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**Fish for Food Security in the Pacific**

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## FISH FOR FOOD SECURITY IN THE PACIFIC

### Purpose

1. The purpose of this paper is to inform the Heads of Fisheries about:
  - i. the vital role that fish plays in providing food security in the Pacific, and
  - ii. the need to identify the future requirements for fish as food and to allocate the necessary proportion of national fisheries resources to meet this future demand.

### Background

2. The Pacific Plan recognises that development of Pacific Island countries and territories (PICTs) is linked to the effective management of fish, and the habitats that support them. The Pacific Plan puts the onus on PICTs to identify precisely how they wish to use fisheries resources to meet their national needs and aspirations in ways that will endure. In a region blessed with abundant tuna, a long tradition of relying on fish for food, and few opportunities to earn income, three main questions will frame national plans for the sustainable use of fish. 1) How can tuna best contribute to economic growth? 2) How much fish will be needed for future food security? 3) How many livelihoods can be based on fisheries resources?

3. This paper outlines the efforts that SPC is making to assist PICTs to identify how much fish they will need to provide food security. It also provides guidance on some of the main steps to be taken to supply the fish required.

### How much fish will be needed for future food security?

4. The rapid population growth occurring in many parts of the region (Figure 1) demands an urgent answer to this question. PICTs need to know where the gaps between demand and supply of fish for food will occur, and how to fill them in ways that are resilient to natural disasters and the uncertainty of climate change.

5. SPC has recently developed an approach to assist PICTs provide sufficient fish for future food security. This approach is described in detail in a recent paper on planning the use of fish for food security in the Pacific published in the journal *Marine Policy* [1], and summarised here. It has four components: a) identifying per capita fish consumption needed for good nutrition; b) estimating current fish consumption; c) forecasting the fish needed for food to 2030; and d) outlining practical ways to provide access to the fish required.

### ***Fish needed for good nutrition***

6. The World Health Organisation recommends that daily protein intake for good nutrition should be ~0.7 g per kg body weight per day, derived from a variety of sources to prevent micronutrient deficiencies. The SPC Public Health Programme advises that, ideally, fish should contribute ~50% of this protein requirement. Based on the predicted age structure of populations in the Pacific until 2030, age-weight relationships typical of the region, and the fact that fresh fish is ~20% protein, the average per capita fish consumption recommended for good nutrition is ~35 kg per year.

### ***Current fish consumption in the Pacific***

7. Household income and expenditure surveys conducted by PICTs, and socio-economic surveys done by the SPC Coastal Fisheries Programme, reveal five strong patterns of fish consumption in the region.

- i) Fish consumption is remarkably high.* Many people in Micronesia and Polynesia eat twice the recommended amount of fish (Table 1). In Melanesia, fish consumption is at or above recommended levels in some countries and below in others (Table 1).
- ii) Rural communities have an extraordinary dependence on fish.* In Micronesia and Polynesia, fish consumption by rural (coastal) communities is double that in urban areas (Table 1). In much of Melanesia, rural communities often eat less fish than their urban counterparts due to poor access to fish by inland communities. However, coastal fishing communities in Melanesia generally consume as much fish as those in rural (coastal) areas elsewhere in the region (Table 1).
- iii) Subsistence fishing is very important.* For most PICTs, 60-90% of fish consumed in rural areas is caught by households.
- iv) Fresh fish dominates the diet.* In rural areas, fresh fish often makes up >90% of fish consumption and is rarely <70%. Similar patterns apply to urban areas, where fresh fish usually accounts for >75% of consumption.
- v) Fish provide the majority of animal protein.* Due to limited opportunities for animal husbandry, fish often contributes 70-90% of the animal protein in the diet.

8. The good news is that coastal and urban populations in the Pacific are eating enough fish for good nutrition. The reality is that they have few alternative sources of animal protein.

**Table 1.** Annual per capita fish consumption (kg) for Pacific island countries and territories (PICT), determined from household income and expenditure surveys (HIES). For coastal fishing communities, consumption was determined from socio-economic surveys (SES). Note that American Samoa, Guam, CNMI and Marshall Islands are not included because HIES from these PICTs only provide data on cash transactions.

PICT	HIES		SES	
	National	Urban	Rural	Coastal
<b>Melanesia</b>				
Fiji <sup>1</sup>	53.4			113.0
New Caledonia	25.6	10.7	54.8	43.2
Papua New Guinea <sup>1</sup>	13.0	28.1	10.2	53.3
Solomon Islands	33.0	45.5	31.2	118.3
Vanuatu	20.3	19.3	20.6	29.9
<b>Micronesia</b>				
FSM	69.3	67.3	76.8	96.0
Kiribati	62.2	67.3	58.0	115.3
Nauru <sup>2</sup>	55.8			62.3
Palau	33.4	27.8	43.3	78.6
<b>Polynesia</b>				
Cook Islands	34.9	24.8	60.9	98.2
French Polynesia	70.3	52.2	90.1	60.9
Niue <sup>2</sup>	79.3			49.5
Samoa	87.4	45.6	98.3	94.1
Tonga <sup>2</sup>	20.3			84.6
Tuvalu	110.7	68.8	147.4	145.5
Wallis & Futuna <sup>2</sup>	74.6			56.2

1. Data not derived from HIES

2. Represents entire PICT

### *Fish needed for food security to 2030*

9. The patterns of recent fish consumption in the Pacific make it clear that fresh fish must continue to be a mainstay of food security. Forecasts of the substantial amounts of fish needed by PICTs for food in 2030 are shown in Table 2.

