risk Management Framework (RONAdapt) represents the Government of Nauru's response to the risks to climate change and disaster risk reduction and is therefore aligned with the development priorities embedded in the NSDS. The RONAdapt document was developed over five years to set out an overall framework for managing the risks to sustainable development. It involved extensive consultation and review by all government sectors, civil society and the general public in Nauru.

d) Identify possible needs and priorities in terms of policies, programmes and institutions governing biodiversity for food and agriculture, and in particular associated biodiversity and wild food species.

There is an urgent need for strengthened cross-sectoral collaboration to ensure that all sectors are promoting the same approaches and practices. Monitoring and evaluation frameworks should be in place to ensure effective implementation - monitoring and evaluating progress is necessary for informed decision making. Importantly the issue of sustainability for all projects should be addressed. The long-term focus of the NSDS provides an opportunity to put in place systems that

meet present and future demands and therefore it is imperative that all other policies and programmes are aligned with the NSDS.

Most, if not all sectors are currently constrained by poor information about current conditions and/or likely future changes in BFA therefore strengthening this information gap is vital for policy and programme planning and development. Capacity building will also be necessary to support institutional strengthening.

3.2 Capacity

a) Identify and prioritize training and education needs that target the conservation and sustainable use of associated biodiversity and describe possible constraints

A first step in educating people is to raise awareness so that they understand the importance of the issue.

Sustainable development is dependent on the national capacity in developing and implementing national sustainable development strategies. In Nauru, national capacity is limited. At the national level, strategies for developing this capacity through education, training and mentoring are necessary for successful progress. Sharing of experiences and lessons learned also provides an opportunity to make large gains at little cost. Partnerships with other SIDS are particularly useful in this regard. Meaningful partnerships with international and regional organizations and technical organizations also provide an opportunity for capacity building. However, these partnerships must be integrated with national priorities and maximize the knowledge transfer.

Education in science and technical areas is much needed. High and persistent unemployment rates in Nauru do not encourage a pro-education attitude – this must be addressed. The school curriculum has to incorporate issues such as BFA to ensure an appreciation of its value.

The Nauru BIORAP highlighted the importance of working with local communities, especially those with ownership over land or marine resources, as well as developing constructive relationships with other land managers including the mining company and immigration centre. The following areas were identified as priority areas:

- Provide training to improve knowledge on conservation issues and effective strategies to protect key resources that are crucial to biodiversity. This may include:
 - Border biosecurity at the port and airport and highlighting the risks and impacts of introducing invasive species.
 - Notifying landowners of the presence of important native plants and encourage them to protect and rehabilitate these species.
 - Development of curriculum materials on Nauru's important plants, animals and ecosystem.
- Rejuvenate and strengthen traditional environmental knowledge systems that were once an integral part of Nauruan's connection to the land and sea.
- Develop a public awareness campaign on the importance of healthy ecosystems. Nauru has acute water and soil challenges and addressing these through ecosystem management will bring many benefits to the community.

Training is of course beneficial but there has to be funding to ensure the trained person can be employed over a realistic period of time and also some process in place so that any training gained overseas can be shared within departments.

b) Identify and prioritize research needs to strengthen the conservation and sustainable use of associated biodiversity, wild foods and ecosystem services and describe possible constraints.

Research into the BFA that exists in Nauru and how to strengthen and expand BFA through agriculture and environmental activities would be useful including a better understanding of the level of agricultural biodiversity that adds resilience to agriculture production from home gardens to larger-scale enterprises. Partnerships with other SIDS will be helpful with research as will meaningful partnerships with international and regional organizations and technical organizations.

On a regional basis, a regional conference on BFA would help in identifying research needs common to several Pacific countries or the region as a whole

IV. Regional cooperation

4.1 Regional initiatives the country is involved in to conserve and use biodiversity for food and agriculture

Table 7 Description of relevant regional policies and programmes that embed the conservation and/or use of biodiversity for food and agriculture, and in particular associated biodiversity, wild food species and ecosystem services.¹²

