Marshall Islands Marine Resources Authority

Annual Report 2002/2003

October 2003.

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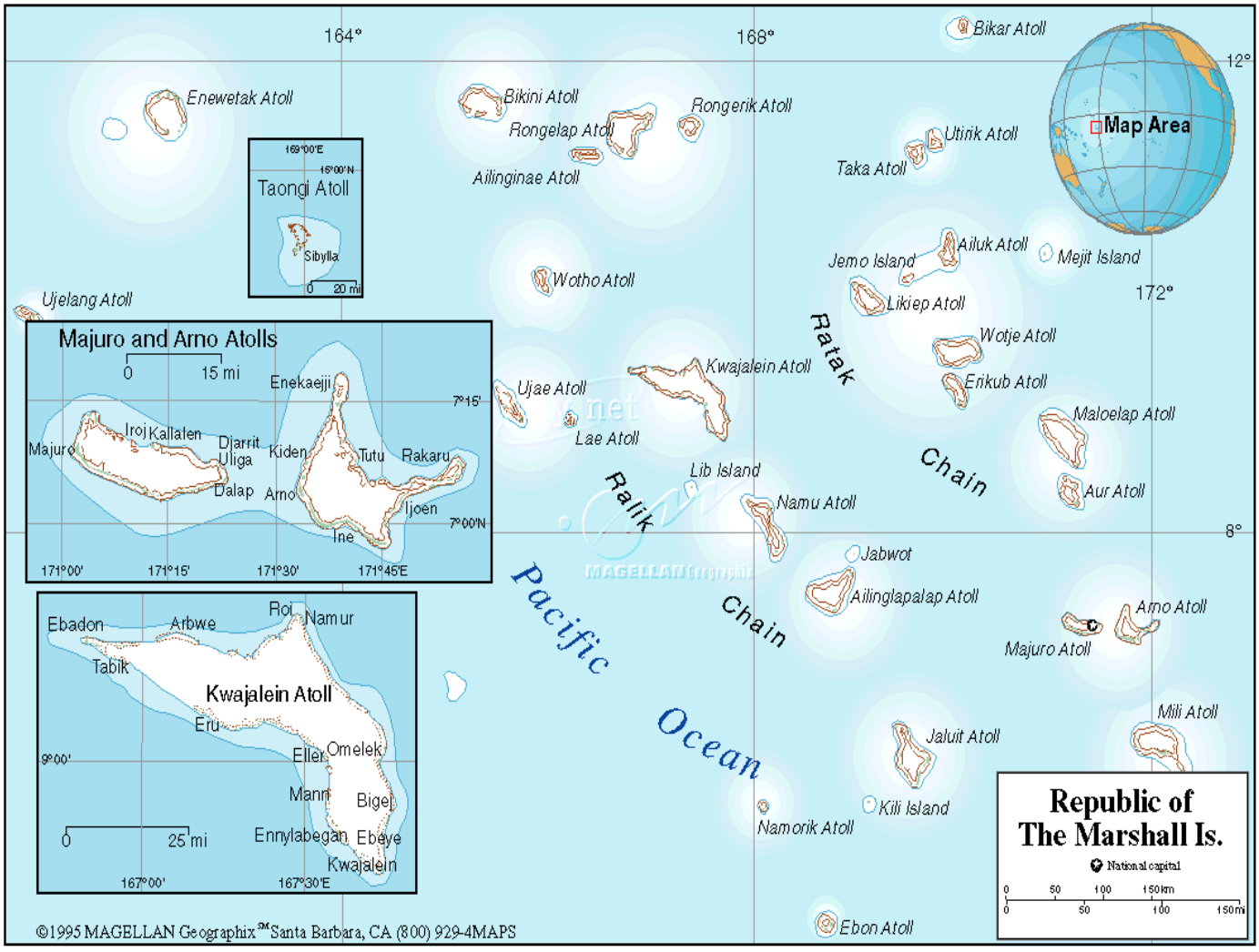
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Bikar Atoll
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Jemo Island
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Likiep Atoll
Wotho Atoll
Ujelang Atoll
Ratak Chain
Wotje Atoll
Erikub Atoll
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Jaluit Atoll
Mili Atoll
Kili Island
Namorik Atoll
Ebon Atoll
Republic of The Marshall Is.
National capital
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• Oceanic and Industrial Affairs

• Export Requirements

Working alongside with the Food and Agriculture Organization (FAO), the MIMRA has developed the seafood export requirements of the RMI. After the training of potential seafood inspectors and a study tour to Bangkok, Thailand, a consultant visited the RMI to assess the situation of exporting companies and the Authority itself.

Along with the seafood management system, the Authority has also developed a processing, marketing, and export regulation for the RMI. It has been evaluated, edited and commented upon by the Office of the Attorney General and finally ready for further action. A working group will be established to further bring in the local requirements, emphasizing on practical aspects, as well as looking at the present and future potential impacts, while further developing the RMI standards. At the same time, they will work together to bring the regulations to adoption by the appropriate Authorities.

Once the draft regulations and management system are adopted, exporting companies must meet such requirements, as having a HACCP plans, implementation of GMP/SSOP, and pass inspection and auditing. All existing and future export establishments must conform to these set standards. Procedures for obtaining export certificates will soon be in place. Consignments will be inspected regularly before export certificates are issued. Inspections of the premises and operation will also be conducted prior to issuance of a license and then every so often. In response to this, the MIFV has made an effort to conform to the pending local standards. It has drafted plans for renovation of the facility to ensure product safety.

• Marshall Islands Fishing Venture

The Fish base, built in 1983, was a development aid package provided by Japan under its grant aid program by the Japan International Cooperation Association. Its primary intention was to assist the Marshall Islands in developing a national fishing industry. Mehau Fishing Co., a Hawaiian based company, first operated the Fish Base. Later came Ting Hong Co, a Taiwanese based company, who then moved out in late 1998.

In early 2001, the company, Marshall Islands Fishing Venture (MIFV) was established and became the third operator of the Fish Base. The MIFV is a subsidiary of Luen Thai Holding Ltd., based in Hong Kong. It agreed to renovate and restore the Fish Base to service Tuna Longline fishing vessels.

In October 2001, the company began hiring and training locals for the operation of the Fish-Base. At the same time, eight of its vessels arrived to take up licenses for fishing within the Republics Exclusive Economic Zone. As of today the MIFV currently employs thirty-five Marshallese boys, with jobs ranging from the processing line to the administration office. The company has also been hiring on locals for key positions at the base. There are currently two employees holding such positions. It is hoped that in the future, locals will hold all key positions at the base.

The MIFV is also an exporting company for whole tuna fish, tuna loins and by catches such as blue marlin and swordfish, with their main markets being the US and Japan. Currently, there are nine companies in the US importing whole tuna fish, tuna loins, and by catches with bigeye being the favored fish to export. Data reveal that April, was the busiest month for the MIFV, whereas August appeared the slowest, bringing the total tonnage exported, to the US, to almost 1,100 tons. The table below shows the species and tonnage of fish that were exported to the US per month for the duration of one year. Loins such as bigeye loin, yellowfin loin, and blue marlin loin are also exported however, in the table below, loins have been lumped with its tuna species.

