

Implementation Guidelines of Integrated Community Based Coastal Resource Management (CBCRM)



The Project for Promotion of Grace of the Sea in the Coastal Villages (Phase III)



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PART 1: Theory of Integrated CBCRM

1. Preface

The Vanuatu Fisheries Department, with the support of the Japan International Cooperation Agency (JICA), has been implementing the Project for Promotion of Grace of the Sea in the coastal village in active participation of communities and government from 2006 to 2024. The main objective of this project was the sustainable use of fishery resources within the reef, but it was an integrated activity that included the coastal area, including the land surrounding the reef and the reef outer garden to the outside. In coastal resource management, not only in Vanuatu, but also in other countries in the Pacific, it is essential for local people to take the initiative in the management of coastal resources. In this project, the extension staff of the Governmental institution in charge of Fisheries worked together with local residents to develop a coastal resource management plan from their perspective, focusing not only on the knowledge needed to sustainably use coastal resources but also on how to motivate residents to participate in coastal resource management activities. This process culminated in the development of an integrated community-based resource management methodology. This implementation guidelines are a guide for a series of PDCA (Plan, Do, Check, and Action) for CBCRM that reflect the practical experiences gained in the project. It also reflects the valuable experience of other projects implemented by SPC and other international organizations, and we believe that it is applicable to a certain extent in the wider region of Oceania.

Specific content includes the planning process for effective Integrated CBCRM, community structures and external support for implementation, policy instruments, and implementation considerations. The main audiences for this guidelines are fisheries extension staff of Governmental institution in charge of Fisheries, community extension volunteers appointed by the government in coastal areas where extension staff is not assigned, local government officers who work with residents of coastal communities to assist in the planning and implementation of Integrated CBCRM and representative of the fisheries communities.

2. Purpose of coastal fisheries resource management and co-management

(1) Necessity of fishery resource management

Fishery resource management is originally a scientific approach to achieve Maximum Sustainable Yield (MSY) in fisheries science and it aims to control the catch amount. However, the reproductive capacity fluctuates depending on the number of spawning stock and environmental conditions, so if fishing is continued beyond the reproductive capacity (if too much of spawning stock are caught), the amount of resources turns to a decreasing trend. Fishery resources are living, and it has the characteristic to be able to reproduce itself unlike mineral resources. Namely, fishery resource management is to confine the catch to the MSY, which means keeping the spawning stock just before the resource turns to decrease trend.

In addition, there is also another idea that the goal of sustainably maximizing fishing income is to set the Maximum Economic Yield (MEY) as the goal of resource management. In any case, the basic idea of fishery resources management is to make effective use of resources on a sustainable basis.

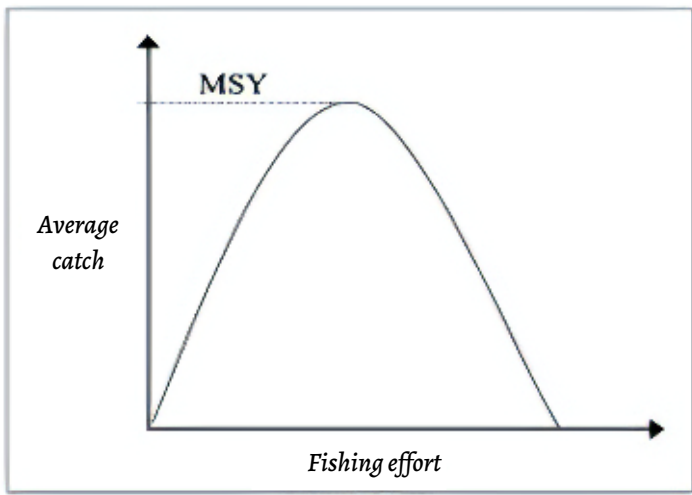


Figure 1: Maximum Sustainable Yield

(2) Concept of co-management

Co-management is a basic idea of Integrated CBCRM. There are mainly three types such as 1) top-down management by the government, 2) voluntary management by fishers, and 3) co-management with government and fishers.



Top-down management is typified by catch quota system common in European countries. Top-down management aims to prescribing fishing ground, fishing season, catch size and so on by governmental regulations to achieve MSY or MEY. Since it usually introduces regulatory system for specific target species at the national level, it is highly possible that the effect will be high if it is implemented properly. On the other hand, it is difficult to deal with the situation in accordance with local circumstances. Especially, in countries where have various target species and be composed large number of small fishing communities such as Asia-pacific region, it is not easy to enforce covering all fishing activities by the top-down management

Voluntary management by fishers is typified by the establishment of protected areas by the community initiative in Vanuatu. Fishers/tribal, resource owners or users practice voluntary management in Solomon Islands. Voluntary management by fishers can respond flexibly according to the expected roles and surrounding environments of the target site. It is relatively easy to comply because of reasonable rules decided by themselves and the limited target areas. On the other hand, Knowledge, skills and budget are insufficient in many cases for this management method. In addition, since management rules are informal, it would be difficult to control it by the public agency.

Co-management with government and fishers/resource owners would be model to leverage the good parts of the two types of fishery resource management mentioned above as well as to complement their difficulties. In general, fishers can tackle the difficulties and needs for the management activities with officer in charge of the public agency in order to find the countermeasures. They then can summarize it in the management plan (action plan) and authorize it as the official management rule by the public agency.

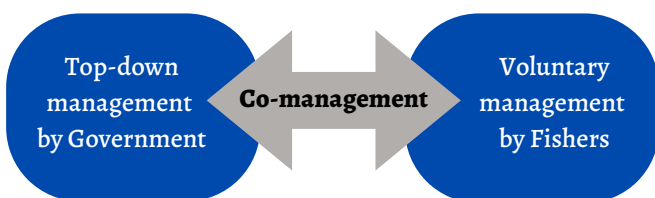


Figure 2: Concept of Co-management

[1] Management measure is inclusive that; controlling fishing efforts (gear, ground, period, target species), illegal fishing surveillance, resource enhancement, reef preservation, etc.

[2] Supporting measure is inclusive that; fishing diversifications such as FAD development, deep bottom fishing development, value addition of fish products and alternative income source development.

[3] Encouraging local participation measure is inclusive that; awareness raising program, underwater research, eco label, fund raising, etc.

3. Concept of Integrated CBCRM

3.1 Basic idea of Integrated CBCRM

Many resource management projects based on the co-management model have been implemented in most of the Pacific countries including Vanuatu communities. Integrated CBCRM is one of them with specific characteristics as follows.

- 1) Targeting not only fishers but also the community people extensively even though the aims are mainly on fisheries resource management,
- 2) Involving various elements necessary to implement resource management comprehensively broadly divided into following three groups.

“Management measure” is a series of activities directly relating to fisheries resources management[1]

“Supporting measure” is a series of activities relating to support community livelihood for sustainably, independently and effectively implementing the resource management[2]

“Connecting measure” is a series of activities relating to connect management and supporting measures and also to motivate participating community people to the resource management activities[3]

- 3) Systematizing and arranging those elements and contents logically

- 4) Packaging flow of resource management activities such as a) planning, b) implementing, c) monitoring/evaluation and d) revising the plan to promote Integrated CBCRM effectively and efficiently

Consequently, Integrated CBCRM is a methodology of participatory resource management with coastal community as the main actor. The community implements activities of the management measure and the supporting measure in a comprehensive manner by aiming sustainable use of resources with the support of public agencies based on the co-management model. The goal and basic principles forming Integrated CBCRM are as follows.

