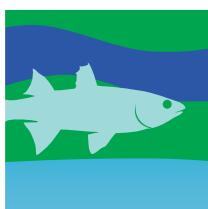
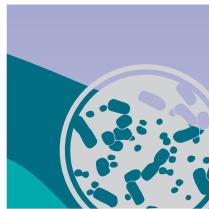
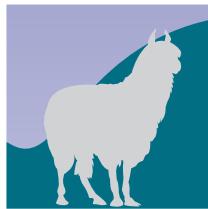

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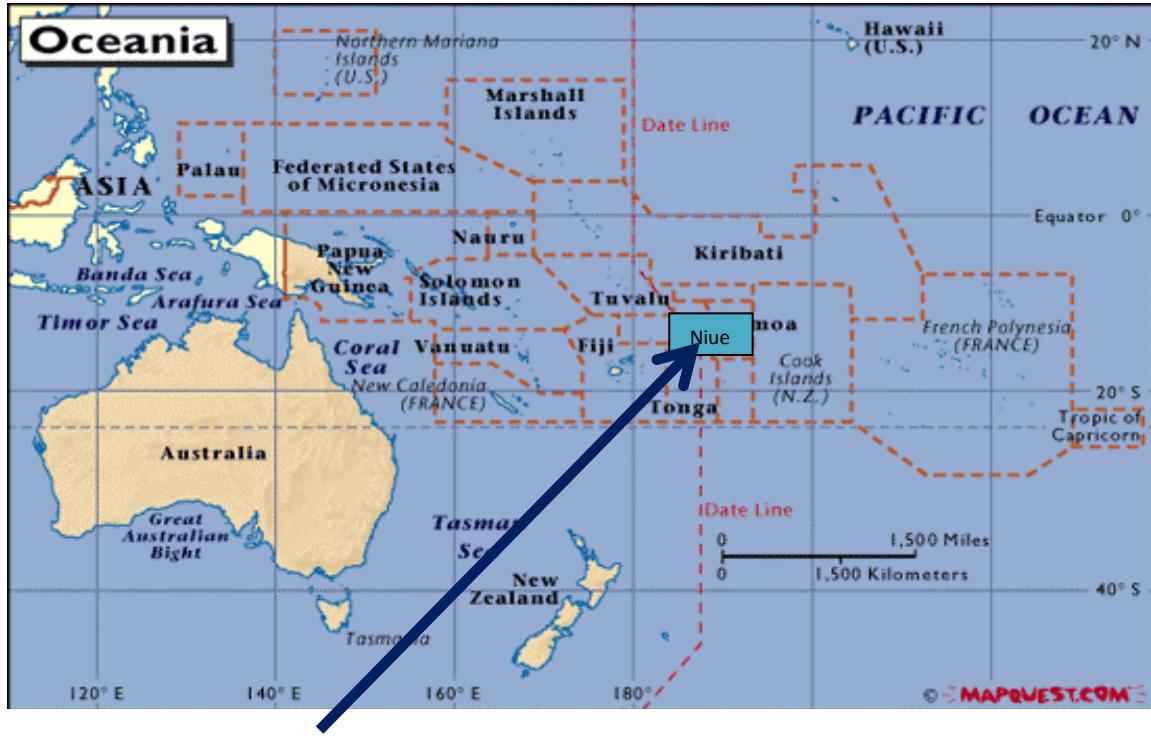
THE STATE OF NIUE'S BIODIVERSITY FOR FOOD AND AGRICULTURE

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1. Assessment and monitoring of biodiversity for food and agriculture

1.1 General context:



Niue is part of Polynesia and is situated in the Southwest Pacific Ocean at latitude 19° South and 169° West. Niue lies approximately 480 km east of Tonga, 930 km west of Rarotonga (Cook Islands), 660km south east of Samoa and 2,400 km north east of Auckland, New Zealand. The total land area of Niue is approximately 260km², with an Exclusive Economic Zone (EEZ) of 39,000km².

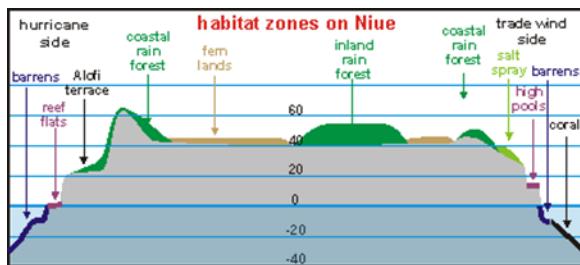
Geomorphology/Topography:

Niue is the world's largest single raised coral atoll, which emerged in stages out of the ocean. Two theories have been proposed regarding the formation of Niue. One theory states that Niue was formed due to forces from internal volcanic activity, because in some areas a thin layer of ash exists that is the cause of locally high radioactivity. The other theory is that the uplifting was due to the buckling of the Pacific tectonic plate prior to its subduction into the Tongan trench, the evidence being Niue's characteristic chasms.

Niue rests on a seamount with the surrounding ocean depths reaching up to 4000m. The island is comprised of three terraces, the lower terrace rim averages 28m above sea level, with the upper terrace rim averaging 69m above sea level. The three distinct terraces imply that Niue was uplifted

out of the ocean in stages.

The centre of the island comprises of a hollow, thought to be the remnants of a lagoon as a result of being raised up out of the ocean in stages.



Source: Ridge-to-Reef Project Document.

Niue's parent rock is coral limestone. Its landscape is rough comprising of jagged coral rocks, boulders and many crevices and holes. The coastline is also rugged and rocky, featuring steep cliffs, caves, chasms and blow holes. There is no surface water on Niue such as streams, lakes or rivers. Rainwater filters through the thin topsoil layer and through cavities in the base rock. A permanent fresh water table is located approximately 50-60m below the rim of the central plateau, evidence of a body of fresh water above sea level. Caves occurring around the island host brackish pools of water whereas caves found in the centre of the island have fresh pools of water. The freshwater lens below the island is the main source of water for domestic use and other uses including agricultural purposes. It is pumped to the surface via a number of artesian bores.

Climate:

Niue lies on the edge of the southern tropical cyclone belt and in the zone of the southeast trade winds. It is subject to strong gale force winds, noticeably through the months of April to October, which is also the season when the country is vulnerable to cyclones. Significant damaging cyclones have occurred on average once every 10 years, the most recent being, cyclone Heta, (5 January 2004) which was a Category 5 cyclone and the worst ever to strike the island with winds of up to 300kph, claiming two lives and causing overwhelming devastation to Niue's biodiversity, forests, agricultural activities and infrastructure.

There are two distinct seasons, a hot wet season from November to March, characterized by high temperatures and humidity, which coincides with the cyclone season. The cooler dry season is from April to October, characterized by warm sunny days, cool nights and strong breezes. Annual average temperature does not fluctuate greatly throughout the year, largely due to the influence of the sea on a small island. However at the height of the wet season mean daily maximum temperature is 30°C (Jan/Feb) with a mean daily minimum of 23 °C. In the dry season (Jul/Aug) the mean daily maximum temperature is 26 °C and a mean daily minimum of 19 °C.

Biodiversity:

Niue has naturally limited occurring flora and fauna due to its geographic location. This has also been advantageous in that there have been a relatively limited number of introduced species to Niue. Three species, classified as vulnerable are the Pacific pigeon, *Ducula pacifica*, fruit bat, *Pteropus tonganus* and the coconut crab *Birgus latro*. Their vulnerability is a result of over harvesting and the effects of climate, such as El Niño weather patterns, and extreme events such as droughts and cyclones. Other invertebrates such as giant clams are also overfished, despite existing regulatory measures.

Summary of Niue's Terrestrial Biodiversity:

Niue has 629 taxa of a variety of vascular species of flora, including an estimated 175 indigenous species. Mature forest consists of a high closed canopy comprised of *Syzygium richii*, *S. inophylloides*, *Dysoxylum forsteri*, *Planchonella torricellensis*, *Pometia pinnata*, and *Macaranga seemanii*. Coastal forest is similar but largely dominated by *Barringtonia asiatica*, salt resistant tree. The secondary canopy is largely made up of *Hibiscus tiliaceus* and *Baccaurea seemanii*. Managed land in fallow periods is comprised of mainly *Hibiscus tiliaceus*, *Morinda citrifolia*, *Macaranga harveyanna*, and if left to fallow for a period of 4-10 years ferns, *Nephrolepis hirsutula* will be present.

The Tongan Flying Fox/peka (*Pteropus tonganus*) is a native land mammal and endangered. It is the only species to pollinate some native trees and so is vital for their survival and the regeneration of the forest via dispersal of fruits/seeds. Unfortunately it is also a local delicacy among many Niueans.

Introduced Land mammals include Polynesian rat, *Rattus exulans* ship rat, *Rattus rattus*, house mouse, *Mus musculus*. Cats, dogs, pigs, chickens and cattle have also been introduced but there are currently no cattle on the Island. Reptiles include 5 species of lizard, 2 geckos and 3 skinks. Vertebrates include 376 Insect species in 15 orders; 4 species of fruit-fly identified: *Bactocera obscura*, *Bactocera passiflorae*, *B. kiriki*, *B. zanthodes*.

There are 31 bird species recorded - 6 seabirds, 10 shorebirds and 15 land birds. There are 2 endemic subspecies: Polynesian triller *Lalage maculosa whitmeei*, Polynesian starling, *Aplonis tabuensis brunnescens*. Land birds also form a crucial link in the regeneration of the native forests through the dispersal of seeds. The feral fowl, *Gallus gallus*, is also present.

There are 8 known species of crabs with Coconut crab, *Birgus latro* the largest and an important traditional food source.

1.1. Role of biodiversity for food and agriculture in your country

Agriculture, fisheries and to some extent forestry are the main sources of local food availability on Niue. A 2009 census found that 87% of households were actively involved in agriculture, 71% kept livestock (pigs and chickens), and 62% engaged in fishing, and 60% hunted for coconut crabs.

Focusing on native biodiversity, Niue has about 19,000 hectares of native forest comprising approximately 70% of the island's land area. The major foods sourced from forests are edible ferns and yams, feral pigs and chickens, land crabs such as the coconut crab *Birgus latro* (uga), Pacific pigeons *Ducula pacifica* (lupe) and Tongan flying foxes or fruit bats *Pteropus tonganus* (peka). The coconut crab is the only land crab that many people still continue to hunt for food, while other species of crab such as the kalahimu and kalavi are taken in smaller numbers.

The estimated population of coconut crabs in the early 90s was about 200,000 and was low considering the amount of habitat available. In 2009, 60% of households (279) engaged in coconut crab hunting with about 12,384 animals caught in the month before the census took place.

Pigeons and flying foxes are two species protected under the Wildlife Act 1972 with hunting with shot guns permitted for a season annually (typically of two months' duration - December and January). Recent surveys of hunters suggest that over 8000 pigeons and 1000-1500 flying foxes are taken annually.

Regarding marine biodiversity, a recent socio-economic assessment carried out in all 14 villages during the 2011 Food Security Assessment and covering 47% of households (218/468) yielded the following results. The average fresh fish consumption (both reef and pelagic fish) was estimated to be 31.1 kg/person/year, which is slightly lower than the regional average (35 kg). Survey data suggested a total annual reef finfish catch of 53.4 tonnes, which meets about 77% of the consumption needs of Niue's total island population. In addition, there was an estimated production of 76.2 tonnes/year from mid-water and trolling fishing, which made the total finfish catch 129.6 tonnes/year. The invertebrate fishing pressure imposed on the total coastal reef-flat area and the 1.9 km² of accessible reef flats was surprisingly high: ~7 and 18.3 tonnes/km²/year respectively. There were no official seafood exports during the assessment, although an estimated 5 tonnes/year of seafood was exported as gifts for relatives overseas. Most fish caught are consumed within the households and only 10% of households report that they provide supplementary income.

Forests and other systems of natural vegetation also provide important ecological services including erosion control, protection from salt spray, soil improvement, flood/runoff control, animal/plant habitats, wind protection, weed/disease control.

A Niue National Forest Inventory carried out in 2008 produced the forest area figures in Table below:

Areas covered by forest in Niue

Forest Type	Area (hectares)
Mature dense forests	5,566
Regenerating medium dense forests	13,191
Other – Littoral (coastal) forests, fenlands and other non-forest land	7,346
Total area of Niue	26,103

The island still has an extensive forest cover: 71.8% of the land area identified as 'mature dense forests' and 'regenerating medium dense forests' during a 2008 National Forest Inventory. Historically there has been a high rate of forest clearance for agricultural purposes, but this has slowed in recent years, increasing the area of secondary forest. Forests provide some local timber for making canoes, furniture and carvings, and a range of non-timber plant products. 26 non-food uses of plants have been identified in Niue, the most widespread being medicinal purposes (68 species), firewood (30 spp.), ornamentals (28 spp.) and spiritual purposes (27 spp.). Of particular significance are the leaves of Pandanus sp. used for weaving.

About 18% of Niue's National Gross Domestic Product (GDP), which increased from NZD17.8 million in 2003 to NZD27 million in 2012, stems from the agriculture, hunting, fishing and forestry sectors (source: Statistics Niue) – i.e. those directly based on biodiversity. Historically, subsistence agriculture was a major means of support, but in recent years there has been some production of

crops for export. In the past three decades there have at times been significant exports of taro (*Colocasia esculenta*), vanilla (Vanilla sp.) and nonu *Morinda citrifolia* — a tree with healing properties in its leaves and fruit.

Natural products made up 76% of total domestic exports in 2012 (nonu 38%, honey 24%, vanilla 6%, taro 5% and coconut 3%) (Source: Statistics Niue). Developing a stable agricultural sector and ensuring continuity of supply for the export market is a challenge, with some crops proving vulnerable to natural disasters such as cyclones, and others dependent for their viability on changeable overseas markets.

Almost all households still depend on agriculture in some way – 422 (91%) of 466 households in a 2009 Agriculture Census. At that time there were around 1125 agricultural plots on Niue of which 813 (72%) held taro, 95 (8.4%) coconut, 68 (6%) yams and 61 (5.4%) vanilla. Most households keep pigs (51% of households) and chickens (55%).

There is currently an increased effort to develop a tourism industry. Visitor numbers have increased to 7,047 in 2013 from 2,706 ten years earlier (source: Statistics Niue) and are projected to reach 10,000 by 2015. Currently a second flight a week is being provided from New Zealand for the period of late May to late October. Tourism can play a significant role in supporting conservation of biodiversity. The attractions that bring people to a destination like Niue, its un-spoilt nature, its green forests and the animals found there, its clear waters and marine life, are biodiversity for food and agriculture components. Ideally tourism that is supportive of biodiversity and the environment should see some of the tourist-generated funds go back into conservation. However it has to be remembered that tourism can also put increased pressure on traditional food sources such as shellfish, coconut crabs, pelagic fish, pigeons and flying foxes that visitors may wish to experience.

Table 1 Production systems present in the country.

Production system	Indicate if present in the country (Y/N)	Description ¹³
Livestock grassland-based systems	NO	
Livestock landless systems	YES	Family based backyard piggeries and poultry systems.
Naturally regenerated forests	YES	Natural regenerated forest areas.
Planted forests	YES	Mahogany and Toona Sp. planted forest areas
Self-recruiting capture fisheries	YES	
Culture-based fisheries	NO	
Fed aquaculture	NO	
Non-fed aquaculture	NO	
Irrigated crops (rice)	NO	
Irrigated crops (other)	YES	Subsistence vegetable garden systems plus two hydroponic systems.
Rain-fed crops	YES	Plantations predominantly consists of the main staple crops such as taro, yams, kumara, banana(plantain) and cassava.
Mixed systems (livestock, crop, forest	NO	

Shifting Cultivation after fallow period	YES	Traditional farming methods is to fallow and to reuse after 5-10 year period.
Organic Certified Cropping Systems	YES	Organic Farming methods, composting and mulching, mainly vanilla production. Certified Organic under BIOGRO New Zealand.
Inshore and Offshore Fisheries Systems	YES	Inshore fisheries mainly reef gleaming, reef fishing including harvesting of molluscs and crustaceans. Offshore fisheries involves tuna and other pelagic fisheries.

