FISH-BE MODEL

Fisheries Information
for Sustainable Harvests
Bio-Economic Model

BASIC FISHERIES PROFILE INFORMATION: INPUTS FOR FISH-BE

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Basic Fisheries Profile Information: Inputs for FISH-BE

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EcoGov2 is a collaborative effort resulting from the bilateral agreement between the United States government through USAID and the government of the Philippines through the Department of Environment and Natural Resources and the Department of the Interior and Local Government. EcoGov2 focuses on strengthening local government units or LGUs, so that they can carry out localized but strategic actions that aim to

- Reduce overfishing and the use of destructive fishing practices;
- Reduce illegal logging and promote the conversion of natural forests; and
- Improve the management of solid wastes and wastewater.

EcoGov 2 provides technical assistance to some 130 strategically located LGUs to enable them to plan and implement locally financed environmental programs, while observing the principles of transparency, accountability and people's participation in all their decisions, transactions and actions.

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Introduction

Fisheries Information for Sustaining Harvests Bio-Economic (FISH-BE) is a communications tool and decision-support program designed to facilitate interactive examination of major decision options available to those concerned with the management of municipal and commercial fishing effort and fish sanctuaries. This tool allows scenario-building based on changes in MPA size, numbers of fishers, number of fishing days and catch per fisher. It also provides estimates on costs and returns of MPA management, both to fishers and to the local government (Licuanan, 2006).

This section describes the collection of fishery data needed as inputs to FISH-BE.

Basic Data Requirements for FISH-BE

The basic information needed for the FISH-BE model includes:

- Number of fishers by sector (municipal and commercial) operating in the bay/fishing ground;
- Annual catch by sector in the fishing ground (by fishing area if applicable);
- Species composition and price (and other relevant characteristics) of the catch; and
- Estimate of amount of resources available (biomass) in the fishing ground.

Each of the above sets of information can in turn be derived from even more detailed information, depending on the level of data gathering employed. FISH-BE is essentially a model that permits a broad simulation of the behavior of a (fishery) system. Being a model, its accuracy is limited by the need to remain generalized over a wide variety of situations. Hence, fine differences in the accuracy of data inputs will have little effect on the results of the model. This guide discusses three levels of data gathering with potential differences on the results of the model.

How Accurate Are the Data?

The more accurate the data, the more realistic the model results should be. However, there is a wide range of data accuracy associated with how data are gathered. The most accurate data are naturally those gathered direct from the primary source and through complete enumeration. The more levels away from the primary source (fishers), the less accurate the data. Hence, for any fishing village, data gathered through daily interviews with all fishers would be much more accurate than those gathered through a single interview of only a portion of these fishers, since the latter would cover a much more limited range (i.e., less fishing days, less fishers, less representation of the various gear types employed) of fishing activities. Secondary information from bulletins and brochures are generally among the less accurate sources.

What Level of Accuracy Can We Afford?

Directly affecting the accuracy of gathered data is the amount of resources available for data gathering. Time and funding are among the major resources necessary. Generally, the cost of data gathering increases as the number and frequency of sample units increases. Hence, with plenty of resources, a systematic monitoring scheme with regular time intervals (daily, weekly, monthly, etc.) may be undertaken covering as many fishing villages (barangays) within the borders of the fishing ground of interest. On the other

extreme, very limited resources may allow only a few sets of interviews (focus group discussions or FGDs) to be done once in a few representative fishing villages. With even less resources, information from municipal agriculture/fisheries offices, if available, could serve as the only source of information. In any of the above cases, one can obtain the basic information needed as inputs into FISH-BE, although with varying resolutions and thus varying levels of being "realistic".

The value of adopting a systematic fishery monitoring program goes beyond the use of FISH-BE as a management tool. This will be discussed in a later section. In most cases, little, if any, fisheries information is available at the onset of management efforts. Nevertheless, obtaining even a rough idea of the extent of MPAs necessary to improve local fisheries production would be beneficial. This would already be useful in identifying and establishing initial management interventions. Subsequent (systematic) monitoring would then be most meaningful in fine-tuning management in response to changes in condition of the fisheries. Hence, the usefulness of tools like FISH-BE is apparent at the onset, providing increasing insights as more refinements are introduced.

Focus Group Discussions

In the initial stages of the fishery management process, FGDs usually serve as the main source of information. An advantage in holding such discussions is that more detailed information can be gathered and some verification is allowed through active discussion with and among the participants. If the purpose of the FGD is to gather fishery data, then the typical participants would be fishers, from both sectors if possible. Either *direct* or *derived estimates* of parameters or information needed by FISH-BE can be gathered from such activities. FGDs require more effort, skill and resources since a series of such activities are typically needed to cover the various barangays and or municipalities bordering the fishing ground.

Data Inputs to FISH-BE

1. Total number of fishers in the fishing ground

Information on number of fishers can be collected from either primary or secondary sources. The information may either be *direct estimates* of the total number of fishers (e.g., from a census/survey) or may pertain to parameters that allow *derived estimates* (e.g., number of fishers per operation of a particular gear and number of gear units in use) of this parameter.

1.1 *Direct estimates* are gathered through censuses. The principal sources are:

- National Statistics Office—the NSO periodically conducts nationwide censuses. The information they collect is useful in the present context only if fishing as an occupation is specified.
- The Municipal Agriculture/Fisheries Office—these or other related offices (e.g., Planning and Development Office) are oftentimes tasked with compiling information gathered through surveys conducted at the barangay level. These oftentimes include information on *part-time/full-time fishers* as well as the *number of boats or vessels* (perhaps categorized into motorized and non-motorized, municipal or commercial).