Goal	Maximize the sustainable benefits of communities obtained from coastal resources
Basic Principals	<ol style="list-style-type: none"> 1. Activities are carried out through the ownership of the community with consideration of gender and social inclusion. 2. Both resource management activities and supporting activities are effectively for sustainable use of resources with practice in comprehensive manner through cooperation with communities and external support organizations. 3. The external supporter acts as a role of the facilitator. Fisheries officer are expected to take this role to facilitate community discussion and community empowerment on several meetings and workshops. 4. The plan is widely regarded as a part of the regional development plan and ultimately linked with the National Development Plan. 5. Four perspective for the planning and evaluation of Integrated CBCRM; “Environment/Resources”, “Economy/Production”, “Socio Culture” and “Institution/Governance” are considered within the activities. 6. The plan is constantly evaluated and revised through monitoring. 7. Community resilience against natural disaster is established from the viewpoint of food security. 8. It conducts scientific and logical monitoring and evaluation.

3.2 Basic components of Integrated CBCRM

3.2.1 Structure of Integrated CBCRM

The basic components of Integrated CBCRM are shown in the following figure. The basic components of Integrated CBCRM are (1) Integrated CBCRM plan, (2) Integrated CBCRM Measures, (3) Integrated CBCRM Committee/Coordination Mechanism, and (4) External support organization/institution (fig.3). Each detail is explained below.

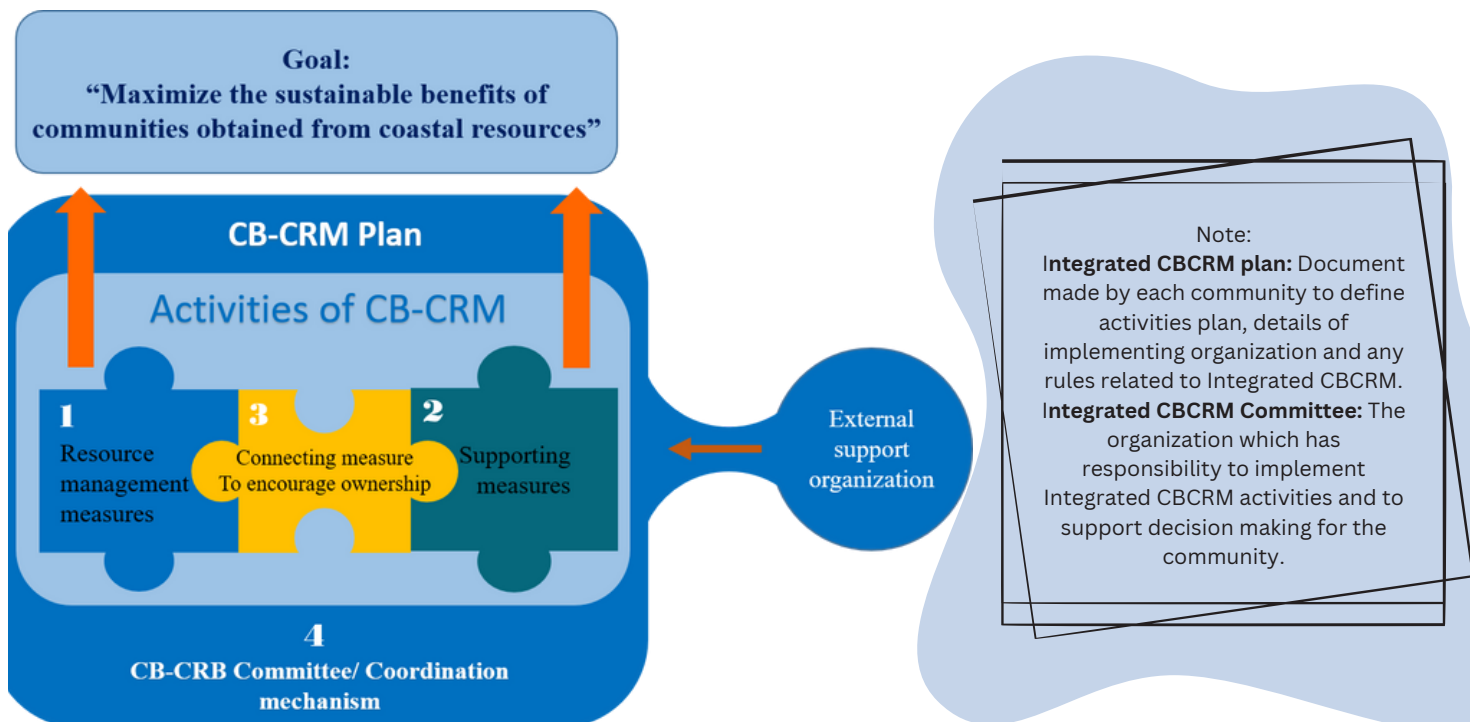


Figure 3: Basic structure of Integrated CBCRM

3.2.2 Integrated CBCRM Plan

(1) Scope of the plan

Integrated CBCRM aims to implement and comprehensive fisheries resource management by community as the main actor. However, the support from public agencies is also essential. For receiving the smooth assistance from public agencies, the scope of the plan would be consistent with the government’s policy. It is therefore desirable that the Integrated CBCRM plan is a part of the regional development plan in the broader scope. In the context, the Integrated CBCRM plan would be preferable to be associated with the administrative unit such as a provincial government covering the target community, furthermore a national level development plan.

Further, since it is necessary to have public effectiveness and enforceability, it needs to be officially approved or registered by Ministry or relevant government agency.

(2) Composition of the plan

The Integrated CBCRM plan should include the following items.

Table 1. Composition of the Integrated CBCRM plan

Items	Contents
Target area	Target areas or communities for Integrated CBCRM are defined.
CBCRM Committee	The fundamental structures such as name of the committee or substituting organization, the chairperson, the list of board members, the committee members, the role and authority, the term of office are specified.
Contents of Activities	There are three items such as <u>resource management</u> measure to manage fisheries resources, <u>supporting measure</u> to support community’s livelihood and <u>connecting measure</u> [4] to connect management and supporting measure. The contents of activities such as the name, the targets, the methods, the period and responsible person should be clarified.
Community based Coordination Mechanism	The mechanism for implementing concrete activities corresponding to the community needs is described. This includes the composition of each activity such as the group centering on the committee, the meeting for problem solving/consensus building, the mechanism of notifying decision items and results of activities to community members, the person in charge.

[4] For details of each measure, refer to “4.3.2 Activities of Integrated CBCRM”.

External support system	This includes the information such as the name of the external support organization, demarcation between the community and external support organization, authority, duty, budget allocation, period to support. External support organizations are supposed to be public sector such as Fisheries Department and international donors.
Method of Monitoring and Review of the Plan	The indicators for goals and progress evaluation for each measure should be decided. In addition, procedures and methods for review such as the period of reviewing the plan, procedures for proposal and approval by the committee and consultation with external support organizations. should be determined. In case of implementing planning and evaluating (monitoring, reviewing) of the Integrated CBCRM plan, “four perspectives” as 1) resources & environment, 2) economy & production, 3) socio culture and 4) institution & governance, are utilized for the regional development [5] .



Column 1: Relationship between National Development Plan and Integrated CBCRM Plan

Integrated CBCRM plan is not just a plan to conserve and sustain the use of coastal resources. Especially, the supporting measure of the resource management which is the main component of the plan is dealt with as an important part of the regional development plan. In other words, it is positioned as a plan to embody the national development plan in each community and the region. Therefore, community members who implement the contents of Integrated CBCRM plan are the main actors to achieve national development goals through their activities.

In order for residents themselves to have ownership of Integrated CBCRM, it is necessary to “visualize” the activities of each Integrated CBCRM plan to achieve the objectives of the NSDP, thereby possible to increase the effectiveness of the plan.

3.2.3 External organizations and policy instrument

The external organization and policy instrument support the community from the outside about various aspects concerning the implementation of Integrated CBCRM, and it is one of the important elements of Integrated CBCRM.

First of all, the external support organizations aim to support community from outside such as fisheries agencies, a community support department of a local government, each administrative organization related to tourism, agriculture, cooperatives, regional development, NGOs, international organizations, donors and so on. Fisheries agencies in particular is expected to play a central role in external support organizations and has the role of a planner or coordinator that supports necessary technologies and funds while involving other Ministries and Departments, NGOs and donors. In addition, external support organizations are not merely unilateral support, but are positioned as partners working with the community on Integrated CBCRM. The resource management is the national level challenge in the first place, and it is necessary that both community and public agency work on the issues. The public agency has usually confronted issues such as legal development, development of management tools, budgetary measure, response to species to be managed throughout the country.