Table 1. MIFV Export to US Markets 2003

Species	BET	YFT	BLZ	SWD	Total Ton
Tonnage	631	175	5	8	819

Source: MIMRA, MIFV
BET: Bigeye Tuna **YFT**: Yellowfin Tuna **BLZ**: Blue Marlin Loin **SWD**: Swordfish

Where the MIFV also exports loins to the US, the company exports only whole fish to its customer in Japan, Luen Thai Fishing Venture Ltd. May and June appear to be the slowest month for the base whereas January saw 118 tons of fish exported to Japan, bringing the total ton exported in a year to 469.

Table 2. MIFV Export to Japan Markets 2002-2003

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
2002-2003	118	97	94	67	11	9	17	32	23	469

Source: MIMRA, MIFV

Table 3. MIFV Export to US and Japan Markets 2001-2003

	BET	BET loin	YFT	YFT loin	BLZloin	SWD	Tuna Belly	TOTAL
2001-2002 US	468	*No export*	130	*No export*	0	0	*No export*	598
2002-2003 US	709	0	183	1	4	9	0	906
2001-2002 JP	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	62
2002-2003 JP	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	469
TOTAL								2,035

Source: MIMRA, MIFV

Table 3 presents a somewhat view of the exports being conducted by the MIFV to its markets in the US and Japan. The company began operation in late 2001; therefore, data is only available beginning in December of the year. Furthermore, where the MIFV submits detailed and daily reports of its US exports to the MIMRA, it only provides monthly reports of its Japan exports. Therefore, the total amount per tuna species to Japan is currently unavailable. With plans to revise the MIMRA database, to include exports, such information shall be available in the near future.

The base operates with locally based foreign fishing vessels, chilled longline vessels, from Mainland China and Taiwan. The outlook for the year of operation, as stated in the last annual report, by the MIFV is based on license fee negotiated per vessel, and the projected number of vessels to be licensed, as shown in Figure 1 below. It was anticipated that the MIFV would operate with 30 vessels; however, the base operates with 10 more vessels than was anticipated. As a result $24,000 USD more was received for license revenue. The license validity for these vessels range from 3 months, 6 months and 1-year period, depending on the vessel operator.

Table 4. Projected MIFV License Rev. 2002/2003

Annual Licenses	25 vessels	$200,000
*Annual Licenses	5 vessels	$30,000
		$230,000

Source: MIMRA
*Clear Water Vessels

Table 5. MIFV License Revenue 2002

Annual licenses	20 vessels	$160,000.00
Semi-annual licenses	15 vessels	$75,000.00
*Annual licenses	2 vessels	$12,000.00
*Quarter licenses	3 vessels	$7,000.00
		$254,000.00

Source: MIMRA
*Clear Water Vessels

In regards to food safety, the MIFV has made an effort to conform to both local and international standards. The base has contacted MIMRA staffs for advice on facility layout, which will ensure the production of safe seafood. Renovation of the facility will commence early next year.

- **Philippines, Micronesia & Ocean Processing Co., LLC**

The Philippines, Micronesia & Ocean Processing Co., LLC (PM&OP) began its operation in the Marshall Islands in 1999. Being a tuna loining plant, the PM&OP's main customer is the American Starkist Tuna Company in PagoPago, American Samoa, which is a tuna cannery.

Tuna are mainly purchased from vessels, carrier and purse-seiners, calling port in Majuro. The raw materials are processed at the loining plant, vacuum-packed in plastic bags and shipped to its customer in refrigerated containers. The remains of the cooked loins, such as bones, etc. are processed into fishmeal, packed and exported to customers.

In 2000, the company had exported 4,000 tons of loins to PagoPago and continued at the rate up to 2002. However, in 2003 the total tonnage of exported loins increased by 830 tons. It is anticipated by the plant that with the new plans, the plant will increase its production.

Since the establishment of the plant in 1999, it has undergone much change in four years. The year 2003 was a time in which the plant really underwent many changes and addition. The 4th line, which was added in 2002, started working; the canteen and more lavatories were added. More employees from the Laura area were hired to work the night shift. As a result, two new buses

were purchased to provide transportation from and to Laura.

In terms of food safety, an expert auditor from the Thailand Fish Inspection Quality Division, using the Thailand deficiency ranking criteria, also inspected the PM&OP Plant in 2003. The results revealed that the plant meets the international market requirements and currently stands as the leading producer of safe fish products in the Marshall Islands. Thereby contributing to the countries' reputation of exporting safe seafood.

- **Fishing Agreements**

Table 6 shows the various entities, which has access rights, through fishing agreements in the RMI EEZ. It includes all but one of the entities, which has rights last year as shown in the table below. The administration of the access agreements takes into account the measures, and policy, at the regional level (Forum Fisheries Agency, FFA and the Secretariat of the Pacific Community, SPC region). These include the Palau arrangements, minimum terms and conditions of access, FFA regional and the Vessel Monitoring System (VMS), VMS registry, as well as the standardized forms for fishery data. It should be noted that these regional efforts also take into account various international practices and norms for fishery operation, particularly the application of the Food And Agriculture Organization (FAO), Code of Conduct, etc. Two of the "Country/Party" category in Table 1 is administered by the FFA, of which the RMI is a member. The U.S Treaty allows for U.S purse seiners to operate in the RMI zone and the FFA member countries EEZ. The FSM Arrangement, on the other hand, allows for domestic flagged purse seiners to fish in the arrangements' parties' EEZ. FSM Arrangement parties include the RMI, FSM, Nauru, the Solomon Islands, PNG, Palau, and the Kiribati. Under the arrangement, the RMI has five flagged purse seiners active: Koo's 101, 102, 103, 106, 107, and 108.

Table 6. Access Agreements in the RMI Exclusive Economic Zone for 2002/2003.

Country/Party	Agreement Type	Administrator	Arrangement Type
USA	**Multilateral**	**FFA**	**Regional Arrangement**
Japan	**Bilateral**	**MIMRA**	**Government to Government**
Taiwan	**Bilateral**	**MIMRA**	**Industry to Government**
Korea	**Bilateral**	**MIMRA**	**Industry to Government**
FSM Arrangement	**Multilateral**	**FFA**	**Sub-Regional**
Fong S:ong Co.	**Bilateral**	**MIMRA**	**Industry to Government**
Shandong Fishery Co.	**Bilateral**	**MIMRA**	**Industry to Government**
Shangai Fishery Co.	**Bilateral**	**MIMRA**	**Industry to Government**
MIFV	**Bilateral**	**MIMRA**	**Industry to Government**
New Zealand	**Bilateral**	**MIMRA**	**Industry to Government**

The FFA in the Solomon Islands administers both the U.S treaty and the FSM Arrangement, and advice member countries of progress and operations, including disbursement of funds through the arrangements. The other longline company, Edge-Water Fishery, which was given experimental fishing licenses for shark fishery, has ceased its operation late last year due to breaches in its agreement with the MIMRA. Table 7 presents the companies/parties and the number of vessels per gear type operated by each the past year.