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

Main Drivers for Change affecting Animal Genetic Resources (AnGr):

- **Climate Change & Natural Disasters:** Introduced exotic pig breeds do not perform as well as local breeds under climate change pressures. Local breeds can be hard to find as they are mainly regarded as feral breeds and are targeted as pests to be eliminated. Extreme events such as cyclones puts pressure on AnGr resources especially coastal areas on the western side of the island which are vulnerable to high winds and wave damages.
- **In-breeding problems amongst small farming communities** – Because of the small based nature of farms and limited genepool of the animal population, the uncontrolled breeding takes place. The on-going problem with in-breeding is common. The DAFF livestock division of Niue Government usually imports new pure bred pig breeds every 10 years from New Zealand to improve and enhance local gene pool.
- **Economic and Market Related Factors:** Cost of production is high due to the high costs of imported agricultural inputs such as livestock medicine and animal pelleted feed. Locally processed meat is also high in price and not easily accessible, leaving most consumers to rely heavily on imported meat.
- **Limited Human Animal Health Resource Capacity:** There is no qualified Vet on the island to assist with animal health matters. Farmers rely heavily on Livestock Officers and local Paravets to assist with animal health treatments and management.
- **Pests and Diseases:** With the lack of Qualified Vets, there are limited diagnostic capabilities to treat and detect certain animal pests and diseases.
- **Overexploitation and overharvesting:** The overharvesting of some important local species as a local delicacy is a threat to coconut crab (*Birgus latro*), wild pigeons and flying foxes .
- **Invasive Species:** Rats (*Rattus rattus* and *R. exulans*) and feral cats (*Felis catus*) are implicated in declines of birds and lizards and feral pigs (*Sus scrofa*) impact on forest condition and on coconut crabs. Yellow crazy ants (*Anoplolepis gracilipes*) are potentially a growing threat to land crabs including the coconut crab.
- **Lack of Enforcement Measures:** General lack of enforcement by authorities to prosecute those who are hunting out of season, and continue to leave pigs outside pens to roam around contributing further to the feral pig problem.

- **Land Tenure Systems and IPR:** All Niuean families own land and people can take advantage of what is growing on their land which can lead to overuse or misuse of certain resources.
- **Lack of Conservation Measures or Policies:** With the lack of conservation measures and policies in place, many resource-users will continue to take advantage and often mismanagement of available resources.

Main Drivers for Change affecting Plant Genetic Resources(PGR):

- **Climate Change and Natural Disasters:** Cyclone Heta in 2004 devastated a lot of plant genetic resources. Niue is located in vulnerable zone for natural hazards and thus vulnerable to the impacts of climate variability and climate induced disasters. 'Dry' season and drought conditions seems to be more severe as experienced in long dry spells in 2012 and 2015(El-Nino conditions) which affected a lot of rain-fed dryland farming systems and staple crops.
- **Invasive Species:** Niue has recently developed a National Invasive Species Strategy and Action Plan (NISSAP) which identifies that invasive plants, invertebrates and mammals threatens terrestrial biodiversity. The eight main weed species currently targeted for eradication or control because of being a threat to other plant species are: Singapore daisy (*Wedelia trilobata*), chain of hearts (*Antigonon leptopus*), Honolulu rose (*Clerodendrum chinense*), giant sensitive plant (*Mimosa diplosticha =invisa*), *Scindapsis aureus*, *Merremia peltata*, *Mikania macrantha* and bronzed-leaved Clerodendrum (*Clerodendrum quadriloculare*).
- **Aging Farmers and lack of Youth Involvement:** The lack of interest from youth in farming is of concern bearing in mind the low population of the country and the number of farmers who are old.
- **High Cost of Production:** A lot of agriculture inputs are imported from overseas such as fertilizers, herbicides, insecticides including fuel, therefore the cost of production is very high which results in a high cost for local produce. This high cost makes competing with overseas suppliers of taro, for example, very hard. It is increasingly recognized that most farmers are not happy with the buying price of agricultural inputs for both local and export markets. These factors limit any opportunity to scale up production for commercial purposes.
- **Limited Production with Low Population:** The small population is an on-going challenge. It is a constraint to ensuring that production from the agriculture sector meets market demand, both locally (growing tourism sector) and overseas.
- **Market Driven and Preference:** With market preference of certain taro crop species in the past for export, most farmers tend to concentrate growing only several varieties that are fast to mature, better taste and size, leaving out other species which are therefore threatened with erosion.
- **Limited Agro-Processing Facilities:** There is limited capacity for agro-processing and value adding of agricultural products on Niue.

Main Drivers for Change affecting Forestry Genetic Resources (FGr):

- **Limited Research on potential forestry products:** There is potential to further explore forestry products from the forestry sector in Niue especially with value added timber and non-timber forest products. Limited human capacity is a constraint to the necessary research work.
- **Lack in Human Resource Capacity:** There is a general lack of interest from the youth in this area of forestry – exacerbated by the overall low population of the country.

- **Invasive Species:** The Giant Taro Leaf Vine *Epipremnum pinnatum* (=*Scindapsus aureus*) has recently increased in distribution since Cyclone Heta (2004) and is now potentially a more significant threat to forest areas. This parasite vine –weed has the potential to smother and suffocate growth of standing trees in forested areas (as seen in western coastal forested areas) which causes the trees to die as a result. The Merremia (fue vao)*Merremia peltata* is another widespread vine of similar effect to that of the giant taro leaf vine, considered to be a native species, which can smother large areas of forest trees.
- **Climate Change and Natural Disasters:** The forests continue to recover from the devastation caused by Cyclone Heta in January 2004. The storm caused widespread defoliation and the uprooting of 5-30% of trees generally and up to 50% of those exposed on the edges of cleared areas and contributed to the spread of invasive species.
- **Forest Clearing for Agriculture Development:** The estimated forest cover in Niue has been estimated to decline from 90% (1950s) to 70% (2008) due to high level of clearing for agriculture development in the mid 80's to the early 90's.
- **Overexploitation of Forest Products:** There is no logging currently taking place, however the overharvesting of other species like the coconut crabs, local pigeons and flying foxes in the forest is a threat, also the increasing growth of tourism sector with more eco-tourism related activities.
- **Uncontrolled Fire Hazards:** The uncontrolled forest fires are a threat to biodiversity because of the limited capacity from the search and rescue fire service to control these fires. It is a challenge to even get to these forest fires with the lack of access roads.
- **Uncoordinated Developments:** The increasing tourism sector and private sector businesses particularly with regards to infrastructure development and public utilities may lead to removal of forest.
- **Land Tenure Systems:** Land owners seem to have the right of access to all forestry resources which often results in mismanagement and overuse of resources. There is increasing pressure to title land and change demographics.
- **Lack of education and awareness:** Lack of awareness on values, multiple roles and functions of forest resources does not help in preventing unnecessary clearing.

Main Drivers for Change affecting Marine/Aquatic Genetic Resources(MGr):

- **Climate Change and Natural Disasters:** Cyclone Heta widely devastated the island's north to northwest exposed coastlines. In areas of highest impact a corridor 20-50m from the cliff edge was de-vegetated and soil washed away to leave barren rock. Several significant areas of cliff collapsed into the sea. Checks by divers soon after the cyclone revealed that little coral remained along the entire coast from Hikutavake to Halalgigie Point past Alofi, but damage was much reduced from there to Tamakautoga and then devastation continued round to Tepa Point. The sheltered bay of Tamakautoga had the highest coral cover (40%) during a 2005 survey. Overall coral cover was significantly reduced except for a few sheltered areas in the west and southwest and eliminated down to bedrock in places.

Surveys in Alofi North and Makefu in March 2004 recorded 'high to severe' damage with major reduction in coral cover recorded on the reef slope in the most exposed locations. There was also proliferation and dominance of a single macro-algal species (*Liagora* sp.) in most slope and reef-flat pools, as well as extensive expansion of turf algae and blue-green algae mats in both reef-flat and slope habitats. Coral recovery is evident but ten years after Heta it has still not returned to the extent observed before the cyclone and significant areas that held corals in the past are still covered in green algae. There are widely varied estimates

for how long it takes for the worst affected reefs to recover from damaging cyclones from 20 to 100 years.

- **Cultural Values:** Cultural values are still very strong amongst Niuean families for fishing areas and ownership. Whenever a family member passes away especially if higher up in status who is also a fisherman, they usually put a temporary ban on fishing grounds or fishing areas of usually 6-12months or even longer. The length of time depends on the family of how long they would agree to have this temporary ban in place to mark the passing away of that family member.
 - **Limited Capacity to monitor illegal fishing in Territorial Waters:** Niue has limited capacity to monitor illegal fishing or poachers entering Niue's EEZ or territorial waters. The Fisheries Division does not have the capacity or even a Patrol Boat to be able to monitor illegal fishing in our waters. The Royal New Zealand Air Force usually assists in this area during their calibration flights that covers Niue's territorial waters on a frequent basis.
 - **Waste Water Pollution:** Households on the coastal areas on the western side of the island still have unsealed human waste septic tanks which have the potential for waste water leakage into coastal marine areas.
- b) There is no national information system in Niue relating to biodiversity for food and agriculture. Various surveys are done to record population trends in target species.

Terrestrial species

Updated information has been provided through bird, flying fox and reptile surveys carried out in September 2012 using the same techniques as earlier surveys. These showed that the two hunted species, Pacific pigeon (*lupe*) and Tongan flying fox (*peka*), had recovered in numbers from the very low points in 2004 following Cyclone Heta. A 3-year ban on hunting and the recovery of the forest were thought to be the key factors responsible for this recovery. However estimates of current harvest rates suggest that the recovery is not sustainable. Two threatened species the blue-crowned lory (*Vini australis*) (*hega*) and the olive small-scaled skink (*Emoia lawesii*) were not detected during the two-week survey and are considered at real risk of local extinction though occasional reports of sightings are still received. Cabinet usually put a temporary ban on shooting seasons for local pigeons and flying foxes(fruit bats) during a long dry spell or drought conditions and also immediately after a major cyclone.