[5] For details of it, refer to “3.3 Four perspectives for planning and evaluation of Integrated CBCRM”.

The community should take care of several issues according to the role and responsibility with mutual collaboration. The information, know-how and lessons learned extracted from the activities can be fed back to the policy, skills and technology development.

The external support system refers to various systems that support the community working on Integrated CBCRM as well. This system includes approval of the Integrated CBCRM plan by government, provision of equipment and financing, setting and approval of MPA by Department of Environmental Protection and Conservation, micro credit service by financial institutions/NGOs, trainings related to management and running of the cooperatives, technical trainings related to the development of income sources, women's empowerment by organization/NGOs. In particular, administrative approval schemes are very important for activating the Integrated CBCRM plan formulated by the community. Without this, the plan is merely a private rule of the community, and people outside the community are not obligated to comply with it, so the effectiveness of management will not be guaranteed. It is desirable to arrange such external support organizations and systems in advance and to propose what kind of support can be obtained according to the community plan and needs.

Table 2. Major external support organizations and policy instruments

	External support organizations	Role/Institution
1	Ministry in charge of fisheries	- Official approval system of Integrated CBCRM plan
2	Fisheries agency/ department	- Planner/coordinator to implement Integrated CBCRM in collaboration with the community. - Technical support - Procurement of equipment - Accreditation and training of community extension officers - Endorsement of community protected area (taboo area)
3	Provincial government /Area Council	-Collaboration with regional development plan. Various indirect support.
4	Ministry of Environment	- Establishment/approval of MPA
5	Financial institution /NGO	- Provision of micro credit service
6	Educational institution related fisheries/ maritime	- Trainings on fishing gears and methods, and outboard motor repair

7	Department of Cooperatives	- Training on the establishment and management of cooperatives - Training on business skills
8	Department of Tourism	- Training on tourism business skill
9	Chamber of Commerce and Industry	- Business development service - Business information

Column 2: What is the role expected for external support organizations and policy instruments?

Integrated CBCRM is mainly based on community, and the most fundamental role expected to the external support organizations is to “motivate” the community members. In other words, it is a catalyzer to promote the resource management activities and the supporting activities by community, a consultant who gives expertise to community, an instructor who directly conveys new technologies and a coordinator who supports the resource management committee and arranges necessary specialists, equipment and money.



3.3 Four perspectives for planning and evaluation of Integrated CBCRM

The “four perspectives” of Integrated CBCRM are developed independently by the Project for Promotion of Grace of the Sea in the Coastal Village (GOS project) for effective and efficient coastal resource management activities based on the analytical method and territorial approach for regional development. This concept is used for understanding the current situation and analyzing the problems based on four perspectives such as 1) resources & environment, 2) economy & production, 3) socio culture and 4) institution & governance in planning stage (baseline survey, planning) and evaluation stage (monitoring, revision).

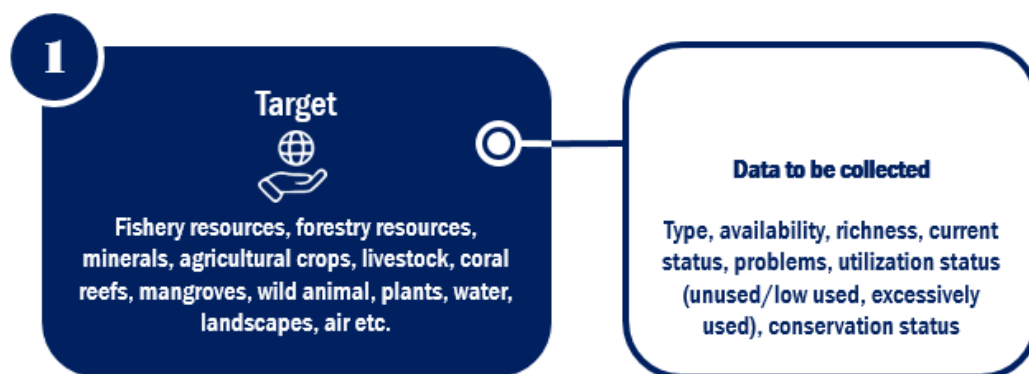
Specifically, it is necessary to check the composition of the Integrated CBCRM committee, the action plan, the roles and uses of the external support organizations and policy instruments from the respective perspectives without fail. Setting indicators on the monitoring sheet and reviewing the plan after receiving the monitoring results are checked from each perspective as well. The outline of the four perspectives and concepts of check items are shown in Figure 4. The details of each perspectives are shown below.



Figure 4: Four perspectives on Integrated CBCRM

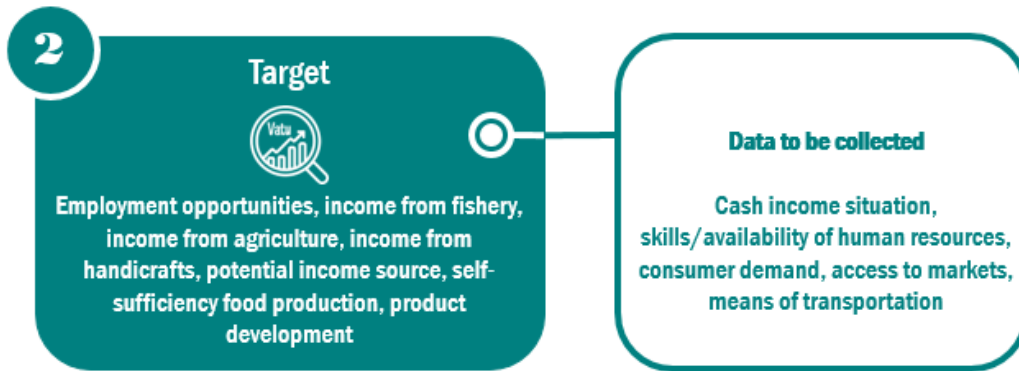
(1) Resource & Environment perspective

This perspective is on the natural environment such as various natural resources including marine resources, topography and landscape belonging to the community. This perspective is mainly necessary for understanding the current situation and analyzing the problems of the natural resource condition around target community. The target and data to be collected regarding this perspective are as follows.



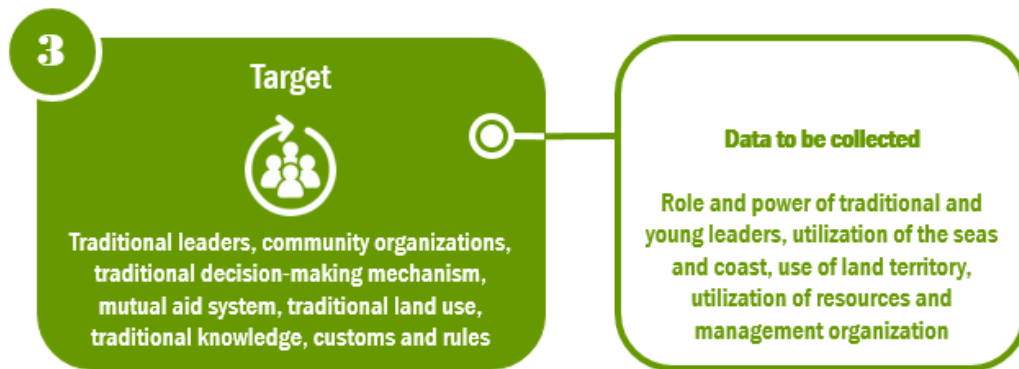
(2) Economy & Production perspective

The perspective is on economic and production activities such as income sources of community people and the production of necessary supplies for living. This perspective is mainly necessary for understanding the current situation and analyzing the problems of local livelihood of target community. The target and data to be collected regarding this perspective are as follows.



(3) Socio culture perspective

This perspective is on social and cultural conditions such as the traditional governance system within the community, knowledge, customs and rules. This perspective is mainly necessary for understanding the current situation and analyzing the problems of the traditional mechanisms of management and coordination of target community. The target and data to be collected regarding this perspective are as follows.



(4) Institution & Governance perspective

The perspective is necessary for understanding the current situation and analyzing the problems on the political and administrative organizations and institutions outside the community. In particular, it refers to an external organization and policy instruments as a position to support community activities. The target and data to be collected regarding this perspective are as follows.



Based on the above, an example of data to be collected at the planning stage (baseline survey, planning) and the evaluation stage (monitoring, revision) are shown below. However, as these contents change variously depending on the location and situation, it should be referred to as an example only.

Table 3. An example of items to be confirmed in each stage

	Resource & Environment	Economy & Production	Socio culture	Institution & Governance
1) Preliminary survey	<ul style="list-style-type: none"> - What kind of fishery resources are utilized? - Is there a resource problem? - What are unused resources? 	<ul style="list-style-type: none"> - What income sources are there? - Average cash income - Potential income sources - Distance to markets - Means of transportation 	<ul style="list-style-type: none"> - Role and authority of traditional leaders - Traditional rules/taboo - Social hierarchy - Sea/land use 	<ul style="list-style-type: none"> - Status of support by government and donors - Support needs
2) Elaborating Integrated CBCRM plan	<ul style="list-style-type: none"> - Fish species to be managed - Management measure - Resources and availability to use for supporting measure 	<ul style="list-style-type: none"> - Is the means of improving value addition of fishery products appropriate? - Selection of alternative income sources - Profitability 	<ul style="list-style-type: none"> - Is the composition of the Integrated CBCRM committee appropriate? - Do the planned activities not have any restriction? - Do the activities not have benefit to a particular group? 	<ul style="list-style-type: none"> - Role of VFD /items of activities - Relevant organization/ refining available systems - Items of technical support - Input equipment
3) Monitoring	<ul style="list-style-type: none"> - Effect of management - Difficulties - Management of resources used for supporting measure 	<ul style="list-style-type: none"> - Sales/Income target - Profitability 	<ul style="list-style-type: none"> - Management status of the committee - Fairness of management measure - Beneficiaries of supporting measure - Presence /absence of conflict 	<ul style="list-style-type: none"> - Input results - Expecting effects their gaps and the reasons
4) Revision	<ul style="list-style-type: none"> - Reflecting to management issues - Solution of issues on using resources for supporting measure 	<ul style="list-style-type: none"> - Target of supporting measure/ scale/ goal etc. 	<ul style="list-style-type: none"> - Items/ content/ targets of management measure - Target of supporting measure 	<ul style="list-style-type: none"> - Input plan

PART 2: Practical Methodology



4. Procedure for Implementing Integrated CBCRM

The flow of procedure for implementing Integrated CBCRM is shown in figure 5. The details of procedure are described as follows.

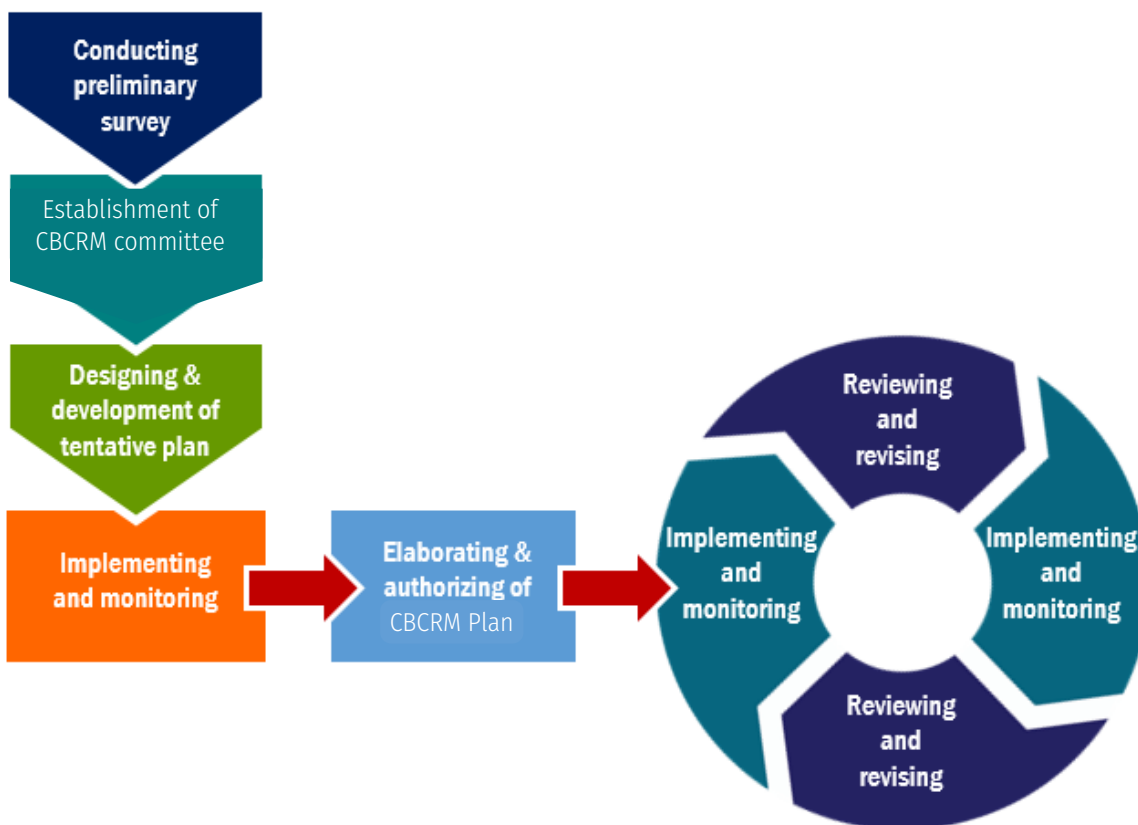


Figure 5: Implementing procedure of Integrated CBCRM

4.1 Conducting Preliminary Survey

(1) Simplified Socio-Economic Survey

This is a simplified survey to collect a minimum information necessary for selecting the target community and for a baseline for implementing Integrated CBCRM. The volume of the contents should be the level that one or two surveyors go around the candidate community that are interested in carrying out Integrated CBCRM and make a survey about one half day to one day. Information to be covered in the survey is as shown in Table 4.

This survey will target basic information for the facilitator to support formulation of the community's Integrated CBCRM plan[6].

[6] For details of it, refer to "3-2-1 Integrated CB-CRM Plan".

Table 4: Items for preliminary survey

Category	Survey items
1. Community's basic information	Number of households, population, distance from city/town, situation of infrastructure such as road, airport and ports
2. Structure of fishery	Number of fishers, existence of cooperatives and contents of the activities, number of boats (Canoe, canoe with outboard motor, FRP[7] boat with outboard motor), main fishing gear and methods, main resource
3. Situation of resource/environment	Awareness of the resource problems (Decreasing resource volume, downsizing of fish size, difference of distance to fishing ground), awareness on necessity of management
4. Situation of economy/production	Main income source and industry, items and the amount of income and expenditure by households, actual situation of sales of fishery product (place to sale, unit price and the method)
5. Situation of socio culture	System of utilization of traditional land and sea (ownership, owners, exclusive use), equality in resource utilization, existence of resource management organization, authority/function for resource management by traditional leaders
6. Situation of institution/governance	Presence or absence of human resources, policy instruments, activities and problems for community support by local administrative organization

(2) Natural resource survey

As preliminary survey, the natural resource survey would be better as simple and short as possible though the survey should collect basic information of the current status of the target area. Prior to the survey, interviewing community members is indispensable to understand the present status of coastal resources and existing traditional management areas (taboo areas).