- Local POs, NGOs and other agencies (e.g., provincial BFAR office)—these represent other possible sources of such information. Normally, these organizations are involved in community development or similar activities in coastal barangays and include baseline data gathering as part of their programs.
- In many cases it may be necessary to conduct limited surveys (i.e., interviews of barangay officials or FGDs) which then serve as the basis for extrapolating to the entire fishing ground. Other livelihood-related information may also be available from such interviews (see below).

1.2 The number of fishers can also be *derived* if information on the following parameters is available:

- A listing of various fishing gear employed in the fishery;
- The number of units of each of the major gear types used by the fishers; and
- The number of fishers operating each unit of the various gear types.

Deriving number of fishers in the area based on the above information is shown in table 1. The example pertains to an area bordered by 4 barangays. In cases where the number of fishers/operation is a range, the median is used.

Table 1. Hypothetical data showing how number of fishers in an area is derived using information gathered from interviews or FGDs

	A No. of Gear Units	B Fishers/ operation	C No. of Fishers = (AxB)
Brgy: Dingley			52
Lines	20	1-2	30
Fish corrals	6	1	6
Traps (by sets)	8	2	16
Brgy: Nambatad			67
Gill Nets	10	1-2	15
Lines	17	1	17
Fish corrals	2	1	2
Beach Seine	3	6	18
Others	6	2-3	15
Brgy: Bayani	....	....	35
Brgy: Labas	....	....	152
Total (in fishing ground)	72		306

The possible sources of such information include:

- **Municipal Agriculture/Fisheries Office** is oftentimes tasked to conduct censuses and inventories at the barangay level. If available, data for all coastal barangays in the municipality would already be compiled at this source.

- **Fisheries and Aquatic Resources Management Councils (FARMCs)** are mandated by law at the municipal level. However, FARMCs at the barangay level are also common in many municipalities. In recent years, barangay-level efforts of conducting fisher and fishing gear inventories have spread to different areas/fishing grounds as serious efforts in regulating fishing intensity.

- **Focus group discussions** conducted at the initial stages with participation of fishers representing various fishing villages and employing at least the major gear types used in the local fishery.

2. Total catch from the fishing ground

Similar to number of fishers, estimates of total catch may either be *direct* or *derived*, and the pertinent information may likewise be primary or secondary. *Direct estimates* of total catch from the fishing ground are only possible through monitoring landing sites. This is discussed further below. Data gathered from all other means only allow *derived estimates*. Such data include the following:

- Estimates of *average catch rates* over the year (kg/trip) by gear type;
- The *number of units of each gear type* in use over the year (see above), and
- The *frequency of fishing* (how many days/month and how many months/year) within the year.

A typical *Catch Matrix* (table 2) is presented below to demonstrate how the different parameters are used in deriving an estimate of annual catch (mt) from a fishing ground. While commercial fishing operations (and "active" fishing gear) are generally prohibited in municipal waters, they are included in this example for demonstration purposes only.

Table 2. A typical catch matrix showing the basic parameters needed to derive estimates of total annual catch (mt) from a fishing ground

	A	B	C	D	E
Fishing Gear	Catch Rate (kg/trip)	No. gear units	Fishing Mo/yr	Fishing Days/mo	Estimated Ann C (mt) = (A x B x C x D)/1000
Commercial					
Danish seine	35.0	6	9	15	28.35
Trawl	30.0	15	12	22	118.80
Municipal					
Gill Nets	4.8	25	9	25	27.00
Lines	3.25	12	12	22	10.30
Fish Corral	5.0	24	6	15	10.80

Fishing Gear	A Catch Rate (kg/trip)	B No. gear units	C Fishing Mo/yr	D Fishing Days/mo	E Estimated Ann C (mt) = (A x B x C x D)/1000
Beach Seine	4.0	15	8	25	12.00
Lift net	2.5-10	19	6	11	3.71
Traps (by sets)	2.1	52	10	30	32.76
Total Annual Catch (mt)					243.72

The information on various parameters shown above are best gathered through FGDs, wherein participants are asked to discuss and provide a "typical" (average) value over a year, or more oftentimes a range of values, for each of the parameters. The level of detail and reliability (= closeness to reality) of values provided will depend largely on the way the discussions are handled/moderated. As mentioned earlier, a series of FGDs is typically needed to arrive at an estimate for the entire fishing ground. The more FGDs conducted, the larger the proportion of the fishery (i.e., fishing ground, fishing effort and overall fishing activities) covered by the data, the more representative and realistic the simulations will be. This, in turn, will provide more useful insights on possible management interventions.

In general, a combination of secondary information on total number of fishers (from sources discussed above) and *catch matrix* parameters (from FGD) provide the quickest, yet comprehensive, method of estimating annual catch from an area. There are, however, limitations to the reliability of estimates using the *catch matrix*. These are discussed in a later section.

3. Catch composition and their prices

The current FISH-BE model in use is designed to recognize two groups of fish: pelagic and demersal. Pelagic fish are those that live normally in the water column, not in close proximity to the substrate (bottom). These include shallow water fish, such as clupeids (sardines, *tamban, tuloy*), engraulids (anchovies, *dilis*), carangids (jacks, *talakitok*, *matangbaka*) and small scombrids (scad, *galunggong*, *hasa-hasa*); and open water fish like tuna (*bariles, tambakol, tulingan*), mackerel (*tanigue*) and sailfish (*malasugi*). Demersal fish, on the other hand, spend most of their time close to the bottom. These include soft-bottom fish, such as nemipterids (*bisugo*), leiognathids (*sap-sap*), and mullids (*saramulyete*); and hard-bottom (reef) fish like serranids (*lapu-lapu*), lutjanids (*maya-maya*), and acanthurids (*labahita*). Because they live in proximity to the substrate, demersal fish are concentrated in shallow waters (shelf; < 200m), generally accessible to municipal fishers. On the other hand, pelagics extend from shallow coastal waters to deep open waters where commercial fishing is currently restricted, oftentimes with the use of fish aggregating devices like *payaos*.

