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.

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.

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**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

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

(source) Fisheries statistic report in Okinawa, Japan

(e.g.) Okinawa, Japan
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)

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
Record Sheet of Fish Catch

<table>
<thead>
<tr>
<th>Date</th>
<th>Time (Depart)</th>
<th>Fishing Place</th>
<th>Gear No.</th>
<th>Fish Catch of Main Species (kg)</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td>12</td>
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</tr>
</tbody>
</table>

Record Sheet of Fish Sale and Fishing Cost

<table>
<thead>
<tr>
<th>Date</th>
<th>Fish Sale (Volts)</th>
<th>Cost of Fishing Activities and Fish Sale (Volts)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fresh Fish</td>
<td>Processed Fish</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<tr>
<td>13</td>
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</tr>
</tbody>
</table>
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 Southern

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAD</td>
<td>$305</td>
<td>$150,000/10 FAD x (3 days)</td>
</tr>
<tr>
<td>Oil</td>
<td>$73</td>
<td>1,000 x 72 x (10 FAD)</td>
</tr>
<tr>
<td>Paint</td>
<td>$446</td>
<td>1,000 x 20 x (3 days)</td>
</tr>
<tr>
<td>Dril Line</td>
<td>$84</td>
<td>1,000 x 3 x (3 days)</td>
</tr>
<tr>
<td>Fuel Line</td>
<td>$90</td>
<td>1,000 x 2 x (3 days)</td>
</tr>
<tr>
<td>UPS</td>
<td>$23</td>
<td>1,000 x 3 x (3 days)</td>
</tr>
<tr>
<td>Fishermen</td>
<td>$973</td>
<td>1,000 x 3 x (3 days)</td>
</tr>
<tr>
<td>FAD Maintenance</td>
<td>$100</td>
<td>1,000 x 3 x (3 days)</td>
</tr>
<tr>
<td>FAD User’s fee</td>
<td>$33</td>
<td>1,000 x 3 x (3 days)</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td><strong>$3,193</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Running Cost per Day

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Calculation</th>
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<tbody>
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<tr>
<td>FAD User’s fee</td>
<td>$33</td>
<td>1,000 x 3 x (3 days)</td>
</tr>
<tr>
<td><strong>Sub Total</strong></td>
<td><strong>$3,193</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Labour

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour (all time)</td>
<td>$292</td>
<td>1,000 x 2 x (3 days)</td>
</tr>
</tbody>
</table>

#### Net Profit

\[
\text{Net Profit} = \text{Total Revenue} - \text{Total Cost} - \text{Labour Cost}
\]

\[
\text{Profit per day} = \frac{\text{Total Revenue} - \text{Total Cost}}{\text{Number of days}}
\]

\[
\text{Minimum number per day} = \frac{\text{Total Revenue} - \text{Total Cost}}{\text{Labour Cost per day}}
\]

12
8-3. Cost performance monitoring (3)

In case of Vieux Fort

| 0. Pre-Condition |  
|------------------|----------|
| Working Days Per Year | 312 days |
| Gross Profit per day | $1,200 |
| Share | 4 shares |

| 1. Fixed Cost per Day |  
|-----------------------|----------|
| **Boat** | $4.01 |
| **Engine** | $12.02 |
| **Trolling Line** | $4.81 |
| **Drop Line** | $5.77 |
| **Hand Line** | $1.03 |
| **GPS** | $0.51 |
| **Compass** | $0.19 |
| **Flare** | $0.05 |
| **Cell Phone** | $0.10 |
| **Life Jacket** | $0.38 |
| **Sub Total** | **$28.87** |

| 2. Running Cost per Day |  
|-------------------------|----------|
| **Fuel** | $690.00 |
| **Engine Oil** | $90.00 |
| **Boat Maintenance** | $2.24 |
| **Engine Maintenance** | $1.92 |
| **Drop Line** | $5.77 |
| **Hand Line** | $1.03 |
| **Ice** | $5.00 |
| **Bait** | $0.00 |
| **Sub Total** | **$800.77** |

| 3. Labour |  
|-----------|----------|
| **Labour (allowance for crew)** | $210.00 |
| **Labour** | $10.00 |

| 4. Net Profit |  
|---------------|----------|
| **$1,200 - ($28.87 + $800.77)** | **$160.36** |
| **Minimum catch per day** | **138.27 lbs** |

8-3. Cost performance monitoring (4)

Example)
<pre>
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<pre>

Example)

<pre>

| <pre>

|  
|--------------------------|----------|
| **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 10 boats 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 10 boats 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
3. Record sheet of fish catch, and fish sale and fishing cost, Project for Promotion of Grace of the Seas for Coastal Villages in Vanuatu, Phase 2, Vanuatu Fisheries Department / JICA 2012
4. Fisheries Act [CAP 315], Fisheries Regulation Order No 23 of 2009
   Arrangement of Sections, Part 12 Fish Aggregating Devices, Vanuatu