The natural research is then implemented by the research specialists such as staff of fishery department based on basic underwater visual census targeting low mobile species such as large snails, giant clams, sea cucumbers, corals and lobster. It is preferable to obtain the cooperation of local residents for the survey. The case example of basic procedure is shown below though there are many manuals for the underwater survey to show the procedure that can be also referred to.

[7] Fiber Reinforced Plastic

- 1) Identify the target sites based on the interviews with community members.
- 2) Observe the bottom condition around target sites by free diving in order to understand general condition of bottom topography and habitat.
- 3) Set five 50 m transects in the site. The interval is depended on the size of target site.
- 4) Record GPS positions of start points and azimuth direction of each transect.
- 5) By free diving, 2 divers move along the transect line with observation of the 2m wide (2 m wide x 2 divers = 4 m wide) area and count and record the number of target species previously determined. In the survey, the divers try to observe the underneath of rock and boulder if possible.
- 6) Number of individuals and approximate size of target species recorded in the target sites are statistically analyzed for estimating the amount of target species.

4.2 Establishment of Integrated CBCRM Committee

4.2.1 Steps to establishment and roles of the committee

Following the “4.1 Conducting Preliminary Survey”, establishment of Integrated CBCRM Committee, the implementing agency of Integrated CBCRM in the community, that leads the participants in each process of planning, implementation, monitoring and review stages. Namely it is a coordination mechanism to make various decisions for Integrated CBCRM. It is also desirable to have an advisory function for the local administration in village level such as Chief councils/House of Chief.

At first, the facilitator encourages the community to hold a representative meeting of the residents, and explain 1) the necessity of resource management, 2) the purpose and activities of Integrated CBCRM, 3) the role and composition of the committee. On that basis, it is necessary to confirm whether there is an existing organization that will take on this role and supports the establishment of a new one. Items to be decided on establishing the committee are 1) Target community and marine area, 2) Authority and duty of the committee, 3) Selection of committee members (traditional leaders, representative of fishers’ organization, women’s group and youth group), 4) Selection of chairperson, 5) Selection of executive member (secretary, treasurer, person in charge of monitoring), and 6) Working group in charge of each measure of Integrated CBCRM activities (After selection of activities).

4.2.2 Structure of Integrated CBCRM Committee

Members of the committee should be decided by discussion of each community, but it is supposed to consist of representatives of each working group, traditional leaders of the community, representatives of fishery organizations, representatives of local organizations such as women’s groups and youth groups, responsible for local administration (Area Secretary). In addition, chairpersons and other executive officers such as secretary, accountant/treasurer and person in charge of monitoring are appointed and a board of directors is organized. As a subordinate to the committee, sub-committees are organized specifically to implement each activity (management measure, supporting measure and Participation promoting measure) and to carry out monitoring.

Further, if there is already an equivalent organization in the community, it can be substituted by having the function of the Integrated CBCRM committee for that organization, so it is not necessary to organize a committee. The example of the structural composition is shown in figure 6.

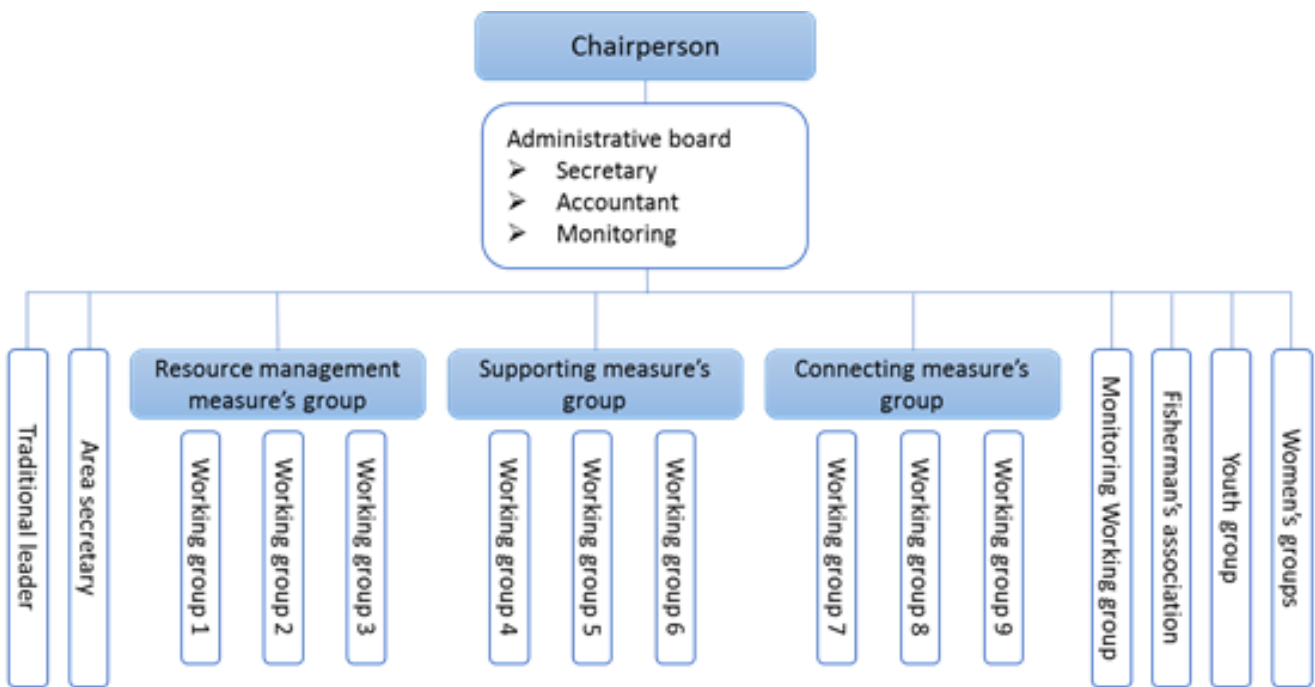


Figure 6: Example of structural composition of Integrated CBCRM committee

Column 3: Integrated CBCRM committee as a coordination mechanism

There are various existing organizations such as Chief Council, youth and women's group, religious affiliation and fishermen's association in the community. In addition, some communities or islands have organized Vanua-Thai[8]. Furthermore, it is assumed that a resident group is formed for each economic activity to implement the supporting measure of Integrated CBCRM.

Integrated CBCRM committee plays a role of encouraging relevant organizations of the community including existing or newly formed residents' organizations to actively participate in Integrated CBCRM activities.

The members can be individuals who belong to existing organization or may be individuals who are newly selected. However, it is desirable to consist of appropriate individuals who have a good understanding of Integrated CBCRM concepts and monitoring methods as coordinators within the community.

[8] It is a resource management group established by NGO, Wan Smol Bag..

4.3 Designing and development of tentative integrated CBCRM Plan

4.3.1 Steps of designing

Following the “4.2 Establishment of Integrated CBCRM Committee”, a tentative Integrated CBCRM plan is formulated with the committee as the main body. For the position and composition of the Integrated CBCRM plan, see refer “3.2.1 Integrated CBCRM Plan”.

1st Step: A facilitator such as fisheries officer with person in charge of local government (e.g. Area secretary in provincial government) or trained NGO/community personalas possible holds a workshop in the community which starts the resource management activities. The facilitator explains i) purpose and basic idea of Integrated CBCRM, ii) significance and method of the monitoring, and iii) items to be included in the activities.

2nd Step: It is planned the tentative Integrated CBCRM using methods such as strength and weakness analysis or brainstorming[9].

3rd Step: Evaluation is made on the tentative Integrated CBCRM plan based on the monitoring sheet[10] (see “4.4 Monitoring methodology of Integrated CBCRM Plan”).

4th Step: Review and modify the tentative plan based on results of the evaluation to complete updated version, desirably within one year.

In addition, the facilitator also supports the committee to document the results decided by the consultation as a tentative Integrated CBCRM plan. The plan is disclosed to community people including committee and widely communicate to community using poster etc.

The items of activity which have to be included in the plan are shown below.

