



Fishery and Aquaculture Country Profiles

Tuvalu



Part I Statistics and main indicators

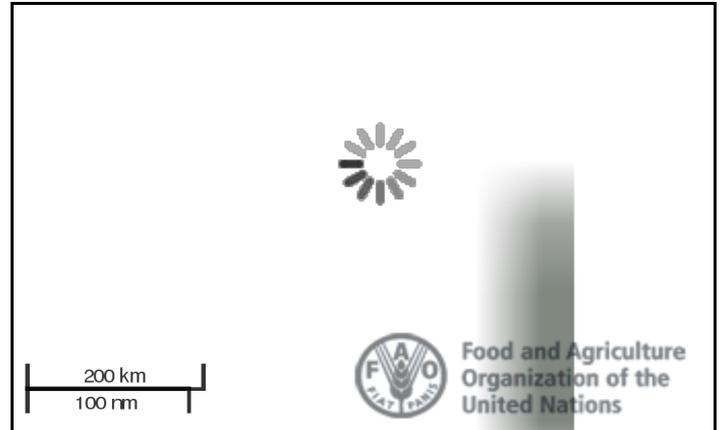
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- Imagery for continents and oceans reproduced from GEBCO, www.gebco.net

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Part I Statistics and main indicators

This section provides statistics and indicators produced through FAO's Statistics programmes, available by the year reported for the narrative section.

General geographic and economic indicators

Table1 – General geographic and economic data – Tuvalu

Area:	26 sq km
Water area:	900 000 sq km
Shelf area:	[no shelf]
Length of coastline:	590 km
Population (2007):	10 000
GDP at purchaser's value (2002)	20 129 000 USD ¹
GDP per head (2002):	2 103 USD
Agricultural GDP (2002):	3 342 000 USD ²
Fisheries GDP (2002):	1 625 000 USD ³

(1) As of January 2010, the latest year for which GDP estimates are available is 2002. In 2002 the average exchange rate was 1.00 USD = 1.83 Australian dollars;(2) This is the official contribution of agriculture, forestry, and fishing to GDP. Source: Tuvalu Central Statistics Division(3) This is the official contribution of fishing to GDP. A re-calculation by the Asian Development Bank indicates that in 2002 the fishing contribution was 25% greater; source: Gillett, R. (2009). The Contribution of Fisheries to the Economies of Pacific Island Countries and Territories. Pacific Studies Series, Asian Development Bank, World Bank, Forum Fisheries Agency, Secretariat of the Pacific Community, and Australian Agency for International Development, 500 pages.

FAO Fisheries statistics

Table 2a – Fisheries data (i) - Tuvalu

2007	Production	Imports	Exports	Total Supply	Per Caput Supply
	tonnes liveweight				kg/year
Fish for direct human consumption ⁴	461	52	100	413	41.3
Fish for animal feed and other purposes	1 740	--	--	---	--

Table 2b – Fisheries data (ii) - Tuvalu

Estimated Employment (2002):	
(i) Primary sector (including aquaculture):	About 4 000 people ⁵
(ii) Secondary sector:	[unknown]
Gross value of fisheries output (2007):	43 773 582 USD ⁶
Trade (2007):	
Value of fisheries imports:	103 000 USD
Value of fisheries exports:	305 000 USD

(4) Data from FAO food balance sheet of fish and fishery products.(5) The 2002 Population and Housing Census of Tuvalu showed that 42% of the population of 9 554 people participated in some form of fishing.(6) From Gillett (2009); includes the six fishery production categories: (1) coastal commercial fishing, (2) coastal subsistence fishing, (3) locally-based offshore fishing, (4) foreign-based offshore fishing, (5) freshwater fishing, and (6) aquaculture.

Part II Narrative

Updated 2010

This section provides supplementary information based on national and other sources and valid at the time of compilation. References to these sources are provided as far as possible.

Production sector

Tuvalu is a group of islands lying in the south-central Pacific north of Fiji. The islands of Tuvalu, all low lying atolls, are Nanumea, Nanumanga, Niutao, Nui, Vaitupu, Nukufetau, Funafuti, Nukulaelae and Niulakita. Even by Pacific Island standards, Tuvalu is quite isolated. There is presently only air service from Fiji and only Funafuti has a useable landing strip. Some of the other islands lack even a pass in the reef to allow the government passenger/cargo boat to enter the lagoon. Tuvalu's small land area of only 26 sq. km. limits the prospects for agriculture or other forms of terrestrially based development. The country places much hope for future economic growth on the fishery resources contained within its large EEZ area, which covers 900 000 sq. km.

Subsistence activities dominate Tuvalu's domestic fisheries sector. A wide variety of techniques are used throughout the group to collect fish, crabs and other invertebrates which are consumed, shared or informally bartered. Fisheries centres have been established on several outer islands with the intention of providing fishers there with income earning opportunities. On the main island, Funafuti, artisanal fishing is limited to a small fleet of 4-5 m outboard powered skiffs which mostly fish by trolling for tuna, and by line fishing for reef fish.

Domestic fishing in Tuvalu is quite small compared to the activities of foreign fleets in Tuvalu waters. The tuna catches of the foreign fleets are very large and the money generated from access fees is a critically important source of government revenue.

With respect to the current situation, fisheries in the waters of Tuvalu can be placed into six categories. These categories and the associated production in 2007 are estimated as:

Table 3 – Fisheries production by category – Tuvalu (2007)

	Coastal Commercial	Coastal Subsistence	Offshore Locally- Based	Offshore Foreign- Based ⁷	Freshwater	Aquaculture
Volume of Production (tonnes)	226	989	0	35 541	0	0
Value of production (USD)	616 526	2 232 686	0	40 924 370	0	0

Source: Gillett (2009)

The main trends and important issues in the fisheries sector

The main trends in the sector include:

- Increasing coastal fishing pressure on the main island of Funafuti due to an expanding population.
- Continuing variability of the volume and value of the foreign tuna catch in the Tuvalu EEZ.
- Falling offshore licensing revenue in real terms
- Increasing costs of domestic motorized fishing, primarily due to escalation in fuel prices.
- Decreasing enthusiasm by donors to promote activities that could increase reef and lagoon fishing effort.