Table 7: Company and Gear type of operations – Number of Vessels

Country/Party	Gear/method	Number of Boats	Flag
USA	**Purse Seine**	**26**	**USA**
Japan	**Purse Seine**	**34**	**Japan**
	Longline	**29**	**Japan**
	Pole and line	**32**	**Japan**
Taiwan	**Purse Seine**	**40**	**Taiwan**
Korea	**Purse Seine**	**26**	**Korea**
!FSM Arrangement	**Purse Seine**	**26**	**FSM, RMI, KI, SI, PNG**
Fong Seong Co.	**Purse Seine**	**2**	**Vanuatu**
Zhandong Fishery Co.	**Purse Seine**	**2**	**PROC**
Shangai Fishery Co.	**Purse Seine**	**2**	**PROC**
MIFV	**Longline**	**34**	**PROC, Taiwan**
New Zealand	**Purse Seine**	**4**	**NZ**
***Clear Water Fishery**	**Longline**	**2**	**FSM**

!Includes the RMI flagged vessels, KOO's 101, 102, 103, 105, 107, 108
*Operates under the MIFV
Source: MIMRA

The period saw a total of 259 vessels, excluding the carriers, operating in the RMI. Again the purse seiners comprised the majority of the licenses issued, with 162 vessels, 65 licenses issued for longline vessels, and 32 licenses issued for pole and line vessels. The Japanese longline and pole and line vessels continue to decrease in numbers, dropping from last year's 45 longline vessels and 74 pole and line vessels. This may be due to the shift in fishery towards the South-west Pacific, such as Papua New Guinea and the Solomon Islands. Perhaps it is due to the adverse effects of La Nino and El Nina, we are not entirely sure. The relative low numbers of licensed vessels and catch and effort in zone with the relative comparison of operations in the region is the only lead.

- **Transshipment Activities**

Fishing vessels continue to call in port Majuro for transshipment, however a decline has been observed. A total of 148 transshipments occurred in Majuro, with a total of 70 vessels showing up for transshipment, a significant drop of more than half of the number of vessels that transshipped in 2001/2002. It had been anticipated that in the year, 2002/2003, a further decrease in fishing effort, and transshipment activity, with the shift in fishery away from within and the vicinity of the RMI EEZ, obvious already in the decreasing catch of fish. At least from what we can gather from the region, during the period, the FSM, PNG, and Solomon Islands experienced a high port call visit by fishing vessels for transshipment purposes.

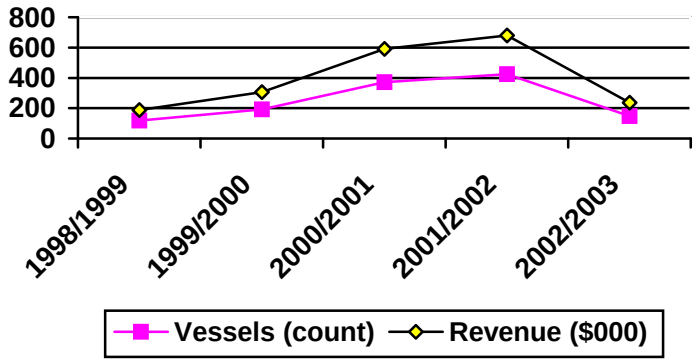
The Taiwanese fleet still dominates the transshipment sector. While it is evident that the proximity of the fishing ground to Majuro makes it economical for the vessels to call Majuro, other factors such as provisioning, crew rest and exchange, and to some extend, leisure activities, entice Majuro port to these vessels. The recent homeland security measures put in place by the United States would also play a role, in so far as vessels deciding to go to port, especially in Guam and Hawaii port. Though this does not have a direct relation to the transshipment activity, the activities and businesses that would compliment the transshipping vessels in Guam and Hawaii, have had serious impacts on their operation. Table 8 presents the numbers and fleet transshipped in Majuro for the period.

Table 8. Transshipment in RMI by party and gear type

Country/Party	Purse Seine	Pole & line	Longline	Carriers/bunkers	Total
USA	0				0
Japan					0
Taiwan	60			8	68
Korea	7			2	9
FSM Arrangement	8				8
Fong Seong Co.	28				28
New Zealand	2				2
China	14				14
Others	15			4	19
Total Vessels	134			14	148
FEE (U.S$ 000)					

Source: MIMRA

Figure 1: Trannshipment in Majuro port since 1998



Source: MIMRA

As can be observed from the chart above, during all three years, 2001/2002 is the Marshall Island's leading year in transshipment activities. Taiwan dominates the transshipment sector. USA and New Zealand vessels occasionally call in port however more frequently they offload their catch to the tuna cannery in American Samoa. As with the previous years, Japan vessels occasionally call in port for the embarking and disembarking of crewmembers, provisioning, and emergency stops. After each fishing trip, Japanese vessels return to Japan where the catches are offloaded.

- **License Revenue**

The license fee for the foreign fishing vessels represents a significant revenue source for the RMI National Government. Since the implementation of the MIMRA Act (revised) in 1997-8, complimented by the reforms, the RMI became a more conducive environment for attracting foreign investment, hence the more Foreign fishing fleet accessed through fishing agreements. Table 9 presents the revenue for the MIMRA through the Oceanic Division, which includes the license fee, catch value, and other fees collected under the bilateral, multilateral fishing arrangements. The total revenue for the period dropped due to the drop in both licensed vessels in the RMI and decrease in the transshipment activities
.

Table 9. License Revenue in RMI for 2002/2003

Country/Party	Purse Seine	Pole & line	Longline	Carriers/bunkers	Total
USA					155,592.28
Japan	34	31	28		1,165,650.44
Taiwan	402,766.66				402,766.66
Korea	263,495.11				263,495.11
FSM Arr.			2		74,712.72
New Zealand	45,200				45,200.00
Fong Seong Co.	20,600				20,600.00
Shandong	20,600				20,600.00
Shanghai	10,300				10,300.00
MIFV			247,000	7,000	254,000.00
Others	10,000		160,300	30,000	200,300.00
Total				37,000	**2,613,217.21**

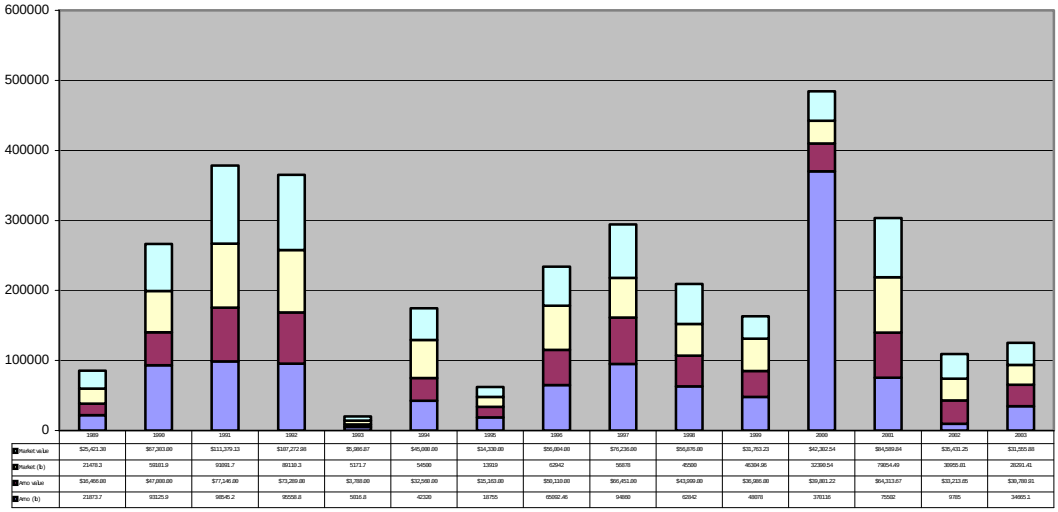
Note: Carriers and Bunkers are not necessarily included as they are either chartered or commissioned

• Coastal and Community Affairs

The Coastal Fisheries Division supervises the outer islands fishing projects and the markets where the fish are sold. There are 2 markets, 7 fish bases, and 2 pilot fishing projects which have been established to increase the level of living in the outer islands by selling The Outer Island Fish Market Center (OIFMC), located behind the MIMRA/R&D Building in Majuro, is where fish from the atolls of Arno, Aur, Jaluit, and Maloelap (including most recently Ebon & Mili) are sold at both retail and wholesale prices. Qualified site managers are stationed at each respective atoll (apart from Mili) to not only buy from the fishers, but to check the quality of the fish brought in and establish location of fishing areas as a safeguard against ciguatoxic fish (*ek in kadrek*). Fish as part of a stable diet, can help promote a healthy lifestyle being a good source of protein. In a quest for healthy living, fear of "*ek in kadrek*" can seriously ruin the reputation a relatively good and edible fish. Local knowledge of an atoll's fishing grounds and ciguatoxic fish are some of the responsibilities that each fish base manager is required to know on hand when purchasing fish from the community fishers. The assurance of having fish safe for consumption is almost guaranteed.

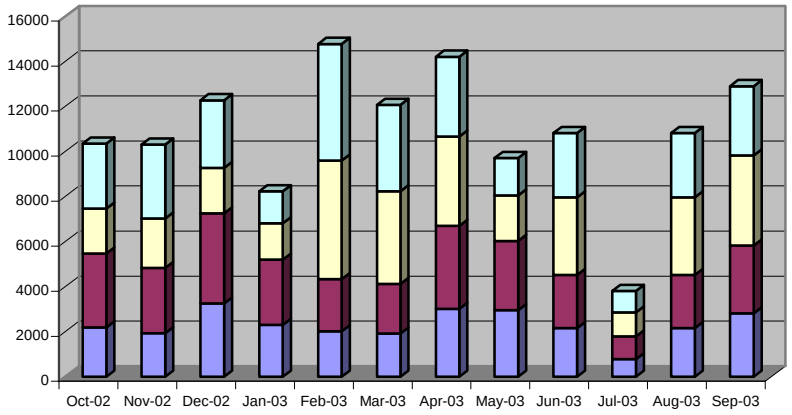
The Arno Atoll Fisheries Association (AAFA) was established in 1989 and has 5 employees. Under AAFA, the two fish bases, located at Arno, Arno and Ine, Arno, select fish to be purchased from the local fisher and provide ice and fuel to be sold not only towards fishing excursions, but also sold to the whole community. Over the past 14 years of operation, more than 1170689 pounds have been marketed to the Majuro community from Arno and FY 2002-2003 brought in roughly 35,100 lbs of fish (a value of $34,563.20). The increase in fuel prices contributed a lot to the operating expenditures of the project at $17,526.72. The rest of the expenses represent salaries, taxes, per diem, repairs, etc.

Figure 2. Arno Atoll Fisheries Association (1989-2003)



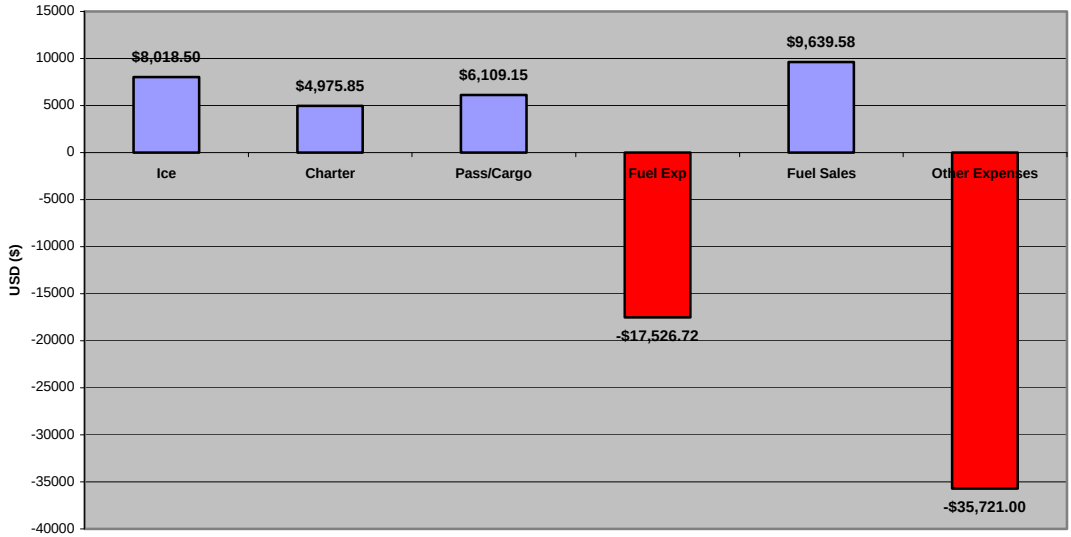
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Market value	$25,421.38	$67,303.00	$111,379.13	$107,272.98	$5,066.07	$45,698.00	$14,338.00	$56,894.68	$76,236.00	$56,676.00	$31,763.23	$42,382.54	$84,589.84	$35,431.25	$31,955.68
Market (lb)	21478.3	58101.9	91691.7	88138.3	5171.7	54598	13919	62942	56878	45599	46394.96	32366.54	79854.49	39955.81	28591.41
Arno value	$36,466.68	$47,666.68	$77,146.68	$73,289.68	$3,766.68	$32,566.68	$25,163.68	$56,110.68	$66,451.68	$43,999.68	$36,986.88	$39,881.22	$64,313.67	$33,213.65	$36,769.91
Arno (lb)	21873.7	93325.9	98545.2	95558.8	5816.8	42330	18755	65692.46	94859	62942	48878	376116	75592	9785	34985.1

Figure 3. AAFA Fish Sales & Purchases (02/03)



	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Arno Value	$2,884.00	$3,285.00	$3,012.20	$1,420.00	$5,185.00	$3,839.00	$3,549.00	$1,666.00	$2,846.00	$958.00	$2,846.00	$3,073.00
Arno #	1992.67	2190	2008.13	1611	5262	4106	3960	2009	3444	1071	3444	4003
Market Value	$3,285.00	$2,899.00	$3,998.00	$2,903.00	$2,315.00	$2,208.00	$3,692.00	$3,082.00	$2,363.68	$1,002.34	$2,363.68	$3,005.67
Market #	2190	1932.67	3261	2302	2020	1925	3012	2956	2161.97	786.71	2161.97	2823.23

Figure 4. AAFA Revenue & Expenses (02-03)



- ## COFDAS

The COFDAS Project, employing 6 people, involves Aur Atoll and Maloelap Atoll and the fish bases have been established with offices, cold storage and freezer facilities and run on diesel generators. 5 boats in Aur and 4 in Maloelap have been made available to the fishermen and the local communities not only to use during fishing excursions but transportation within the atolls. Currently, the water catchment tanks at the Aur fish base, due to unknown reason, was unable to hold water thus preventing from making ice to distribute to the fishermen and community members alike. Plans for next fiscal year is to replace the water catchment tanks for Aur and have all the boats in Aur and Maloelap undergo minor repair and maintenance to keep them in optimal working conditions.

- ## Seaweed Project

The objective of this technical assistance provided by the United Nation Food Agriculture Organization (FAO) is to introduce *Eucheuma cottonii* farming and adopt appropriate cultivation methods including identification of suitable cultivation sites and implementation of a pilot study in the Marshall Islands in collaboration with the relevant government authorities and private sector, local governments

and communities, farmers and students. The technical assistance will enhance the capacity of the Marshall Islands to better develop seaweed cultivation in a sustainable manner as well as with a maximum contribution to food security.

In June 2003, about 20 kilograms (44 pounds) of wild growing *Eucheuma cottonii* were collected in North Tarawa, Kiribati, and transferred to the Marshall Islands by airplane. Upon arrival, they were placed in the aerated tanks for quarantine purpose in one of the College of the Marshall Islands (CMI)'s facilities (Science Station) in Arrak. Seven days later, these seaweed seedlings were planted out on lines and transferred by boat to the Rongrong site in the southern tip of the island. The idea in confining them there was to contain "hitchhikers" or unwanted species just in case there are still some that did not get eradicated during the quarantine period. Secondly, it would give a chance to high school students on the island to broaden their marine science knowledge about seaweed farming.

Rongrong islet in the southern end of the island was chosen as the test plot site based on the site survey conducted in October 2002. The area has good water flow. There are other seaweed species growing in the area and the bottom is soft making it easy for staking. Corals are present indicating that it is always submerged even at the lowest tide. This site was located opposite the high school compound.

During the time of planting, members of the community came to observe the farming operation and participated in the actual planting after getting instructions from MIMRA staff and the Seaweed Specialist. A council member was designated to monitor the plot while students of CMI would weigh the seaweed and monitor growth every fortnight.

It is interesting to note the rapid increase in sizes of the seedlings. About 90% of the lines have all increased in weight with growth rates ranging from 1.3 to 3.4 % per day indicating good results. An average of 2.0 % per day is about the standard that makes a site suitable. The remaining 10% of the lines suffered heavy grazing and lost of seedling due to this problem. Only one of the lines showed negative growth rate as shown in the table below. Mainly the floating lines suffered plant loss. It is advisable to see how growth rates vary throughout the year to determine if there will be variation from year to year. On the last day of

monitoring, a gill net of 1.5" mesh was used to surround the plot to retain any drifting pieces of thallus within the farm.

- **Project for Inshore Fisheries Resource Study and Management in Atoll Areas**

With the assistance of the Overseas Fisheries Cooperation Foundation (OFCF), the commencement of the Atoll Project resulted in the following:

- Systemization of data collection methods regarding the fisheries status and catches
  To find the status of fisheries of Arno Atoll, 20 fishery households in 9 Arno villages were visited to conduct research on fisheries status, consisting of questionnaire survey and interviews. The research items were basic and comprehensive, ranging from family composition, number of vessels, fishing gear/method, frequency of fishing, target species, fishing ground, quantity of catch, balance of accounts, to traditional fishery regulations.

A workshop of Catch Data Collection, aimed at all 12 villages in Arno, was held to explain the "Catch Data" Questionnaires. Only 10 households out of 200 had completed the questionnaires, thus resulting in insufficient data for estimating the actual status of fisheries.

A market research was conducted using the sales books of two distributors who deliver catches from Arno Atoll to major supermarkets in Majuro (July 2002 – June 2003). Due to incomplete sales books and insufficient responses, the actual status was hard to grasp

- Estimation
  Through the insufficient nature of the fisheries status and catches, the estimation of CPUE of rabbitfish value, will be done later on with steady efforts to collect more data.

- Estimation of stock size of giant clam
  A stock assessment of giant clam species in Arno Atoll was conducted and resulted in the following estimated stock size: *Tridacna maxima* – 5, 060,000; *Tridacna squamosa* – 92,000; *Hippopus hippopus* – 59,000. Along with this, satellite photos were taken to show the habitat distribution of the giant clams. The photos and the on site surveys made it possible to study the distribution and

composition of the seabed substrate for all areas of the atoll. The results were compiled into a Geographical Information Map of the entire seabed around Arno Atoll shallower than 20 meters.

- Collection of ecological information required for fisheries management
  For reef fish, interviews with fishermen regarding the distribution of rabbitfish, their juvenile ecology, feeding habits, growth and reproduction age, etc. The collection of the otolith from rabbitfish (*mole*) was conducted and the specimens sent to Central Marine Laboratory of Japan to verify age.
  Along with this, a research on the seasons of production for the three species of giant clams commenced to find the level of maturity of individuals by weighing the mollusk and gonad. Originally, recruitment, mortality and growth rates were to be researched as well but being unnecessary to establish fishery management regulations, this part was cancelled.

- Advice on fisheries management
  Public awareness of the Catch Data Questionnaires, the Arno Atoll Fisheries Management Plan, and Fisheries Management Ordinances, and the roles and importance of the CBFMO (Community based Fisheries Management Organization) and AALFC (Arno Atoll Local Fisheries Committee) were conducted. A total of 32 dedicated members were selected representing each village, traditional leaders, the Mayor and Councilmen of the Arno Atoll Local Government and resulted in a draft Fisheries Management Plan.

- Seed production
  The establishment of the hatchery facility in Arno (equipped with a laboratory, workshop, office and accommodation) within the premises of MIMRA resulted in the grand opening in June 2003. The first spawning induction of giant clams (*T. maxima*) in April 2003, resulted in 13 million fertilized eggs.

- Establishment and extension of grow out farm
  Will commence early 2004

- Activities in Majuro
  Will commence in 2004

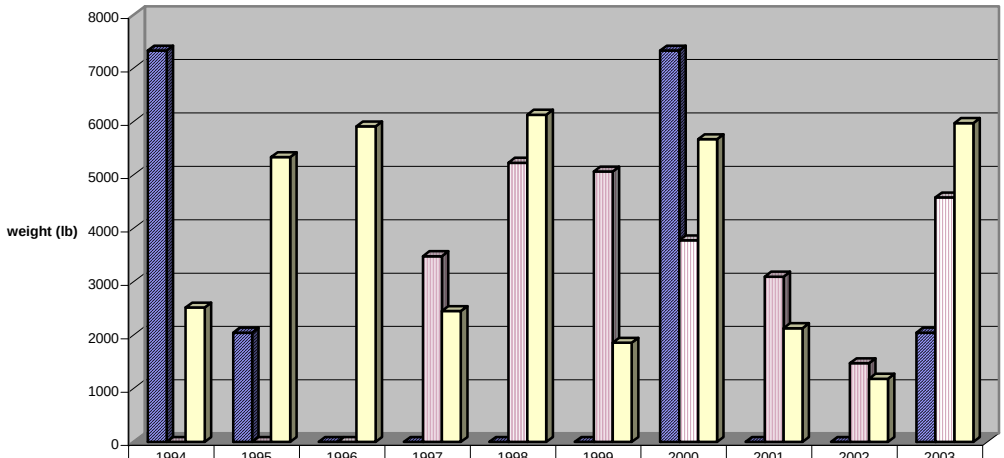
- **JICA PROJECTS**

The JICA has assisted MIMRA in establishing the Kwajalein Atoll Fish Market Center (KAFMC) on Ebeye, Kwajalein and three fish bases – Ailinglaplap Fish Base, Likiep Fish base & Namu Fish Base under the "Project for Improvement of Fish Marketing System in the Outer Islands" which started in 1994 and "Project for Development of Fishing Communities in Jaluit Atoll" in April 2002.

The boat traveling between Ebeye and the three fish bases is the F/V Ieplap. Unfortunately, Ieplap is in need of repair despite the yearly maintenance it receives. It is not only in need of new engines, but a new body as well. Regardless, the KAFMC receives fish from Ailinglaplap, Likiep & Namu almost regularly. The results of this can be seen starting from 2001. Future activities for Ailuk Atoll are now being reviewed to see whether it is feasible to undertake.

An assessment of the status of the fish bases will commence in late 2003 by JICA. The fish bases on Ailinglaplap, Likiep & Namu are powered using photovoltaic solar systems and now require replacement of the batteries.

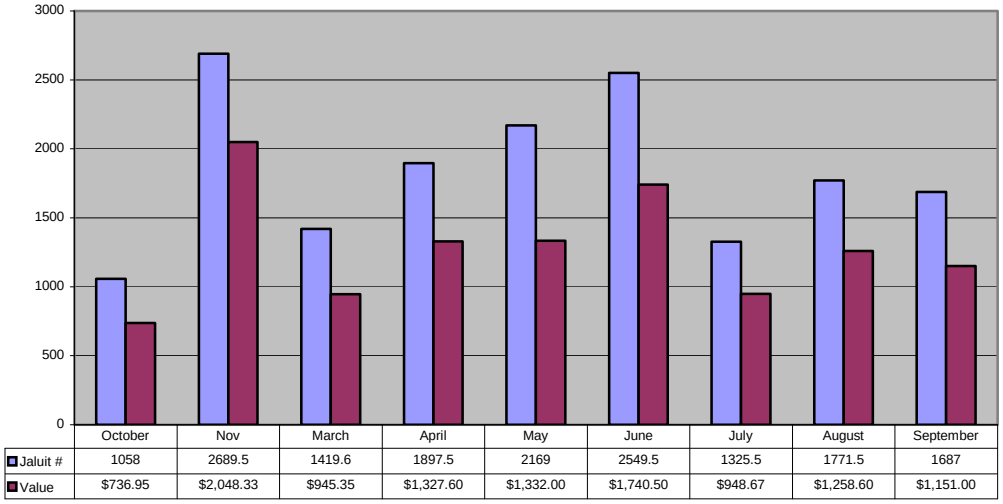
Figure 5. Fish Total for KAFMC



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Ailinglaplap	7330.2	2047	0	0	0	0	7330.2	0	0	2047
Namu	0	0	0	3478	5228	5064	3777	3095	1472	4580
Likiep	2517.6	5334	5909	2449	6127.5	1859	5669	2130	1182	5973

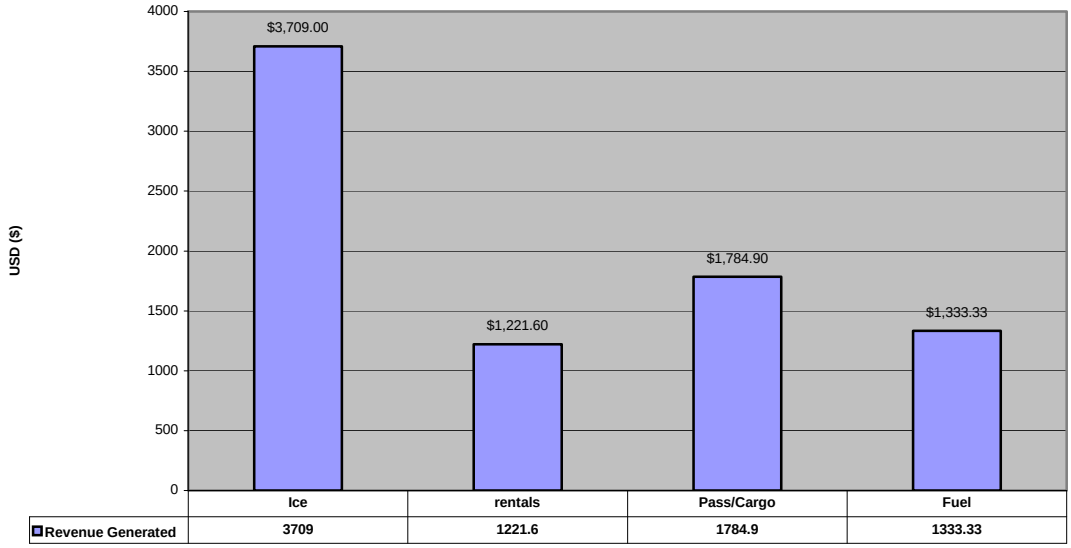
"The Project for the Development of Fishing Communities in Jaluit Atoll" or as it is called now – The Jaluit Atoll Fishing Project (JAFP) has shown a great deal of interest not only to the fishermen but also to the whole Jaluit Atoll community. Nine boats have been provided for the fishermen to use as well as subsidized fuel, ice and storage facility. Each trip from Jaluit has produced a constant supply of very high quality reef fish especially red snappers (*jera* & *jato*) and soldierfish (*mon*) which have become very popular with the customers of the OIFMC in Majuro. Several trips made my F/V Laintok were made to the mini-fish market in Kili Island but had stopped due some minor setbacks. Plans to resume selling fish in Kili are underway and will commence in the near future.

Figure 6. JAFP Fish Purchases



	October	Nov	March	April	May	June	July	August	September
Jaluit #	1058	2689.5	1419.6	1897.5	2169	2549.5	1325.5	1771.5	1687
Value	$736.95	$2,048.33	$945.35	$1,327.60	$1,332.00	$1,740.50	$948.67	$1,258.60	$1,151.00

Figure 7. JAFP Revenue (02/03)



Likiep Giant Clam Hatchery Facility
(Clyde)

- **Marine Ornamental Trade**

The marine ornamental trade (or aquarium trade) has steadily been rising with exports increasing. Organisms exported out of the Marshall Islands by local companies are live fish, giant clams, live rock, corals and various marine invertebrates. As reflected in the charts, this trade is based on the preference of the customers. With the giant clams, it is the T. maxima species that is in high demand. All clams exported out of the Marshall Islands are hatchery-reared and not from the wild, one of the requirements of CITES. All certificates of origin & health are required when exporting marine ornamentals. Although the Marshall Islands is not a party to CITES, these permits are the equivalent in authority to any permits to be issued pursuant to ***Fish and Wildlife in lieu of CITES (Annex II) statement RE: 50CFR-23(b3).***