4.3.2 Activities of Integrated CBCRM

In this section, examples of the tools of Integrated CBCRM such as tools for the resource management measure, the supporting measure and the connecting measure as participation promoting measure are summarized.

The resource management measure and the supporting measure are supported mutually, and sustainable management of fisheries resources in the coastal area is realized by balanced implementation of both sides. In addition, the Participation promoting measure has the function of firmly connecting the supporting measure to the resource management measure. As it was, the resource management measure and supporting measure are car’s wheels of Integrated CBCRM, and the Participation promoting measure becomes the axle to connect these.

(1) Resource management measure

The resource management measure includes management tools such as minimizing pressure on resources and restoring the productivity of resources. The management tools are as follows 1) Regulatory management tools” to reduce fishing pressure through various catch restrictions, and 2) Resource propagation tools as “Effective fisheries management tools” to increase resources abundance by implementing fishery management.

1) Regulatory management tools

Regulatory management tools refers to the regulations that we can put in place for managing of the fishery resources and control of fishery activities. This includes i) Catch restriction by species, ii) fishing gears or method restriction , iii) fishing ground, and iv) fishing seasons.

[9] For details of it, refer to Manual for Implementation of trainings for the Integrated CB-CRM for Fisheries Development Officers, 5-2 Workshop”

[10] For details of it, refer to Manual for Implementation of trainings for the Integrated CB-CRM for Fisheries Development Officers, 6. Necessary knowledge and techniques as a monitor of monitors”.

Table 5: Regulatory Management Tools

Kind of tools	Activity/Description
Catch restriction by species	It is a regulatory tool concerning the catch amount for example by quantity, numbers or weight and catch size of target species(resources). This is to control catch of target species such as green snail, sea cucumber, etc.
Fishing gear or method restrictions	It is a regulatory tool to prohibit the use or restricting the numbers of specific fishing gears and methods. The example of this tool is mesh size of gill net, use of dynamite, no night diving, no scuba diving, etc..
Control by fishing ground	It is a regulatory tool on restricting fishing in specific marine areas. It is necessary to specify the marine areas to be regulated for example specify taboo area and Marine Protected Area (MPA).
Control by fishing seasons	It is a regulatory tool to restrict fishing activities for specific time/periodsseasons. For example, prohibiting fishing for specific fish species during certain period of time such as spawning season.

The contents of these tools overlap each other (for example, a control by fish species includes factors of fishing method, ground and period, and on the contrary, a control by fishing ground includes factors of fish species, methods and period as well), and it is sometimes difficult to classify clearly. In that case, the resource management measure would be undertaken by multiple tools based on the resource problem occurring in the area.

Column 4: Case of management measure in North Efate

In the case of the Integrated CBCRM plan in North Efate, a basis of the management measure was expansion of taboo area. This is classified as “Control by fishing ground”. However, in their plan, community people did not impose a total fishing ban in the management area, but they also specified banned species and banned fishing method in the management area. From this example, it is obvious that each regulation overlaps each other.

Part of resource management measure in North Efate

Management are and location (Control by fishing ground)	Banned Species (Control by species)	Banned Fishing method (Control by fishing gears and methods)
Vatunmanko S17°37' 828" E168°12' 643" – Loubouluk S17°39' 176" E168°11' 266"	Trochus, Green Snail, Prawn, Land Crab, Sea Crab, Fish (including Aquarium fish), Turtle, Giant Clam, Chiton (Tamuruku), Sea cucumber, Clam shells and Octopus	- Dive fishing during day and night.

In addition, the following tool examples are given in Table 6 as reinforcement tools to ensure compliance with these regulatory tools mentioned above.

Table 6: Reinforcement Tools to Ensure Compliance

Kind of tools	Activity/Description
Spatial Total Allowable Catch (TAC)	The quota management can be considered as the best option to manage commercial invertebrate resources on community level with collaboration between scientists and government agency. This methodology ensures that fishing pressure is set at a sustainable level according to the resource status in respective fishing grounds in order to prevent over exploitation. For example, prior to any harvest for invertebrate's resources, a stock assessments should be conducted within a specific area of interest to determine the harvestable stock biomass. TAC will be derived from the harvestable stock biomass.
Establishment of Fisheries Management Committees	It is a measure to establish community based committees for joint management of shared resources and fishing grounds that are being used by fishers from multiple regions, such as deep-sea bottom fishes or offshore reefs between islands.
Fishing ground surveillance	It is an activity for fishery surveillance aiming at controlling and preventing fishers from violating rules and Integrated CBCRM plan. However, it should be considered that authority is necessary to arrest violators/poachers/offenders. It is desirable to cooperate and coordinate with the police and/or the coast guard.

2) Resource propagation tools

Resource propagation tools refers to activities that support fisheries stock enhancement either through aquaculture approaches or technology or natural stock restoration. Following activities are considered effective in the Pacific Islands Region (Table 7). These activities are expected to directly address the improvement of community members' awareness of the resource management, contrary to the regulatory approach which restricts fishers' activities.

Table 7: Tools for Resource Propagation as Management Measures

Kind of tools	Activities/Description
Translocation of broodstock of shellfishes	It is targeted to relatively low mobile species such as green snail and giant clam. For these species, raising the broodstock density by gathering large individuals in specific area promotes the self seeding, increases the reproductive rate and enhances the increase of resources.
Establishment of artificial nursery ground for larval and juvenile lobster	Lobster larva usually uses seagrass ground, algal bed and rubble substrate when it metamorphoses to juvenile lobster and settles itself down on the sea bottom. Normally, sandy bottom is not utilized for this settlement phase. It would be effective to deploy artificial seaweed in combination with small blocks as hiding places for juvenile and young lobster on sandy bottom in MPA for providing new nursery ground for lobster in order to enhance the lobster resource.
Coral reef preservation	The environment of coral reef is conserved through cleaning the ocean bottom inside coral reefs and exterminating acanthasters and promotes the multiplication of resources. The transplantation of coral tips would be effective too.
Cleaning of beach	It is aimed to maintain and to improve the fishing ground environment through cleaning up gathered garbage on the coast and preventing from returning the garbage such as plastics and others to the sea again.
Mangrove area preservation	It promotes multiplication of resources through cleaning and restricting of logging within the mangrove area, maintaining and improving the environment through reforestation. The nursery tree planting would be also effective.

(2) Supporting measure

The main purpose of supporting measure is to maintain the livelihood of members of target community especially local fishers under the impact of resource management measures such as fishery regulations as well as to support resource management measures through the contribution from incomes by supporting measures. The supporting measure can be divided into three approaches such as 1) "Diversification of fishing" with development of low used or unused resources to maintain fish catch and income while reducing catch pressure to the coastal resources, 2) "Value addition of fish products" that can be expected to maintain and improve income without increasing the catch amount and 3) "Alternative income source development" to compensate incomes from fish catch reduced by management. Concrete activities are assumed to be diverse depending on the economic potential of each target regions and communities. Several activities demonstrated in Vanuatu are introduced here.

1) Diversification of fishing

Several fish species are sorted out as low used or unused resources. These species are a) large pelagic fish such as tunas in the offshore, b) small pelagic fish such as horse mackerel and sardines, c) deep-bottom fish such as *Etelis coruscans* (Longtail poulet in Vanuatu) and d) diamond back squid which is distributed in medium depth water.

To develop these resources, there would be several ways such as a) fishing ground development by deploying Fish Aggregating Devices (FADs), b) introduction of fishing gears and methods for bottom fish and diamond back squid fishery, and c) development of sailing/small outboard motorized canoe which can be built and operated at low cost as shown in Table 8.

Table 8: Tools of the Supporting Measure for "Diversification of Fishing"

Kind of tools	Activities/Description
FAD development for large pelagic fishes	Introduction of FAD and appropriate fishing methods (middle depth trolling, dropline etc.)
FAD development for small pelagic fishes	Sustaining the supply of bait for bottom fish by deploying small and shallow water FAD
Deep sea bottom fishing development	Introduction of effective fishing gears and methods, and improvement of quality control on the boat (Utilization of ice or ice pack etc.)

