

Fisheries and Aquaculture Statistics - Lesson5 (Part- B)

5B.1 Lesson5 part-B Statistical Methods for Collection of Fisheries Data Including Sampling Design



Notes:

Data needs in fisheries and aquaculture sectors:

Sound data is a pre-requisite to assess and monitor the state of natural resources (e.g. fish resources, aquatic ecosystems, water, land and aquatic genetic resources), and the performance and sustainability of fisheries. Sound data helps plan an integrated approach towards addressing all dimensions of sustainable development goals - economic, social and environmental.



5B.2 Contents



Notes:

As Previously noted, the Statistical Methods for Collection of Fisheries Data is split into 2 parts- Part A and Part B we understood certain concepts in section part A of this lesson. In this section, we will further explore how these concepts are applied and computed.



5B.3 Classification of Fishing Units



Notes:

Fishing units can be classified into the above categories.



5B.4 Defining Boat/gear category



Notes:

When defining boat/ gear categories, the following criteria need to be considered.



5B.5 The Boat Approach



Notes:

In planning the sample-based fishery survey, the fishing unit (boat/gear) must be defined.



5B.6 The Gear Approach

Tł	nis approach can be used when:
~	Frame surveys provide the number of gears by boat/gear type, such as space raising factors estimating fishing effort.
A	Fishing Activity level can also be measured by Gear Activity Co-efficient (GAC).
4	CPUE is the catch per day of gear.

Notes:

Alternatively, fishing gear can be used as statistical units.



5B.7 To define a species category, the following criteria need to be

recorded

Whethe	r the species	is:	
≻ Com	mercially imp	ortant	
> Impo	rtant to the lo	ocal people	
≻ Of b	ological inter	est.	

Notes:

These criteria are based on the need to prioritize statistical monitoring of catches.



5B.8 Concepts for Catch Estimate



Notes:

Catch refers to all the species in a defined geographical area and references a particular period and/ -or a specific boat/gear category.

Effort is defined in terms of number of boat days.

SP = The fraction of total catch corresponding to a species.

P = Sale price of a landed species.



5B.9 Concepts for Effort Estimate



Notes:

There are four approaches for estimating fishing effort mentioned above. The applicability of each method depends on local conditions within the region and on the human capacity available to conduct required data collection.



5B.10 Complete Enumeration Through Census of Fishing Activities



Notes:

Complete enumeration is not always feasible and using mixed methods may be more effective.



5B.11 Survey for Basic Fishery Data



The figure above depicts survey requirements.

Catch = CPUE x BAC x F x A

CPUE is estimated from the landing survey.

BAC is computed as average F/NC, NC is the number of calendar days.

F is the raising factor expressing the total number of fishing units potentially operating at all fishing sites (i.e. the overall geographical spectrum). F can also be derived from the frame survey.

A is the raising factor expressing total number of fishing activity days during the month, - i.e. it is calculated each month and is set to NC= number of calendar days in a month.



5B.12 Sampling in Both Space and Time



Notes:

This is the most common approach for estimating total fishing effort.



5B.13 Sampling in Space and in Time



The sampling in space and time approach consists of the following four surveys.

To assess fishing effort

- A census-based Frame Survey provides the raising factor, F, to express the total number of boats.
- An Active Days Survey provides the time raising factor, A, to express the number of days with fishing activities.
- A sample-based Boat- Activity Survey determines the Boat Activity Coefficient (BAC) to express the probability of a boat being active on any given day.

To assess overall CPUE:

• A sample-based Landing Survey determines the sample's overall CPUE's



5B.14 Census in Time and Sampling in Space



Effort = AverF x F;

Where AverF is the average fishing effort exerted by a single fishing unit during the month and is the raising factor expressing the total number of fishing units/boats that are potentially operating.



5B.15 Census in Space and Sampling in Time



Effort = Aver E x A;

Where Aver E is the average fishing effort in boat days over the sample days. A is the number of fishing activity day during the month.



5B.16 Census in Space and Sampling in Time



Notes:

Census survey space and sampling requirements inclue:

Fishing Effort

- A survey at all homeports to determine the total fishing effort and average fishing effort per day, AverE.
- Since all homeports are visited at least once a month, the number of boats, F, is known.
- A survey to determine time raising factor, A, expresses the number of days with fishing activities.
- Overall CPUE
- A sample-based Landing Survey to determine the sample's overall CPUE's



5B.17 Data Dissemination and Storage

	Identifiers			Yearly	Monthly Data		
Major Stratum	Minor Stratum	Boat/ Gear	Species	Data	1	2	1 2
						Catch, Efforts,	
						CPUE, Prices, Values	

Notes:

After completing an operational cycle (usually a year), it is recommended to integrate monthly estimates into a single database for improved future application. The above table illustrates an example of such a database.



