

FAD Fishery Management

<A participatory community-based FAD fishery management>



**Project for Promotion of Grace of the Seas for Coastal Villages
in Vanuatu, Phase 2**

**Vanuatu Fisheries Department
Japan International Cooperation Agency
IC Net Limited**

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1. Introduction (Background information) (1)

Why FAD fishery would be important in Vanuatu?

- **Some Visible Benefits of FADs**
 - Diversification of fishery
 - Increased landings
 - Cost and effort savings
 - Eases pressure on Reef fish population
 - Encourage new entrance to the fishery, increases fisher confidence
 - Contributes to National Food Security
 - Encourage greater collaboration among fishermen

1. Introduction (Background information) (2)

What issues associated to FAD fishery in Vanuatu?

- **Some Problems associated to FAD fishery**
 - User rights Conflict
 - Perceived High cost of construction and maintenance
 - Low usage opportunities in rough seas and strong currents condition
 - Over crowding of near FADs and poor fishing practices
 - Decreasing yield among coastal FADs
 - Inadequate management and regulation measures
 - Vandalism
 - Requires some technology improvement



Issues associated to management body

Issues associated to technology improvement

Issues associated to resource management

2. What would be required for sustainable FAD fishery management? (1)

- Administrative management

Top down approach



- A participatory community-based management
(based on the concept of co-management)

Department of Fisheries

in collaboration with

Respective fisher coop, or

Fisher group <FAD management group>

Individual fisher



Bottom up approach

2. What would be required for sustainable FAD fishery management? (2)

- Regulation (for construction, deployment and fishing operation, etc.,)
 - Technology development (for economic/efficient FAD; non-submerge, long durability, development of under/unutilized species, etc.,)
 - Construction and deployment plan
 - Maintenance plan
 - Monitoring plan
1. FAD condition (for appropriate maintenance; repair, & replacement)
 2. Catch data around FAD (catch & effort, species composition, biological data collection of target species)
 3. Cost performance (initial cost, durability: operation<no-submerge> days, operation cost, etc.,)

2. What would be required for appropriate/sustainable FAD fishery management? Who should manage FAD fishery? (3)

- **Fund generation plan**

Current situation: Relying on government or foreign fund



In future: Collection of FAD license fee and FAD user's fee to accumulate fund for realization of sustainable FAD fishery management



1. How to collect (license fee, users' fee or extra charge for fuel purchased in each coop, to the boat owners)
2. How to manage (each fisher cooperative?)
3. How to utilize (for maintenance, replacement, technology development, data collections, and other management activities?)

3. FAD fishery regulation (1)

“Regulation should cover all aspects of the FAD fishery operations and management, based on a consensus of stakeholders”

- Rule for construction and placing of FAD
- Clarification of Responsibilities for management authorities
- Designated FAD
- Clarification of Identification and Marking of FAD
- Clarification for fishing operations near FAD
- Clarification for FAD user license and fee
- Clarification of FAD users' responsibility for required data provision (catch & effort, biological data)
- Clarification of FAD users' responsibility for resource management measures (targeting juvenile)

* It will take time for legislation procedure, therefore Fisheries Department should start legislation process from initial stage

**VANUATU Fisheries Act [CAP 315]
Fisheries Regulations Order No 23 of 2009
Arrangement of Sections**

PART 12 FISH AGGREGATING DEVICES

80 Placing of devices

- (1) A person must not place a fish aggregating device in Vanuatu waters except with the permission of the Director, in consultation with relevant authorities, and in accordance with such conditions as the Director may specify or as are otherwise specified in this Part.
- (2) The permission of the Director under this clause may be given in the form of a facsimile or email or in writing whether as a condition of the licence or otherwise.
- (3) Permission to place a fish aggregating device does not confer any exclusive right to fish in the vicinity of the device.
- (4) The master of any vessel placing a fish aggregating device must notify the Director within 24 hours of the nature and location of the device.

**VANUATU Fisheries Act [CAP 315]
Fisheries Regulations Order No 23 of 2009
Arrangement of Sections**

81 Designated fish aggregating device

- (1) The Director may, by notice published in the Gazette, declare any fish aggregating device to be a designated fish aggregating device for the purposes of this Part.
- (2) A person must not use any designated fish aggregating devices for mooring purposes, unless there is a written approval by the Director.

82 Marking of devices

- (1) All anchored fish aggregating devices placed in Vanuatu waters must:
 - (a) bear a radar reflector and such lights as must be clearly visible at night from a distance of 1 nautical mile; and
 - (b) have such other equipment or markings as the Director may from time to time require.
- (2) All floating fish aggregating devices must clearly show the radio call signs of fishing vessels that issue the fish aggregating devices.

**VANUATU Fisheries Act [CAP 315]
Fisheries Regulations Order No 23 of 2009
Arrangement of Sections**

83 Unauthorized removal of fish aggregating device

A person must not remove or destroy a fish aggregating device without the authorization of the Director.

84 Disposal of unauthorized device

A fish aggregating device that is placed in Vanuatu waters otherwise than in accordance with a permission given under clause 75 or found in Vanuatu waters without a marking or piece of equipment required by clause 77, may be used or disposed of in such manner as the Director may direct.

85 Offence and penalty

A person who contravenes any provisions of this Part is guilty of an offence and is punishable on conviction by a fine not exceeding:

- (a) in the case of an individual – VT200,000;
- (b) in the case of a company, association, or body of persons corporate or incorporate- VT1,000,000.

4. FAD fishing license

From Free access fishing (everybody access)

- ✓ Unclear responsibility for each user



To Limited [licensed] access fishing

- ✓ Identification of registered boat
- ✓ Clear responsibility for each user
 - to pay registration and user's fee for FAD management and maintenance
 - to provide required data (catch & effort, biological) for resource management

5. Technology development activities (1)

➤ Technical issues for FAD fishing

- ✓ FAD submersion problem
- ✓ Loss of FAD
 - Increase of operation cost
 - Reduction in operation days



- Improvement for FAD structure by economic and effective methods: **Minimization of FAD submersion and loss, and maximization of operation days**

&

➤ Insufficient research and development for Un/Under utilized resource around FAD

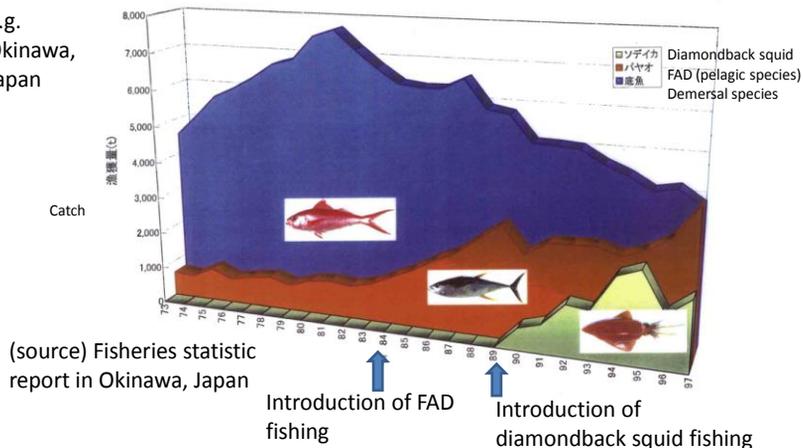


- Un-utilized resource development and management around FAD: **Diamondback squid development and marketing**

5. Technology development activities (2)

Technology development for Un-utilized resource utilization around FAD

e.g.
Okinawa,
Japan



- Diversification of resource use
- Utilization of un/under-utilized resource and saved overexploited resource

6. FAD construction and deployment plan

Traditionally, FAD construction and deployment based on FAD fishers' experience

plus

Technology standard, in safe, efficient and economical aspects, for FAD construction and deployment should be set up by a management authorities,

based on

Basic knowledge of mooring and materials

Basic knowledge of construction and deployment

Deployment operation must be **safe & easy**

Materials and construction must be

economical & efficient

7. Maintenance activities

- FAD regular maintenance by a management body
 1. Check & clean the upper rope, remove hooks from the rope
 2. Clean & change Attraction device
 3. Replace damaged buoys and clear entanglement
 4. Replacement of FAD, if it is lost

FAD maintenance activities = Key to improve FAD durability

Under the management body

Regular maintenance/management plan being required

- Daily check by fishers

If fisher find any problems on FAD, he should report it to a management body

8. FAD monitoring activities

- FAD condition monitoring
(for maintenance and repair)
- Catch and effort monitoring
& Biological data collection for target species
(for resource management data collection)
- Cost performance monitoring
(for economic data collection)
- FAD fishery surveillance
(for illegal fishing boat around FAD and illegal FAD)

8-1. FAD condition monitoring (1) (for maintenance and repair)

- FAD regular maintenance by a management body
Regular maintenance/management plan being required
e.g. once per month under moderate current conditions
- Daily check by fishers

If fisher find any problems on FAD, he should report it to a
management body



To record maintenance and repair works on each FAD on Log sheet



- Maintenance, repair and replacement cost calculation
- Technical improvement on FAD design and construction

8-1. FAD condition monitoring (2)

Fisheries Division/NAFCOOP
FAD Maintenance/Repair Log Sheet

Location: _____ Fisher in charge: _____
 Date: dd ____ mm ____ yyyy ____ Crew size: ____ Fuel (\$): ____
 Departure: ____ hr ____ min Return: ____ hr ____ min

FAD ID	FAD ID	FAD ID	FAD ID
Materials Used			
Materials Cost (\$)			
Maintenance Work Done			
Activity VC / CL / UT / RE	Activity VC / CL / UT / RE	Activity VC / CL / UT / RE	Activity VC / CL / UT / RE
Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO
Notes	Notes	Notes	Notes
Activity VC / CL / UT / RE	Activity VC / CL / UT / RE	Activity VC / CL / UT / RE	Activity VC / CL / UT / RE
Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO
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Activity VC / CL / UT / RE	Activity VC / CL / UT / RE	Activity VC / CL / UT / RE	Activity VC / CL / UT / RE
Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO	Part FP / FL / BO / BP / AP / JO
Notes	Notes	Notes	Notes
Codes			
Activity VC/CL/UT/RE: VC=Cleaning, CL=Cleaning, UT=Cleaning, RE=Repair			
Part FP/FL/BO/BP/AP/JO: FP=Flotation, FL=Flotation, BO=Buoy, BP=Buoy, AP=Anchor, JO=Joints			

The above FAD maintenance and repair log sheet should be used for the activity

8-2. Catch and effort monitoring & Biological data collection

- Collection of FAD fishery catch and effort data by use of modified field sheet (data collectors)
- Biological data collection for target species <e.g. dolphinfish and yellowfin tuna>
(Length, weight, maturity, etc.,)



To analyze **catch and effort trend** of FAD fishery

To analyze **size trend** of target species

(To identify migration pattern of target species)

(To analyze the long term potential of the resource)



To obtain certain **indicator** to check **resource trend** for realization of sustainable and profitable resource utilization

1

Record Sheet of Fish Catch

Record Sheet No.1

Village Name : _____ Fisher Name : _____

Fishing Gear : 1. Gill Net, 2. Trolling, 3. Bottom Line, 4. Spear Gun, 5. Cast Net
 6. Fish Trap, 7. Other Fishing Gear (Type : _____)

Month: January / February / March / April / May / June / July / August / September / October /
 November / December

Date	Time		Fishing Place	Gear No.	Fish Catch of Main Species (kg)											
	Depart	Arrive												Others		
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																

2

Record Sheet of Fish Sale and Fishing Cost

Record Sheet No.2

Village Name : _____ Fishers Name : _____

Month: January / February / March / April / May / June / July / August / September / October /
 November / December

Date	Fish Sale (Vatu)		Cost of Fishing Activities and Fish Sale (Vatu)						
	Fresh Fish	Processed Fish	Gasoline	Engine Oil	Ice	Food and Water	Transportation	Equipment Purchase	Other
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

8-3. Cost performance monitoring (1)

- Initial cost of FAD construction & deployment
 - FAD maintenance cost
 - Operation cost/day x operation days
- ↓
- **Cost performance** of FAD and FAD fishing
- ↓
- Calculation for **appropriate number of FAD and FAD users' fee**

8-3. Cost performance monitoring (2)

In case of Soufriere		
0. Pre-Condition		
Working Days Per Year	312 days	6days/wk = 312 days
Gross Profit per day	\$720	120 lb x \$6/lb = \$720
Share	4 shares	1 boat+1 engine+2 crew
1. Fixed Cost per Day		
Items	Cost	Calculation
Boat	\$3,69	\$23,000 ÷ (312 days × 20 yrs)
Engine	\$12.82	\$16,000 ÷ (312 days × 4 yrs)
Trolling Line	\$14.42	\$150 × 30 set ÷ 4 time ÷ 312 days
Drop Line	\$481	\$500 ÷ set ÷ 4 time ÷ 312 days
Hand Line	\$2.40	\$150 ÷ 6 ÷ 4 time ÷ 312 days
GPS	\$0.32	\$500 ÷ (312 days × 5 yrs)
Compass	\$01.3	\$200 ÷ (312 days × 5 yrs)
Flare	\$002	\$35 ÷ (312 days × 5 yrs)
Cell Phone	\$01.0	\$150 ÷ (312 days × 5 yrs)
Life Jacket	\$038	\$300 ÷ 2 ÷ (312 days × 5 yrs)
Sub Total	\$39.09	
2. Running Cost per Day		
Items	Cost	Calculation
Fuel	\$244.80	15 gallon × 15.32/gallon
Engine Oil	\$30.00	2 quart × \$15.00/quart
Boat Maintenance	\$08.0	\$500 ÷ 2 yrs ÷ 312 days
Engine Maintenance	\$7.69	\$200 ÷ 2 months ÷ 312 days
Trolling Line	\$14.42	\$150 × 30 set ÷ 4 time ÷ 312 days
Drop Line	\$481	\$500 ÷ set ÷ 4 time ÷ 312 days
Hand Line	\$2.40	\$150 ÷ 6 ÷ 4 time ÷ 312 days
Ice	\$0	
Bait	\$20	
Sub Total	\$324.92	
3. Labour		
Items	Cost	Calculation
Labour (allowance for crew)	\$222.60	(\$720 - Fuel \$244.80 - Engine Oil \$30) ÷ 4 × 2 crews
4. Net Profit		
\$720 - (1+2+3) =	\$133.39	
Minimum catch per day	606.7lbs	(fixed cost per day \$39.09 + running cost per day \$324.92) ÷ \$6 per pound

8-3. Cost performance monitoring (3)

In case of Vieux Fort		
0. Pre-Condition		
Working Days Per Year	312days	6 days/wk = 312 days
Gross Profit per day	\$1,200	200 lb x \$6/lb = \$1,200
Share	4 shares	1boat+1engine+2crew
1. Fixed Cost per Day		
Items	Cost	Calculation
Boat	\$4.01	\$25,000 ÷ (312days×20yrs)
Engine	\$12.02	\$15,000 ÷ (312days×4yrs)
Trolling Line	\$4.81	\$50 x 30 set x 1time ÷ 312days
Drop Line	\$5.77	\$450x4 set x 1time ÷ 312 days
Hand Line	\$1.03	\$80x4setx1time ÷ 312days
GPS	\$0.51	\$800 ÷ (312days×5yrs)
Compass	\$0.19	\$300 ÷ (312days×5yrs)
Flare	\$0.05	\$80 ÷ (312days×5yrs)
Cell Phone	\$0.10	\$150 ÷ (312days×5yrs)
Life Jacket	\$0.38	\$300x2 ÷ (312days×5yrs)
Sub Total	\$28.87	
2. Running Cost per Day		
Items	Cost	Calculation
Fuel	\$690.00	3 tanks x \$230/tank
Engine Oil	\$90.00	3 tank x 2 quart x \$15/quart
Boat Maintenance	\$2.24	\$700 ÷ 1 yrs ÷ 312 days
Engine Maintenance	\$1.92	\$50 x 12months ÷ 312days
Trolling Line	\$4.81	\$50 x 30 set x 1time ÷ 312days
Drop Line	\$5.77	\$450x4 set x 1time ÷ 312 days
Hand Line	\$1.03	\$80x4setx1time ÷ 312days
Ice	\$5	\$5/baket x 1 baket
Bait	\$0	
Sub Total	\$800.77	
3. Labour		
Items	Cost	Calculation
Labour (allowance for crew)	\$210.00	(\$1,200-Fuel\$690-EngineOil\$90) ÷ 4 x 2 crews
4. Net Profit		
\$1,200 - (1+2+3) =	\$160.38	
Minimum catch per day	138.27lbs	(fixed cost per day \$28.87 + running cost per day \$800.77) ÷ \$6 per pound