Regional policies and programmes	Description
Pacific Plan	Pacific Forum leaders agreed to the development of a ‘Pacific Plan’ with the goal to “Enhance and stimulate economic growth, sustainable development, good governance and security for Pacific countries through regionalism. The Plan has reference to ‘Improved Natural Resource Management and Environmental Management’ in the plans Strategic Objective no. 5, with initiatives being promoted in: sustainable development, fisheries, forestry, coastal waters, waste management, energy, freshwater management, biodiversity and climate change.
The Framework for Nature Conservation and Protected Areas in the Pacific Islands region, 2014-2020	The Framework will provide guidance for the region on key priorities for biodiversity conservation and ecosystem management with clear linkages to NBSAPs and the Aichi Biodiversity targets. Strategic goal C is ‘to improve the status of biodiversity by safeguarding ecosystems, species and diversity
Pacific Islands Regional Marine Species Programme 2013-2017	A regional strategy for cooperative conservation and management of dugongs, marine turtles, whales and dolphins in the Pacific Region. Other marine species of conservation concern will be added as the need arise.
A New Song for Coastal Fisheries: Pathways to Change	In March 2015, regional Pacific stakeholders and Governments engaged in collaborative planning to establish a new direction in the management of Coastal Fisheries. A New Song for Coastal Fisheries: Pathways to Change calls for a “...new and innovative approach to dealing with declines in coastal

¹² Reference: question 84 of country report guidelines.

	fisheries resources and related ecosystems". The paper makes five recommendations designed to strengthen community-based ecosystem approaches to fisheries management (CEAFM) across the region by adopting a capacity development approach as an integrated strategy, to develop capacity in CEAFM in information, management, monitoring and enforcement functions, from community to national government.
Pacific Islands Regional Ocean Policy and Framework for Integrated Strategic Action (PIROP)	The Pacific Islands Regional Ocean Policy is a policy for all the islands of the Pacific: it has been adopted by the leaders of all Pacific Island countries through the Pacific Islands Forum and is additionally supported by all Pacific Island territories. The Policy underscores the continuing importance of ocean and coastal resources and environments to the region's nations, communities and individuals. Central to the policy is the belief that ocean, coastal and island ecosystems contain high biological diversity that has sustained the lives of Pacific Island communities since first settlement and that it is vital to reduce the negative impacts of human activities and implement measures that protect and conserve biodiversity. It is important that biodiversity protection be pursued in a way that is compatible with community control of resources, and not unduly restrictive of social and economic development, particularly at the community level
Regional Strategic Plan on the Conservation, Management and Sustainable Utilization of Forests and Trees Genetic Resources in the Pacific	Regional Strategic Plan on the Conservation, Management and Sustainable Utilization of Forests and Trees Genetic Resources in the Pacific approved in 2008 by Ministers and Heads of Agriculture and Forestry - serves as the framework for planning and implementing the conservation, management and sustainable use of forest and tree genetic resources with the PICT. One major recommendation from that Regional Strategy and Action Plan is the establishment of the regional tree seed centre
Pacific Ridge-to-Reef Program	Goal of the programme is to maintain and enhance Pacific Island countries' ecosystem goods and services (provisioning, regulating, supporting and cultural) through integrated approaches to land, water, forest, biodiversity and coastal resource management that contribute to poverty reduction, sustainable livelihoods and climate resilience
Pacific Regional Action Plan on Sustainable Water Management	One of the three key messages is: Implement strategies to improve the management of water resources, and surface and groundwater catchments (watersheds) for the benefit of all sectors including local communities, development interests, and the environment.
Towards a Food Secure Pacific	One of the strategies embedded in Theme 3 Enhanced and sustainable production, processing and trading of safe and nutritious local food is: Promote sustainable management of land, freshwater, agrobiodiversity and marine resources

4.2 Needs and priorities

- a) Identify possible needs and priorities in terms of embedding biodiversity for food and agriculture, and in particular associated biodiversity, wild foods and ecosystem services into regional and international initiatives.**

The needs and priorities are:

- Improved coordination and information sharing between the different sector policy and programmes.
- Improved national to regional data collecting and reporting mechanisms
- Better knowledge management systems so data collected can be easily accessed and shared
- Increase in integrated policy planning with an ridge-to-reef approach
- Improved monitoring and evaluation to improve decision-making and planning
- Establishment of a regional coordination post, possibly at FAO-SAPA.