Some of the major issues in the fisheries sector are:

- Although Tuvalu is located in one of the most favorable tuna fishing areas in the world, the exports of tuna from the country have remained zero over many years.
- Despite the importance of access agreements to the Government, fishing operations are mostly not well monitored.
- There is considerable complexity in reducing Funafuti inshore fishing effort. The concept that there are limits to inshore fisheries production is new to many Tuvaluans
- The perception by some government officials that any controls placed on inshore fishing by the Fisheries Department is frequently perceived by the general public as being contradictory to the Fisheries Department's development efforts.
- The regional/global move to ecosystem-approach to fisheries management, however desirable, is clashing with the realities of fisheries management in Tuvalu.
- Safety at sea and the loss of lives of fishers while trolling offshore is a major issue.
- The desirability for development of a domestic tuna industry, must be reconciled with the difficulties and expense from operating such an industry from a high cost location such as Tuvalu. Many fisheries specialists visiting Tuvalu over the years have commented on these constraints (Box 1).

Box 1 - Constraints to fishing industry development in Tuvalu

Gillett and Reid (2005)⁸:

- There should be recognition that the production/export of chilled fishery products requires air freighting, which is both very costly and limited in volume. Unless there are very special conditions, such export is unlikely to be profitable.
- There should be recognition that the production/export of frozen fishery products is relatively expensive from Tuvalu due high costs of most of the inputs. Cheap local labour is not likely to compensate for these expenses. Unless there are very special conditions, achieving profitability in the export of frozen products will be quite difficult.

FFA (2004)⁹:

- The fact that there could be few or no opportunities for fisheries industry development at the present time should be seriously considered. The difficult transportation logistics to outside markets, lack of support services, high cost of fuel, poor availability of water, little heritage of major commercial activity, high costs of doing business, limited domestic market for by-catch and other factors, all work against the establishment of a domestic tuna industry like those of many Pacific Island countries. While some of these could be addressed by major inputs from the government or donors, such improvement may still not result in the fundamental underlying economics being favourable.

Chapman (2004)¹⁰:

Tuvalu suffers from some deep seated disadvantages in the areas of investment capital (finance), management and technical skills, technology, marketing infrastructure, and shore based infrastructure. The major natural disadvantages and constraints for fishery industry development can be summarized as the lack of:

- Domestic capital to finance relatively large scale commercial projects;
- Domestic investors willing to commit finance to risky commercial ventures;
- Effective means to transport fish to overseas markets;
- Supporting infrastructure, including comprehensive shore facilities and protected anchorages for smaller artisanal craft;
- Managerial expertise to successfully guide a commercial venture;
- Skills and technology in a range of areas needed to underpin a commercial export oriented fishery, including: fishing, processing, storage, and shore based skills such as marketing, accountancy, and repairs and maintenance.

7) This is the catch taken by foreign flag vessels in the Tuvalu EEZ. In FAO statistics of capture fisheries production, this catch is accounted under the catch of the nation(s) under which the vessel(s) is (are) flagged.

(8) Gillett, R. and C. Reid (2005). A Business Plan for the National Fishing Corporation of Tuvalu. Gillett, Preston and Associates, for the Forum Fisheries Agency, 30 pages.

(9) FFA (2004). Domestic Tuna Industry Development in the Pacific Islands: The Current Situation and Considerations for Future Development Assistance. Forum Fisheries Agency, Honiara, 198 pages

(10) Chapman, L. (2004). Nearshore Domestic Fisheries Development in Pacific Island Countries and Territories. Secretariat of the Pacific Community, Noumea.

Marine sub-sector

The marine fisheries have two very distinct components, offshore and coastal:

- Offshore fisheries are undertaken on an industrial scale by foreign-based vessels. These are mainly purse seiners and longliners, and to a much lesser extent, pole-and-line vessels. There are no locally-based vessels operating in offshore fishing.
- Coastal fishing is primarily carried out for subsistence purposes, and to a lesser extent, for sales in local markets. The only export-oriented fishing activities are those for beche de mer (amounts are small and sporadic) and for shells for handicrafts.

Virtually none of the fish caught by foreign vessels within Tuvalu's EEZ are brought ashore. However, the licensing of foreign vessels is a crucially important source of government revenue. Over the five-year period 2003 to 2007 access fees have averaged 13.3 % of the government's total revenue. With respect to coastal fishing, Vunisea (2004)¹¹ describes the situation: "Because fishing is closely knit into the everyday lives of people, there exists a rich history of fishing, fishing lore and practices which need to be acknowledged and taken into account in any work relating to coastal fisheries development or management."

No discussion of fisheries in Tuvalu would be complete without mention of the National Fishing Corporation of Tuvalu. NAFICOT was established by legislation in 1982 as a mechanism to allow Tuvalu to benefit from the commercial exploitation of its marine resources. In the early years of NAFICOT the main role of the company was to provide the management structure for a donated Japanese pole-and-line tuna vessel, Te Tautai, which was delivered in March 1982. Important events affecting NAFICOT are given in Box 2.

Box 2 - A chronology of important events affecting NAFICOT - Tuvalu

- 1982: The National Fishing Corporation of Tuvalu was established by the NAFICOT Act.
- 1984-86: A fisheries resource assessment sponsored by Japan was carried out using the NAFICOT vessel Te Tautai.
- 1986: NAFICOT became a government enterprise under the Ministry of Natural Resources.
- 1986: Te Tautai moved to the Solomon Islands to operate
- 1987: The Teone fish market, constructed/equipped with British/Australian funding, was acquired by NAFICOT.
- 1987: United Kingdom funding was provided for the construction of a new fish market, which was constructed beside the slipway. As part of this project, Australian aid was provided in the form of equipment for the market.
- 1988: NAFICOT's pole-and line vessel had a peak annual catch of 1,091 mt
- 1989: Te Tautai was chartered for three years by the SPC, to undertake a regional tagging programme. The charter fee paid for the vessel (around AUD 4.0 million) allowed NAFICOT to put some of these funds into reserve.
- 1989: The Government of Japan donated six, 9.0 m diesel-powered fishing boats
- 1991: Commencement of a new USAID-funded survey project for deep-water snappers.
- 1992: The CFC (Community Fishery Centre) was established at Vaitupu. CFCs on other islands followed.
- 1993: At the completion of the SPC charter, F/V Te Tautai sat idle until it was transferred to the Marine Department (Ministry of Works and Communication) in September.
- 1994: Study of NAFICOT undertaken by the Commonwealth Secretariat
- 1994-97: A Japanese project (COFIDAS) assisted NAFICOT to investigate the feasibility of fishing and marketing for deep bottomfish around Funafuti. In addition, a Japanese engineer and a Japanese adviser were stationed in Funafuti to get the NAFICOT freezers operational and to install a new ice maker.
- 1997: ADB produces a Tuvalu economic report with a section on NAFICOT
- 1997: NAFICOT's pole-and line vessel sank in Funafuti lagoon
- 2001: SPC produces a national tuna fisheries assessment for Tuvalu

- 2001: Work began on a draft Tuvaluan National Tuna Development and Management Plan
- 2001: SPC produces document titled: “Development Options and Constraints Including Training Needs and Infrastructure Requirements within the Tuna Fishing Industry and Support Services in Tuvalu”
- 2002: Four person Tuvalu delegation travels to Korea to inspect vessels
- 2002: National Tuna Development and Management Plan is produced
- 2004: FAO undertakes institutional review of the NAFICOT and the Fisheries Department.
- 2004: In April NAFICOT accepts two second-hand vessels offered by the Korean Government as aid assistance to Pacific Island countries.
- 2004: In May and June a SPC Fisheries Development Officer conducted an initial assessment of the two ex-Korean vessels and a workshop on processing and handling of sashimi grade tuna.
- 2004: In November the ex-Korean vessels take first fishing trips in Tuvalu
- 2004: NAFICOT formulates “Outline of the Proposed Business Plan for the Operation of Two Commercial Fishing Vessels”
- 2004: NAFICOT signs agreement with Fiji Fish to market fish from the newly-acquired fishing vessels.
- 2005: In April an FFA mission visits Tuvalu to formulate a business plan for NAFICOT and recommends disposal of the longliners.
- 2007: The Tuvalu Government puts the longliners up for sale.

Source: Gillett and Reid (2005); SPC = Secretariat of the Pacific Community, USAID = United States Agency for International Development

(11) Vunisea, A. (2004). Preliminary assessment of coastal fisheries management needs in Tuvalu. Secretariat of the Pacific Community, Noumea

Catch profile

Estimates of the volumes and values of the catches of the four main commercial species of tuna (Bigeye, yellowfin, skipjack and albacore) taken by foreign vessels within the Tuvalu EEZ have been made by the Forum Fisheries Agency¹², using data sourced from the Oceanic Fisheries Program of the Secretariat of the Pacific Community. By adding in volumes and values of non-tuna species catch, estimates of total catches can be made.

Table 4 - Estimating tuna catches in Tuvalu waters by foreign-based fleets - Tuvalu

Tuna Catch	2002	2003	2004	2005	2006	2007
Volume foreign fleet catch in Tuvalu waters (mt)	28 332	3 499	19 282	14 572	14 873	33 848
Volume foreign fleet total catch in Tuvalu waters (mt)	29 749	3 674	20 246	15 300	15 616	35 541
Value foreign fleet tuna catch at destination market (USD million)	26.6	4.1	23.3	23.2	15.2	48.2
Value foreign fleet catch in Tuvalu waters adjusted for transship (USD million)	22.6	3.5	19.8	19.7	12.9	40.9

Estimates of catches from Tuvalu’s coastal fisheries vary widely. In 2008 the Asian Development Bank examined a large number of studies on coastal fishing in the country, and made catch estimates:

- The annual coastal commercial production in the mid-2000s was estimated to be 226 mt, worth USD 616 526
- The annual coastal subsistence fisheries production in Tuvalu in the mid-2000s was estimated to be 989 tonnes, worth USD 2 232 686

(12) FFA (2008). The Value of WCPFC Tuna Fisheries. Unpublished report, Forum Fisheries Agency, Honiara

Landing sites

The catch from offshore fishing in the Tuvalu EEZ is either delivered by the catching vessels to foreign ports or transshipped in ports in neighboring Pacific Island country to processing facilities, mainly in Asia. Only a very small amount of transshipping occurs in Tuvalu. The coastal commercial catch is mostly offloaded in the main island of Funafuti, with much smaller amounts offloaded at villages in the outer islands. Subsistence fishery landings occur at coastal villages throughout the country, roughly in proportion to the distribution of the population.

Fishing practices/systems

The catch in the offshore fisheries is made entirely by foreign-based industrial fishing vessels. The table below gives the fleet composition for recent years. Tupulaga (2008)¹³ states “the purse seine fleet alone contributed 98% to the total reported catch”.

Table 5 - Foreign fishing vessels licensed to operate in the Tuvalu EEZ - Tuvalu

	Types and Numbers of Licensed Vessels	Countries Participating
2005	93 longliners, 7 pole/line vessels 140 purse seiners	FSM, Fiji, Japan, Korea, New Zealand, Papua New Guinea, Taiwan, and USA
2006	34 longliners 3 pole/line vessels 52 purse seiners	Japan, Korea, Netherlands Antilles, New Zealand, Taiwan, and USA
	81 longliners	

2007	3 pole/line vessels 57 purse seiners	Japan, Korea, New Zealand, Taiwan, and USA
2008	42 longliners 3 pole/line vessels 126 purse seiners	Japan, Korea, New Zealand, Spain, Taiwan, and USA

Source: Fisheries Department, unpublished data

Most commercial fishers on Funafuti use a variety of fishing techniques. The decision of which specific technique to use (spear fishing, bottom fishing, netting, trolling) depends on a number of factors, including market conditions, weather, and the phase of the moon. Gillett and Moy (2006)¹⁴ give information on spearfishing in Tuvalu:

Spear fishing is done during the day and at night in both the lagoon and on the ocean side of the nine islands in the country. Fairly simple gear is used by fishers in the eight outer islands (mainly for subsistence but some fish is sold), as well as on Funafuti (some for subsistence but most fish is sold). Although modern spearguns are occasionally used, most fishers use sling-type spears in which the rubber is not fixed to the spear shaft. These spears are mainly constructed by the divers themselves. The spear tips (some single, some triple) are sharpened before each spearfishing session. Very young divers sometimes make their small spears from old umbrella frames. Scuba gear is not used, but one set of hookah gear, leftover from beche-de-mer fishing in the mid-1990s, has been employed for spearfishing.

A study by the Forum Fisheries Agency indicates that 10 to 20 small outboard-powered boats on Funafuti fish commercially, mainly coastal trolling for tuna. Another 10 commercial boats fish occasionally troll. Alternatively, the head of the Funafuti Fishermen's Association indicated that there are about 10 boats which could be considered full-time commercial tuna boats.