Different gear types are employed to catch these fish groups. The value of the different species differs depending on the type of fish, their size, and the cost of catching them. Detailed information on catch composition and their respective values (prices) are best gathered by means of a systematic monitoring

scheme. However, initial information can be gathered through FGDs. Again many of the details are lost (or can no longer be recalled) through such discussions, but there may not be a critical need for high resolution data at the initial stages of the management process. The table below provides typical catch composition information which can be used as a guide and no information can be gleaned from interviews. Table 3 shows the average annual catch composition of various gear types employed in four (4) shallow bays in the country (San Miguel Bay, Sapian Bay, and Lingayen Gulf). The right half of the table shows similar information on two relatively deep (>200m) embayments (Sogod and Ormoc Bays) in the country.

Table 3. Average annual catch composition (% of total landings by gear) of various gear types used in shallow and deep bays in the Philippines

	Shallow Bays		Deep Bays	
Fishing Gear	Demersal	Pelagic	Demersal	Pelagic
Barrier net	100	0	50.0	50.0
Beach seine			34.0	66.0
Bottomset gillnet	79.7	20.3	53.2	46.8
Bottomset longline	85	15	100.0	0.0
Castnet	92	8	0.0	100.0
Drift gillnet	10	90	30.3	69.7
Danish seine			50.0	50.0
Drive-in gillnet			0.6	99.4
Encircling gill net	2.5	97.5		
Filter net	93	7		
Fish corral	35.2	64.8	42.7	57.3
Jigger - Octopus			100.0	0.0
Jigger – Squid			12.6	87.4
Handline	40.5	59.5	25.7	74.3
Multiple hook and line	100	0	11.2	88.8
Pots/Traps	100	0	99.3	0.7
Push Net			50.0	50.0
Ring Net			0.0	100.0
Surface-set gillnet	52	48		
Scissor net	99	1		
Spear	100	0	95.8	4.2
Stationary liftnet	37.1	62.9		
Scoop net			0.0	100.0
Trammel Net			84.1	15.9
Trawl	72.6	27.4		
Tuna troll line			1.3	98.7

4. Estimate of catches by zone in the fishing ground

This is derived by first constructing a "picture" of where fishing is conducted. This is what is called a *gear map*, showing the relative (proportional) distribution of the various gear types within the fishing ground.

The quickest way to construct a *gear distribution map* is through an FGD. A sketch based on a nautical chart of the area is used as the drawing board. The chart should include as many "geographical" reference points as possible. Such reference points should be known and familiar to the local fishers. Examples include:

- Local names of islands/islets;
- Isobaths;
- Shoal areas;
- Habitat types (if available; e.g., extent of reefs/grassbeds, reef flats or mudbanks; location of mangroves); and
- Approximate location of schools, chapels and other similar landmarks.

Such points will serve as spatial references which FGD participants can refer to in noting down on the chart the location where the different gear types are used. To achieve some sense of proportionality in the number of each gear type, the fishing locations using the most common (numerous) gear type should be plotted first on the chart. Since this gear is the most common, a maximum number of a given symbol (ex., 20) may be noted on the chart, with a larger portion of the 20 marked in those locations where a similar proportion of that gear type is usually fished. A smaller number (ex., 15) may be used for the second most common gear type, and so on until the fishing locations of all major gear types are depicted on the chart.

In addition to the gear map, a gear calendar is also constructed. A gear calendar shows the seasonality in use of the various gear types, among other things. Target species availability, spawning season, recruitment and other information pertaining to the resources and the fishery may also be depicted.

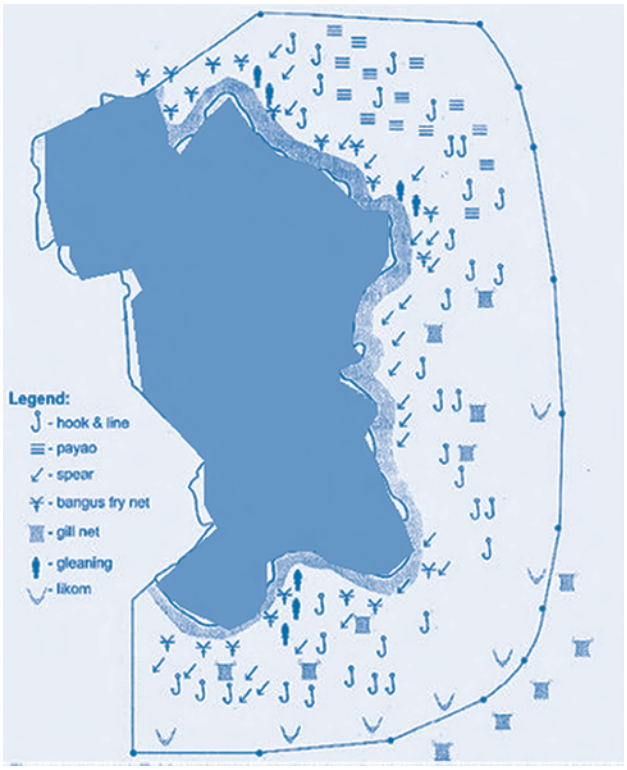

Figure 1. Gear distribution map of Tabina, Zamboanga del Sur, in Iliana Bay. Each symbol pertains to a different gear type