Diamondback squid fishing development	Development of diamondback squid fishing. Resource development through appropriate fishing methods including developing new markets.
Hybrid canoe development (Sailing/outboard engine)	Promotion of development of fishing outside the reef with low cost

2) Value addition of fish products

Value addition of fishery products consists of several activities such as a) reduction of distribution cost through maintaining freshness/ reduction of post-harvest loss/ joint shipment of products., b) development of processed products and value addition of sale of cooked seafoods targeting for tourists (e.g. Fish Cafe) and c) expansion of stable sales of fish at low cost inside the village and region as shown in Table 9.

Table 9: Tools of the Supporting Measure for “Value Addition of Fish Products”

Kind of tools	Activities/Description
Improvement of fish distribution system	It aims to increase the profit rate through maintaining freshness/ reducing post-harvest loss and reducing distribution cost by joint shipment within the community.
Fish processing	It aims to add high value of catch through developing fillets, vacuum packing, frozen and smoked products, mince and other fish products.
Local handicraft development for shell craft	Souvenirs using shellfish as the material in the community are developed. However, the management is necessary to utilize shellfish resources, and it is proposed to utilize only shells that have been used as edible or already dead.

Fish café (Local fish restaurant/take away)	Cooked fishery products are locally sold mainly for tourists and visitors from outside the community. It is not only for value addition but also reducing distribution cost. However, it is a condition where stable demand can be expected.
Community fish market	Freezing facilities are provided in the villages and profit rate is increased through stable supply within the region, long term preservation and reduction of distribution cost by selling locally.

3) Alternative income source development

Alternative income source development is to introduce livelihood improvement activities not directly related to fishery and to provide means not to rely on natural fishery resources as shown in Table 10.

Table 10: Tools of Supporting Measure for “Alternative Income Source Development”

Kind of tools	Activities/Description
Aquaculture development	It is positioned as a cash income means for residents’ self-sufficiency or sales. In addition, in the event of disasters, it will be expected to function as an urgent food source. Tilapia and fresh water prawn in inland aquaculture, tridacna in sea water aquaculture are promising fish species.
Development of eco-tourism	It aims to attract tourists through developing accommodation facilities and tourism programs using coral reef organisms and the natural environment of the land area as tourism resources.
Development of road market	Stores on the road where traffic is heavy rather than in villages are set up and sell local products such as seafoods and shell-crafting.

(3) Connecting measure

The connecting measure plays a role in connecting the resource management measures and supporting major organically. The connecting measure is not directly related to resource management measure but it collaterally supports the resource management through the activities and encourages the community members to participate in resource management activities. In addition, it is possible to set multiple tools of connecting measure simultaneously.

The strength of consciousness to resource management is related to the high degree of dependence on fisheries resources. Therefore, the tools of supporting measure that do not depend on fishery resources would be weakly motivated to participate in resource management measure. Figure 7 is a schematic diagram drawn based on this assumption.

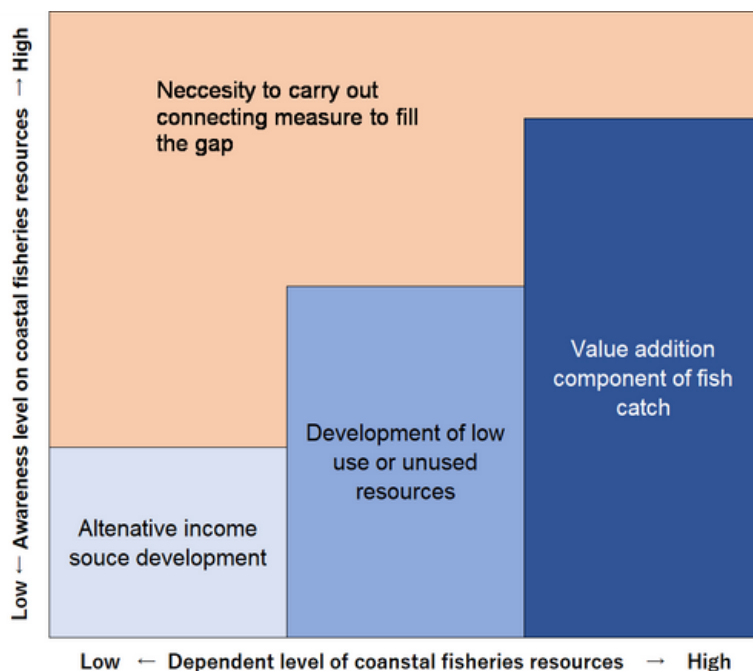


Figure 7: Relationship between supporting measure and connecting measure

Table 11: Tools of Connecting Measure

Kind of tools	Activities/Description
Data collection on catch and fish distribution	<p>For improvement of the current management measure, the data of the actual status of fishing activity such as fish catch and fishing effort catch is collected. It might be utilized for the scientific management. It responds to the supporting measure dependent on fishery resources such as FAD and development of deep-bottom fish resources.</p> <p>In addition, since this data can be used for estimating catch amount, it is useful for financial institutions to confirm the repayment capacity of the local borrower because it records daily catches or income for him or her. Therefore, it is also a tool that connects resource management measure and supporting measure in a bi-directional way as it can be one of the measure that promotes fisheries development. In fact, statistical data raises awareness of stakeholders on management measure and supporting measure at the same time.</p>
Activities on awareness raising and education	<p>Community people’s understanding and cooperation are very important for promoting resource management. This activity aims to enlighten community members including fishers in order to strengthen regional and nationwide resource management systems. in target areas, This activity also scopes to promote educational activities for children for future generation.</p>

Sports events	<p>Sports event is an important tool for promoting participation of community members including fishers. Sports events attract younger generations who are not usually interested in community activities. The participants are usually not biased toward political or economic interests. In conjunction with the event, it can be utilized as opportunities for various kinds of awareness raising and public relation activities, soliciting to management activities, forming groups, scouting next generation leaders.</p>
Research and study	<p>By participatory approach, basic information for resource management is obtained through underwater visual census and/or hearing survey on the past trend of resources from community members. In case of underwater visual census, it corresponds to the supporting measure to utilize reef resources for tourism. It can be a powerful encouraging local participation tool that raises stakeholder's awareness on the resource management measure. However, these activities must be carried out in the correct manner under the guidance of specialists such as the Fisheries Department.</p>
Eco-tag (Eco label)	<p>It aims to develop tags (labels) as certification of commercial products to prove that they are fish or shells caught under appropriate resource management. In addition to making standards for accreditation, it is desirable to obtain approval from government agencies. It is corresponds to the supporting measure and management measure due to subject to utilize the resources such as shell crafting.</p>
Fund raising for resource management activities	<p>Residents contribute a part of the profit obtained from the supporting measure of the resource management activities to support the resource management. This can relate to every supporting measure, and it has a high affinity for the activities that do not rely on natural fishery resources, among others.</p>
Providing labor force to resource management activities	<p>Even though a part of the residents cannot lead the management activities with their ownerships, they participate in the resource management activities such as coastal cleaning and surveillance and control by providing their labor force.</p>

4.4 Monitoring methodology of Integrated CBCRM Plan

Monitoring is carried out to assess and improve the implementation status of Integrated CBCRM. “Integrated CBCRM monitoring sheet” is utilized to monitor consistently from the planning of the Integrated CBCRM plan, implementation of activities to reviewing of the plan. The figure below shows the structure of Integrated CBCRM monitoring and the detail is described below.



Figure 8: Structure of Integrated CBCRM monitoring

4.4.1 Function of the monitoring sheet

There are two functions of the monitoring sheet for Integrated CBCRM as follows.

(1) Checklist for planning Integrated CBCRM

The first function is a checklist to confirm items to be considered during planning of activities when a community wants to start resource management activities.

(2) Monitoring for progress and achievement status

The second function is a checklist to monitor the status of the progress and the achievement after the activities have started.