With respect to subsistence fishing, Vunisea (2004) states that most people are engaged in fishing almost daily to meet subsistence needs. Men mostly fish from canoes or boats while women glean and collect on the reef flats. Women in some outer islands are more involved in activities such as crab collection, net fishing, night fishing using knives, collecting shells for necklaces and other such activities. In some islands women rarely go fishing, as is the case for Niutao and Nanumea where there are no lagoons.

(13) Tupulaga, P. (2008). Tuvalu Part 1 Report 2008. Submission to the 4th Regular Meeting, Scientific Committee (WCPFC), Port Moresby, Papua New Guinea. (14) Gillett, R. and W. Moy (2006). Spearfishing in the Pacific Islands: Current Status and Management Issues. FAO Fishcode Review No.19, ISSN: 1728-4392, Food and Agriculture Organization of the United Nations, 72 pages

Main resources

Tupulaga (2008) gives the composition of the catches taken by the offshore fleets for recent years:

- Purse seine: About 94% skipjack, 5% yellowfin, and 1% bigeye and other
- Longline: About 47% yellowfin, 28% bigeye, 9% albacore, and 16% other
- Pole-and-line: About 99.5% pole-and-line, and 0.5% yellowfin

The species composition of the catches from coastal fisheries in Tuvalu has not been documented. The fishing

techniques that produce most of the coastal catch are likely to be trolling and spearfishing. Troll catches are dominated by skipjack and yellowfin, but also include some mackerel tuna and dogtooth tuna (Wilson 1995)¹⁵. Common species in the Tuvalu spearfishing catch are given in the table.

Table 6 - Common species in the Tuvalu spearfishing catch

Tuvalu name	English name	Scientific name	Comment
Ume	Long-nosed unicornfish	<i>Naso unicornis</i>	Very important in catch
Maninilakau	Orangespine unicornfish	<i>Naso lituratus</i>	Very important in catch
Pokapoka	Unicornfish	<i>Naso</i> sp.	A black unicornfish
Ponelolo	Lined surgeonfish	<i>Acanthurus lineatus</i>	
Kapalagi	Surgeonfish	<i>Acanthurus</i> sp.	
Ulafi	Parrotfish	<i>Scaridae</i> .	
Laea	Parrotfish	<i>Scaridae</i>	
Maiava	Rabbitfish	<i>Siganus</i> sp.	Very important in catch
Malau	Soldierfish	<i>Myripristis</i> sp.	

Source: Gillett and Moy (2006)

Flyingfish are quite important in Tuvalu. Of the 40 species of flyingfish found in the central Pacific, *Cheilopogon* and *Cypselurus* are probably the most common genera in Tuvalu.

(15) Wilson, M. (1995). Tuvalu Fisheries Resources Profiles. FFA Report 95, Forum Fisheries Agency, Honiara

Management applied to main fisheries

Tuvalu is a member of the Western and Central Pacific Fisheries Commission that was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. The Convention entered into force in June 2004.

In Tuvalu national government interventions in the fisheries sector are largely limited to action in support of obtaining government revenue from the foreign offshore fisheries and to small-scale inshore fisheries development. A report of the Forum Fisheries Agency¹⁶ states “Apart from conditions relating to the licensing of foreign fishing vessels, there is very little regulation of fisheries in Tuvalu. In earlier times there were well developed systems of traditional resource management but many of these appear to have broken down.”

Johannes (2000)¹⁷ provides some information on fisheries management at the island level. Section 1 of Schedule 3 of the national government’s Local Government Act, permits island councils “to provide for the improvement and control of fishing and related industries” and “to prohibit, restrict or regulate the hunting, capture, killing or sale of animals, reptiles, bird or fish or any specified kind of animal, reptile, bird or fish.” In short, “conservation in Tuvalu is largely the responsibility of the people of each island”. Johannes provides a description of actions by the various island councils that could be considered fisheries management measures. As an example, the situation at Nukulaelae Atoll:

- According to Nukulaelae’s Control of Faapuku and Kaumu Bye-law of 1984, fishing with nets or spear for faapuku (identified by several fishers as *Epinephelus macrospilos*) and kaumu (apparently a small spotted grouper) is prohibited June through August.
- The spawning aggregations of certain reef fish are protected.
- The Council of Chiefs is said to have banned anchoring on the reef - anchoring over corals tends to smash them.

- For alternating six month periods the islands on northern and southern halves of the atoll are closed to collecting of seabirds, their eggs, land-crabs, and coconut crabs.

Finekaso (2004)¹⁸ states that one of the most important marine resource conservation measures in Tuvalu is the “Li’iga” system whereby there is a total ban on any type of fishing activity in all inshore fishing grounds. This system still survives on the island of Niutao.

With the assistance of UNDP and the South Pacific Regional Environmental Programme, Tuvalu established its first marine protected area within the Funafuti lagoon in 1996. Many of the other islands in Tuvalu have established such areas – with objectives much broader than just fisheries management (e.g. biodiversity conservation).

Tuvalu’s National Master Plan for Fisheries Development 2008 – 2011¹⁹ states that nearly all island communities stated that they would like help with assessment of fisheries resources and developing management measures. In many countries, this is the main function of the Fisheries Department, but in Tuvalu most of the effort and funding has been diverted to other “development” efforts, and the only real management initiative has been the setting up of marine protected areas on each island.

With the paucity of conventional fisheries management measures that support established objectives, it may be informative to discuss a tuna management regime (box) that was formulated and agreed to in principle, but for which formal adoption did not occur, due to some relatively minor editorial requirements, the departure of the head of the Fisheries Department and the death of his successor.

Box 3 - The status of the Tuvalu tuna development and management plan

According to the text of the “National Tuna Development and Management Plan 2002-2006”, the “Plan describes what the Government of Tuvalu intends to do over the next five years, from 2002 to 2006 to develop and manage tuna resources so to increase their contribution to the long term economic and social welfare of the people of Tuvalu.”

The Plan has two major overall objectives:

- To maximize the long term economic and social benefits for the people of Tuvalu from the development of tuna resources;
- To ensure the sustainability of harvesting of tuna resources.

The development objectives given in the plan are:

- Increase the participation of private sector interests in tuna fishing through the provision of infrastructure needed to foster development, such as a anchorage for fishing vessels, and land availability for constructing support services, like processing and/or storage facilities.
- Work with other government departments in overcoming the logistical problems of transporting products, especially fresh fish, at a cost effective price both internally, and to export markets from Tuvalu.
- Promote value-adding to tuna catches in Tuvalu, to maximize local employment, and produce a low weight, high value product to minimize freight costs to export market.
- Establish an effective extension service to introduce alternative small-scale and medium-scale harvesting techniques to Tuvalu when the main infrastructure constraints are overcome and fish can be exported easily.
- Encourage the private sector to enter into joint ventures with foreign investors to establish viable fishing operation with shore facilities for processing and exporting fresh or processed tuna based in Tuvalu.

