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## **Priority adaptations to climate change for fisheries and aquaculture in Solomon Islands: reducing risks and capitalising on opportunities**

**Ministry of Fisheries and Marine Resources (MFMR), SPC and AusAID**

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**Honiara**

This document summarises the outputs from the workshop held by the Ministry of Fisheries and Marine Resources and the Secretariat of the Pacific Community to identify priority adaptations to climate change for the fisheries and aquaculture sector in Solomon Islands. The workshop was supported by AusAID and was designed to select the best adaptations and supporting policies for minimising the risks posed by climate change to the plans that Solomon Islands has to (1) maximise the sustainable benefits from tuna for economic development, (2) provide enough fish for food security, and (3) optimise the number of livelihoods that can be based on fisheries and aquaculture. Adaptations were also designed to capitalise on the opportunities expected to eventuate from climate change.

The plans to increase the economic benefits from tuna include developing onshore facilities for tuna processing and value-added products, linking DWFN licences to onshore processing to maximise landings, and encouraging local participation in tuna fishing through joint ventures. The plans to ensure that fisheries and aquaculture contribute their full potential to food security are based around continuing to provide access to 35 kg of fish per person each year.

Wherever possible, the adaptations identified during the workshop were designed to address issues facing the management of fisheries and aquaculture in the short term (e.g. population growth), and climate change in the longer term. Such measures are considered to be 'win-win' (W-W) adaptations. In some cases, 'lose-win' (L-W) adaptations were also recommended. These adaptations involve foregoing some benefits now to strengthen the capacity of resources to cope with the changing climate.

The workshop also recognised that many of the adaptations to climate change are management actions that are (or should) already be in place to deliver sustainable benefits from the nation's fisheries and aquaculture resources. A prime example is integrated coastal zone management (ICZM). The need for ICZM to maintain coastal fisheries production has been recognised for many years and should help build resilience of coral reefs, mangroves and seagrasses to climate change.

### **1.1. Adaptations to maintain the contribution of tuna to economic development**

The adaptations required to maximise the benefits from tuna fisheries for Solomon Islands involve development of flexible management measures to ensure that large quantities of tuna can still be channelled through the established and proposed canneries and processing plants as the abundance of tuna in the EEZ changes due to climatic variability (ENSO), and as the distribution of tuna moves progressively east under the changing climate. These adaptation actions include:

- Full implementation of the vessel day scheme (VDS): The 'cap and trade' provisions of the VDS enable all Parties to the Nauru Agreement to receive some level of benefits during ENSO events, regardless of where tuna are concentrated (W-W).

- Developing and maintaining an economic partnership agreement (EPA) with the European Union: The global sourcing provisions of an EPA will assist Solomon Islands to obtain the fish to supply existing and planned national fish canning and processing operations in those years when insufficient fish are landed by national fleets (W-W).
- Diversifying sources of fish for canneries. Other adaptations to help secure fish for canneries include: reducing access for DWFNs to the EEZ to provide more fish for national vessels; requiring DWFNs to land some of their catch for use by local canneries; and enhancing arrangements for national fleets to fish in the EEZs of neighbouring countries (W-W).
- Continued conservation and management measures for all species of tuna to maintain stocks at healthy levels and make these valuable species more resilient to climate change (W-W).
- Energy efficiency programmes for industrial fleets: Energy audits to identify how to reduce fuel use during fishing operations should assist national fleets to cope with rises in oil prices. Energy audits should also reduce the costs for fleets fishing further afield as the distribution of tuna shifts to the east (W-W).
- Environmentally-friendly fishing operations: Minimising the effects of existing fishing operations, and those projected to occur as tuna move east, on non-target species will help meet the requirements of certification schemes. Emissions of CO<sub>2</sub> from vessels and canneries should also be minimized to reduce the carbon footprint of industrial fisheries (W-W).
- Re-assessment of safety-at-sea provisions/regulations/ practices to ensure that industrial vessels are able to cope with more severe weather and sea conditions (L-W).
- Consider sea-level rise and increased severity of cyclones when designing new facilities for industrial fishing ports and canneries, or upgrading existing facilities (L-W).