The bird counts showed a gradual decline in one of the most common species, the Polynesian triller (*Lalage maculosa*) (*miti*), from 1994 to 2012. It is a cavity nester and possibly being impacted by the introduced ship rat (*Rattus rattus*). There is also an indication that the white-rumped swiftlet (*Aerodramus spodiopygius*) (*pekapeka*) may have declined though it is more difficult to census reliably.

Coconut crabs are included in this section despite key parts of their lifecycle occurring at sea - they are hunted on land and this is likely to be the key factor affecting their numbers. During the Agriculture Census of 2009, 279 households (60%) were identified as engaged in uga hunting with about 12,384 crabs caught during the month before the census took place, an average of 44 per household per month (Statistics Niue 2009). Hunters today have identified that the size of crabs caught is declining with fewer very large animals which suggests that the population as a whole may not be in such a healthy state.

Marine species

Regarding any changes in inshore fish populations, the Namoui marine protected area near Makefu and a control site, Avatele, have been surveyed 3 times in November 1998, February 2004 and in May/June 2005 although data are poorly replicated because they were collected at different seasons for different reasons. Fish biodiversity, density and biomass were similar in each survey suggesting that the poor quality of Niuean reef fish resources was largely structural, with only limited negative effects from Cyclone Heta. The same variables were consistently higher at the control site, showing that protected status had not increased the finfish resource in Namoui over a period of seven years. This suggests that: 1) the cyclone erased the benefits, if any, of the protection status, and/or 2) protection was not fully enforced, and/or 3) fishing pressure was so low on Niuean reef fish that protection had no effect on the resource and/or 4) the Namoui MPA is too small to generate any measurable effect on the resource.

Invertebrates that are taken for food were surveyed in 2005. Densities of giant clams had fallen dramatically since the early and late 1990s and one species *Tridacna squamosa* is now at very low densities and over-fishing is considered the likely cause. Densities of sea cucumbers, of which six commercial species are present, had significantly reduced in 2005 compared to before Cyclone Heta and earlier surveys in the 1990s. The dinoflagellates *Gambierdiscus* spp. has shown periodic or local increases in numbers leading to cases of ciguatera fish poisoning. Surveys in 2002 showed a particular problem around the Alofi wharf area. There is no information on changes in the numbers of pelagic fish species and the local joint venture fishing in Niuean waters ceased operations in 2010

- c) List associated biodiversity species that are actively managed in production systems for the provision of ecosystem services in Table 2
- d) Table 2. List of associated biodiversity species that are actively managed in production systems for the provision of ecosystem services.¹

Associated biodiversity species	Ecosystem functions and services provided by the species in the production system
Honey Bees(<i>Apis mellifera</i>)	<p>Honey bees play a very important role in Niue's biodiversity in terrestrial ecosystems especially as pollinators to many agricultural crops, ferns/shrub lands and tropical rainforests.</p> <p>The Niue Honey Company (New Zealand Ltd) is the only beekeeping operation on Niue and currently owns and maintains an estimated 1500 hives in 30 apiaries. The annual honey crop is expected to be 15-20 tonnes per year, most of which is exported to New Zealand for packing and onwards export to other countries. A small but growing quantity of honey is being marketed locally in Niue, especially to tourists.</p> <p>All hives on Niue are currently owned by the Niue Honey Company New Zealand Ltd who also state that they own any feral or wild hives by virtue of the fact that feral colonies will have emanated from their managed hives.</p>
<i>Mucuna Sp. Legume Cover Crop</i>	<p>Introduced legume plant by the Department of Agriculture, Forestry and Fisheries as a cover crop under the soil rejuvenation and rehabilitation program. A very important cover crop and the main functions are to protect the soil from erosion and enrich the organic matter; the latter improves the soil structure leading to better aeration, infiltration and retention of moisture.</p> <p>The cover plants also minimise leaching losses of nutrients and reduce competition from noxious weeds. More importantly is that this legume cover crop fix nitrogen and make it available to the main crop.</p> <p>A group of farmers are currently growing this cover crop in their farming areas.</p>

e) [Insert rows as needed]

- d) Provide in Table 3 a list of wild food species known to be harvested, hunted, captured or gathered for food in your country. Indicate the change in state of the species over the last 10 years (strongly increasing (2), increasing (1), stable (0), decreasing (-1), or strongly decreasing (-2), or not known (NK)).

¹ Reference: question 27 of country report guidelines.

Table 3 Wild food species used for food in the country.²

Wild food species	Change in state (2,1,0,-1,-2, NK)
Arrowroot (<i>Tacca sp.</i>)	(0)
Wild Yams(ufilei,pilita) (<i>Dioscorea spp.</i>)	(-1)
Edible Fern- <i>Asplenium nidus</i> (luku)	(0)
Breadfruit (<i>Artocarpus altilis</i>)	(0)
Coconuts - <i>Cocos nucifera</i>	(0)
Cordyline, green leaf (<i>Cordyline fruticosa</i>)(ti -gau)	(0)
Pulaka, <i>Cyrtosperma merkusii</i>	(-1)
Giant taro (<i>Alocasia macrorhiza</i>) (cape)	(-1)
Pacific Litchii [Tava] (<i>Pometia pinnata</i>)	(0)
Tropical Almond [Selie] (<i>Terminalia catappa</i>)	(0)
Fig <i>Ficus scabra</i> Forst.f(mati)	(0)
Kolivao- <i>Syzygium richii</i>	(1)
Nonu - Indian Mulberry (<i>Morinda citrifolia</i>)	(1)
Red Bead Tree,(pomea) Red Sandalwood(<i>Adenanthera pavonina</i>)	(0)
Animal/Birds:	
Feral Pigs (<i>Sus scrofa</i>)	(-1)
Feral chickens(fowls)	(0)
Fruit Bat(peka) (<i>Pteropus vampyrus</i>)	(-1)
Wild Pigeon(lupe) (<i>Ducula pacifica</i>)	(0)
Coconut crabs(<i>Birgus latro</i>)	(0)
Land crab(<i>Cardisoma carnifex</i>)	(0)
Honey(<i>Apis mellifera</i>)	(0)
Fish/Molluscs/Marine Sp.	
Tuna(<i>Thunnus albacares</i>),(<i>Katsuwonus pelamis</i>),(<i>Thunnus alalunga</i>)(<i>Gymnosarda unicolor</i>)vahakula,takua,vahaleleva,valu)	-1
Wahoo(<i>Acanthocybium solandri</i>)(paala)	-1
Marlin(<i>Tetrapturus audax</i>)(haku)	-1
Baracuda(<i>Sphyraena barracuda</i>)(utu)	-1
Flying Fish(<i>Cheilopogon unicolor</i>)(hahave)	-1
Mackerel (<i>Decapterus macarellus</i>)(ulihega)	0

² Reference: question 34 of country report guidelines.

Parrot Fish(<i>Chlorurus microrhinos</i>)(monega)	0
Mahimahi(<i>Coryphaena hippurus</i>)	-1
Jobfish(<i>Aphareus reticulatus</i>)(Palu Gu)	0
Lyretail yellow edged(<i>Variola louti</i>)(malau)	0
Blotcheye soldierfish(<i>Myripristis bendti</i>)(telekihi)	0
Balck jack(<i>Caranx lugubris</i>)(tafauli)	0
Brassy Chub(<i>Kyphosus vaigiensis</i>)(Nue)	
Honeycomb grouper(<i>Epinephelus merra</i> (Gatala))	0
Stocky Hawkfish(<i>Cirrhitus pinnulatus</i>)(ulutuki)	0
Lobsters(<i>Panulirus penicillatus</i>) etc.	-1
Octopus (<i>Octopus Cyanea</i>)	-1
Mottled Sally lightfoot crab(kamakama) (<i>Grapsus albolineatus</i>)	-1
Silvermouth turban(alili) <i>Turbo argyrostomus</i>	0
Ugako -Snake Like Worm (shell) <i>(Serpulopis colubrinus)</i>	0
Seaweed(Limu) Toothed stolon (Caulerpa cupresoides) Coarse seagrape(<i>Caulerpa racemosa</i>)	-1
Sea Urchin(<i>Echinostrephus sp.</i>)(vana)	0
Limpets(Matapihu) <i>Patella flexuosa</i>	-1
Sea Cucumber(Loli) (<i>Holothuria atra</i>)	0

- e) If available, provide information on the proportion of the population in your country that uses wild food on a regular basis for food and nutrition.