The tuna management objectives are given as:

- Continuing to strengthen the exercise of sovereign rights by Tuvalu over tuna
- Increasing the economic gains received by Tuvalu from the exercise of its rights over tuna
- Ensuring effective participation by Tuvalu in regional tuna management activities
- Reflecting customary values in tuna policy and planning, including recognition of the importance of the contribution of tuna to food security, protection of the interests of small scale tuna fishers, respect for local bylaws and by catch management.

The tuna management strategy is given as:

- Revising the legal framework: a new marine resources act to be presented to parliament.
- Revising the licensing system, including updating the licensing requirements for foreign vessels, introducing licensing requirements for larger scale Tuvalu fishing vessels, and applying limits to catches
- Increasing Tuvaluan involvement with foreign fishing operations
- Strengthening tuna management capacities

Although it was anticipated that the plan would be approved in late 2001 and implementation would begin in early 2002, this has not occurred. According to the Permanent Secretary of the Ministry of Natural Resources and Lands, the Plan was submitted to the Development Coordination Committee (DCC) in early 2003. The DCC endorsed the Plan but required some minor editorial changes before submitting it to Cabinet. This has yet to occur.

Management objectives

The Marine Resource Act 2006 gives “general principles” for fisheries management and states that fisheries management plans must include the objectives of the management, but the Act does not stipulate any specific management objectives.

Due to the few national fisheries management measures currently in place, it is not possible to draw conclusions on national fisheries management objectives.

Gillett and Moy (2007) analyze local fisheries management measures in Tuvalu dealing specifically with spearfishing and conclude: “Several of the islands’ restrictions on spear fishing seem to have the objective of reducing fishing pressure, making fish more available to line fishers, and protecting spawning aggregations. There could also be a generational aspect to the spear/line conflict - old men, who mostly fish with lines, disapproving of spear fishing, mostly done by much younger males.”

Management measures, institutions, and institutional arrangements

As indicated above, there are few national fisheries management measures that support established objectives. Examples on measures on Nukulaelae Atoll are given above, along with the proposed arrangements for the management of the offshore fisheries.

The Fisheries Department of Ministry of Natural Resources and Lands is the government entity charged with fisheries management at the national level. More information on the Department is given in Section 7 below. Island councils are empowered under the Local Government Act to regulate local fishing activities.

Fisheries Agency Honiara.

(17) Johannes, R. (2000). Findings During A Trip To Introduce To Tuvalu Methods Of Obtaining And Storing Local Marine Environmental And Fishing Knowledge. Departments of Fisheries and Natural Resources and Environment, Funafuti(18) Finekaso, S. (2004). Traditional Marine Ethnobiological Diversity and its Application to Inshore Marine Resources Management in Tuvalu. Masters of Arts thesis, University of the South Pacific, Suva. (19) MNR (2008). National Master Plan for Fisheries Development 2008 – 2011. Ministry of Natural Resources, Government of Tuvalu.

Fishing communities

The concept of “fishermen communities” has limited applicability to Tuvalu. Most households in the country are involved in coastal fishing activities. SPC (2005)²⁰ presents the main findings of demographic, socioeconomic, household and housing information collected in the 2002 Population and Housing Census of Tuvalu. With respect to fishing employment, the report indicates that 67% of all households in Tuvalu were involved in fishing activities”.

It could therefore be stated that all villages in Tuvalu are “fishing communities”.

(20) SPC (2005). Tuvalu 2002: Population and Housing Census. Volume 1. Analytical report, Secretariat of the Pacific Community, Noumea, New Caledonia.

Aquaculture sub-sector

Uwate (1984)²¹ lists the older attempts at developing aquaculture in Tuvalu. Past investigations and work have included efforts on baitfish, crabs, milkfish, mollies, mullet, pearl oyster, tilapia, and turtles.

Tuvalu’s National Master Plan for Fisheries Development 2008 – 2011 states that the Fisheries Department and island communities have undertaken a number of projects and culture trials, but “none of these have resulted in a single working aquaculture project in Tuvalu...there are no functional aquaculture activities”.

(21) Uwate, K. (1984). A review of Aquaculture Activities in the Pacific Islands Region. East-West Center, Honolulu.

Recreational sub-sector

Although subsistence fishing may have a large social component and be enjoyed by the participants, there is little recreational fishing as a leisure activity for villagers. A few residents of Funafuti (mostly expatriates) have outboard-powered open skiffs that are occasionally used for recreational fishing. There is no active management specifically for the recreational sub-sector.

Post-harvest sector

All of the fish captured by the offshore fisheries in Tuvalu EEZ is utilized outside the country. In general, the tuna captured by purse seiners is for canning, while the tuna captured by longliners is for the Japanese sashimi market (mainly high quality bigeye and yellowfin) and for canning (albacore and lower grades of bigeye and yellowfin).

The coastal commercial catch is mainly offloaded in the main island of Funafuti for sale to households on that island, with much smaller amounts offloaded at villages in the outer islands. Some of the outer islands catch is sent to Funafuti for sale to households. Subsistence fishery catches, as the name implies, are mainly for

domestic use of the household that made the catch - but some are giving away to relatives and friends. The export of fishery products from Tuvalu is very small: sporadic exports of beche-de-mer (e.g. in 2007, 4 202 USD of beche-de-mer was sent to China) and some shell handicrafts (mainly given departing Tuvaluans). In the 1990s some exports of tuna jerky were sent to Fiji, but this did not continue for very long after the sponsoring project was completed.

Fish markets

Fish are sold through a few small markets on Funafuti. There are also several locations where fish is sold informally on the roadside. Sales are often made by the wives of the fishermen making the catch.

In the outer islands the intention was that “community fishery centres” would have an important role in fish marketing. The centres have not been entirely successful (Box 4).