## 1.2. Supporting policies

- Maintain transparent access agreements for DWFNs so that allocations under the VDS are understood by all stakeholders; and strengthen national capacity to implement the VDS.
- Adjust the national tuna management plan and licensing conditions (if needed) to provide more flexible arrangements to acquire tuna needed for local canneries and processing operations.
- Support the inclusion of the implications of climate change in the future management objectives of the WCPFC.
- Require all industrial tuna vessels fishing in Solomon Island's EEZ to provide operational-level catch and effort data to improve the models for estimating the redistribution of tuna stocks due to climate change.
- Apply national management measures to address the implications of climate change for tuna in archipelagic waters beyond the mandate of WCPFC.
- Develop further measures to mitigate the capture of bigeye tuna by purse-seine.
- Use regional trade and preferential access agreements to market environmentally-friendly tuna products, and develop distribution channels that minimise CO<sub>2</sub> emissions.

## **2.1. Adaptations for food security and livelihoods**

The adaptations and suggested policies for maintaining the important role of fish for food security and livelihoods in Solomon Islands centre on (1) minimising the size of the gap between the fish required for good nutrition and the fish available from coastal (and freshwater) fisheries through appropriate management of coastal (and freshwater) fish habitats and stocks; and (2) filling the gap by increasing access to tuna and boosting freshwater pond aquaculture.

Different adaptations apply to rural and urban areas. In rural areas, the adaptations are designed both to minimise and to fill the gap, whereas in urban areas adaptations are limited to filling the gap.

### **2.1.1. Rural areas**

#### **2.1.1.1. Adaptations to minimise the gap by maintaining healthy fish habitats and stocks**

- Improved coordination, adoption and implementation of ICZM and catchment management principles among relevant government departments to reduce the negative effects of sedimentation, nutrients and pollution from mining, agricultural and forestry operations on coastal (and freshwater) fish habitats to maintain their natural resilience to climate change (W-W).
- Promote cohesive local governance arrangements to lay the foundation for committed, stable and widely inclusive sustainable use of coastal (and freshwater) fish habitats and fish stocks (W-W).
- Expansion of community-based management based on the principles of 'primary fisheries management' and an ecosystem approach to help (1) safeguard coral reef, mangrove and seagrass fish habitats; and (2) maintain the replenishment potential of targeted fish and invertebrate species. Such approaches include but should not be limited to intermittently opening locally marine managed areas. In particular, size limits, closed seasons etc should also be applied (W-W).
- Enhance reef resilience by balancing the catch of herbivorous fish to take advantage of their expected increase in abundance, but retain enough of these fish, and other herbivores (e.g. sea urchins), to limit the overgrowth of corals by algae (W-W).
- Improved monitoring of coastal fish stocks using indicators suitable for multispecies fisheries to evaluate the effectiveness of management strategies. Modifying household income and expenditure surveys to measure changes in the types of fish caught by subsistence fishers, and bought and sold in urban and rural areas, will be important (W-W).
- Complete the mapping of all coastal fish habitats and implement regular monitoring of habitat area (W-W).
- Harmonise opportunities for expansion of freshwater fish habitats due to higher rainfall and greater river flows with protection of agricultural land and infrastructure from inundation (L-W).

#### **2.1.1.2. Adaptations to fill the gap by increasing access to fish**

- Increased use of inshore FADs to improve access for coastal subsistence and artisanal fisheries to skipjack and yellowfin tuna and other large pelagic fish as rural populations grow, and as coral reef fish production declines under climate change. Stockpiles of materials to replace lost or damaged FADs should be maintained by Provincial Fisheries Officers so that FADs can become a permanent part of the national infrastructure for food security (W-W).
- Monitor the catches made around FADs to evaluate the social and economic benefits of this adaptation and better inform local managers about the number, design, placement and

maintenance of FADs. Until any vandalism of FADs due to non-harmonious use within communities is resolved, restrict use of FADs in such situations to designs with subsurface floats (W-W).