V. Synthesis of needs and priorities and the possible way forward

1.Assessing and Monitoring	Identification of responsibilities for monitoring and assessing biodiversity for food and agriculture	Mandate a national agency with the role of data collecting, monitoring and assessing biodiversity for food and agriculture (e.g. agriculture or environment or both)
	Identification of clear goals for monitoring and assessing biodiversity for food and agriculture	Integrate assessment and monitoring of biodiversity for food and agriculture into national strategic plan
	Monitoring of effectiveness of management decisions on biodiversity for food and agriculture, at national and regional levels	Design/adopt systems to monitor the impacts of management decisions on biodiversity for food and agriculture
2.Conservation and sustainable use	Identification of the associated biodiversity found within the different production systems	Study associated biodiversity which will require collaboration at international, regional, and national levels to facilitate information sharing and research
	Knowledge on how management practices and diversity-based interventions influence biodiversity for food and agriculture	Study impact of specific management practices on biodiversity in different agricultural systems and at different locations and disseminate information to all relevant organizations
	Knowledge (technical/field) on management practices and diversity-based interventions that support sustainable use of biodiversity for food and agriculture	Collate and disseminate information and knowledge on the various practices and interventions and provide training for farmers, fishers, etc.
	Policy support for the sustainable use of biodiversity for food and agriculture	Review existing policies, including their implementation, as to their coverage of and possible (negative or positive) impact on sustainable use of biodiversity for food and agriculture
	Adoption of sustainable management practices, genetic resources improvement practices and diversity-based interventions that strengthen sustainable use of biodiversity for food and	Establish national policies and strategies that improve support to farmers, livestock keepers, forest dwellers, fisher folks and other stakeholders applying practices that favour the maintenance and

	agriculture	sustainable use of BFA, strengthening food security and climate change resilience
	Use of local/traditional foods to support linkage of BFA with nutrition and health	Strengthen public awareness building on the lessons learnt of the 'Go Local' campaign, including coverage in the school curriculum
	Use of traditional knowledge supporting the sustainable use of BFA	Promote the use of traditional knowledge through documentation and sharing of the knowledge between countries Investigate the scientific basis of traditional knowledge related to BFA, as appropriate Establish relevant policy and legislation to enable measures such as traditional bans to be enforced and strengthen community buy-in
	Integration and collaboration between key agencies and other stakeholders to improve information sharing	Explore mechanisms at the national and regional levels for strengthening collaboration, including more effective information sharing
	Understanding of how ecosystem approaches can contribute to the conservation of biodiversity for food and agriculture	Evaluate ecosystem approaches and engage existing projects to contribute to information pool
	Access to information on the sustainable conservation of biodiversity for food and agriculture	Develop/adapt knowledge management systems at national and regional levels
	Conservation strategies	Develop a rational conservation strategy for BFA addressing resource constraints, in particular funding and capacity of existing facilities Strengthen conservation capacity of the Pacific genebanks (e.g. SPC CePaCT)
	Policy support for the conservation of biodiversity for food and agriculture	Review existing policies, including their implementation, as to their coverage of and possible (negative or positive) impact on conservation of biodiversity for food and agriculture
Policies, institutions and capacity	Recognition of importance of BFA	Source, document and disseminate success stories by social media and education programmes
	Knowledge/information on policies that address BFA at the national and regional levels, identifying opportunities to address BFA issues	Review current policies for acknowledgement of BFA, and achievable goals and ensure policies are harmonized
	Coherent policies and programmes that inter-link the sectors (Agriculture, Environment, Education, Health, Forestry,	Promote the development of cross-sectoral policies and programmes at all levels through establishment of a cross-sectoral working group

	Fisheries, Community, etc.)	taking into account existing efforts.
	Implementation of existing policies	Strengthen capacity at the national and local level to implement policies Engage and empower communities in the development and implementation of relevant policies
	Information hub for research priorities, contactable people and funding sources in the PICTs for BFA	Establish/strengthen information hub to collect, maintain and disseminate information on research priorities, contactable people and funding sources
	Better understanding of biodiversity for food and agriculture	Training at required levels - targeting different stakeholders, age groups, gender etc. (Schools, Government ministries, Church groups, NGOs, short promotional videos, politicians)
	Assessment of capacity and identification/prioritization of training needs at the national level	Implement training programs according to needs identified and available resources
	Implementation of BFA activities and programmes	Targeted training of committed and active staff within relevant agencies
	Capacity building in access and benefit-sharing	Establish guidelines and mechanisms to assist countries in access/exchange activities
	Involvement of a wide range of stakeholders in research on biodiversity for food and agriculture	Involve all relevant stakeholders in project design/planning, implementation, monitoring and reporting
	Regional and international cooperation on research	Regional conference on BFA supported by regional and international organizations
Regional and international cooperation	Enhanced regional and international collaboration	Improve coordinating mechanism(s) between regional agencies Establish systems for sharing knowledge and resources amongst the agencies Consider establishing a regional coordination post, possibly based in FAO