Box 4 - Community fishery centres in Tuvalu

The Government’s most important initiative to support inshore fisheries development in the outer islands has been the construction of Community Fishery Centres (CFCs), which were intended to provide a marketing, processing and storage facility to absorb the catches of local fishermen. Each Centre would provide a more continuous supply of fish to consumers on the island, with any surplus shipped to Funafuti for sale through the national fishing company. The first Centre was built in Vaitupu with Japanese aid funding in the early 1990s, and further Centres built in Nukufetau and Nanumea in 1997 with Australian aid. These three islands were selected as the most promising locations, due to their relatively large populations and/or their abundant fish resources.

Although it soon became clear that none of these projects was financially viable, the Government proceeded with the construction of further Centres of the Australian design in Nanumaga, Niutao, Nukulaelae and Nui. These were built during 2000 and 2001 and were financed by the Government. The problems experienced with the operation of these Centres repeats many of the lessons learned in other Pacific Island countries with similar projects over the past 40 years. These have included transport and marketing problems, frequent breakdowns of refrigeration machinery, unexpectedly low and inconsistent supplies of fish, financial mismanagement, and confusion over responsibilities between the local administration and headquarters. Even in the best circumstances – operating with professional managers and handling relatively large volumes of fish for high priced markets – rural Fisheries Centres in the Pacific Islands have never sustained a profitable operation for any length of time.

The current situation of the CFCs in Tuvalu can best be described as ‘run down’. Although Centres in Vaitupu, Nanumea and to a lesser extent Nanumaga are still actively buying and selling fish on a daily basis, others are barely operating. All Centres have broken down equipment and other maintenance needs. Each Centre received subsidy from the Government in 2008.

On the other hand the CFCs are viewed as providing a valuable service by the communities of each island, and a decision to close them down would be very unpopular. It is also true that they provide one of the few sources of paid employment and opportunities to earn income on most islands. A review of the CFCs was carried out in 2004, and most islands have endorsed the recommendations.

Source: National Master Plan for Fisheries Development 2008 – 2011

Socio-economic contribution of the fishery sector

Role of fisheries in the national economy

A recent study by the Asian Development Bank attempted to quantify the fishery-related benefits received by Tuvalu. The study gave the available information on the contribution of fishing/fisheries to GDP, exports, government revenue, and employment. The results can be summarized as:

- Official estimates show that fishing in 2002 was responsible for 8.2 % of the GDP of Tuvalu. A recalculation using a different methodology shows it was 25 percent greater.
- Exports of fishery products form most of the exports of Tuvalu, but the total amount of all exports is quite small.
- Access fees paid by foreign fishing vessels in recent years represent 13.3 % of all government revenue.
- Employment in fisheries (both formal and informal) is quite important; 67% of all households in Tuvalu are involved in fishing activities.

From the above it can be seen that in Tuvalu fisheries make a relatively important contribution to GDP, government revenue, and employment.

Supply and demand

Supply

The government has several strategies to increase the national fish supply. These involve supporting the communities fisheries centres (box in Section 4.2) and encouraging shipments of fish from the outer islands, having the Fisheries Department focus on small-scale fisheries development, and promotion of aquaculture.

Major factors affecting the local supply of fish are over-fishing in Funafuti, transport links to the outer islands, and the cost of commercial fishing from Funafuti.

Demand

The per capita consumption of fish in Tuvalu, based on the 2007 FAO Food Balance Sheet, is 41.3 kg. Various other studies have made estimates ranging between 85 and 146 kg. Considering Tuvalu's population, 100 kg of fish consumption per capita translates into a 2010 demand for 979 tonnes of fish. Factors influencing the future demand for fish are migration from the outer islands (where fish consumption is highest) to Funafuti, population change, increase in the price of fish (mainly due to fuel cost increases), relative cost of fish substitutes, overseas cash remittances (enables greater consumption of fish substitutes) and changes in dietary preferences.

Trade

The published export statistics of Tuvalu are not very detailed – they are only disaggregated to the level of “Consignment”, “Other”, or “Sold”. Staff of the Central Statistics Division Customs Department indicate that virtually all of the “Sold” category consists of marine products such as beche de mer. Staff of the Customs Department indicate that the only significant exports in recent years are beche de mer and aluminium scraps (crushed cans), with the latter actually being a re-export.

The fishery exports of Tuvalu in 2007 was estimated as USD 305 thousands, including USD 4 202 of beche-

de-mer (CSD 2008)²².

(22) CSD (2008). Biannual Statistical Report. Central Statistics Division, Ministry of Finance and Economic Planning. Government of Tuvalu.

Food security

Fish is an extremely important element of food security in Tuvalu. The FAO Food Balance Sheets show that in 2007 fish contributed an average of 22.3% of all protein to the diet and 38.0% of animal protein. In the outer islands the contributions are much higher. Animal protein substitutes for fish consist mainly of various types of imported meat, much of which are extremely fatty and have negative health implications.

Employment

SPC (2005) presents the main findings of demographic, socioeconomic, household and housing information collected in the 2002 Population and Housing Census of Tuvalu. With respect to fishing employment, the report states:

- 67% of all households in Tuvalu were involved in fishing activities, although mainly for their own consumption.
- The highest percentage of households participating in fishing was on Nanumea (95%) and the lowest was on Funafuti (52%).
- Commercial fishing was slightly more common in the outer Islands than in Funafuti (10% and 8% respectively).
- Of those households that engaged in fishing, most fished only on the reef, especially in Funafuti (Figure 29). However, a large minority (42.5%) of all households fished both inside and outside the reef. Just over 6% of all households fished only outside the reef.
- Of the 528 people whose main economic activity was fishing, 68 (12.9%) were females.

Rural development

In the fisheries sector the major rural development efforts of the government have been the community fisheries centres (box in Section 4.2). Other development schemes on the outer islands have consisted of the promotion of commercial fish drying/salting, improvements in inter-island shipping arrangements, introduction of trochus, and (for some islands) aquaculture trials.

Trends, issues and development

Constraints and opportunities

Some of the major constraints of the fisheries sector are:

- Many of the inshore fishery resources, especially those close to the Funafuti urban markets, are fully or over-exploited.
- Small-scale fishers experience difficulty in economically harvesting the relatively abundant offshore tuna resources; chasing tuna schools with outboard-powered skiffs is relatively inefficient, especially in an era of high fuel costs.
- There are considerable difficulties associated with economically marketing fishery products from the outer islands where abundance is greatest to the Funafuti urban area where the marketing opportunities are greatest. The community fishery centres are likely to require subsidies in perpetuity.