*The distribution of the various symbols reflects the proportional distribution of gear units in the fishing ground. (Source: PCRA Report by MS U Naawan)

Table 4. Gear calendar showing months (Xs) when specific gear type was used in the fishing ground

Fishing Gear	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Set gillnets		X	X	X	X	X	X	X	X	X	X	X
Drift gillnets					X	X	X	X	X	X	X	
Ring net						X	X	X	X			
Bott-set longline				X	X	X	X	X				
Fish corrals			X	X	X	X	X	X	X	X		
Handline	X	X	X	X	X	X	X	X	X	X	X	X
Lift nets		X	X	X					X	X	X	

How Realistic is the Catch Matrix?

The catch matrix is a simple way of estimating annual catch based on data gathered through FGDs or similar interviews. An example of an extended catch matrix, combining Tables 1 and 2 above, is shown in table 5. It supplies the basic data requirements needed for FISH-BE, but also provides additional insight on the status of the fishery.

Table 5. An extended catch matrix combining data from tables 1 and 2

Fishing Gear	Est. Catch Rate (kg/trip)	No. Gear Units	Ave No. Fishing Days	No. Months Fishing /y	Est. Ann C (mt)	No. Fishing trips	No. of Fisher Per Operation	Est. No. Fishers
Commercial								
Ring Net	85.0	3	10	8	20.4	240	10	30
Bag Net	103.6	6	9	8	44.8	432	6	36
Municipal								
Drift Gillnet	31.1	3	5	7	3.3	105	2.5	7.5
Scoop Net	10.5	62	12	12	93.8	8,928	2	124
Set Gillnet	7.0	604	12	12	608.8	86,976	1	604
Tuna Longline	4.6	91	7	12	35.2	7,644	2	182
Bottom Set Longline	3.8	122	12	12	66.8	17,568	1	122
Drive-in Gillnet	3.0	1	8	10	0.2	80	2	2
Fish Corral	2.3	12	15	11	4.6	1,980	1	12
Drift Long line	2.1	29	12	11	8.0	3,828	2	58
Multiple Handline	1.8	298	12	12	77.2	42,912	1	298
Spear	1.7	27	8	12	4.5	2,592	1	27
Simple Hook and Line	1.6	358	10	12	68.0	42,960	1	358
Squid Jig	1.4	67	7	12	7.8	5,628	1	67
Push Net	0.8	45	7	6	1.4	1,890	1	45
Total		1,728			1,045	223,763		1,973

For example, one can determine from the table which gear(s) contribute most to total landings (catch) or to total number of fishing trips (effort) each year. The column on estimated number of fishers provides an idea of how many fishers will be affected if certain gear types were to be regulated. The table also allows deriving the number of days of fishing operations by gear and over-all gear types. Such information is indicative of level of exploitation.

There are, however, serious limitations to the catch matrix. These include the assumption that the estimate of gear units reflects the average number of gear units used over the year, and therefore masks any seasonality in the data. Seasonality may be an important consideration in some fishing grounds, especially if the pertinent gear targets specific species. Another limitation of the matrix is the apparent restriction of fishing trips to the use of a single gear at a time. It is common practice for many fishers to use handlines and other gear types each night, or to shift use of various gear types within the year, depending on season, weather and sea conditions.

The catch matrix is nevertheless a quick and useful way of acquiring a rapid appraisal of a local fishery. One way of checking the "reliability" of its information is by comparing its estimate of total number of fishers (across all gear types) with an independent estimate from a recent census. Small differences (10-20%) between the two estimates would suggest that the major limitations mentioned above are minimal.

A Systematic Monitoring Scheme

Management plans are formulated and implemented to introduce changes that will improve conditions of the local fishery. Because each locality has its own environmental (nature + human) characteristics, there is no fixed recipe for the kind, amount and frequency of management interventions that will bring about a given positive change. These have to be determined empirically, or by observation. This is why systematic monitoring schemes should be a fundamental part of any management scheme for it to be successful. While implementing initial management measures, a monitoring scheme will show if such measures have an impact or not, and thus if there is need for adjustments. Furthermore, if monitoring were systematic (at regular intervals), adjustments or even new measures can be implemented at the right time, and not when it's too late, as is often the case.

With respect to FISH-BE, using updated and more reliable data (from monitoring) will produce more realistic results and insights on the fishery, which could then lead to refinement of management.

Monitoring schemes that have been applied in various localities around the country include regular *monitoring of catch and effort* at major landing sites. The gathered data are then used in constructing a *catch matrix* for each time interval, such as each month, using estimated raising factors to extrapolate catch estimates for all minor and major landing sites in the area. The most common problems associated with such a scheme is the misinterpretation of total monitored landings as total catch (i.e., absence of extrapolation) or errors in employing raising factors. The following information is necessary for proper derivation and use of raising factors:

- Estimate of total number of landing sites (minor/major) in the area;
- Proportion of minor and major landing sites; and
- Estimate of proportion of total landings landed during the daytime and night (weekday vs weekend).