5B.18 Fishery Statistics by Household Approach

Basic Criteria	Target
Statistical Unit	Household engaged in fishing & aquaculture
Degree of engagement	Full time/Part time
Use of water resources	Inland & coastal water resources
Purpose of engagement	Subsistence on sale artisanal and commercial
Type of activities	Fishing & aquaculture

Notes:

(The table above shows the criteria used for the target population.)

The target population is dependent on the objectives of the data collection. The identification of a target population is a crucial step in data collection.



5B.19 Example:

1st	2nd	3rd	
Has a population census been undertaken in past?	Is there information to complete an initial list of households?	Can geographic information be used to identify households?	
Yes↓	Yes↓	Yes↓	
Did the population census include of screening questions?	Can the survey question be used to refine household selection?	Can household selection be refined with administrative information?	
Yes L	Yes I	Yes I	

Notes:

The table above is an example of fishery statistics by Household Approach.



5B.20 Fishery Statistics by Sampling Approach

Sample frame:	Data items:
It is the complete list of all households engaged in fishing and aquaculture statistics.	 Data items are generally grouped into categories matching with the global strategy and are further grouped under pillars of sustainability i.e., geographical, environmental, social, economic and governance.

Notes:

Examples of Data items:

GEOGRAPHICAL: -

- 1011 Location of commercial unit.
- 10111 Name of the unit.
- 10112 Address.
- 10113 Coordinates.

SOCIAL: -

- 2011 Household composition, age, sex, education.
- 2018 Engaged in fisheries.

ECONOMIC: -

3011 Production



- 30111 Utility & value
- 3091 Government Expenditure
- 30911 Public Investment
- 3045 Machinery
- 30451 Aquaculture Equipment

ENVIRONMENT: -

- 4021 Pollution
- 40211 Waste due to fishery

GOVERNANCE: -

- 5011 Legal Framework
- 50111 Regulation & Management

5B.21 Stratification in Sampling Approach





Primary stage units are enumeration areas or administrative blocks, such as villages or countries. The second stage units are the households engaged in fishing and aquaculture activity.

5B.22 Example for data collection & tabulation (Continued)

Household Engagement					
Variables	Fishing	Aquaculture	Post Harvest	Total	
Number					
Sum total of income among surveyed household					
Average Income					

Notes:

This table provides an example for data collection and tabulation.



5B.23 Example for data collection & tabulation (Continued)

	1	Fish Prod	uction			
	Quantity			Value		
Variables	Fishing (F)	Aquaculture (A)	Post Harvesting processing (P)	F	A	Ρ
Number of households						
Sum of Production						
Average						

Notes:

A similar data tabulation plan for employment, education, sex and other parameters.



5B.24 CAPI



Notes:

CAPI replaces Paper Assisted Personal Interview (PAPI) methods and offers solutions for lower cost, faster and higher quality survey data collection. The well-known advantage of this technology the improved research quality, a quicker turn around and easier integration with other activities. This also helps manage complexity of data.

Open Art Fish is a statistical monitoring tool for open approaches and, rules and techniques for Fisheries. It consists of an Open Art Fish software application and its backbone database. The software is designed to estimate total catch and value by species for sampling schemes of small-scale fisheries. A free of charge mobile phone application is available to facilitate collection and prompt submission of survey data to the database.



5B.25 Recommendations:



Notes:

- There is a need for implementation of guidelines and standard methodologies to evaluate the specific contribution of aquatic biological resource use throughout the value chain. Recent attempts have used census-type surveys to obtain snapshots of social and economic contributions (including non-commercial activities) throughout the value chain. However, this approach requires further testing and refinement before global standards can be established.
- The Fish Price Index is not included in FAO publications, different methodologies exists but since 2011, fish and fishery products have been included in the annual OECD-FAO Agricultural Publication. This index included seafood imports to 3 markets, the EU, Japan and USA. The index includes six major species groupings (salmon, whitefish, other fish, crustaceans, small pelagics, and tuna). The fish price index (FPI) relies on trade statistics because seafood is heavily traded internationally, exposing non-traded seafood to price competition from imports and exports. Calculations of the extent of price competition in different countries



support the plausibility of reliance on trade data. Overall, the FPI shows less volatility and fewer price spikes than other food price indices including oils, cereals, and dairy. For more information on Fish Price Index please refer to the following website- <u>http://www.fao.org/tempref/FI/DOCUMENT/globe/fishisfood.pdf</u>

5B.26 References:



Notes:



5B.27 End of Lesson



Notes: