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Workshop on Fish Aggregating Devices (FADs)

Part I. Review of Pacific Island FAD Deployment Programs

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INTRODUCTION

FAD deployments became widespread throughout Pacific islands following their use by commercial fisheries in the Philippines and a FAD development program conducted in Hawaii by the National Marine Fisheries Service. Positive attributes associated with FADs; the potential for increased fisheries production, safety for fishermen, reduced search time, reductions in fuel expenditures, and a means for reducing fishing pressure on inshore resources, established them as important tools for fisheries development. From 1979 through 1983, Pacific island countries deployed 600 FADs and planned to deploy over 300 more. At an average unit cost of US$ 3000 (raft and mooring) the total investment for deployed and planned FADs exceeded US$ 2.5 million. FAD deployments were financed almost exclusively by regional donors.

A wide array of designs and construction techniques characterized first and second generation FADs. Rafts ranged from coconut logs, bamboo rafts, and foam-filled tractor tires, to sophisticated FAD-specific designs such as aluminum catamarans and pentasphere buoys. Anchors were concrete, surplus steel, or even scrap metal chained together. Mooring systems, which lacked rigorous standards for design and hardware, were generally fabricated from buoyant polypropylene rope. A midwarp chain counterweight was added to prevent the slack line in the mooring from floating on the surface. Improvements in FAD systems relied extensively on a blend of local experience and innovative trial and error.

Aside from unrefined technology, the success of FADs and early FAD programs was also linked to skill and training levels of personnel, natural phenomena including storms and shark bite, and vandalism.

FAD loss rates were high and FAD life spans were generally short. Some FADs were lost on deployment, others after only a few days. In Pacific island countries, from 1979 through 1981, average life span of FADs ranged between 25 and 365 days. In most countries average life span was on the order of 6 months. No FAD lasted longer than 592 days (Shomura and Matsumoto 1982). By mid-1983, countries reported that average life spans of FADs had increased to around 9 months, although no FAD exceeded 669 days on station (Boy and Smith 1984).

FADs were popular among fishermen, but high loss rates, short life expectancies, and relatively high unit costs, created concerns over whether FAD costs outweighed benefits. Donor agencies grew reluctant to fund FAD deployments, because competing projects which did not require continual infusions of money seemed to offer greater value. Schemes to collect FAD-catch and effort data from fishermen, which could help justify FAD funding, were either non-existent or generally unsuccessful.

The existing situation prompted a South Pacific Commission investigation of Pacific Island FAD programs in 1983. The study's primary objective was to find ways to increase FAD life expectancy to two years while maintaining unit costs at the regional average of US$ 3000. The work included 1) in-country studies of FAD system design, fabrication, and deployment techniques, and 2) design of an appropriate deep water FAD mooring system based on sound principles of engineering. The handbook that resulted, **Design Improvements to Fish Aggregating Device (FAD) Mooring Systems in General Use in Pacific Island Countries** (Smith and Boy 1984), was quickly adopted, and still iwthe principle guide used throughout the region for FAD mooring system design and components.

The FAD Handbook introduced an inverse catenary curve mooring system. The inverse catenary curve, which contains the slack line of the system, is formed by splicing sinking (nylon) and floating (polypropylene) ropes together. The length of the polypropylene rope is sufficient to lift 2.5 - 3 meters of mooring chain off the bottom. The length of nylon upper rope is calculated so that an inverse catenary curve, comprised of sections of both nylon and polypropylene forms, and so the polypropylene portion of the loop is kept a safe depth below the surface. The recommended length for the inverse catenary curve was 305 meters (1000 feet).

SPC continued work directed at improving FAD life expectancies. FAD mooring systems designs for moderate to shallow depths (Boy and Smith 1985) were presented at the 17th Regional Technical Meeting on Fisheries in 1985, and a two week FAD Workshop held in 1987 taught the theory and methods described in the FAD Handbook to fisheries representatives from Pacific Island countries.

PROJECT MOTIVATION AND OBJECTIVES

Several factors motivated the present SPC FAD research: 1) since 1984, no concerted regional efforts to improve FAD technology or evaluate the success of the inverse catenary mooring system have taken place; 2) difficulties in attracting funds for FAD deployment programs persist, primarily due to the reputation of FADs for having short life expectancies; 3) development and introduction of successful FAD-based fishing techniques, such as vertical longlining; 4) shifts in the world-wide tuna market have stimulated changes in tuna fishing patterns and created potential opportunities for FAD-based fisheries in Pacific Island countries.

Study objectives were: 1) a comparative review of present Pacific Island FAD programs with earlier work (Shomura and Matsumota 1982, Boy and Smith 1984), 2) a technical evaluation of existing FAD systems; the inverse catenary system, FAD components from raft to anchor, and a critical look at raft design; 3) an assessment of SPC member country technical and training needs from FAD planning through fabrication, deployment, and maintenance; 4) development of a generic raft/buoy design suitable for Pacific Island countries, which could be constructed from locally available materials.

METHODS

An extensive detailed questionnaire, country visits, FAD program documentation, and personal communications were the foundation of the study. Questionnaires were sent to Fisheries Divisions in 22 countries. The questionnaire covered: 1) recent history of FAD deployments; 2) technical information on rafts/buoys, mooring systems, FAD constuction and deployment techniques; and 3) technical and practical expertise. Study visits were made to Hawaii, Fiji, Vanuatu, New Caledonia, Cook Islands and French Polynesia. Work in Hawaii and New Caledonia included observations of FAD deployments.

Lt. Richard Boy, USCG Buoy Systems Engineer, developed guidelines for a generic raft/buoy based on technical information learned during country visits.

RESULTS and Discussion

Although large numbers of FADs are deployed by commercial fishing operations in several countries, most notably the Solomon Islands, Papua New Guinea, and Fiji, the focus of this work is on FADs deployed by fisheries divisions in support of fisheries development. FADs deployed by commercial operations are governed by a completely different set of cost/benefit parameters. Extending life expectancy is not a principle concern when a single fishing trip can produce many tons of catch. Inexpensive FADs which last a single fishing season are acceptable. In contrast, longer and more predictable FAD life spans is the paramount objective when FADs are deployed for small-scale fisheries. The aim of this was to review recent FAD histories, and then recommend designs, materials, and methods which promote longer life expectancies for FADs.

The information presented in this paper is derived from 15 returned questionnaires, and includes responses that cover the entire range of FAD programs in the region, as well as those countries with the most firmly established and well supported FAD programs. Responses from the remaining countries is expected, and the final work will include that information.

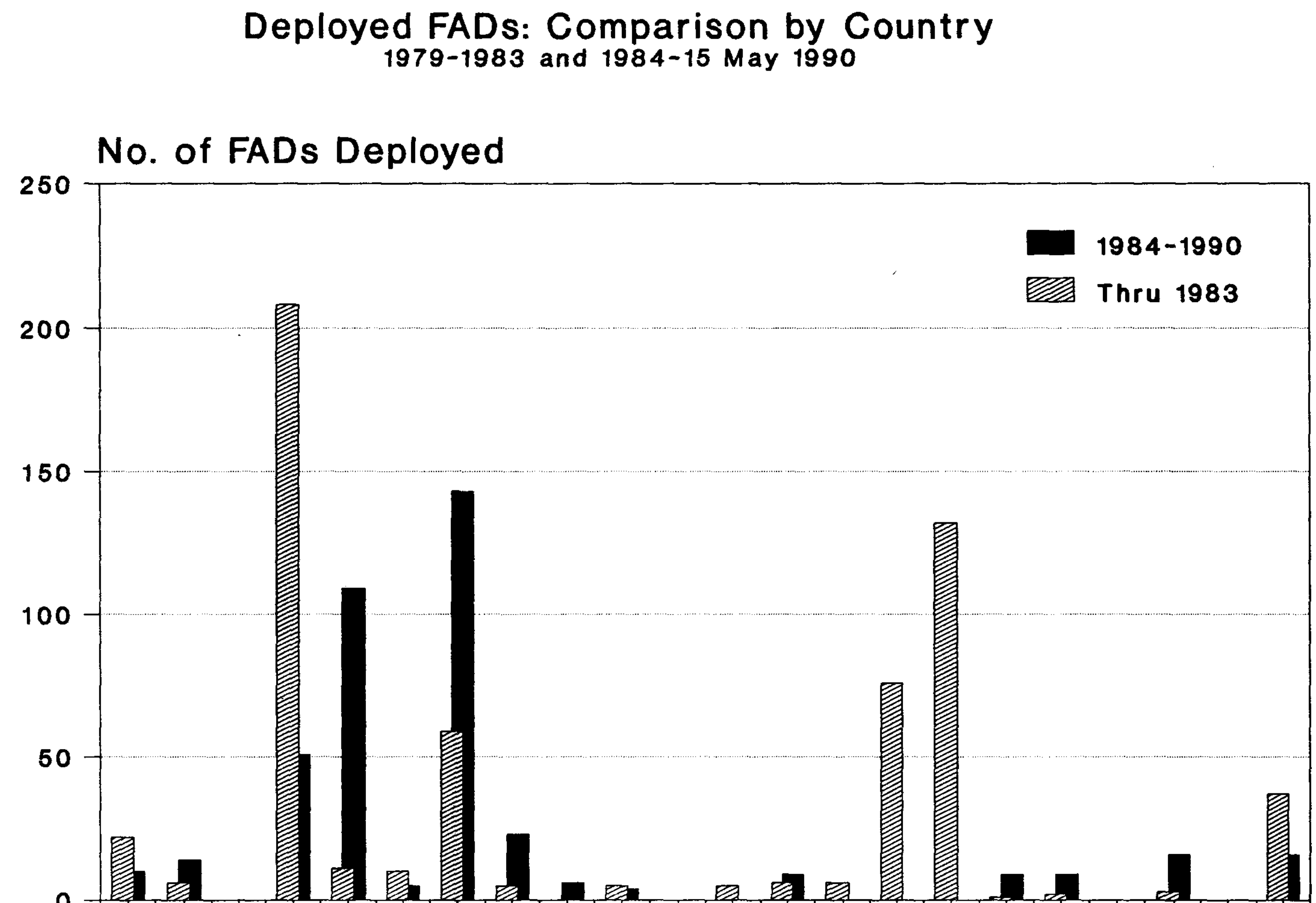
Comparative Review of Pacific Island FAD Programs: Pre-1984 and January 1984-15 May 1990

Between 1984-15 May 1990, 431 FADs were deployed by Pacific Island countries (Table 1). That compares with 600 FADs deployed prior to 1984, data which includes between 300 and 400 FADs set by commercial fishing operations. FAD deployments by island Fisheries Divisions have increased by approximately 250 over the pre-1984 time frame. Even so, most countries reported decreases or only modest increases in FAD deployments when compared to the earlier data (Figure 1). Two countries, French Polynesia and Hawaii, were primarily responsible for the increase noted. Together those countries accounted for 58 percent (252 of the 431) of the FADs deployed between 1984 and 15 May 1990. Neither country's FAD program depends on funding from donor agencies, but instead is financed by territorial and federal governments. Both countries have large local fishing populations, and the popularity of FADs among fishermen has provided the impetus for continued program funding. Hawaii's deployments over the 84-90 time frame represent program development and expansion to a fixed number of sites and then primarily replacements of lost FADs. In French Polynesia lost FADs are replaced, while program expansion to new sites continues.

Table 1. Summary by country of FADs deployed, lost, recovered, and planned, (January 1984 - 15 May 1990).

Country	Deployed	Lost	Recovered	Planned
American Samoa	10	11	7	5
Cook Islands	14	8	2	6
FSM (Truk)	7	1	0	10
Fiji	51	37	2	20
French Polynesia	109	84	14	44
Guam	5	0	NA	0[a]
Hawaii	143[b]	91	40	28[c]
Kiribati	23	18	2	unk
Marshall Islands	6	6	0	unk
North Mariana Is	4	2	2	9
Nauru*				3[d]
Niue*				
New Caledonia	9	9	2	5
Palau*	0	0	NA	3[e]
PNG*				
Solomon Islands*				
Tokelau	9	7	1	6
Tonga	9	6	0	5
Tuvalu*				
Vanuatu	16	14	3	9
Wallis/Futuna*				
Western Samoa	16	13	1	9
TOTAL	431	307	76	164

*responses not yet received, Palau data obtained from personal communication
[a]replacements only
[b] includes 22 midwater FADs
[c]includes 12 mid-water FADs
[d]also will purchase 3 replacement systems
[e]also will purchase 2 replacement systems

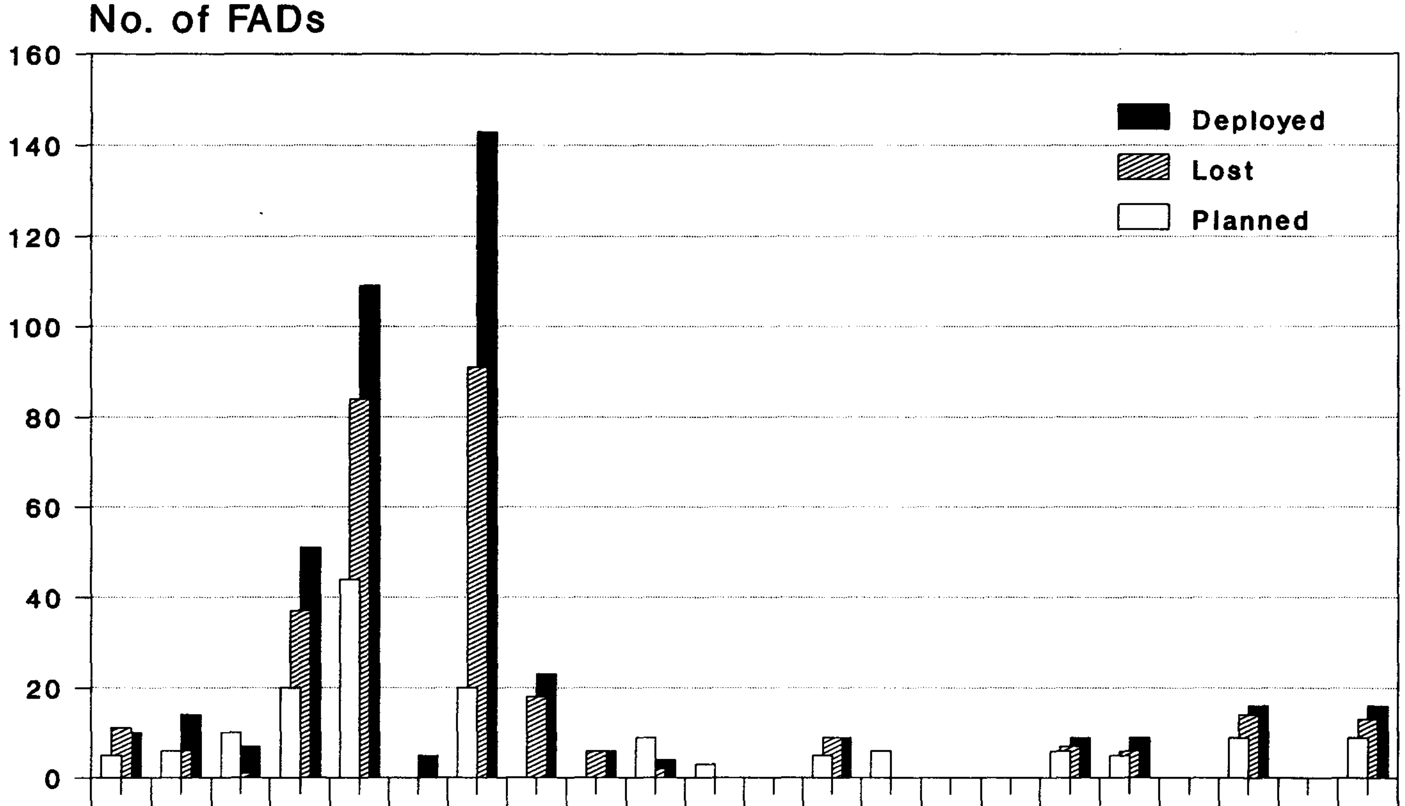


	AS	CI	FSM	F	FP	G	H	K	MI	NMI	Na	Ni	NC	P	PNG	SI	Tk	Tg	Tv	V	WF	WS
1984-1990	10	14		51	109	5	143	23	6	4			9				9	9		16		16
Thru 1983	22	6		208	11	10	59	5		5		5	6	6	76	132	1	2		3		37

Country

Figure 1. Comparative summary of FAD deployments: 1979-1983 and 1984-15 May 1990.

FAD Summary: Deployed, Lost, and Planned
(1 January 1984 - 15 May 1990)



	AS	CI	FSM	F	FP	G	H	K	MI	NMI	Na	Ni	NC	P	PNG	SI	Tk	Tg	Tv	V	WF	WS
Deployed	10	14	7	51	109	5	143	23	6	4			9				9	9		16		16
Lost	11	6	1	37	84	0	91	18	6	2			9				7	6		14		13
Planned	5	6	10	20	44	0	20			9	3		5	6			6	5		9		9

Country

Figure 2. FAD summaries by country: deployed, lost, and planned FADs.

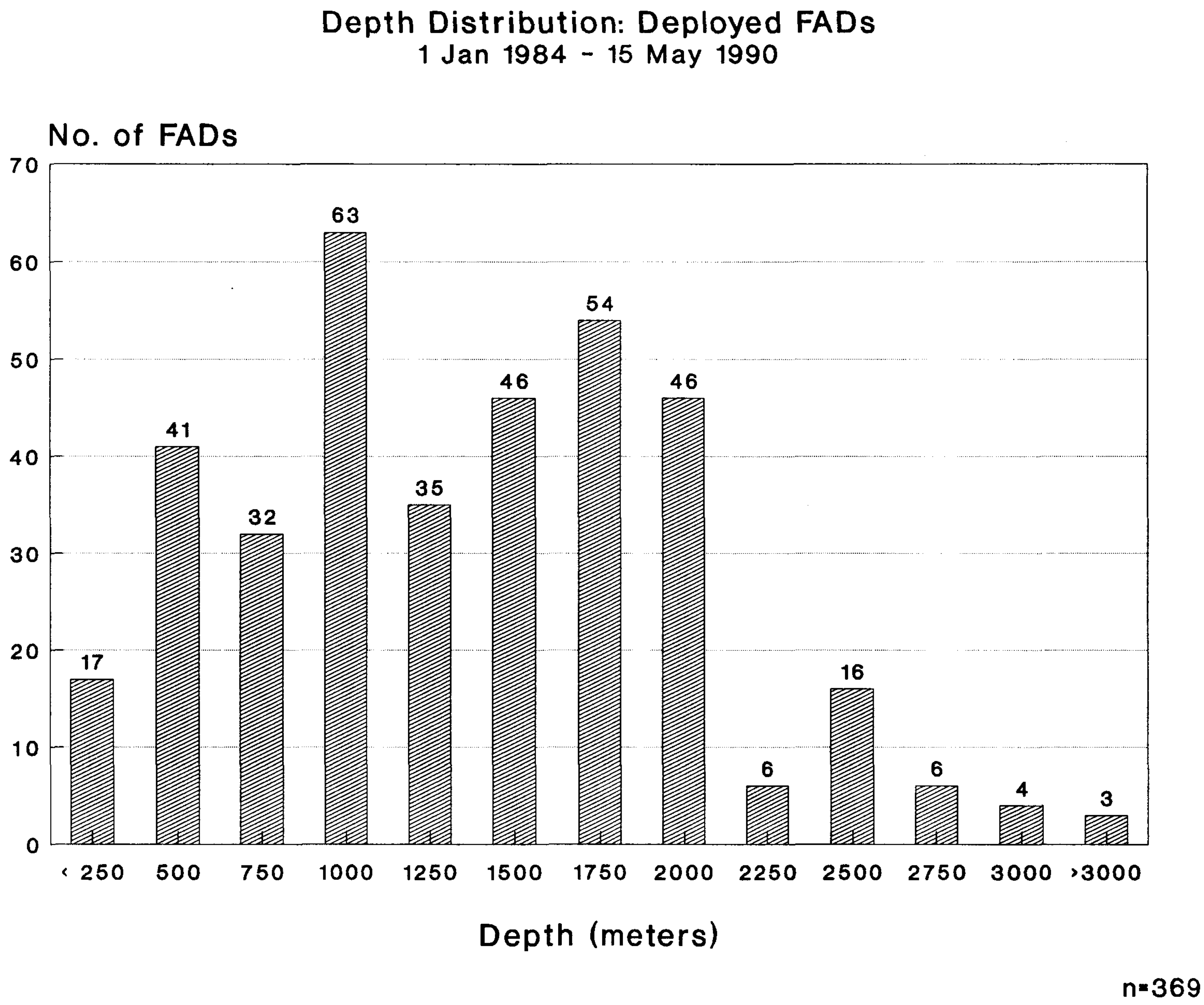


Figure 3. Depth distribution of FADs deployed in Pacific Island countries between January 1984 and 15 May 1990.

The dramatic decrease shown for Fiji FAD deployments is misleading. The pre-1984 data includes FADs deployed by commercial fishing operations. FADs known to be deployed by commercial operations were eliminated from the present Fiji data. Even so, the data may still contain a number of FADs set by IKA Corporation. At present Fiji Fisheries deploys FADs in just two areas; south of Lami-Suva, which has a large number of small-scale commercial fishermen, and near Sevu Sevu on the island of Vanua Levu.

The increase noted for Vanuatu were FADs set mostly during 1984, just after the SPC FAD Handbook was published. In the past four years FAD deployments have tailed off, and because of short, unpredictable life expectancies, the wood fibreglass catamarans used earlier were replaced with bamboo rafts.

The deployments in Tonga also reflect a special situation. All of those FADs were deployed by Paul Mead, a former SPC master fishermen, while on assignment in Vava'u. Three of those FADs were deployed in water shallower than 100 meters.

It's possible that in countries with few FAD locations and small local fishing populations that decreases in FAD deployments reflect longer life spans of individual FADs, and only replacement of those FADs once lost. The country data on deployed and lost FADs (Figure 2), from January 1984 through May 1990, indicates that was not the case. Instead it reflects the fact that after several years of FAD deployments countries were reassessing their own FAD programs and that funding was more difficult to come by. The FADs reported for Guam, FSM (Truk), and the Northern Mariana Islands were deployed between March and June of 1990, after going several years without any deployments.

Depths Ranges of FADs

The average mooring depths for FADs by country, and the depth ranges for FADs presently on station are presented in Figure 3. No FADs moored shallower than 100 meters are shown. All countries reportedly use the SPC Handbook, to calculate length of mooring system ropes. The recommended depth range for a mooring with a 305 meter catenary loop was 800 fathoms (1483 meters). Adjustments are recommended for moorings in shallower and deeper waters. For deeper moorings it's recommended to add 1 meter of nylon for every additional meter of depth. In waters shallower than 800 fathoms subtract 1 meter of nylon for every 1 meter decrease in depth. For very shallow depths its important to ensure that the system contains sufficient slack line to accommodate estimated variations in depth. Its unclear whether mooring depth adjustments are routinely factored into mooring system calculations. French Polynesia reduces the length of nylon, in part because nylon rope is more costly than polypropylene. Guam's FAD mooring ropes are calculated to maintain the upper part of the loop a safe depth below the surface (153 meters). Failure to incorporate adjustments can contribute to preventable FAD losses, particularly for losses where vessels have severed mooring lines.

FAD Life Expectancy: Lost FADs and FADs on Station

Before 1982, FAD life spans in Pacific Island countries ranged from 7 to 592 days and averaged between 70 and 368 days. For most countries FAD life spans were about 6 months (Shomura and Matsumoto 1982). Over 1982 and 1983, average life expectancies of FADs throughout the Pacific region increased from 6 to approximately 9 months (Boy and Smith 1984). Some FADs

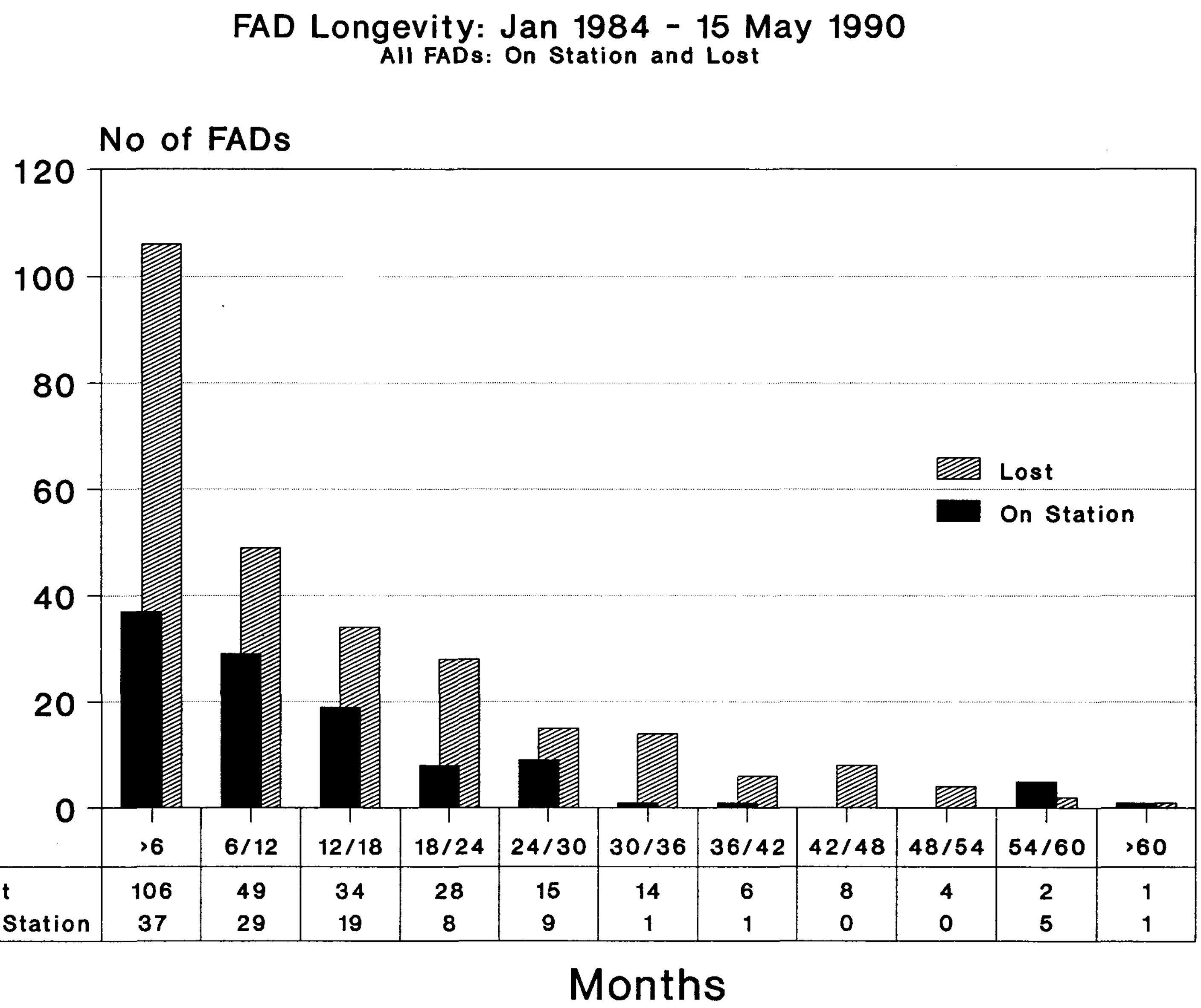
Table 2. Time on Station for lost and continuing FADs, by country. Time is listed in days and reported in 6 month intervals. Years appear in boldface type.

Country	< 182	183 **365**	366 546	547 **730**	731 912	913 **1095**	1096 1277	1278 **1459**	1460 1642	1643 **1825**	> 1825
AS	2		3	2	1	1					
CI	7		3		1						
FSM*	7										
F	10	5	4	2		1	1				
FP	45	39	7	10	6	3		2	2		
G	5										
H	30	23	20	18	12	10	7	6	2	7	2
K	12		3	1							
MI	1	3									
NMI	2	1			1						
NC	5	1	2		1						
Tk	4		1	2	1	1					
Tg	3						1				
V	7	1	4			1					
WS	2	4	6	1							

*Includes data from Truk State only

remained on station up to 22 months (669 days), but up to that time no FADs eclipsed 2 years on station.

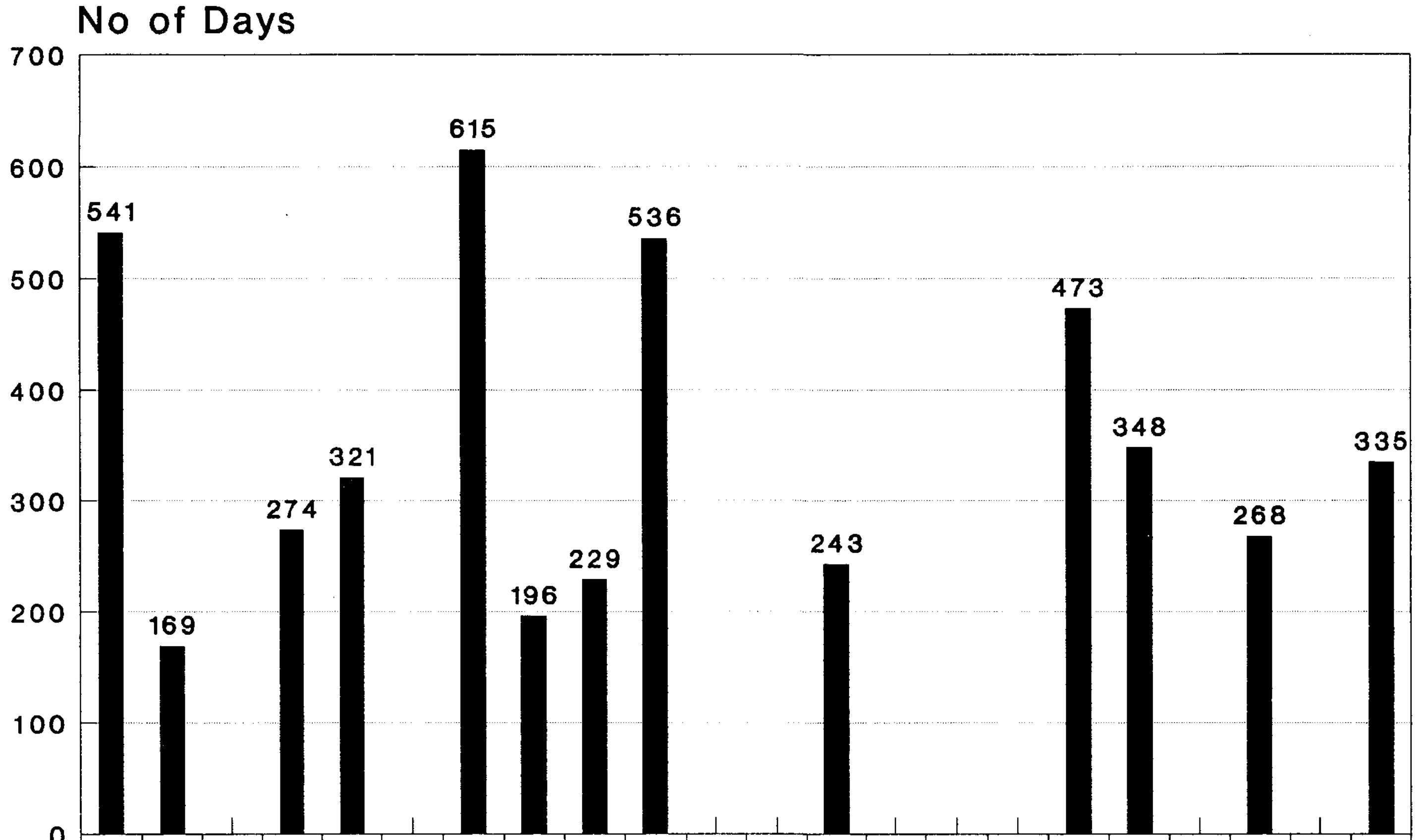
In sharp contrast to FADs deployed before 1984, 10 of the 15 countries that responded recorded at least 1 FAD on station for longer than 2 years (Table 2, Figure 4). In fact, 18 percent (67/377) of FADs for which data exists exceeded 2 years on station. Presently in Hawaii 6 FADs have been on station for 5 years (1825 days). Average life spans for FADs lost between January 1984 - 15 May 1990 ranged from 169 to 615 days. Four countries reported average life spans near or in excess of 18 months (546 days) (Figure 5), which is twice as long as life spans prior to 1984. Despite greater average life spans and record times on station no country



	>6	6/12	12/18	18/24	24/30	30/36	36/42	42/48	48/54	54/60	>60
Lost	106	49	34	28	15	14	6	8	4	2	1
On Station	37	29	19	8	9	1	1	0	0	5	1

Figure 4. Time on station for lost and active FADs.

Lost FADs: Time on Station
Average (ranges listed)



	AS	CI	FSM	F	FP	G	H	K	MI	NMI	Na	NI	NC	P	PNG	SI	Tk	Tg	Tv	V	WF	WS
Long	1027	365		1083	1635		1692	708	304	783			771				980	1153		980		564
Mean	541	169		274	321		615	196	229	536			243				473	348		268		335
Short	174	67		38	0		0	0	123	288			23				86	42		15		42
n	7	4		20	84		91	12	4	2			9				8	4		12		10

Country

Figure 5. Average time on station for FADs lost between January 1984 and 15 May 1990.

Table 3. Time spans of lost FADs

Time Interval (in days)	FADs Lost	Cumulative FADs Lost	Cumulative Percent
<182	106	106	39.7
183-365	49	155	58.0
366-546	34	189	70.8
547-730	28	217	81.3
731-912	15	232	86.9
913-1095	14	246	92.1
1096-1277	6	252	94.4
1278-1459	8	260	97.4
1460-1642	4	264	98.9
1643-1825	2	266	99.6
>1825	1	267	100

The median longevity = 298 days. (50 percent of the Lost FADs were lost within 298 days after deployment).

attained a 2 year average life expectancy. Half of all FADs lost between 1984-15 May 1990, were lost within 298 days (approximately 10 months) of deployment (Table 3). Although the problem of premature FAD loss still exists, the data strongly suggests that the combination of improved FAD mooring system design and a better understanding of FAD construction and deployment processes, has produced substantial improvements in FAD life expectancies.

Probable Causes of Lost FADs

Probable causes of FAD loss was unknown in nearly half (127/269, 47 percent) of the losses reported. Probable cause of FAD loss is difficult to confirm unless FADs are recovered, and in many cases, even then causes of loss are not evident. Just 76 FADs were recovered out of the 431 deployed (Table 2). Therefore it's necessary to conservatively view information on probable causes for FAD loss (Table 4).

Reports of mooring line failure were not widespread. Three countries, Hawaii, French Polynesia, and Kiribati, accounted for 16 out of the 17 losses. It's suspected, particularly after completing country study visits, that many of the FADs reported lost for unknown causes are

Table 4. Probable causes of FAD loss.

Item	Known or Probable Cause	Number	Percent
1	Unsuitable site	19	13.4
2	Mooring line failure	17	12.0
3	Raft/buoy breakage	15	10.6
4	Line break by vessel	12	8.4
5	Fish bite	13	9.2
6	Sinking	5	3.5
7	Vandalism	20	14.1
8	Storm	17	12.0
9	Man bite	19	13.4
10	Other	5*	3.5

* corrosion of mooring hardware

probably indirectly due to general mooring failure as a result of improper fabrication and deployment procedures.

Raft/buoy breakage failures were FADs which used aluminum catamarans and bamboo or light wooden rafts. The 7 catamarans that failed were on station between 388 and 1153 days. Time on station for bamboo and wooden rafts was 60-480 days. Infestations of wood-boring marine worms caused losses of two FADs which were donated as part of an aid agreement.

Shark bite continues to be a problem, but it was not reportedly widespread (Hawaii, French Polynesia, and New Caledonia). Fibre analysis confirmed shark bite caused two FAD losses in New Caledonia. People have suggested using dark mooring lines as a remedy, but no evidence was available on whether or not that practice was successful. Rope coatings have not conclusively proven to remedy shark bite.

Vandalism still plagues FAD programs. During the first years of FAD deployments fishermen who were unaware or unconvinced of FAD functions and benefits sometimes cut mooring lines. Now that FADs have become popular conflicts among user groups are more prevalent causes of vandalism. In countries where markets can only handle small amounts of fish, good fishermen sometimes cut FADs loose as a means of reducing catches by less skilled fishermen. Vandalsim in French Polynesia, where 11 cases were reported, illustrates the other principle type of user group conflict. FADs were initially deployed to assist bonitier fishermen who pole and line for skipjack. FAD deployments stimulated rapid and widespread development of a FAD-associated handline fishery which targeted deeper dwelling tunas. Conflicts arose as handliners displaced bonitier fishermen from the FADs. Also, handlining reportedly makes surface schools of tuna in the vicinity of the FAD more difficult to catch. Irate bonitier fishermen cut FADs free. In an attempt to reduce conflicts and FADs for the bonitier fleet have been deployed further offshore, beyond the range of the small boat handline fishermen.

Handlining around FADs has also dramatically increased FAD losses from man bite. All 19 cases of man bite reported occurred in French Polynesia. It signals a problem which is likely to become more widespread as Pacific Island fishermen take up deep handlining and vertical longlining. Handlines and hooks often become tangled or snagged on FAD mooring lines. Efforts to retrieve caught gear often produces small cuts in the nylon rope which then weakens and sometimes fails. Two remedies are being tried: 1) fishing is prohibited within 100 meters of the FAD buoy, and 2) putting a protective sheath of 3 millimetre polyethylene tubing over the surface 200 meters of nylon. The fishing restriction is difficult to enforce, particularly after dark. Furthermore, tunas associated with FADs are known to concentrate up-current. Currents which push FADs down-current an unpredictable distance expose the upper portion of the mooring line to tangling and cutting by handlines. The polyethylene tubing is meant to protect the nylon from fishing line cuts, and to prevent hooks from snagging. The outer diameter of the tubing is greater than the gape of the tuna circle hooks used by the handliners. One FAD equipped with protective tubing was lost after a hooked fish wrapped around the mooring line. It's thought that the strain of the struggle between fish and fishermen caused the monofilament fishing line to saw the mooring in two.

The prevalence of vandalism and man-bite as probable causes for FAD loss underscores the need for finding solutions to those problems.

FAD Costs

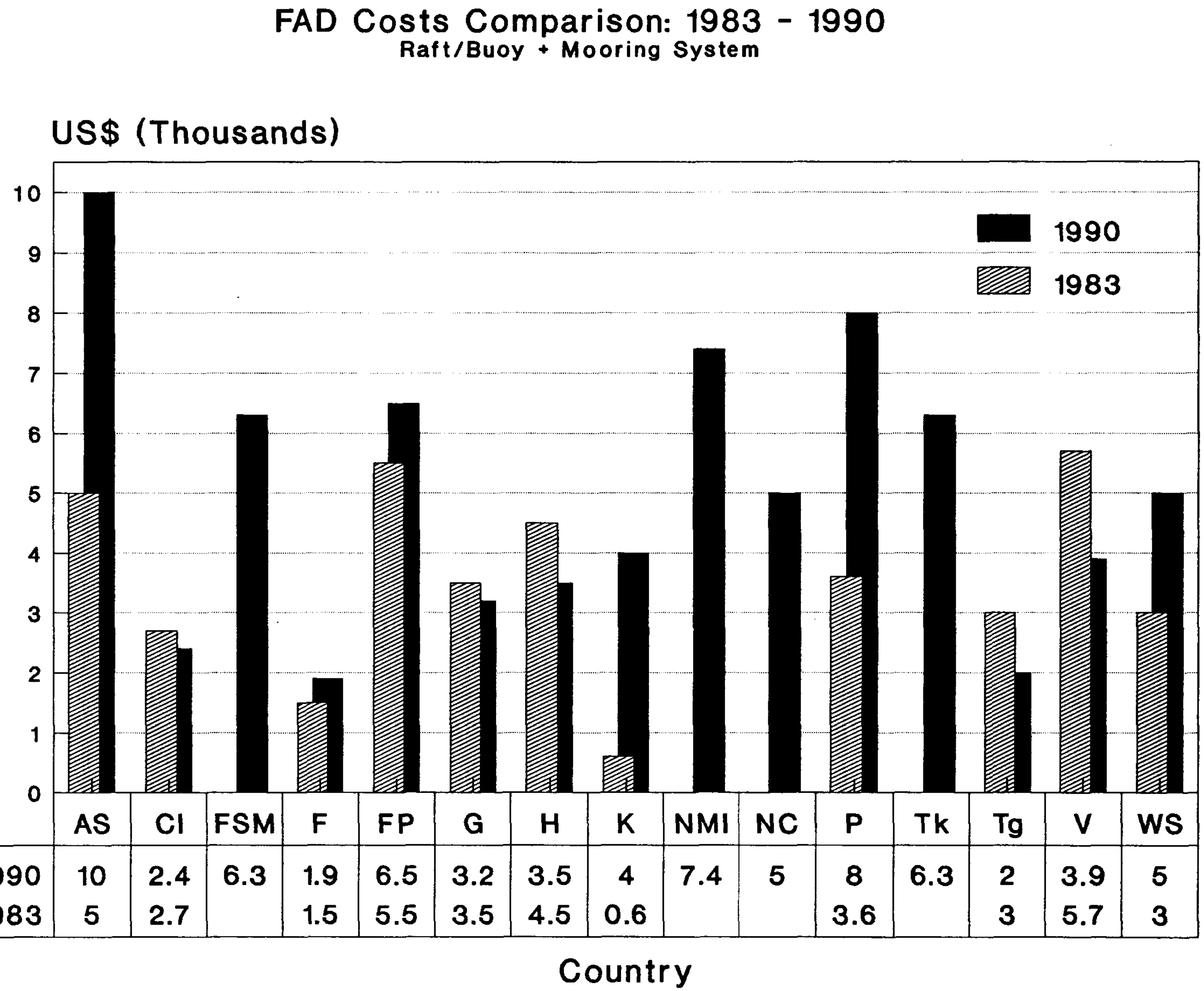
Between 1983 and 1990, the average cost per FAD (buoy/raft and mooring system) has risen from US$ 3000 to US$ 5000 (Figure 6). FAD systems vary widely in price (Table 5, Figure 7)). The variation reflects differences in designs, materials, local labour costs, and even shipping.

Raft costs are generally consistent with sophistication of design. Fiji and Vanuatu make rafts from bamboo bolted onto inexpensive mussel culture buoys. Guam and Hawaii utilize surplus buoys available from the US government. Expenses are primarily for modifications that render buoys suitable for FAD; light masts, lights, and counterweight masts (Hawaii). The rafts used in American Samoa, Tokelau, Tonga, and Western Samoa are aluminium catamarans which are manufactured in Western Samoa. Costs reported for Tonga are low because recycled catamarans were used. The Cook Islands, New Caledonia, French Polynesia and the Northern Mariana Islands have developed their own designs, and rafts are fabricated locally. All but the buoys used by the Northern Mariana Islands are of steel construction. Of the steel rafts, those used by French Polynesia are the most complicated and costly to build. The Northern Mariana Islands FAD buoy is a prototype design built from fibreglass.

Mooring systems became more costly to countries when the inverse catenary design was adopted. Before 1984 there were no recommended standards for either ropes or hardware. Mooring ropes were made entirely of polypropylene. The composite rope inverse catenary was more expensive due to the nylon rope component. Nylon (20mm) costs as much as US$ 570 per 200 meter coil compared to US$ 230 for 200 meters of polypropylene (20mm). Although the FAD Handbook recommends 16 millimetre nylon and 20 millimetre polypropylene some countries have increased rope diameters to give added strength to FAD moorings. Hawaii constructs mooring systems for windward FADs with 25 millimetre lines. Several other countries use 22 millimetre rope. High costs reported for mooring systems in American Samoa are in part due to heavier lines (25 millimetre), but mostly because complete system components of high quality are purchased locally from a single marine supply company.

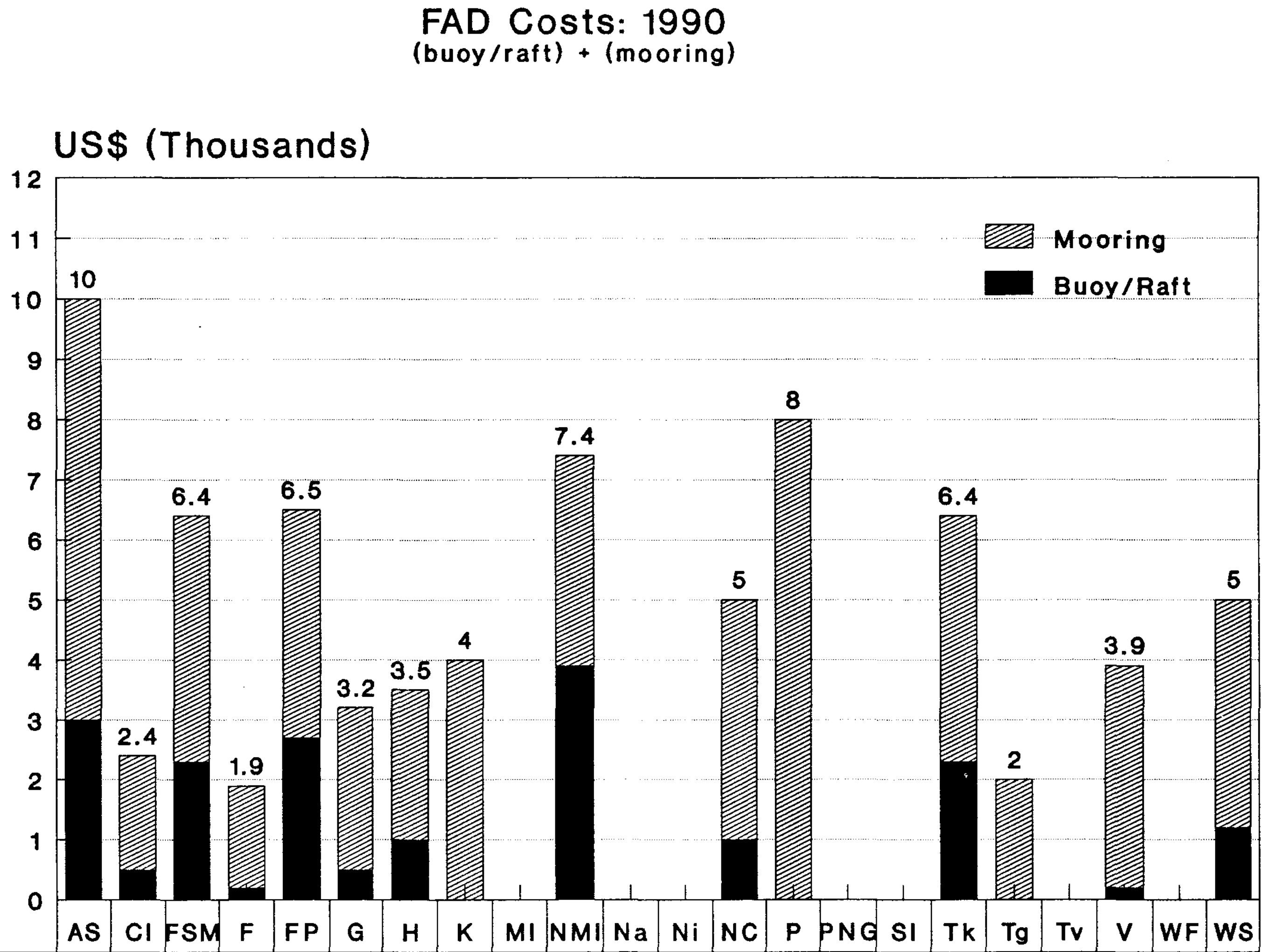
Table 5. FAD costs by country.

COUNTRY	RAFT/BUOY	MOORING	RAFT and MOORING	DEPLOYMT	TOTAL
Am Samoa	3000	7000	10000	NC	10000
Cook Is	500	1900	2400	150	2550
FSM (Truk)	2300	4000	6300	2200	8500
Fiji	200	1700	1900	NC	1900
Fr Polynes	2700[1]	3800	6500	NC	6500
Guam	500	2700	3200	3700	6900
Hawaii	1000	2500	3500	3600	7100
Kiribati	-	-	4000	NC	4000
Marshall Is					NA
CNMI	3900	3500	7400	750	8200
New Caledonia	1000	4000	5000	NC	5000
Palau			8000	NA	6000
Tokelau	1900	4400	6300	NC	6300
Tonga	-	-	2000	NC	2000
Vanuatu	200[2]	3700	3900	NC	3900
W Samoa	1200	3800	5000	NC	5000
		Average	**5000**	**Average**	**5850**



	AS	CI	FSM	F	FP	G	H	K	NMI	NC	P	Tk	Tg	V	WS
1990	10	2.4	6.3	1.9	6.5	3.2	3.5	4	7.4	5	8	6.3	2	3.9	5
1983	5	2.7		1.5	5.5	3.5	4.5	0.6			3.6		3	5.7	3

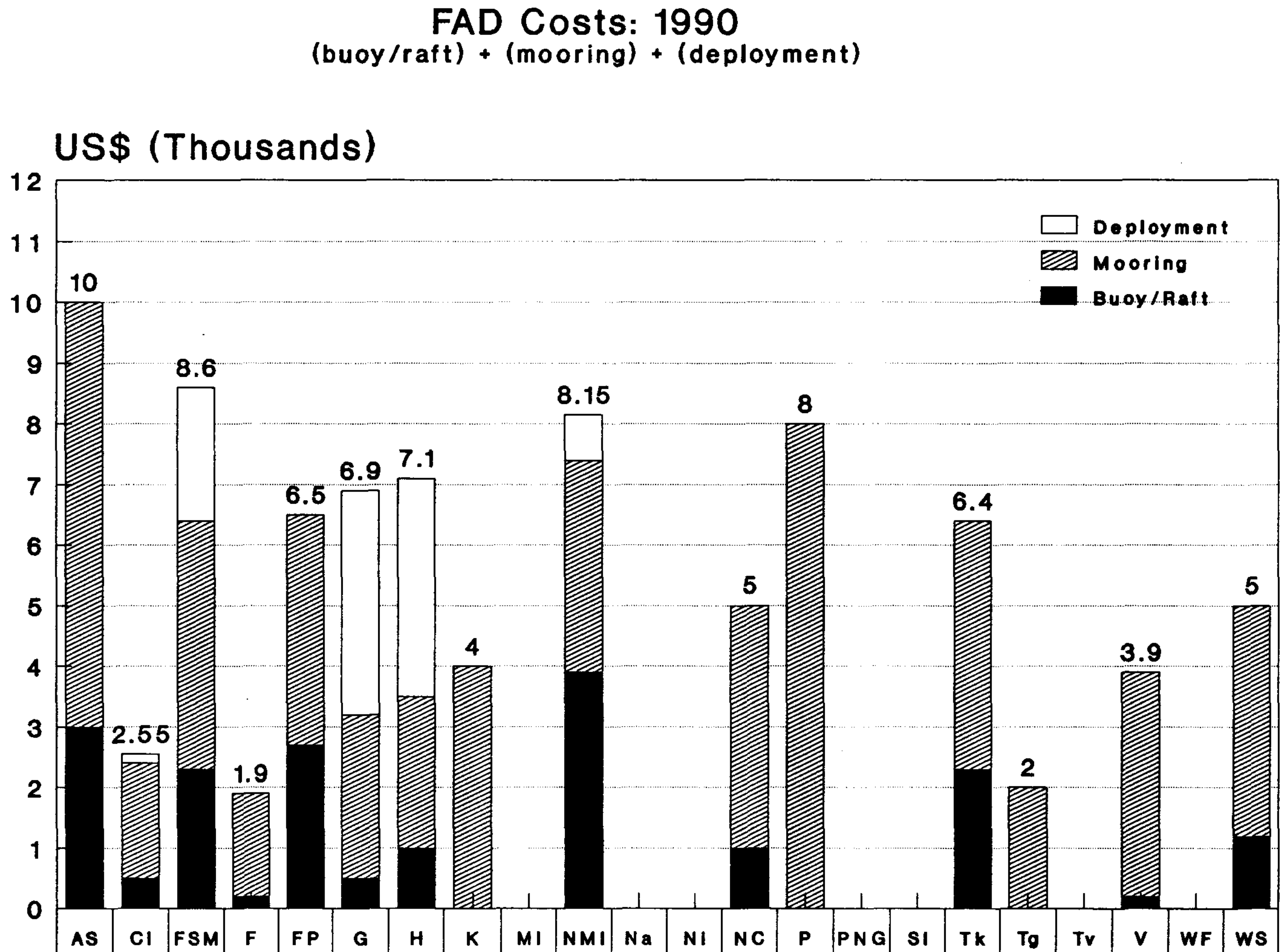
Figure 6. Cost comparison of FADs deployed in Pacific Island countries: 1979-1983 and 1984-15 May 1990.



	AS	CI	FSM	F	FP	G	H	K	MI	NMI	Na	Ni	NC	P	PNG	SI	Tk	Tg	Tv	V	WF	WS
Mooring	7	1.9	4.1	1.7	3.8	2.7	2.5	4		3.5			4	8			4.1	2		3.7		3.8
Buoy/Raft	3	0.5	2.3	0.2	2.7	0.5	1			3.9			1				2.3			0.2		1.2

Country

Figure 7. FAD costs by country. Buoy/raft + mooring.



	AS	CI	FSM	F	FP	G	H	K	MI	NMI	Na	NI	NC	P	PNG	SI	Tk	Tg	Tv	V	WF	WS
Deployment		0.15	2.2			3.7	3.6			0.75												
Mooring	7	1.9	4.1	1.7	3.8	2.7	2.5	4		3.5			4	8			4.1	2		3.7		3.8
Buoy/Raft	3	0.5	2.3	0.2	2.7	0.5	1			3.9			1				2.3			0.2		1.2

Country

Figure 8. FAD costs by country. Buoy/raft + mooring + deployment.

Deployment costs range from no charge to US$ 3600 (Figure 7). The no charge deployments are consistent with previous research. Fisheries Divisions or government vessels often bear Costs of deployment because of the importance of FADs to local fisheries development. In other areas costs reflect going rates for vessel charters. Hawaii routinely deploys two buoys on the same day and changes light packs on FADs along the course to deployment sites to economize operations.

FAD Funding

Before 1984, FAD deployments by Fisheries Divisions were financed exclusively by regional donor agencies. When donors grew reluctant to fund FAD deployments due to uncertain benefits and the need for continual funding Pacific Island countries sought alternative sources of support. Regional donors still commit money for FAD programs, but islands also fund FADs via fishing access agreements and local government appropriations to Fisheries Division budgets. FAD projects in French Polynesia and Hawaii obtained support through territorial and federal governments. At present, 8 of the 15 countries receive annual appropriations for FADs through Fisheries budgets. Although local appropriations are generally insufficient to maintain FAD programs, it underscores the importance of FADs to Pacific island countries. While countries experienced difficulties in attracting enough funds to keep FAD programs going they tried ways to find ways of increasing FAD life expectancies. Most countries implemented the recommendations in the FAD Handbook as quickly as possible.

FAD Cost-Benefits

Unpredictable and often short life expectancies have created the impression that FAD costs are too high and benefits are too few. Much of that thinking is shaped by the relatively high average unit costs of FADs (US$ 5000). However, it may be appropriate to measure FAD costs against average FAD life spans. If a FAD cost US$ 5000 and lasted 1 year, the per day cost of that FAD is $13.70. Even in American Samoa, where unit costs are US$ 10000, and life spans of lost FADs ranged between 174 and 1063 days, per day FAD costs come to only US$ 18.50. Quantitative data from 3 years of controlled test fishing in American Samoa reported catch per unit effort (cpue) around FADs at 16.1, 24.2, and 29.7 kg/hr while cpue from open ocean control areas was 3.8, 7.5, and 6.3 kg/hr (Buckley et al. 1989). In Hawaii, fishermen made 8,134 trips to FADs and caught 411,212 kg of fish (Anon 1989). The average daily cost per FAD, including deployment costs, was US$ 11.50. Certainly, a great number of other important variables apply, and examples above are greatly over simplified. They were presented to provoke readers into re-examining the perspectives used to assess FAD value.

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