- Develop fisheries for small pelagic species. In the event that niche market, pole and line fisheries for tuna are established, develop bait fisheries to supply pole and line boats (W-W).
- Improved post-harvest technology (e.g. smoking and drying) for large pelagic fish caught around FADs and small pelagic fish to increase the availability of fish for food security at times when it is not possible to fish, or when catches are low. Assess the application of solar power for drying/freezing in remote areas (W-W).
- Renovate selected rural fisheries centres to provide bases for training in fishing and post-harvest methods, and easy access to fishing equipment at cost price (W-W).
- Develop tourism based on coastal habitats and fisheries resources in places where live coral cover can be maintained (e.g. by moving colonies) as coral reefs degrade (W-W).
- Complete the impact risk assessment process for importation of Nile tilapia farming to establish small-scale pond aquaculture in rural areas (W-W).
- In the event that introduction of Nile tilapia is recommended:
  - Identify sites and methods for pond aquaculture likely to be favoured by higher rainfall and warmer temperatures but exclude sites with unacceptable risks of flooding (W-W).
  - Train fish farmers in the best practices, site selection, pond construction, farm management, and small business skills (W-W).
  - Develop an efficient system for maintaining genetically selected, fast-growing tilapia, and for distributing them to all growing areas (W-W).
- Assess the potential for integrated aquaculture-agriculture systems using animal waste to fertilize ponds and aquaponics (W-W).
- Increase the resilience of seaweed farming to climate change by (1) importing new varieties with greater resistance to warmer water temperatures; and (2) identifying sites where problems associated with reduced salinities from higher rainfall will be minimised (W-W).
- Monitor water temperature and pH at prospective pearl farming sites to identify areas where conditions are likely to remain suitable for producing high-quality pearls (W-W).
- Identify microsites where farming of marine ornamental species (e.g. giant clams and hard corals) can continue as sea surface temperature and ocean acidification increase (W-W).
- Assess the potential for wild milkfish, rabbitfish and mullet juveniles to be grown-out practically and profitably (W-W).
- Establish loan schemes to promote development of local enterprises based on fishing around FADs, post-harvest to extend shelf life of catches, and pond aquaculture. (W-W).

### **2.1.2. Urban areas**

- Identify measures to support SME enterprises to purchase small-sized tuna, partially damaged tuna and bycatch (e.g. rainbow runner) from industrial fleets during transshipments in Honiara and Noro for sale to the rapidly growing population.

- Use licence conditions and inspections while vessels are transshipping to ensure that the small-sized tuna and bycatch landed in Honiara are stored well prior to landing to maintain fish quality (W-W).
- Harmonize landings from industrial fleets with catches of local fishermen to minimise the effects on local jobs while providing additional fish for the rapidly growing population of Honiara (see specific recommendations from UNIDO/SPC/FFA study once finalised) (W-W).
- Complete the impact risk assessment for the farming of Nile tilapia to facilitate development of peri-urban aquaculture and increase access to fish in Honiara (W-W).

## 2.2. Supporting policies

- Strengthen governance to achieve ICZM and sustainable use of all coastal fish habitats and ICZM by: (i) building the capacity of management agencies to understand the threats posed by climate change; (ii) empowering communities to manage fish habitats; and (iii) changing agriculture, forestry and mining practices to prevent sedimentation, addition of nutrients to coastal waters and pollution.
- Minimise barriers to landward migration of mangroves and other coastal habitats during development of strategies to assist other sectors respond to climate change.
- Promote mangrove and seagrass replanting programmes in suitable areas to meet the twin objectives of enhancing habitat for coastal fisheries and capturing carbon.
- Mandate the use of 'primary fisheries management' and an ecosystem approach for stocks of coastal fish and shellfish to maintain their potential for replenishment.
- Increase access to tuna for the food security of rural communities by reducing allocations of estimated sustainable catch from the EEZ to industrial fleets.
- Use licencing conditions to deliver the quantity and quality of fish needed for food security in Honiara.
- In the event that the impact risk assessment for Nile tilapia recommends the introduction of this fish, promote the benefits of Nile tilapia farming for supplying fish to communities with poor access to other sources of animal protein. Limit Nile tilapia farming to catchments where the Mozambique tilapia is already established (and confirm that this species is not established on Choiseul) to reduce any possible effects of tilapia on freshwater biodiversity where these fish are not present.
- Facilitate training needed to operate profitable businesses based on small-scale tuna fisheries and pond aquaculture, and promote innovation networks to increase the uptake of efficient practices.
- Promote private sector investment in coastal tourism designed to accommodate climate change, particularly the projected changes in sea level, storm surge and changes to coral reefs and other coastal habitats.
- Strengthen national capacity to adopt and implement aquatic animal health and biosecurity measures, including monitoring, detecting and reporting aquatic animal diseases to prevent introduction of new pathogens.
- Ensure household income and expenditure surveys are modified to assist adaptive management of the fisheries and aquaculture sector.