10. These forecasts not only alert governments to how much fish should be made available for food security to 2030, they also indicate the access to fish required by rural and urban populations (Figure 1). In Micronesia and Polynesia, future growth in demand for fish will be limited to urban areas. In Melanesia, there will be increased requirements for fish in both urban and rural areas (Figure 1).

**Table 2.** Forecasts of fish (in tonnes) required by Pacific island countries and territories (PICTs) for food to 2030. Shading indicates those countries where preliminary analyses indicate that coastal fisheries are unlikely to supply the fish needed in the future.

PICT	2010	Year 2020	2030
<b>Melanesia</b>			
Fiji	30,000	33,200	37,500
New Caledonia	9,500	11,000	12,300
Papua New Guinea	111,300	142,500	183,100
Solomon Islands	18,000	25,500	29,900
Vanuatu	8,200	10,700	13,600
<b>Micronesia</b>			
CNMI	3,360	4,070	4,070
Guam	6,920	8,490	9,390
FSM	8,250	9,650	9,920
Kiribati	7,730	9,050	10,230
Marshall Islands	1,780	2,090	2,390
Nauru	630	760	890
Palau	930	980	1,000
<b>Polynesia</b>			
American Samoa	2,340	2,820	3,330
Cook Islands	620	560	590
French Polynesia	17,200	18,840	19,950
Niue	120	90	90
Pitcairn Island	<5	<5	<5
Samoa	15,180	15,210	15,600
Tokelau	100	100	100
Tonga	3,490	3,690	3,900
Tuvalu	1,050	1,050	1,050
Wallis & Futuna	1,170	1,240	1,300

***Where will the additional fish come from?***

11. The forecasts provide national planners with clear targets for access to the fish needed for food security. They also pose many challenges. Where will the fish required come from? How can it be made available most cost-effectively? How can growing urban populations be supplied without affecting the resources needed for subsistence in rural areas?

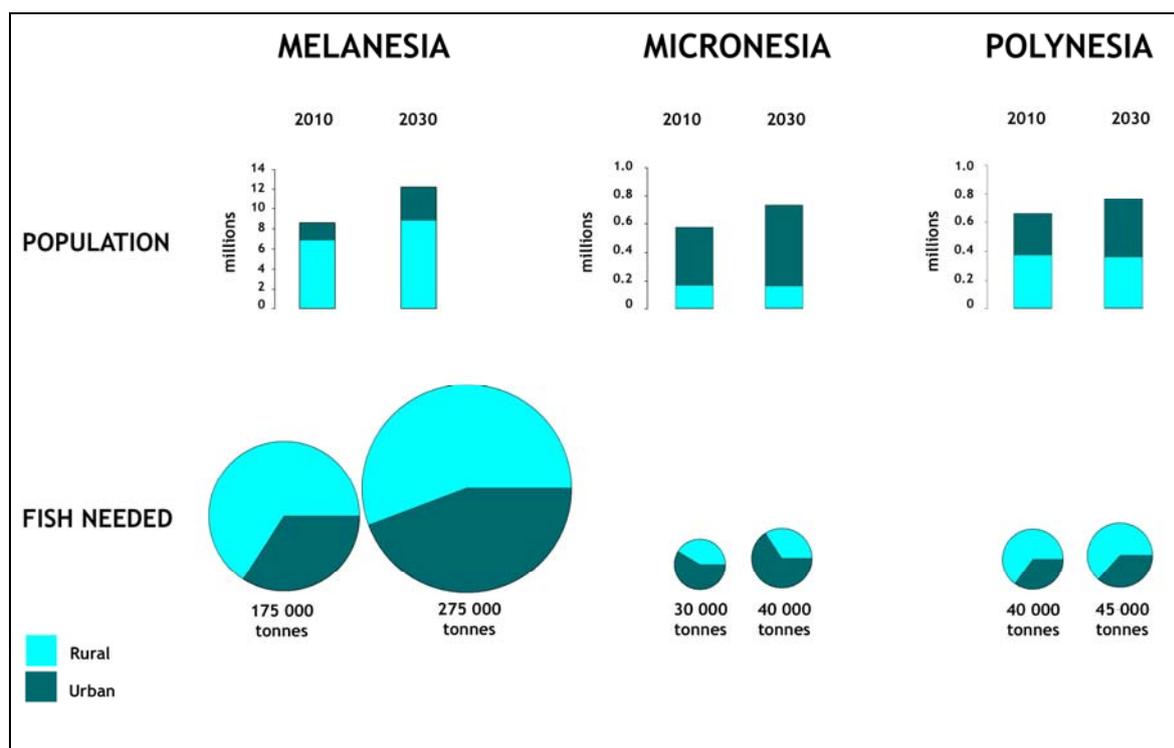
12. The large increases in fish required by many PICTs (Table 2) makes it clear that the current resources available to rural communities leave them vulnerable to reduced food security for three reasons:

- i) Coastal fisheries in many PICTs do not have the capacity to provide more fish (Table 2), therefore per capita fish consumption will decrease as rural populations grow.
- ii) Increased demand for coastal fish from urban centres will place pressure on rural communities to use coastal finfish for both livelihoods (sales to urban markets) and subsistence, increasing the risk of overfishing and reducing the local availability of fish for food.

- iii) Climate change is likely to reduce the diversity and abundance of reef-forming corals, and the productivity of fish associated with coral reefs.

13. To provide access to the fish needed for future food security, national planners need to take five steps: i) assess sustainable production from oceanic, coastal and freshwater fisheries, and aquaculture; ii) identify what proportion of each resource is needed for food security; iii) develop vehicles to deliver these allocations efficiently; iv) implement policies to support these vehicles; and v) oversee efficient management of all parts of the process.

**Figure 1.** Projected population growth in rural and urban areas of Melanesia, Micronesia and Polynesia to 2030, and the fish needed for future food security.



### *Pivotal role of coastal fisheries*

14. Coastal fisheries are on the doorstep of most people in PICTs (except PNG) and will be called upon first to provide subsistence protein requirements for reasons of tradition and convenience. Assessing the role of coastal fisheries in meeting future food security will require more effort. SPC and partners are developing a Coastal Fisheries Management Initiative to guide PICTs on how to maintain coastal fisheries within sustainable bounds, and estimate production. The structure of some national fisheries agencies may need to be changed so that more human resources can be dedicated to work to understand and maintain the contribution of coastal fisheries to subsistence and livelihoods.

### ***Reducing vulnerability of rural communities***

15. Past investments in research and development by the region provide two vehicles for diversifying access to fish for rural communities. These vehicles are:

- i) Low-cost, inshore fish aggregating devices (FADs) to provide access to tuna and other large pelagic fish for subsistence; and
- ii) Small pond aquaculture (in PICTs with adequate freshwater).

16. Establishment of these vehicles will give rural communities options to: a) use coastal finfish either for subsistence, or to earn income to buy canned fish when it is not possible to harvest; b) forego catches from coastal fisheries for a period to restore them to more productive levels; and c) switch to whatever resource is least affected, or favoured, by climate change.

17. The policies required to establish the use of low-cost inshore FADs include: allocating more of the tuna available to a PICT to subsistence and small-scale fishers; expanding the national infrastructure necessary to provide food security to include installation and regular replacement of FADs, and supporting enterprises involved in post-harvest and national distribution of tuna. Developing ways to distribute tuna landed at major ports that is unsuitable for export will be particularly important in providing fish to the urban poor at low cost.

18. The activities required to establish small pond aquaculture are: i) identifying appropriate species and culture methods; ii) minimising effects on biodiversity, iii) developing cost-effective feeds based on locally available ingredients; iv) investing in national systems for producing and distributing fry, v) training farmers; and vi) minimising disease risks.

### **Conclusions**

19. The extraordinarily high consumption of fish by many PICTs underscores the vital contribution of fish to the food security of the Pacific. To ensure that fish continues to play this important role PICTs need to:

- Provide continued access to fish in rural areas in ways that people can catch or produce it themselves;
- Prevent coastal developments from damaging fish habitats, and manage coastal fisheries harvests so that they remain within sustainable limits (otherwise, the gap to be filled by fish from FADs and pond aquaculture will be even greater [2]); and
- Ensure access to enough fish for good nutrition of rapidly growing urban populations.

20. Providing access to enough fish for good nutrition in coastal and urban areas to 2030 is well within the grasp of most PICTs. Diversifying the supply of fish through development of low-cost inshore FADs and small pond aquaculture will provide coastal communities with options for using more of their coastal resources for livelihoods. It will also make food security in PICTs more resilient to natural disasters and the uncertainty of climate change.

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### **References**

- [1] Bell, J.D., Kronen, M., Vunisea A., Nash, W., Keeble G., Demmke, A. Ponifex, S. and Andrefouet S. (2009). Planning the use of fish for food security in the Pacific. *Marine Policy* 33: 64-76.  
[2] SPC Policy Brief 1/2008 'Fish and Food Security'