- The box in Section 3.1 details the multitude of constraints on establishing an industrial fishery in Tuvalu. The difficult transportation logistics to outside markets, lack of support services, high cost of fuel, poor availability of water, little heritage of major commercial activity, high costs of doing business, limited domestic market for by-catch and other factors, all work against the establishment of a domestic fishing industry like those of many Pacific Island countries.

The opportunities in the fisheries sector include:

- Improvements in the process of negotiating foreign fishing vessels access to the Tuvalu EEZ.
- Encouraging the industrial fishing vessels to offload fish on Funafuti.

Tuvalu's National Master Plan for Fisheries Development 2008–2011 lists additional opportunities:

- Invite expressions of interest from fishing companies in a partnership to develop tuna longlining and deep water bottom fishing in the Tuvalu EEZ
- Engage with pearl culture and aquarium fish export companies
- Develop and implement a detailed plan for the upgrading of the community fishery centres.
- Undertake a FAD deployment programme, for Funafuti and islands without lagoon fishery resources.
- Develop some simple regulations to conserve the most threatened fisheries resources
- Develop and approve a tuna management plan
- Establish a giant clam hatchery
- Develop a shell handicraft project to supply shell cutting and polishing equipment to each island's CFC for the production of new types of shell handicraft,
- Request a donor an institutional strengthening project
- Establish a Fisheries Advisory Council
- Support the Tuvalu Fishermen's Association

Another opportunity that is presently being developed is a joint-venture with a Taiwan Province of China firm to own and operate a tuna purse seine vessel. The Tuvalu-Chingfu joint venture provides the opportunity for Tuvalu to participate in the purse seine fishery – in exchange for granting the seiner assured access to the fishing grounds of Tuvalu and neighboring countries.

The perceptions of the various island communities in Tuvalu as to development possibilities were obtained as part of the process in the formation of the National Master Plan for Fisheries Development 2008–2011. These are given in the table below.

Table 7 - Areas of development interest from community consultation - Tuvalu

Description of area of interest	NUK	FUN	NKF	VTP	NUI	NTO	NGA	NMA
<i>Marketing</i>								
New products and markets	X	X	X	X	X	X	X	X
Processing waste for animal feed		X			X	X	X	
Improved transport to Funafuti	X						X	X
<i>CFCs</i>								
Upgrade of storage/freezers	X		X	X	X	X	X	X
Infrastructure – jetty, market	X	X	X					
Provision of equipment	X	X	X	X	X	X	X	X
Staff training	X		X	X	X			X
Improved management			X			X		
<i>Resource management</i>								
Resource assessment and surveys	X		X					X

Advice on management measures	X	X	X	X	X	X		
Help with Conservation Areas	X	X					X	
<i>Fish Aggregation Devices</i>								
Deployment of FADs		X	X	X	X	X	X	
<i>Safety at Sea</i>								
Sea safety supplies (flares etc)		X		X		X	X	X
Training in OBM maintenance			X	X	X	X	X	
Rescue vessel				X			X	
<i>Fishing technology</i>								
Supply of fishing gear for resale	X	X	X	X	X	X	X	X
Other supplies – spares, petrol			X					X
Training in fishing gear/methods		X		X	X			
Launch for offshore fishing				X			X	X
<i>Aquaculture</i>								
Hatchery based (clams, pearl)	X	X		X	X	X		X
Fish pond (mainly milkfish)	X	X	X	X	X	X		X
Other – seaweed, transplantation		X			X	X	X	
<i>Women in Fisheries</i>								
Shell handicraft making		X	X	X	X	X	X	X
Other (training, boat)							X	X
<i>Fisheries infrastructure</i>								
Fishing boat harbour						X	X	
New reef passage							X	
Navigation lights for passage				X	X	X	X	
<i>Other</i>								
Monitoring/reporting of FFVs						X	X	
Traditional fishing methods							X	
Jobs on foreign fishing vessels							X	

Notes: Nuk = Nukalaelae; Fun = Funafuti; Nkf = Nukufetau; VTP = Vaitupu; Nui = Nui; Nto = Nuitao; Nga = Nanumanga; Nma = Nanumea. An important aspect of fisheries development opportunities in Tuvalu concerns the resilience of the atoll environment to fishing pressure. The ability of atolls, with characteristically clear water and relatively small inflow of nutrients, to support substantial fisheries production over the long-term is thought to be relatively low compared to areas adjacent to much larger land masses. It has become apparent, across the Pacific, that atolls and other small islands are unable in the long-term to support substantial export fisheries relying only on inshore fishery resources and that attempts to do so have resulted in lower fish available for local consumption.

Government and non-government sector policies and development strategies

The most recent articulation of the government's policies and strategies in the fisheries sector are found in the National Master Plan for Fisheries Development 2008–2011. These are:

Key Policy Objectives:

- Improve management of fisheries resources – inshore and EEZ;
- Eliminate subsidies to CFCs through efficiency gains, privatization or closure;
- NAFICOT is made commercially viable.

Priorities and Strategies:

- Review operations of CFCs to reduce subsidies through efficiency gains, privatization or closure;
- Develop and adhere to a fully costed business and management plan for the operation of NAFICOT's long-line venture so that no subsidy is required;
- Increase revenue from fish licensing;
- Formulate and implement a clear, coherent and integrated fisheries sector development programme.

The private sector in Tuvalu is very small and its policies are not formalized. The fishers association in Funafuti is vocal on obtaining government support for lower fuel costs and for safety gear on the local troll vessels.

Research, education and training

Research

Many fisheries research projects have been carried out in Tuvalu. The older research is listed in the document "Tokelau and Tuvalu: an atoll fisheries bibliography"²³. The results of many of the research projects are summarized by resource in the "Tuvalu fisheries Resources Profiles"²⁴.

Fisheries research in Tuvalu in the past few decades has included coverage of tuna, tuna baitfish, ciguatera, giant clams, trochus, fish nomenclature, marine ethno-biodiversity, aquaculture potential, specimen shells, beche de mer, pearl oysters, deepwater bottomfish, seabirds, traditional fishing, and turtles.

Research is not mentioned in Tuvalu's National Master Plan for Fisheries Development 2008 – 2011, but the Plan proposes a new structure for the Fisheries Department that includes a Principal Fisheries Officer for fisheries research.

(23) Gillett, R. (1988). *Tokelau and Tuvalu: an atoll fisheries bibliography*. Document 88/4, FAO/UNDP South Pacific Regional Fisheries Development Programme, Suva, Fiji, 72 pages.

(24) Wilson, M. (1995). *Tuvalu fisheries Resources Profiles*. Report 95, Forum Fisheries Agency, Honiara.