A systematic monitoring scheme should also consider the following to ensure impartiality in gathered data:

- Sampling frequency adequately covering temporal (diel, lunar, seasonal) variation
- Sampling sites adequately covering spatial (primary vs secondary landing sites, vs. market)

Primary landing sites are where fishers typically deliver their catches to first level buyers/middlemen *(comprador),* who oftentimes also provide them with the capital for fishing, among other expenses as well. Such sites provide the most accurate and reliable primary information because the sources are the fishers themselves. Monitoring landing sites is made difficult by the very structure of typical artisanal fisheries, which is discussed further below.

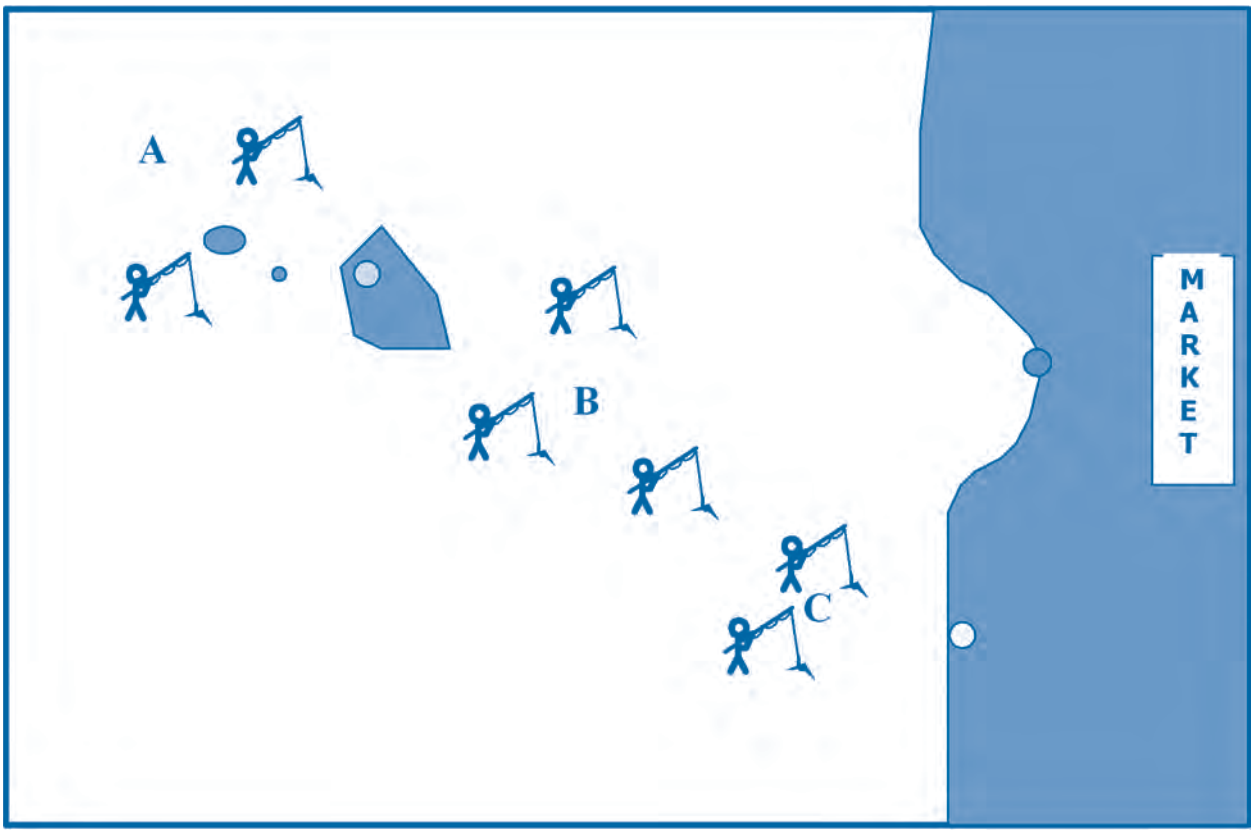

Figure 2. Typical municipal fishery

Fishers A oftentimes land their catches in the island(s) (green dot). Buyers with catches from several fishers, oftentimes from different gear types as well, then transport and land their "goods" at the main landing site in town (red dot). Fishers B usually land their catches in the main landing site due to the latter's proximity. Fishers C though may land their catches in another site (yellow dot), after which aggregate catches are drove to the town's market via land. Hence monitoring only at the main site (red dot) would result in gathering primary catch data (from B) mixed with aggregate catches (from A & C).

Monitoring of catch and effort information for catch matrix construction still suffer from limitations on the catch matrix. However, these can be minimized by using periodic (e.g., monthly) matrices instead of averaging the data into a single matrix, as is oftentimes done. Additional information includes the disposition of fishing effort in space and time, which is also useful in fisheries management.

Another systematic monitoring scheme focuses on landings at representative sites, regardless of gear type (although such information may still be gathered). The procedure likewise makes use of raising factors for the proportion of minor/major landing sites not monitored, but does not construct a catch matrix in order to derive total catch. The latter is derived using raising factors only, and is thus not affected by limitations to the catch matrix (i.e., assumptions on fishing frequency and use of more than one gear per night). These estimates a thus more robust and realistic than those derived with the catch matrix.

The best approach would be a combination of the two approaches mentioned above. *Catch and effort* data provide additional meaningful insight into the fishery, while *landings* provide more realistic estimates of what is produced in the locality.

Socioeconomic Data Collection Protocol

Introduction

The following is a summary outline and procedure for generating information that will be useful for CRM Planning and development of FISH-BE. The accompanying data-gathering instrument, described in later sections, may be accomplished through various methods, the simplest of which are focus group discussion or individual interviews. The field visits to the local market and ocular inspection of fish landing sites aim to provide supplemental information in order to validate or confirm the outcome of focus group discussions or individual interviews. Secondary data gathering and interview with local government representative generates data on costs and revenues of coastal resources management. The procedures for these methods are outlined below.

I. Focus Group Discussions (FGD)

The steps outlined here may change in different sites and conditions in the target area.

A. Organize Your Focus Group Discussion

A series of preparations are needed prior to conduct the FGD. These activities maybe changed depending on local conditions.

1. Prepare a list of participants.

- Inform the LGU through a letter to the local executive (mayor) that you will conduct an FGD;
- Identify coastal barangays that will be involved in the discussion;
- List participants representing the FGD groups: (1) fishers group, (2) fish dealers and vendors group, (3) commercial fishers group, (4) government representatives coming from the planning office and agriculture office or Fisheries and Aquatic Resources Management Council (FARMC); and
- Determine the number of participants from the identified barangay (key informants maybe provided by the barangay captain).

2. Identify participants.

- At least 6-8 participants for each group. The four groups of respondents, based on occupation are:
  - Fishers' group;
  - Fish dealers and vendors group;
  - Commercial fishers group; and
  - Government representatives coming from the planning office and agriculture office without prejudice to the FARMCs

3. Prepare for the FGD.

- The three groups could be gathered in one session for general orientation and then separated into groups for the filling up of the appropriate data sheets.
- Each group will organize by identifying various responsibilities such as discussion group facilitator and documenter.

B. Conducting the Focus Group Discussions

The session will begin with an orientation on the rationale and purpose of the discussion and participants' expectations. The mechanics of the FGD will be explained by the facilitator. A group discussion leader, documenter and time keeper will be assigned from each group. Each group will present the output at the plenary session; its purpose is to validate the outputs of each group. Towards the end of the session the FGD facilitator will provide a summary of the discussion focusing on the generated table(s). The sessions will have a dual purpose of capturing data and provide an analysis of the income-expenses flow of fishers in order to give respondents an overall picture of financial flow within a year.

Each group will accomplish the appropriate tables (table 1-Municipal Fishers, table 2-Municipal Fishers, table 3-Commercial Fishers, table 4-Government Officers, table 5-Fish Dealers and Vendors). If a local unit does not have commercial fishers, table 3 can be ignored. Likewise, costs and revenues of local government units, table 4, can be captured separately through on-site interviews with concerned local government departments*.

The timing of the focus group discussion for fishers and vendors may depend on their availability, normally dictated by schedules of transactions.

*(Table 4 may be accomplished through visits with local government offices involved and discussion with appropriate technical working groups or individuals. Details of budgetary allocation would be available with the local government department concerned such as the local environment, agriculture office, planning or budget office.)

C. Synthesis and Summary of the FGD Results

The synthesis will involve accomplishing the tables presented in the next sections.

II. Individual Respondent Interview

Getting information through this approach requires developing a survey instrument designed for a particular group. In a field practicum setting, a subgroup for the groups assigned to a particular barangay will conduct interviews simultaneously with FGD and field observations. Respondents for interviews are the following:

- City Assessor's Office - for fish catch data and information on the number of fishers;
- Municipal Agriculturist - to get data on budget for CRM or fisheries;
- Municipal Environment Officer - to get data on budget for CRM or fisheries;
- Fishers (Municipal and Commercial) - to use the survey instrument for fisheries and socioeconomics;
- Municipal or City Planning Office - for activities of local executives related to coastal and fisheries management; and
- Fish Vendors and Dealers (Buyers) - to get information on fish prices, transport and processing of fish harvests and similar information.

Survey Form 2 below is an example of an individual respondent survey instrument to gather fishery socioeconomic data.

III. Field Observations

The data requirements outlined below for socioeconomic data is the basic outline for the procedure for conducting field observation in order to generate data.

1) Fish Port
2) Fish landing sites (major and minor)
3) Local market
4) Coastal communities

IV. Benefits Transfer Method

Secondary data collection for those are not locally available, such as transaction costs, and estimates of externalities, nonmarket benefits of marine sanctuaries, and opportunity costs and benefits.

If cost and length of time is a limiting factor for collecting these data value estimates from previous studies can be used; in economics, this is called "benefits transfer." Benefit transfers involve applications of existing estimates of values or raw data sets that were developed in one context to address a valuation question in an another context. A number of available databases provide this data. Additionally, there are researches that can determine under what circumstances estimates are transferable.

For a brief introduction to this method you may search the Internet for "benefits transfer" or you can check this site: (http://www.ecosystemvaluation.org/benefit_transfer.htm)

Data Capture for Socioeconomics Requirements for CRM Planning and FISH-BE Model

PRIMARY DATA

Estimates of average daily and monthly income and expenditures of commercial fishers

(1) Expenditures of households (on a daily basis)
   a. Fishers with motorized boat
   b. Fishers with nonmotorized boat

(2) Expenditures associated with fishing (on a daily basis)—primary data
   a. Municipal fisher
   b. Commercial fisher

(3) Yearly expenditures on fishing (e.g., net, boat, equip, etc.)—calculated from daily expenditures
   a. Municipal fisher
   b. Commercial fisher

(4) Income from fishing activity (daily basis)—primary data
   a. Municipal fisher
   b. Commercial fisher

(5) Total number of fisher households—primary or secondary data
   a. Municipal fisher
   b. Commercial fisher

Estimates of Average Daily and Monthly Income and Expenditures of Commercial Fishers