Figure 8. Marine Ornamental Exports

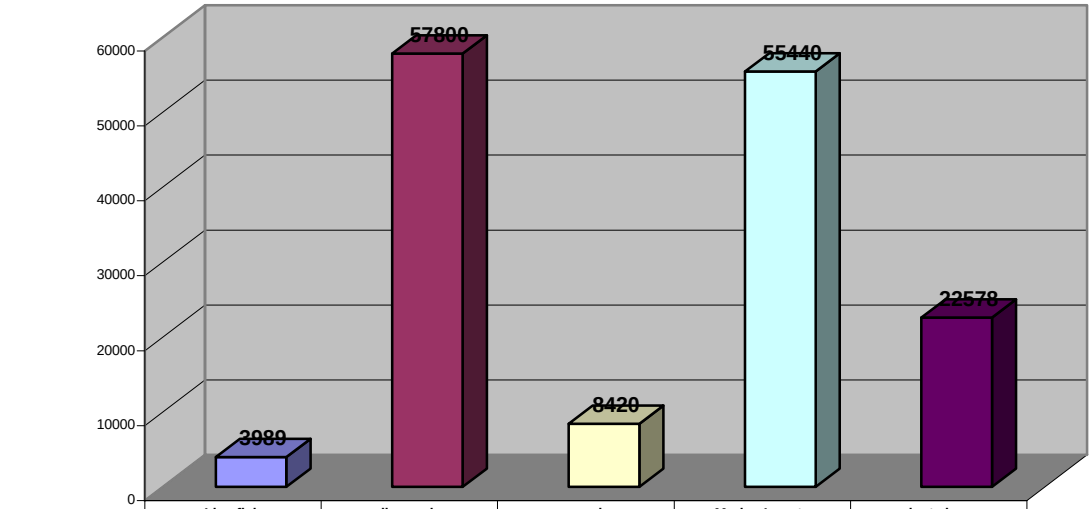
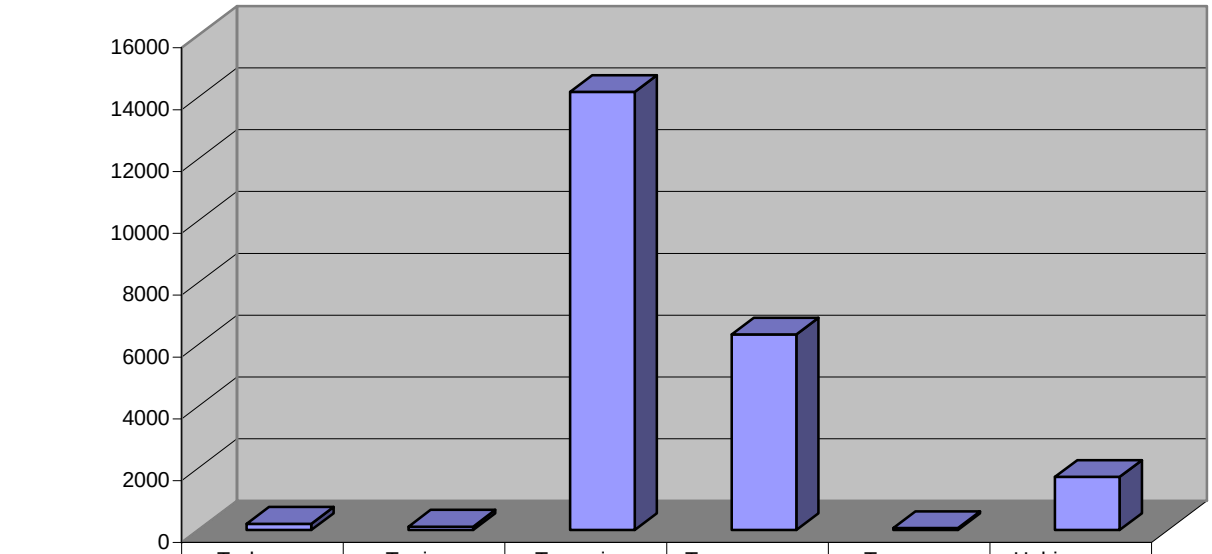


Figure 9. Giant Clams Exported 2002-2003



- **Mariculture Affairs**

- **MIMRA LIKIEP HATCHERY**

The MIMRA hatchery is located on Loto Island at Likiep Atoll in the northern Marshall Islands about 360 km from Majuro Atoll. The hatchery consists of one half-buried concrete spawning tank 1 X 2 m (500 Liters), 8 fiberglass larval culture tanks (900 liters), 8 concrete raceway tanks 2 X 11 m (12,000). The pumping system consists of 2 gas fueled Robin motor pumps capable of delivering 180 plus l/min. each. The hatchery is staffed by 2 people.

Broodstock and Spawning

The Marshall Islands have four indigenous species of giant clams Tridacna gigas (*Kabor*), Tridacna maxima (*Mejenwod*), Tridacna squamosa (*Tetwod*) and Hippopus hippopus (*Dimuj*). The brood stock clams are readily collected from the wild and kept in the lagoon near the hatchery.

Table 10. Giant clam brood stock available at the hatchery

Species	No.of Adults	Size Range (cm)
T. gigas	12	35 – 70 cm
T. maxima	39	12 – 17 cm
T. squamosa	103	25 – 40 cm
H. hippopus	40	25 – 45 cm

Source: MIMRA

When a clam species is required for spawning, twenty or so are lifted from the holding area and brought ashore on the beach near the spawning tank. The clams are generally induced to spawn using passive spawning techniques. There is no full-time electric power available at Likiep Atoll so biochemical used for induction (e.g. serotonin) cannot be kept refrigerated as required.

All the clams are thoroughly scrubbed with hand brushes to remove any growths and debris from the outside of the shells. The flutes are broken off to reduce surface area for bacterial contamination. The clams are then rinsed with one micron filtered seawater and placed on a dry surface exposed to direct sunlight for about two hours. They are then placed in the spawning tank and the tank is filled with cool ambient filtered seawater (27 - 29˚C). If a single released gametes, it will induce the other brood stock clams to spawn.

If the clams have mature gonads and the spawning induction is successful, sperm and eggs will be released. Eggs are collected from different individuals and fertilized with a small amount of sperm from various clams contributors to provide the most genetic variety in each batch of larvae.

Table 11. Spawning attempts and Number of eggs collected in 2001 – 2002

Date	Species	No eggs collected	As of June 2002
11-28-00	T. maxima	20 million	1,000 (20-21 cm)
03-26-04	T. maxima	30 million	7,000 (24-46 cm)
04-24-01	T. maxima	50 million	15,000 (25-40 cm)
06-07-01	T. maxima	100 million	250,000 (14-33 cm)

Source: MIMRA

Juvenile Culture

The Juvenile clams are then placed in the raceway tanks and filled with 10 micron filtered seawater. At 2-3 months old and

1-2 mm in length, the juveniles are become visible. Most of the juveniles are reared in the raceways until they are 38-50 mm (1.5-2 inches) in length whis is the smallest size range sold to aquarium exporters in Majuro. Larger size classes range from 51-76 mm (2-3 inches).