4.4.2 Fundamental idea of the monitoring sheet

Monitoring for Integrated CBCRM has the following features and effects.

- 1) Self-evaluation: Monitoring is basically done by the community members who implement the resource management activities. Through the self-evaluation, it is expected that the community members can review the contents of activities efficiently and can understand the strengths and weaknesses of the activities. In addition, it is also expected that ownership of activities will be improved without considering “we are evaluated by outsiders”.
- 2) Easy to compare with other communities: Comparison with activities of other communities becomes easier by using the common format. The monitoring sheet can be a mutual learning tool for multiple communities to improve their activities while referring to the activities of each other.
- 3) Creation of network: It becomes a tool to create the network among the activity sites as the same reason above. In addition to the mutual learning, the network complements their strengths and weaknesses, and has many effects such as building a cooperative system for common issues.
- 4) Adaptive management: Adaptive management becomes possible from the effects mentioned above 1) to 3). In other words, it is a tool for the community to review the activity plan developmentally through self-evaluation, lessons learnt from their failures and expanding activities that have succeeded.

5) Emphasis on continuity: Since points rating method are employed for the monitoring sheets, the score will increase gradually if their activities progress. On the contrary, if there is a problem in their activities, the score will be lowered. Therefore, it encourages them to continue their efforts to increase the score.

6) Effective improvement of administrative support: Since administrators can easily grasp the success points and problems of each activity, it is easier to support for problem solving.

For details of monitoring method and monitoring sheet, refer to “Manual for Implementation of trainings for Integrated CBCRM for Fisheries Development Officers, 6. Necessary knowledge and techniques as a monitor of monitors”.

4.5 Implementing and monitoring of the tentative Integrated CBCRM Plan

While the resource management measure, supporting measure and the encouraging local participation measure included in the tentative Integrated CBCRM plan are in implementation stage, the effectiveness is verified and the difficulties are identified. The verification period is approximately one year. The implementation method varies according to the measure, but it is carried out under the ownership of the committee/sub-committee according to the concept. However, since the community is often short in technical and financial resources, the facilitator needs to actively lead the activities of the committee/sub-committee by utilizing the external support organization and policy instruments. During the verification period, monitoring sheets are utilized to confirm the implementation system of Integrated CBCRM, the progress and results of each activity. Especially at the end of the verification period, it is necessary to revise the plan based on the result, and therefore, a comprehensive evaluation should be carried out. For monitoring methods and the sheets, see 4-4 Monitoring methodology of Integrated CBCRM plan.

4.6 Reviewing and Revision of Integrated CBCRM Plan with adaptive management

Revision of tentative Integrated CBCRM plan is carried out based on monitoring results. To review the plan, from the evaluation and consultation of the monitoring results to the announcement to stakeholders, the procedure is shown in Figure 9. The contents of review include the way of coordination mechanism including committee/sub-committee, methods, targets, indicators for evaluation of each activity, etc. Although this activity is conducted through initiative of the Integrated CBCRM committee, it is necessary for the facilitator to provide close support. The procedure is shown in Figure 9.

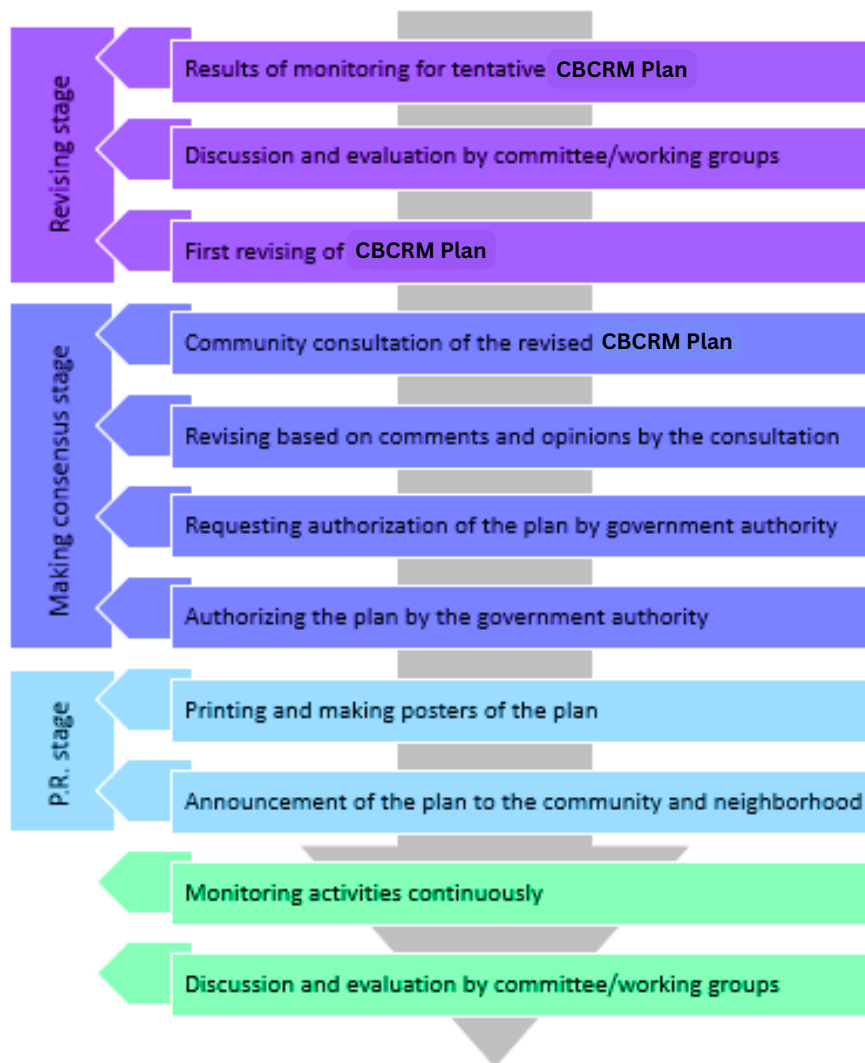


Figure 9: Reviewing procedure of Integrated CBCRM Plan

The detail of the procedure is described as below.

4.6.1 Revising stage

The monitoring results of the activities of the tentative Integrated CBCRM plan will be discussed in detail in the Integrated CBCRM committee and the tentative plan will be evaluated. The points to be evaluated are (1) the way of coordination mechanism including the committee/subcommittee, (2) the outcome of each activity of the management measure, (3) the result of each activity of the supporting measure, (4) the result of each activity of the encouraging local participation measure and (5) additional activities of each measure, etc. With the evaluation result, draft of revised Integrated CBCRM plan is formulated. The committee will carry out the revision, but the facilitator needs to provide close support. Moreover, the monitoring of Integrated CBCRM also leads to the understanding of the present status of the Coastal Strategy and National Development Plan.

4.6.2 Making consensus stage

With the draft of revised plan, the community workshop is organized to collect several opinions and build consensus among the community. Revised plan is modified based on the opinion and discussion made at the community workshop. This is called the community-adopted version. Regarding this community-adopted version, it is a time to carry out procedures to obtain official approval by the fisheries agencies or other related authorities. Regarding this procedure, conditions varies from country to country, but in countries where such a system is not defined, it is necessary for the administrative side to prepare the system in advance.

4.6.3 Public relation stage

The Integrated CBCRM plan, which has been officially approved by the administration, is printed for distribution to each stakeholder, and it summarizes the outline in a poster etc. With this, the contents of the Integrated CBCRM plan are informed within community people thoroughly and the poster is distributed to neighboring villages and local administrative organizations and other relevant parties in order to gain understanding from many stakeholders and make efforts to publicize.

After that, monitoring is continuously carried out to continue the activities of Integrated CBCRM and it is periodically reviewed once a year. In addition, ministries concerned with fisheries collect this monitoring sheet from each community working on Integrated CBCRM, and assess the current situation, extract problems and lessons learned, and reflect them in policies relating to Integrated CBCRM.

End