There is no accurate data regarding the proportion of the population that use wild food on a regular basis for food and nutrition but the 2009 Agricultural census found that 60% of households hunted for coconut crabs and 62% engaged in fishing. Taking into account other wild foods not accounted for in the census it is likely that about 70% of the population use wild food on a regular basis for food and nutrition.

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

Main threats to biodiversity for food and agriculture in Niue

Invasive species

Niue has recently developed a National Invasive Species Strategy and Action Plan (NISSAP) that identifies the invasive plants, invertebrates and mammals that threaten terrestrial biodiversity. There is no information on marine invasive species and surveys being done. The indigenous crown of

thorns starfish (*Acanthaster planci*) is monitored to obtain warning of any eruption of numbers, but there have been no such issues in recent years. Small numbers of starfish are occasionally removed from dive sites. Rats (*Rattus rattus* and *R. exulans*) and feral cats (*Felis catus*) are implicated in declines of birds and lizards. Feral pigs (*Sus scrofa*) damage 20% of agricultural plantations, according to the 2011 census and negatively impact on forest condition and on coconut crabs. Yellow crazy ants (*Anoplolepis gracilipes*) are potentially a growing threat to land crabs including the coconut crab, to judge by their impacts on red crabs (*Gecarcoidea natalis*) on Christmas Island.

There are 8 main weed species currently targeted for eradication or control: Singapore daisy (*Wedelia trilobata*) Chain of hearts (*Antigonon leptopus*), Honolulu rose (*Clerodendrum chinense*), Giant sensitive plant (*Mimosa diplosticha=invisa*), Aureus (*Epiptremnum pinnatum*), *Merremia peltata*, *Mikania macrantha* and Bronzed-leaved clerodendrum (*Clerodendrum quadriloculare*).

In certain weather conditions, Niue experiences occasional population explosions of introduced mealy bugs and associated honeydew-feeding ants, which lead to infestations of a black sooty mould fungus that is damaging for many plants, particularly citrus trees. An intensive spraying program is required to control it.

Loss or deterioration of habitat

Reduced population pressure for further agriculture development and the lack of a taro export scheme have apparently reduced the rates of forest clearance. However, a current push to develop tourism and construct more facilities on the coast may have minor impact on areas of littoral forest. Forest condition continues to improve from Cyclone Heta in 2004, with the exception of some areas that have been opened up to greater infestation by climbing invasive weeds such as *Merremia peltata* and *Epiptremnum pinnatum*.

Natural disasters and climate change

The last major devastating storm was Cyclone Heta in 2004, but Niue has a history of occasional major cyclones over a 10 year cycle, the one previous to that being Cyclone Ofa in 1990. There is a pronounced “dry” season and rainfall is typically reduced in El Niño episodes leading to noticeable droughts in both 2012 and 2014.

SPC (2008a) reviewed the possible impacts of climate change on Niue and the region’s pelagic fisheries. There are likely to be distributional changes in the tuna fishery as these fish typically adapt to variation in climatic conditions by moving to find their preferred sea temperature range. Climate change may lead to more permanent El Niño conditions which mean increased fluctuations in fish numbers and distribution. Relative warming could reduce the strength of the water up-welling system in the central equatorial pacific where Niue is located, which in turn may reduce fish productivity.

Over-exploitation

Current harvest rates for the Pacific pigeon (lupe) and the Tongan flying fox (peka) have been assessed as unsustainable and enforcement of hunting regulations has been recommended to address this. The hunting season is defined on an annual basis and the most recent one ran for three months (November 2014 – January 2014), a month longer than usual, with similar numbers of registered shotguns (c.400) and ammunition allocations (100 rounds/gun) as previous years. Hunting out of season is regularly reported so the pressure on these species has not reduced.

There is evidence that the size of coconut crabs harvested is declining suggesting that these may also be over-harvested and restricting exports is one possible response. Giant clams have also declined in numbers and over-harvesting is implicated.

The increased cash value placed on fish (\$15-\$20/kg for wahoo and tuna) and shellfish (a “margarine” punnet of tubeworms that used to fetch \$20 a few years ago is now \$60), potentially adds to pressure on some stocks. There is high localised pressure when villages have fishing days ahead of their show days, and large numbers of canoes compete for catch over relatively small areas.

Pollution

Small scale impacts are associated with waste dumps, coastal run-off, and the use of pesticides. Seepage from septic tanks is a concern particularly in coastal areas. The 2011 national census identified that 78% of households had fully enclosed septic tank systems (concrete all round), but 16% had bottomless tanks (concrete sides and roof) and 10% no tanks at all, with sewage going into natural holes. The latter two are clearly a threat to underground water resources and in places to coastal ecosystems.

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.

Niue's National Invasive Species Strategy and Action Plan 2013-2020: invasive species threaten the native biodiversity, agricultural production and human wellbeing and this Strategy addresses the control or eradication of the worst of these. Rodents (two species of rats and mice) and feral cats are likely to threaten the extinction of native birds (e.g. the hega or blue-crowned lory) and reptiles (e.g. the olive small-scaled skink) as well as impacting on forest growth and human health. Feral pigs damage forests and plantations and feed on native invertebrates. Several pest plants, or weeds, threaten native plants and forest quality and impact on the agricultural sector requiring the extensive use of herbicides. Invasive yellow crazy ants threaten native invertebrates including the uga or coconut crab. Insect pests affecting food crops include four fruit flies that have some economic impact through restricting export of fruit. No detailed surveys have been undertaken for marine invasive species. In 2004 the IUCN produced an updated publication of a selection of ‘100 of the World’s Worst Invasive Species’. Niue already has at least 11 of the species on this list so has plenty of work to do to manage these, and Niue must maintain strong border control systems to avoid more invasive species entering the Island.

Niue Island Organic Farming Association is promoting the Organic Farming Principles at the national level. Part of their mandate includes promoting Organic composting techniques which are widely implemented with farmers, and to lessen the use of chemical fertilizers which is a threat to the underground water lens, which is the island’s main source of drinking water. Another initiative under this program is to continue seeking for alternative organic based herbicides for paraquat. Most farmers rely heavily on this chemical herbicide because of its effectiveness on weed control. Paraquat is banned and is being phased out in other parts of the world and is a threat to beneficial microorganisms in the soil responsible for building up of organic matter. It is also a threat to the underground water source if use in large quantities is continued over time. With Niue’s very porous

soil structure, it is likely for these types of chemicals to seep through to the underground water lens with the aid of heavy rainfall at times.

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. Niue is at a significant disadvantage with regards data collection and monitoring because of the size of the population but strong linkages with New Zealand should be able to help the country come to a practical and realistic solution.

Better collaboration between agencies at the national level, possibly through a BFA committee.

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.

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, better management of harvesting is needed which could be achieved through improved awareness and education, though close monitoring and enforcement of any bans and limits is likely to be needed as well.

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

2.1 Sustainable use

Table 4 Management³ and diversity based⁴ practices that support the maintenance and use of biodiversity for food and agriculture in production systems.

Production system	Management/ diversity based practice ⁵	Trends in the application of the practice over the past ten years
Sustainable Land Management Practices	<p>The long term goal of this initiative is the sustainable management of Niue's unique natural terrestrial resources while at the same time promoting sustainable productive systems contributing to the social well-being of its present and future generations.</p> <p>Project objective is to build capacity for sustainable land management via a targeted practical participatory "bottom up" approach. Capacities for SLM are built in appropriate governmental departments, civil society and community groups, resource users and mainstreamed into government planning and strategy development. This is also linked to the Niue Island Organic Farmers Association through the large scale composting unit that was developed. The initiative had two pronged approach, firstly in theory and Capacity Building Training:</p> <p>"Enhance capacities for economic and financial sustainability of the agricultural, agro-forestry and forest use systems of Niue by providing practical training to build capacity for sustainable land management." Secondly on the practical side by developing a demonstration farm that incorporates organic farming principles with the engagement of the community.</p>	More people are aware of the need for sustainable land management practices. Farm Project site handed back to Village Council and Community.
Niue Island Organic Farming Principles with NIOFA.	Organic Farming, Niue Island Organic Farming Association (NIOFA) is a legally recognized organization which exists to promote and drive the principles and practices of organic farming in Niue. NZAid initially funded the project titled "Niue Organic Farming Project" with the objective of promoting organic farming techniques, methods and their underlying	Organic farming principles are adopted by almost half of the population of Niue.

³ Annex 5 of the country report guidelines describes a list of management practices supporting the use and conservation of biodiversity for food and agriculture.