(1) Number of "pahinantes" (crew members) in the commercial boat
(2) Total capacity of the boat
(3) Total cost per trip and per day
(4) Average catch per day
(5) Sharing of income from fishing
(6) Average sales per day

CRM COST AND REVENUE (AGENCY/MARKET DATA)

Government Data

(1) Types of fees collected related to fishing (e.g., licensing, marketing, transport, entrance fees, other fixed fees)
(2) Total expenditures on coastal resources management (include initial investment, capital investment and operating costs) disaggregated by management zones

a. Tourism and Recreation Zone (size, if available)
b. Fishery Zone
c. Coastal Settlement Zone
d. Trade and Navigation Zone
e. Marine Protected Zone (include size, if available)
f. Mariculture Zone (include size, if available)
g. Other zones e.g., mangroves and fishponds

(3) Program of activities related to coastal resources management
(4) Infrastructure, facilities and equipment related to fishers and marine sanctuaries
(5) Expenditures on marine sanctuary maintenance and protection, including management
(6) Costs of establishing a marine sanctuary (identify cost items)
(7) Revenue from coastal resources management
(8) Average value of fines and penalties per month collected from fishery, by source

Private Sector Group Involved

(1) Cost of transporting fish
(2) Cost of marketing fish
(3) Costs for fish storage
(4) Cost of fish packaging

Market Information

(1) Kilograms of fish brought and sold in the local *talipapa* or public market
(2) Prices of fish at the fish landing site, "local talipapa", local market (by species)
(3) Historical data on fish prices e.g. weekly data from the MAO
(4) Market destinations of fish catch

Annexes

Annex 1

Survey of Fishing Income and Expenses of Municipal Fishers (Useful for FGDs)

Instructions:

1. The interviewer guides the respondents through informal inquiry or focus group discussion. To accomplish the table by column fill up column 1 followed by column 2, and so on. The answer for each month may be the same. The interviewer should completely fill up the cells;
2. If any cell is not applicable write "NA" (For example: there are no fishing activities). The information on non-fishing income is in Table 2;
3. Column 4 can be calculated by column 3 minus column 2, and may be accomplished after the interview.

Particulars	Average Fish Catch Per day	Cost Per day of Fishing	Total Sales Per Day	Net Income from Fishing	Average Household Expenses (Day or Mo)	Net Savings Per day
Unit	kg/day	P/day	P/day	P/day	P/day	P/day
Column #	1	2	3	4	5	6
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Average						

Annex 2
Survey of Non-fishery Based Income of Municipal Fishers

Instructions:

1. Record the income-generating activity or activities of the fisher by month. Activities many not be same during fishing season and non-fishing season;
2. Ask the respondents for estimate of costs for undertaking the activity either on per day or per month basis, whichever is easily remembered by the respondent. The interviewer will need to convert the information on a per day basis after the interview;
3. Ask the respondent to estimate or get the average income for each month;
4. The interviewer will calculate the net income from the activity and record the result in column 4. Note that activities, costs and income do not necessarily vary each month. Write "NA" for months, if not applicable. Be sure that the cells are completely filled out.

Particulars	Income-generating Activity or Activities	Cost Per day of Activity	Average Income Per Day	Net Income from Activity
Unit		Pesos/day	Pesos/day	Pesos/day
Column #	1	2	3	4
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
Average				

Annex 3
Survey of Fishery Income of Commercial Fishers

Instructions:

1. The table represents one sample of a commercial fisher or average commercial fisher with a crew that may vary in number on any particular month. Record the crew size in column 1 for each moth;
2. In column #2 record the average catch of the commercial vessel on a typical day of the month. In column #3 record the estimate of cost for one day of fishing (24 hours). In column 4, the average sales revenue of the commercial vessel, and calculate the net fishing income in column 5;
3. In column #6, estimate the average share of the crew (based on interview of sample crew member of a commercial vessel) from the commercial fishing and also indicate the average household expenses (column 7), then calculate net savings *per day (column 8)*.

Particulars	Average Crew Size Per Day	Average Fish Catch Per Day	Average Cost Per Day of Fishing	Average Sales Per Day	Net Income from Fishing	Crew Member Average Fishing Income	Crew Member Average Household Expenses	Net Savings Per Day
Unit	kg/day	P/day	P/day	P/day	P/day	P/day		
Column #	1	2	3	4	5	6		
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								
Average								

Annex 4
Information on Government Costs and Revenues from Coastal Resources Management

Instructions:

1. This table maybe accomplished through interviews with the planning office or department accountable for coastal resources management. Fill out only the columns and rows that are relevant for a particular LGU.
2. Fixed costs may also refer to "Investment costs" while "Recurring costs" excludes salaries of management personnel, but includes compensation for enforcers and monitoring teams. Overall management cost need not be distributed among the zones.
3. It is important to fill out the size or area of the relevant zones.

Particulars	Unit of Measure	Tourism & Recreation Zone	Fishery Zone	Coastal Settlement Zone	Trade and Navigation Zone	Marine Protected Zone	Mariculture Zone	Other zones
Total Area Covered								
Total Cost								
Breakdown of Fixed Costs								
Buildings and Structures								
Vehicles								
Equipment								
Physical Developments								
Site Development Cost								
Breakdown of Recurring Costs								
Monitoring Cost								
Enforcement Cost								
Repair and Maintenance Cost								
Overall Management Costs								
Salaries of Personnel								
Supplies and Materials								
Travels								
Utilities and Rents								
Communications								
IEC								
Trainings								
Other Services								
Miscellaneous Expenses								
Others								

Annex 5
Information on Prices of Fish in Fish Landing Areas in the Coastal Area

Instructions:

This table may be filled accomplished through focus group discussion or field interviews. Respondents include fishers, local fish dealers, and vendors). This can be generated through focus group discussion or field interviews. Focus group discussion is easier to manage and can readily generate information by reducing data processing and analysis.