Education and training

Education related to fisheries in Tuvalu is undertaken in a variety of institutions:

- Academic training in biological, economic and other aspects of fisheries is given at the University of the South Pacific in Suva, and to a lesser extent at universities in New Zealand, Australia, Japan, and the United Kingdom.
- Training courses, workshops and attachments are frequently organized by the regional organizations: the Secretariat of the Pacific Community in New Caledonia and by the Forum Fisheries Agency in the Solomon Islands. The subject matter has included such diverse topics as fish quality grading, stock assessment, statistics, seaweed culture, fisheries surveillance, and on-vessel observing.
- Courses and workshops are also given by NGOs and by bilateral donors.

Foreign aid

The major bilateral donors in the fisheries sector are Australia, France, Japan, New Zealand and Taiwan, Province of China. The major multilateral donors are the European Union and ADB. Assistance has flowed from UN agencies, including FAO, UNDP, ESCAP, and UNCDF. The regional organizations serving Pacific Island countries, including the Forum Fisheries Agency, the South Pacific Commission, the South Pacific Regional Environment Programme, the Forum Secretariat, and the South Pacific Applied Geoscience Commission have also been active in supporting Tuvalu's fisheries sector.

Projects have variously been concerned with the provision of shore-based plant and equipment (buildings, ice plant, boat harbours and wharves, fishing gear), resource surveys and research (deep bottom fish, aquaculture), the provision of fishing vessels, and assistance with projects involving marketing, training, and statistics. One of the themes of the Tuvalu's National Master Plan for Fisheries Development 2008 – 2011 is developing greater self-reliance: "Although Tuvalu has had political independence for 29 years, the country has developed an increasing economic dependence on overseas aid. While the flow of aid funds has undoubtedly improved the infrastructure – particularly on Funafuti – and increased the material prosperity of most Tuvaluans, it has also created a culture of dependency. Almost every planned activity in the Fisheries Department now seems to require donor assistance and funding. This is not healthy, and it may not be sustainable."

Institutional framework

The main government fisheries institution is the Fisheries Department of the Ministry of Natural Resources and Lands.

The Marine Resources Act 2006 gives the Minister responsible for fisheries the power to administer the fisheries and make regulations as he sees fit. According to the Act, the Minister "may appoint in writing a fisheries officer and such other officials to discharge fisheries related functions". In practice, the Fisheries Director reports to the Chief Executive Officer of the Ministry, who reports to the Minister, and who in turn reports to Cabinet.

The main focus of the Fisheries Department is on coastal fisheries development and on management of the activities of the foreign fishing vessels that operate in Tuvalu's EEZ.

The Fisheries Department can be thought of as being partitioned into four sections. These are:

- Inshore Fisheries Management and Aquaculture
- Licensing, MCS and reporting on commercial tuna fishing and access arrangements
- Vessel operations, support to CFCs, Maintenance of assets
- Support Staff

According to Tuvalu's National Master Plan for Fisheries Development 2008 – 2011, the Fisheries Department has adequate numbers of staff, many of whom are well qualified and have frequent chances to upgrade their skills through overseas training. It also has some useful assets, notably the vessel MV Manau, which allows service delivery to the outer islands as well as earning revenue through charters. However, the Department is constrained by the following:

- Most of the budget is consumed by wages (including that for the community fisheries centres) and subsidies, leaving very little for actual activities (or even maintenance of assets);
- Partly as a result of this, nearly all activities are donor driven - they either require donor funding, or result from initiatives of regional organizations, or both;
- Senior staff are new in their roles, and are heavily committed to regional issues requiring frequent travel overseas.

Other important fisheries institutions in Tuvalu are the Funafuti Fishermen Association and the 'Falekaupule'

on each island. The latter is a traditional body responsible for making decisions regarding development and management of fisheries resources and other matters at the island level.

Some of the important internet links related to fisheries in Tuvalu are:

- www.spc.int/coastfish/Countries/Tuvalu - Information on Tuvalu fisheries, links to other sites
- www.spc.int/coastfish/news/Address_Book/Address_book.htm - fisheries address and contact in Tuvalu
- www.fishbase.org – information on fish found in Tuvalu

Legal framework

The Marine Resources Act 2006 is the main law dealing with fisheries in Tuvalu. It is a 79-page document in 11 parts. The main features of the Act are:

- The principal objective of the Act is to ensure the long-term conservation and sustainable use of the living marine resources for the benefit of the people of Tuvalu.
- The Minister responsible for fisheries has the authority for the conservation, management, development and sustainable use of the living marine resources in the EEZ of Tuvalu.
- The Minister must take into account 15 stated principles and measures in the conservation, management, and development of fisheries.
- The Minister has the power to administer the fisheries and make regulations as he sees fit.
- The Minister may appoint in writing a fisheries officer and such other officials as needed to discharge fisheries related functions.
- The Minister may declare that a fishery important to the national interest is a “designated fishery”.
- The Fisheries Officer shall prepare a management plan for each designated fishery.
- 13 requirements for each fisheries management plan are specified.
- All vessel engaged in fishing must have a valid/applicable permit under the Act or a valid/applicable license under a multilateral access agreement in accordance with the Act.
- The transshipment of fish in the Tuvalu EEZ is regulated.
- The requirements for a Tuvalu fishing vessel operating outside of Tuvalu waters are given.

Other relevant legislation includes the Marine Zones (Declaration) Act of 1993 and the National Fishing Corporation of Tuvalu Act of 1980, revised in 1982. The relevance of the latter has diminished due to the activities of NAFICOT being greatly reduced in recent years.

More information at: **FAOLEX legislative database**

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Additional information

FAO Thematic data bases

- **FAO Country Profile**
- **Fishery reports (FIRMS)**
 - Pacific islands region : Marine fisheries : 2009
 - World : Deep-sea fisheries : 2009
 - World : Global Tuna Fisheries : 2009
- **Database on Port State Measures**
- **FAOLEX legislative database**
- **Database on Introductions of Aquatic Species**
- **Regional Fishery Bodies (RFB)**
 - Forum Fisheries Agency (FFA)
 - International Whaling Commission (IWC)
 - Secretariat of the Pacific Community (SPC)
 - Western and Central Pacific Fisheries Commission (WCPFC)
- **FAO Fishing Vessels Finder (FVF)**

Publications

- List of relevant FAO publications

Meetings & News archive

- Meetings archive
- News archive