⁴ 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.

⁵ Reference: questions 52, 53 and 56 of country report guidelines.

	benefits; establishment of a register of farmers who adopt organic farming methods and under the New Zealand Biogro-Organic Farming Certification membership and registration. Most of these growers are vanilla (<i>Vanilla Tahitensis</i>) farmers.	
(DSAP) Development of Sustainable Agriculture in the Pacific Program	The Project “Development of Sustainable Agriculture in the Pacific (DSAP) funded by the European Union and implemented by the Secretariat of the South Pacific was a 4-year regional project initiated in 2004. The main objectives of the project were to support the development of national capacities in agriculture extension, promotion of sustainable agriculture development, improved food security and livelihoods of target farm families and is in line with the UNCCD thematic programmes; agro-forestry and soil and biological diversity conservation; and local development initiatives.	Some farmers continue to adopt the principles promoted by DSAP but the percentage is quite low.
FAO Food Security Project for small holder piggery and poultry farms in Communities.	Both the Smallholder Pig Farming and Poultry Production projects that were implemented back in 2007 are jointly funded by the FAO and Italy through the FAO Regional Programs on Food Security. The projects interlinked with the Young Farmers Project, NIOFA and that of the DSAP project, with regard to import substitution, sustainability, provision of manure for composting/ nutrient recycling and the empowerment of the community for additional income generation.	The trend is steady and will continue to grow with high demand of locally grown meat produce.

Box 2: Describe a successful programme or project that has been undertaken in the country to support one of the practices listed in Table 4

The Niue Organic Farming Organization National Program:

SPC is working with Niue to further develop organic agriculture through the IFAD funded Capacity-Building for Resilient Agriculture in the Pacific. This project is implemented by the Pacific Organic and Ethical Trade Community, or POETCom which is housed in SPC Suva, Fiji.

(a)Types of activities were supported: The project is designed to work directly with civil society institutions, in this case Niue Island Organic Farmers Association (NIOFA), with the expectation that creating capacity amongst producers through producer organizations is likely to lead to long term sustainable benefits. The project works closely with the Department of Agriculture, Forestry & Fisheries who also contribute human resources towards project implementation. Young people are a particular focus so that equipped with skills and knowledge of better organic farming practices young people can earn an income for themselves and their families and do so in a way that is resilient and beneficial for the environment. Building the capacity of producer organizations,

developing mentoring systems with experienced farmers, farmer field schools and developing value chains to local markets are key strategies being used.

(b) Areas and numbers of farmers (pastoralists, forest dwellers and fisher folk) involved: While this project is focused on production systems, Niue has had a long commitment to developing organic agriculture with NIOFA being a founding member of POETCom. Niue is also an illustration of the potential value of organic certification to our economies in the Pacific. Niue has 3 agricultural exports – honey, noni and vanilla. All of which are organically certified opening niche market opportunities which otherwise would not exist. There are approximately over 50 vanilla growers registered under NIOFA Organic Certification with BIOGRO New Zealand. The Niue noni farm registered under this certification process covers an area of approximately 60 hectares and aims to increase to 120 hectares with juice production currently at around 100,000L per month. There are approximately over 1500 bee hives on Island under Organic Certification.

(c) State and outcome with respect to the components of biodiversity

The main component of BFA that will benefit from this organic initiative will be the soil micro-organisms and ecosystem. Currently the Department of Agriculture, Forestry and Fisheries is supporting capacity building and certification for Niue Island Organic Farmers Association (NIOFA). With the soil condition of Niue, it will be vital that support services promote the use of organic practises such as composting, to improve organic composition of the soil building on Sustainable Land Management (SLM) principles. Priority areas and likely outcomes include:

- Improving soil fertility through promotion and utilization of organic methods
- Establish an organic waste collection program
- Compost development modelling approach to compost production using organic wastes.
- Finalize and implement Niue Island Organic Policy

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.

Activities such as the annual yam festival and thanksgiving food festival encourage crop and variety diversification which in turn enhances food and nutritional security. For the yam festival families are encouraged to grow these crops especially for this annual festival.

Nearly all Niue families are involved in the thanksgiving food festival and grow crops specifically for this event. Over the years it has expanded to involve a lot of crops such as bananas, vegetables, other root crops, fruit trees and marine species as well. Families usually donate their best crops and other food stuff for their village pastor during this thanksgiving ceremony where the pastor in the end will distribute all these food to all the people of the village in equal proportions. The ongoing of this traditional practice encourages local people to grow more local food for conservation purposes that contribute to healthy nutritional and food security benefits.

The FAO assistance for a small food product development and processing unit(Test Kitchen) encourages production of local foods to replace expensive and nutritionally-poor imported foods.

Several local entrepreneurs have since taken the opportunity to process products through the newly established unit, including frozen Takihi (a local delicacy), ice-cream, vanilla extract, papaya jam, fruits in syrup, a range of pickles and local staple chips.

Tamakautoga and Vaiea Vegetable Garden Projects, funded by FAO, are initiatives to demonstrate how families can work together in terms of supplying vegetables for home consumption and also it can be used in the near future as an avenue for families in the community to earn income through the selling of their produce.

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

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 ⁶	<ul style="list-style-type: none"> • Completed a National Climate Change Policy and drafted a Joint National Action Plan for Disaster Risk Management and Climate Change • The conservation of local breeds of chickens and pigs under the FAO AnGr Program as they adapt and suit well to climate change conditions.
Use of BFA to manage the spread of/control invasive alien species ⁷	<ul style="list-style-type: none"> • Biological control for the invasive weed species (<i>Mimosa diplosticha</i>=<i>invisa</i>) with the use of <i>Heteropsylla spinulosa</i> (Homoptera:Psyllidae), a Non-indigenous Insect for Control of Giant Sensitive Plant, <i>Mimosa diplosticha</i> (<i>Mimosaceae</i>) was introduced in the past.
Use of BFA to prevent natural or human-made disasters and/or reduce their effects on livelihoods, food security and nutrition ⁸	<ul style="list-style-type: none"> • The root crops in the past has played an important role in an event of natural disasters such as cyclones as they are less affected by strong winds. Farmers are advised to grow more root crops during cyclone seasons as a means for food security.

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.

Niue is currently involved with the Project titled “Application of Ridge to Reef Concept for Biodiversity Conservation and for the Enhancement of Ecosystem Services and Cultural Heritage in Niue”

This project will enhance Niue’s capacity to effectively create and manage protected areas for biodiversity conservation, sustainable use of natural resources, and safeguarding of ecosystem

⁶ Reference: question 69 of country report guidelines.

⁷ Reference: question 46 of country report guidelines.

⁸ Reference: question 43 of country report guidelines.

services. It focuses on the expansion of its protected estate on land and on its marine areas through a combination of community conservation areas and government-led protected areas. In Community Conservation Areas, both strict protection and sustainable use zones will be identified and planned carefully, using innovative protection tools recognizing that tenure over most land areas is vested in local communities.

This project has been designed to engineer a paradigm shift in the management of terrestrial, coastal and marine protected sites from a site-centric approach to a holistic “ridge to reef” comprehensive approach. Through this approach, activities in the immediate production landscapes adjacent to marine and terrestrial protected areas will be managed to reduce threats to biodiversity and ecosystem services stemming from key production activities (e.g. tourism and agriculture).

Additionally, the project also introduces the concept of connectivity between landscape and seascape in Niue. Terrestrial protected areas will include a landscape that links strictly protected community areas (*tapu*) to each other to enhance their integrity and to form a functional ecological corridor between them.

The four Pacific Island Countries of Niue, Fiji, Samoa, Vanuatu account for about 70 percent of the land area of the Polynesia-Micronesia biodiversity hotspot, where species endemism is particularly high and one-third to one-half of species are currently threatened with extinction. However, despite this globally significant biodiversity, conservation — whether in formally protected areas or the wider production landscape — needs to be developed. Weaknesses are due to a number of reasons, all of which the GEF-funded Forestry and Protected Area Management in Fiji, Samoa, Vanuatu and Niue project seeks to overcome, including resistance to change in local communities, inadequate coordination among stakeholders, lack of capacity (including resources), and a lack of experience in adopting community-based approaches to conservation. The need to revise and update related policy and legal frameworks is also being addressed.

The project’s objective is to enhance the sustainable livelihoods of local communities living in and around protected areas in the four Pacific Island Countries concerned. Overall, the aim is to strengthen biodiversity conservation and reduce forest and land degradation. Global benefits from the project will include increased representation of important ecosystems in the protected area networks in these countries, enhanced biodiversity conservation in production landscapes (through mainstreaming and marketing of biodiversity goods and services), increased financial sustainability for protected area management and reductions in the barriers to sustainable forest and land management.