Particulars	January	February	March	April	May	June	July	August	September	October	November	December	Average
Unit	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg	Pesos/ kg
Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Average													

Annex 6
Other Data Requirements

Other Data Requirements from the MAO

1. Fees and charges for various fishing activities
2. Tourism activities related to coastal areas
3. Commercial activities in foreshore areas and corresponding fees and charges
4. Cost of meetings with other agencies and organizations (e.g., transportation, food and other supplies)

Other data that can be provided by Fish Dealers and Vendors

1. Sources of fish
2. Destinations of fish by species and type
3. Cost of transactions with government offices
4. Cost of transactions with buyers

Annex 7

Fisheries and Socioeconomics Assessment Questionnaire Fisher/Household Survey

Date:	_____	Barangay:	_____
Place of Interview:	_____	Name of Interviewer:	_____
Time started:	_____	Time ended:	_____

Remarks:

_____

_____

_____

I. Fisheries

1. Is fishing your main or one of your livelihood activities?
   _____ Yes _____ No. If no, please go to question # 19. If yes, go to question #2.
2. Where do you fish? _____
3. What type of vessel (banca) do you use?
   _____ Motorized _____ Non-motorized _____ No banca
4. What fishing gear/s do you use?
5. How often do you fish per day?
6. How many hours do you fish per day?
7. What are the species of fish per fishing gear do you usually catch/day?
8. How many kilos of these species of fish do you catch per day?
9. From the total number of kilos of fish caught/day, how many kilos are for family/household consumption?
10. How many kilos from your total fish catch are for selling?
11. How much do you sell fish/species?

Table 1. Summary answers for questions 1 to 11

Fishing Gear Used	Frequency of Fishing/ No. of Hours Per Day	Species of fish/ fishing gear	No. of kilos of fish caught/day	No. of kilos of fish for HH consumption	No. of kilos of fish sold	Selling price of fish/specie
1.						
2.						
3.						
4.						
5.						

12. How much is your estimated gross income per day from fishing?

13. How much are your estimated fishing expenses per day?

14. How much is your estimated family expenditure/day?

15. How much is your estimated net income/day from fishing?

Table 2. Summary answers for questions 12 to 15

Estimated Gross Income per Day	Estimated Livelihood Expenses per Day	Estimated Family Expenditure per Day	Estimated Net Income per Day

16. Have there been significant changes in the species and volume of fish catch? If yes, go to question # 15. If no, go to question no. 14.

17. If no, why do you think have there not been changes in the species and volume of fish catch?

_____

18. If yes, what are these changes?

_____ Decrease in the number of species of fish caught.
_____ Increase in the number of species of fish caught.
_____ Decrease in the quantity of fish catch.
_____ Increase in the quantity of fish catch.
_____ Others, which _____

19. What are the reasons for the changes mentioned above? Choose among the statements below. More than one answer is possible.

_____ Use of illegal fishing practices
_____ Intrusion of commercial fishermen in municipal fishing waters
_____ Increase in number of fishermen
_____ Lack of fishery law enforcement
_____ Others, which _____

20. What are your proposed solutions to the problems above?

_____
_____
_____
_____

21. What are the major problems of fishermen in the area?

_____ Absence of alternative livelihoods
_____ Lack of financial support from the local government
_____ Lack of fishing ordinances
_____ Others, which _____

22. Have you seen rare marine species such as "dugong," whales, "butanding," dolphins, sea turtles and other species in the area?
_____ yes _____no. If yes, go to question #21.

23. What species have you seen?

24. Where have you seen it?

25. When was the last time you saw it?

Table 3. Rare and endangered species sightings

Species	Place of Sighting	Period of Sighting

II. Other Livelihood Activities, Products and Commodity Flow

26. What are your main livelihood activities besides fishing? Kindly enumerate all.

27. What are your products or outputs? Kindly enumerate all.

28. How much is your estimated gross income per day/harvest for products sold in the market?

29. How much are your estimated livelihood expenses per day/harvest for products sold in the market?

30. How much is your estimated family expenditure/day? (This is the repetition of the question above)

31. How much is your estimated net income per day/harvest for products sold in the market?

Note: Income is measured depending on the type of livelihood. Fishing income is usually measured per day while income from agriculture is per harvest. Output may be a good or service.

Table 4. Summary answers for questions 26 to 31

Main Livelihood	Produce or Outputs	Estimated Gross Income/Day or Income/Harvest	Estimated Livelihood Expenses/ Day or Expenses/ Harvest	Estimated Family Expenses/ Day	Estimated Net Income/ Day or Net Income/ Harvest
1.					
2.					
3.					
4.					
5.					

32. What are your products from your main livelihood/s?

33. Enumerate target markets of your products/channel of products.

Table 5. Summary answers for questions 32 to 33

Produce or Outputs from Main Livelihood/s	Target Markets of Outputs/Channel of Products

34. What are the problems you encounter in your main livelihood activities and what are your proposed solutions to these?

Table 6

Problems Encountered	Proposed Solutions

35. Do you know of any existence of a marine sanctuary in your area? Y/N

36. If there is, did you notice any changes since the establishment of a marine sanctuary?

37. What kinds of changes did you notice as a result of the establishment of a marine sanctuary?

THANK YOU VERY MUCH!!!