8-3. Cost performance monitoring (4)

Example)
<pre-condition>

Initial cost of FAD materials: EC\$5,000/unit (3,000~5,000)

- If durability of FAD is 1 year,
Cost of FAD/day: EC\$16 (5,000 ÷ 312days)
- If 10 boats share 1FAD,
Cost of FAD/day/boat: EC\$1.6 (16 ÷ 10boats)
- If 10boats use 3FAD
Cost of 3FAD/day/boat: EC\$4.8 (1.6x3) -----(A)

8-3. Cost performance monitoring (5)

Continue)

Maintenance cost of 3FAD:

- Fuel: EC\$500/time (\$250~500) x
12times/year=EC\$6,000/year
- Material: EC\$3,000/unit (\$1,000~5,000) x 3FAD = EC\$9,000/year
Total: EC\$15,000/year

Maintenance cost of 3FAD/day/boat: EC\$48.0 (\$15,000/312days)

If 10boats share the maintenance fee;

Maintenance cost of 3FAD/day/boat: EC\$4.8 (\$48.0/10) ----(B)

Cost of 3FAD including maintenance/day/boat: EC\$9.6---(A)+(B)



In this case, FAD user's fee should be at least EC\$9.6/day/boat

→ One (1) fish contribution /day/boat

8-4. FAD fishery surveillance

“Collaboration with Coast Guard”

- Fishermen should report any incident and illicit activity around FAD to Coast Guard
- Arrange discuss in a session between management authority and Coast Guard Unit
- Schedule surveillance operations by Coast Guard



It is important for fishers to be shown enforcement of law, if necessary

9. Fund generation activity

Under fishers participatory FAD fishery management, it might be essential for FAD users to establish workable and practical fund generation system for replacement and repair of FADs

- How to collect user's fee
- How to manage fund
- How to utilize fund

9-1. How to collect FAD user fee

- Issue license (every year renewal)



Collection of FAD license fee [done with vessel lic]
Registration of FAD fishing boats
in each cooperative

- Collection of FAD users fee
(e.g.)



- ✓ Charging EC\$20/100lbs of fish caught around FAD (Dominica) in each landing site
- ✓ Charging extra EC10~20cent/gallon of fuel purchased in each cooperative gas station (St Lucia: subtract the charge from fuel rebate return in each coop)

Simple, easy and sustainable method should be used

9-2. How to manage fund

- A management body should supervise fund
- Clarification for role of respective fisher coop
Each cooperative should manage fund
- Annual report for fishers
- FAD management plan
- Financial report

9-3. How to utilize fund

Strictly for FAD Management

- Replacement of FAD
Whenever old FAD is lost, new FAD should be replaced, a.s.a.p. (Stock of FAD materials being required)
- Maintenance of FAD
Cost for labour, fuel, materials, etc., for regular (monthly) based maintenance
- Any management related matter

10. Sensitization activity

- Meeting with stakeholders
- Use of media
- Pamphlet or newsletter
- FAD management group discussions
- Educate consumers on the fishery operations and management



Obtain public support

- Empower and give FAD fishers confidence and pride to collaborate in the participatory management of the FAD fishery

11. References

1. FAD fishing digital textbook 1~4: Study on Formulation of Master Plan on Sustainable Use of Fisheries Resources for Coastal Community Development in the Caribbean, CRFM/JICA, 2010
2. Baseline survey report: Project for Promotion of Grace of the Seas for Coastal Villages in Vanuatu, Phase 2, Vanuatu Fisheries Department / JICA 2012
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