Clam Sales

The main buyer of the Likiep hatchery reared juvenile clams is ORA, Inc. formerly known as the RRE Long Island Clam Farm, whom purchased the entire stock mentioned in the Table 12 below.

The juvenile clams are not only sold to the local exporters on Majuro but are used in reseeding the reefs around the whole Likiep Atoll. Five hundred juvenile clams were also donated to the Jaluit High School for educational purposes.

Table 12. Clam sales

Date	Species	No. Clams	Mean Size	Age in Mo.	Unit Price	Total Price
03-08-03	T. maxima	1,514	4.7	20-26	2.5	$1,627.50
11-29-03	T. maxima	651	4.9	----------	2.5	$5,500.00
04-03-04	T. maxima	2,200	4.7	34-42	2.5	$3,750.00
05-15-04	T. maxima	1,500	4.9	35-41	2.5	$7,782.50
07-10-04	T. maxima	3,113	4.9	39	2.5	$1,560.00
08-07-04	T. maxima	624	3	39	2.5	$1,577.50
08-21-04	T. maxima	631	4.5	39-41	2.5	$1,522.50
09-04-04	T. maxima	609	3.6	44	2.5	$3,785.00
TOTAL		**10,842**			**$2.50**	**$27,105**

Source: MIMRA

Conclusion

The MIMRA Likiep Hatchery is now in full swing and is supplying the ORA, Inc. with colorful juvenile clams weekly on every Tuesdays and Saturdays. There are about 50,000 marketable clams in stock. We want to increase our shipments from Likiep but there is not enough space on every flight from Likiep. It is a great need for the hatchery to be expanded by constructing a additional raceways and also to try to culture other species such as trochus, seaweed or pearl oyster.

• Policy and Planning Affairs

In January 2003, the national working group comprising of Marshall Islands Marine Resources Authority, Marshall Islands Visitor Authority, Environment Protection Agency, Ministry of Internal Affairs, and College of the Marshall Islands officials (MIMRA, MIVA, EPA, IA, and CMI)-M2EIC group implemented on the development of the second community based fisheries management program in Likiep Atoll. MIMRA spearhead herewith project in fulfilling its mandate under the MIMRA Act 1997, whereby MIMRA delegates its responsibility to the Local Government Councils to manage and conserve the marine resources and environment of local communities within the five miles zones.

Community-based fisheries management planning program is a process of discussion among all stakeholders that aim to create capacity to shift focus from the national authority towards local responsibility and management of coastal fisheries resources. The planning process encourages community members to discuss problems in their marine environment and

resources and come up with solutions using Rapid Historical Appraisal (RHA) method. (MacArthur, 1994 in Appendix I)

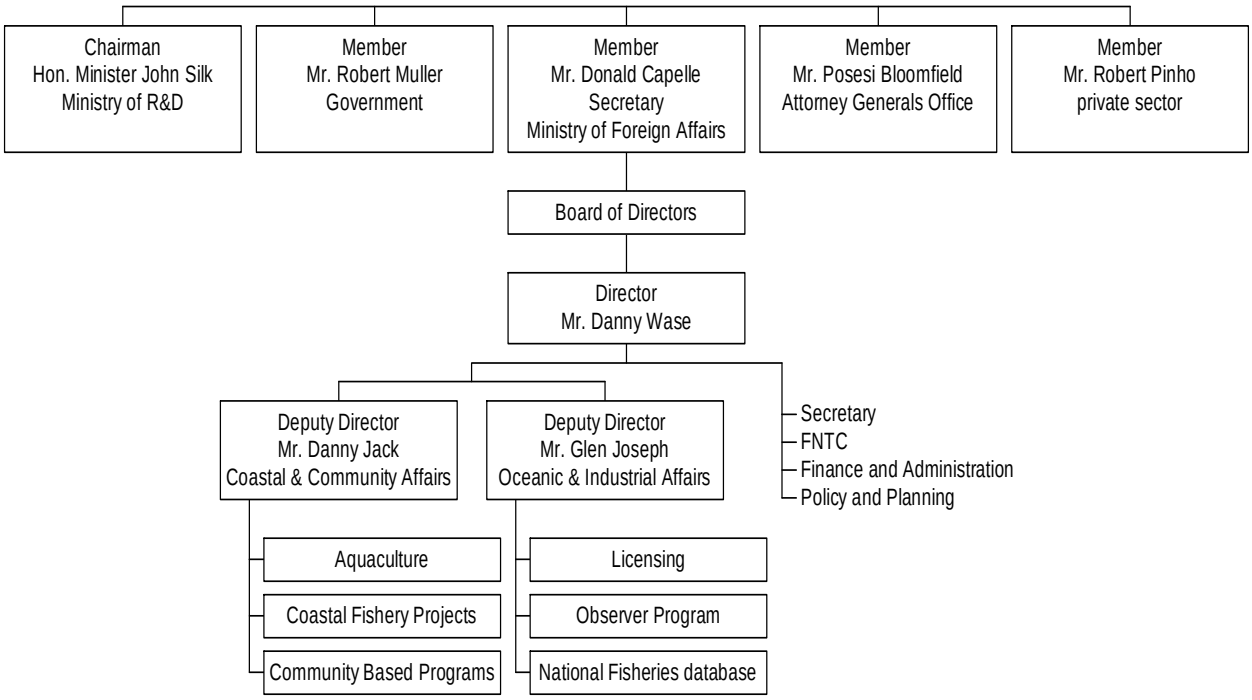
As part of the technical supports and assistances under the Likiep Fisheries Management Plans, the Policy Division in conjunction with the Marine Science Program of the College of the Marshall Islands conducted the marine resources assessment survey in Likiep Atoll. However, prior to the survey mentioned above, in February 2001, the marine scientists have conducted an atoll-wide biodiversity assessment in Likiep Atoll. The 2003 marine survey was targeted in specific areas identified by the Likiep Fisheries Management Advisory Committee (F-MAC) as proposed tentative Marine Protected Areas (MPAs). Both surveys highlighted the importance of preserving biodiversity and emphasized the potential decline of important food fish species unless precautionary management measures are taken to protect the living marine resources of the atoll.

The Likiep Fisheries Management Plan provides the framework for the public awareness and regulatory tools as the primary means to conserve the marine environment and resources in Likiep Atoll. The process required the Likiep communities in the formulation, implementation, monitoring and evaluation of measures taken under the administrative and legal guidance of the Likiep Atoll Local Government and the technical guidance by Marshall Islands Marine Resources Authority.

The second atoll that the national working group facilitated the community based fisheries management program was the Rongelap-Mejattto community in Kwajalein Atoll. In April of this year 2004, the coastal resource management facilitators conducted the awareness program such as environmental education particularly solid waste and presented the proposed Marine Protected Area sites to the Rongelap community.

In regards to the solid waste issue, the facilitators were able to work with the community in collecting all the obsolete solar batteries that are laying in most of the households. The non-useable batteries were then transported by boat from Mejatto to Ebeye for disposal. The Ebeye EPA officials, who transferred the dead batteries from Ebeye to Kwajalein for storage and recycling, did logistical arrangements with the Kwajalein Military officials.

MIMRA Organization:



The organizational chart above attempts to show the MIMRA organization. It is does not include specific projects and staff in its entirety. It should be used only as a guideline.

-End-