The establishment of a Marine Protected Area at Beveridge Reef also satisfies the integrated and holistic approach promoted by the project by recognizing the link that is thought to exist between the Reef and mainland Niue through which the former serves as a source of recruitment for clams and other marine species that make up Niue’s coral reefs.

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

- **Annual Yam Festival:** All 13 villages around Niue observe this yam (*Dioscorea spp.*) root crop festival on an annual basis. Farmers and families are encouraged to grow these root crops especially for this annual festival. This is a traditional practice that will continue to take place and will contribute to the conservation of the yam species and also food security.
- **Thanksgiving Food Festival:** This thanksgiving festival is a Religious ceremony in which nearly all Niue families are involved. Families usually grow crops specifically for this event. Taro (*Colocasia esculenta*) is the main crop that is involved but over the years it has expanded to involving a lot of other crops such as bananas, vegetables, other root crops, fruit trees and marine species as well. Families usually donate their best crops and other food stuff for their village pastor during this thanksgiving ceremony where the pastor in the end will distribute all these food to all the people of the village in equal proportions. The ongoing of this traditional practice encourages local people to grow more local food for conversation purposes that contribute to healthy nutritional and food security benefits.
- **Traditional Processing of Arrowroot Starch (*Tacca spp.*):** The local processing of arrowroot starch for food is still an ongoing traditional practice taking place today. The arrowroot (*Tacca spp.*) is an annual crop that grows in the wild. During the season of autumn (April-May) each year, families usually harvest arrowroot tubers grown wild from the ground to be processed as food. The traditional methods of processing arrowroot are still very strong amongst the Niuean people. Starch processed from here is also a local delicacy for making local dessert dishes such as nane (local pudding) and pitako (local bread).
- **Agricultural Show days:** Farmers are still encouraged to grow a wide variety of crops for the National Agricultural Show days every year. The incentive for farmers involves getting monetary prices for the crops judged during this annual show day event. The Government through the Department of Agriculture, Forestry & Fisheries and FAO observes this annual event in line with the World Food Day activities. Farmers are aware of this annual show day and they will grow their crops specifically for this event. The judging and weighing of the biggest Niue taro which is a national icon usually takes place at this national event as well.

(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.

- There is a need for evaluation of past and current programs or policies to better assess their impacts on biodiversity for food and agriculture.
- Increase capacity for monitoring and promoting sustainable use of biodiversity for food and agriculture.
- Develop an effective and reliable information system and data generation that is simple and user friendly for all relevant stakeholders on biodiversity for food and agriculture.
- Better collaboration between key agencies and relevant stakeholders to improve sharing of information on sustainable use of biodiversity for food and agriculture.
- Policy support for the 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 agriculture
- Evidence-based policies supporting sustainable use of biodiversity for food and agriculture
- Use of local/traditional foods to support linkage of BFA with nutrition and health
- Use of traditional knowledge supporting the sustainable use of BFA

2.2. Conservation

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

- **List and describe any existing national *in situ* conservation initiative(s).**

Niue has two terrestrial conservation and protected areas - Huvalu Conservation Area (IUCN Category VI) and Hakupu Heritage and Cultural Park (IUCN Category III). The Huvalu Conservation Area was established in 1992 through assistance from the South Pacific Biodiversity Conservation Program (SPBCP) and SPREP. The land area is approximately 54 km² on the eastern side of the island. It includes an area of reef flat about 15 to 20 m from high tide mark. Huvalu consists of a sacred Tapu area, a primary forest and a buffer zone. The Hakupu Heritage and Cultural Park extends south from the Tuhia Access Sea Track that was established by members of the family owning the land. Its primary objective is for inventory and protection of areas of historical and ecological significance, including caves used traditionally for burials and others where women of the village traditionally undertook weaving, as well as fortress sites identified as ancestral dwellings, as well as a peka sanctuary.

There are two marine protected areas, the Anono Marine Reserve, formerly known as Namoui (IUCN Category VI) and Alofi North Temporary Closed Area (which has since been reopened). The terrestrial PAs cover 23% of Niue's area, and the marine ones cover a very small area of Niue's EEZ (23.45 ha over 31 million ha). In addition, there are other small areas that have been traditionally defined as strict protection zones (tapu) or subject to seasonal closures. Although still practised, these are in danger of dying due to lack of formal recognition by government.

The government has also closed some marine areas from fishing, such as the Beveridge submerged reef where regulations provide for the protection of the "Beveridge Reef Designated Fishery" such that no person shall knowingly destroy or damage a reef within the Beveridge Reef Designated Fishery except with and in accordance with the approval of an authorized officer.

In other areas the government is promoting management and development of pelagic fisheries (tuna and associated species) guided by a new "Niue Pelagic Management and Development plan (2012)". The overall thrust of the plan is to take an Ecosystem-based Approach to Fisheries Management (EAFM) that has a broader focus than simply that on the sustainability of target species and takes into consideration the interactions that the fishery has on other sectors and the wider ecosystem.

Some reef monitoring activities are also undertaken. Under the business-as usual scenario, the funding available under this baseline program will not be sufficient to expand the protected area

estate and cannot result in the integration of existing PAs and tapu areas into a single and continuous terrestrial conservation area.

- **Indicate which species/groups of species are being conserved and with what objective(s).**

Pigeons(lupe) and flying foxes(peka) are two species protected under the Wildlife Act 1972 with hunting with shot guns permitted for a season annually (typically of two months' duration December and January). Recent surveys of hunters suggest that over 8000 pigeons and 1000-1500 flying foxes are taken annually (Butler et al., 2012). The Huvalu Forest Conservation Area is the largest area specifically managed for conservation and sustainable resource use. It comprises an area of 5,400 ha, consisting of 100 hectares of tapu where hunting, logging and research are prohibited. This is surrounded by 2,500 ha of primary forest in which some hunting and other activities are permitted. Beyond this area is a buffer zone of 2,800 ha of agricultural land that is subject to controlled, shifting cultivation. There are few controls on the removal of forest products outside of tapu areas. Lupe and peka are partly protected species except during the hunting season.

Uga-coconut crab (*Birgus latro*) is regulated under the Domestic Fishing Act. However, there is no regular monitoring of wildlife populations and habitat. The current ban on exporting of uga-coconut crab (*Birgus latro*) as in whole or part (when cooked) out of Niue is in place due to the recent survey conducted by the SPC and Niue Fisheries in 2014. The numbers of large coconut crabs have not increased in Niue since the studies in the late 80's and early 90s. The banning of exporting coconut crabs currently in place would help reduce hunting pressure to build stocks so large sizes become more common and to build stocks to a healthy self-replenishing state.

In an effort to quantify coconut crab exports, DAFF conducted surveys of aircraft cargo from 07 March 2014 to 24th January 2015. The survey involved visual inspection of aircraft cargo and of passenger baggage at the Hanan International Airport baggage x-ray security check point where the number of coconut crabs seen in cargo was recorded. Passengers were also interviewed to determine the quantity of crabs they had packed for the flight to New Zealand. Responses to interviews were voluntary. It was estimated that around 10,000 coconut crabs were exported over the period of 11 months.

- **Describe any existing 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 to Pacific Island countries, including Niue, 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'.

GEF-funded Forestry and Protected Area Management(FPAM) in Fiji, Samoa, Vanuatu and Niue project is designed to strengthen the capacity of Fiji, Samoa, Vanuatu and Niue to arrest the continuing loss and degradation of their native forests and at the same time, improve in sustainable ways the livelihoods of rural populations whose dependence on biodiversity is a contributing factor. The targeted countries are located in two of the World's 34 'Biodiversity Hotspots' where the richest and most threatened reservoirs of plant and animal life are found.

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

List and describe any existing national *ex situ* conservation initiative(s).

There are no major *ex situ* conservation initiatives taking place at the national level other than a small scale Nursery at the Government Farm on the Northern part of the Island. The Nursery propagates assorted seedlings such as fruit trees, vegetables, forestry species and ornamentals and made available to the public when needed. There are other small scale Women in Business nurseries who are also privately owned and mainly growing ornamental flowering plants.

The Government Vaipapahi-Farm through DAFF also receives improved plant genetic resources such as drought resistant crop varieties from SPC-Centre for Pacific Crops and Trees (CePaCT). These are kumara, cassava and bananas which are raised and distributed to other farmers. There are still a high number of farmers as also indicated by the 2009 Agriculture Census (87% active in farming) who grow taro, bananas, yams, cassava and kumara plant species on a voluntary basis for food security. Some small groups within this larger pool of farmers are also growing their small scale crop plantations for conservation purposes on a continually basis.

- Indicate which species/groups of species are being conserved and with what objective(s).**

The main species targeted here are mainly the root crops (taro, cassava, yam, kumaras) as they tend to survive a bit longer in drought related conditions. Bananas (plantain) are also targeted. These are the main staple crops on Niue and they have contributed largely to food security over many decades. The improved drought/disease resistant, fast growth root crop varieties provided by SPC-CePACT will enhance and improve access and availability of more crop varieties to the farming communities. This will in the end contribute to the overall food security in Niue and income generating opportunities in line with the growing Tourism Sector.

- Describe any existing sub-regional/regional *ex situ* conservation initiative(s) the country is involved in.**

Niue, 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.

The SPC Centre for Pacific Crops and Trees can support SPC member countries in conserving agricultural biodiversity. Niue through the Department of Agriculture, Forestry and Fisheries have stored and preserved over twenty taro varieties as tissue culture material in the CePACT Laboratory in Fiji. These taro varieties are available any time to Niue whenever needed, but it is also a back-up in case in future the taro varieties on Island maybe affected or potentially wiped out by a natural disaster or from pests and diseases.

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.

- Knowledge on the linkage between production, conservation and ecosystem services
- Understanding of how ecosystem approaches can contribute to the conservation of biodiversity for food and agriculture
- Access to information on the sustainable conservation of biodiversity for food and agriculture
- Knowledge on conservation techniques (in situ and ex situ) with emphasis on in situ BFA
- Conservation strategies
- Policy support for the conservation of biodiversity for food and agriculture

2.3 Access and exchange

a) Describe in 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)⁹

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>		
PGRFA	NA	
AnGR	NA	
FGR	NA	
AqGR	NA	
<i>Associated biodiversity</i>	NA	
Micro-organisms	NA	
Invertebrates	NA	
Vertebrates	NA	
Plants	NA	
<i>Wild foods</i>	NA	

⁹ 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.

[Insert rows as needed]

Niue is also in the process of acceding to the FAO International Treaty on Plant Genetic Resources. The process of acceding to the Treaty is envisaged to be finalised before end of 2016. Niue has not signed or ratified the Nagoya protocol. The Ridge-to-Reef project is likely to support capacity building in the Nagoya Protocol.

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.

- The lack of National Laws and policies in place for the access and benefit sharing of the utilization of biodiversity for food and agriculture.
- National laws and regulations aligned with international requirements of conventions, protocols and ITPGRFA.
- Accession to the Treaty and Nagoya Protocol.
- Protection of IP/traditional knowledge.

III. Policies, institutions and capacity

3.1 Policies, programmes, institutions and other stakeholders

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

Niue has:

- National Strategic Plan (2014-2019) - whose objective is to “build a sustainable future that meets our economic and social needs while preserving environmental integrity, social stability, and the Niue culture”. The 5th Pillar of the Plan is “sustainable use and management of Niue’s natural resources and environment for present and future generations”.
- Adopted a Forest Management Plan for Niue
- The Code of Harvesting Practice for the Indigenous Forests of Niue (2004) provides practical and rational guidelines to all those involved in forest harvesting, aiming at reducing forest damage and improving forest yields. The Code provides sets of best practice covering both

environmental and operational matters and also specifies uniform safety standards and prescriptions, which must be adhered to in any forest harvesting operation

- The Niue NBSAP was prepared in 2001 with the vision of – “Niue is an Environment Friendly Nation in which conservation and the sustainable management of biological resources support all the living community.” It covered terrestrial habitats, terrestrial species, marine biodiversity, governance, waste management and water resources, alien invasive species and public awareness and education and it affirmed that “Biodiversity incites spirituality in the communities and helps shape our culture because of our dependence on it for supply of food, for a sense of identity and raw materials for commerce.”
- Developed an Agriculture Sector Plan/Policy 2015-2019
- Developed Food Security Policy - Niue Food and Nutrition Security Policy 2015-2019
- Developed a Soil Resource Manual for Management of Soil Resources of Niue.
- Initiated a Forest and Protected Areas Management Project(FPAM) as part of a regional 4-country program coordinated by FAO
- Adopted a Management and Development Plan for Niue pelagic fishery
- Drafted a Coastal Fisheries Management Plan
- Developed a Niue Sustainable Coastal Development Policy
- Enacted and drafted several key pieces of legislation: Water Act 2012, Water Regulation Bill and Guidelines, Bio-security Bill, Environment Bill, Environment Impact Assessment Regulation, Forest Bill, Whale Watching Regulation
- Completed a National Climate Change Policy and drafted a Joint National Action Plan for Disaster Risk Management and Climate Change
- Developed a National Integrated Waste Management Strategy 2010-2015 and the accompanying Action Plan
- Initiated an invasive species project as part of the regional GEF-PAS project coordinated by SPREP
- Participated in a GEF Pacific Integrated Water Resource Management Project with a focus on improving land management in the borehole catchments of Alofi
- Participated in the regional Pacific Adaptation to Climate Change program with a focus on improving household rainwater harvesting
- Developed Water and Waste Water Management Plans for the village of Alofi South and Alofi North
- Developed two community-based Village Development Plans for Hakupu and Tuapa villages
- Promoted eco-tourism
- Reviewed Territorial Sea and EEZ legislation and completed a re-draft
-

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

Weaknesses:

- Poor implementation due to lack of coordination between relevant government agencies
- Lack of/limited capacity for monitoring and recording data on conservation

- Lack of funds to implement the policies

Strengths

- Raise awareness of the importance of biodiversity
- Provide a framework for donor intervention
- Provide guidelines to support harmonized implementation of interventions.

Despite the significant government response to the identified threats to biodiversity and the environment in general, gaps remain and barriers stand in the way of further progress and the achievement of sustainability – these are placing Niue's biodiversity and environment at risk.

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.

The Niue Island Organic Farmers Association (NIOFA) was developed by farmers of Niue with the support from the Government of Niue. NIOFA's main focus is to promote the concept of organic farming in Niue. It was formed in the year 2000 by a handful of dedicated farmers, with a passion to adopt and promote organic farming as the way forward.

14 Village Councils were set up by the Village Councils Ordinance 1967 and which in Niue play an important role in the protection and management of biodiversity and the environment. Village Councils have broad powers, including conducting business enterprises, improving housing standards, promoting agricultural and fisheries enterprises and cooperating with the Government to provide social services. To deliver these functions, Councils are empowered to make by-laws and to levy taxes. These provisions are relevant to the recognition of traditions, culture and traditional authority. In 2008, Village Councils were given the opportunity to develop Village Plans and two villages, namely Tuapa and Hakupu accepted the challenge and developed plans. The Tuapa Plan was produced as part of a UNDP sub-regional programme covering four South Pacific Countries: Cook Islands, Niue, Samoa and Tokelau. The overall objective of the plan is to strengthen the Tuapa community's capacity to drive the planning and implementation of their own sustainable development priorities towards achieving the Millennium Development Goals (MDGs) by 2015, taking into account human rights approaches and gender issues.

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 development of ridge-to-reef type projects engages all ministries in the planning process, as does the development of the National Biodiversity Strategy and Action Plan.

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.

- Current policies and programmes should be reviewed for acknowledgment of BFA and achievable goals, and to ensure policies are harmonized.
- Needs a clear direction on which Ministry will be responsible in monitoring biodiversity for food and agriculture in each country which could be supported by an overarching national biodiversity and genetic resource policy, which should link with agriculture, forestry, fisheries, environment and climate change policies on biodiversity and genetic resources. This national policy should also establish the management, implementation and coordination mechanism of the policy.
- Capacity to implement policies should be strengthened at the national and local level

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.

- BFA education should begin at primary school level so BFA must be included in the school curriculum from primary through to and including secondary
- Educating the general public as to the link between BFA, the environment and food security is needed.
- Building/strengthening the capacity of government staff and relevant others to assess, identify and monitor components of biodiversity.
- Establish guidelines to support training needs

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.

- Identify and prioritize research needs (priority species, BFA in production systems, soil micro-organisms/indicators) at the national level but ensure that any needs common to other countries are addressed at the regional level prioritization
- Review existing projects to assess whether data on BFA could be easily included without significant funding implications.
- Strengthen documentation and knowledge management in general.

IV. Regional cooperation

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

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

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 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 a 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 agriculture	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 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 gene-banks (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, Fisheries, Community, etc.)	Promote the development of cross-sectoral policies and programmes at all levels through establishment of a cross-sectoral working group 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	<p>Improve coordinating mechanism(s) between regional agencies</p> <p>Establish systems for sharing knowledge and resources amongst the agencies</p> <p>Consider establishing a regional coordination post, possibly based in FAO</p>