

<b>COURSE CODE:</b>	FIS506
<b>COURSE TITLE:</b>	Fisheries Economics
<b>NUMBER OF UNITS:</b>	2 Units
<b>COURSE DURATION:</b>	Two hours per week

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### **COURSE DETAILS:**

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### **COURSE CONTENT:**

Major economic constraints in fisheries development; free access fisheries, sustainable yield curve and total revenue curve; Bioeconomics equilibrium, factor rents, welfare economic theory and its relevance for fisheries; Externalities in fisheries; capital investments and consumption patterns, fisheries resources and right of ownership.

### **COURSE REQUIREMENTS:**

This is a compulsory course for all students in Department of Aquaculture & Fisheries Management. In view of this, students are expected to participate in all the course activities and have minimum of 75% attendance to be eligible to write the final examination.

### **READING LIST:**

Adegeye, A. J. and Dittoh, J. S. (1985). Essentials of Agricultural Economics. Impact publishers, Nigeria Limited, Ibadan. 251p.  
Olaoye, O. J. (1993). Institutional framework for cooperative societies in Nigeria. A term paper presented during B. Agric. Project, university of Agriculture, Abeokuta. 38p.

### **LECTURE NOTES**

*LECTURE NOTE ON FISHERIES ECONOMICS (2 UNITS) FIS 506*

**PREPARED BY**

**DR. IDOWU ADEKUNLE ADEDOYIN**

**Major economic constraints in fisheries development, Free access fishery**

**Major economic constraints in fisheries development**

**Aquaculture (Constraints)**

In spite of the potentials of the potentials of aquaculture, there are lots of problems militating against its development. Some of the constraints are:

- \*Poor quality fish seed
- \*Lack of cost effective fish feed
- \*Lack of capital
- \* Security of Fish farms
- \* Unstable government and defective government policies
- \* Faculty data collection
- \* Lack of environmental impact considerations and
- \* Poor marketing structure.

**1. Poor Quality Fish Seed**

This is due to lack of functional fish hatcheries where farmers can purchase fingerlings of good quality to stock their farms. Often they travel far distance to collect or source from the wild or open waters. Some hatcheries sell advanced fry as fingerlings. Leading to poor survival, stunted growth and poor returns of investment .

· High Cost of Fish Feeding

The high cost of fish feed especially good quality fish feed pellets has led to the farmers using quality feed to sparingly feed their fish. The high cost of fish meal and its competitive use by L/stock farmer have made it unaffordable to fish farmers.

· Lack of Capital

Most fish farmers lack adequate capital to either operate farms profitable or expand them. The situation is made more difficult by the unwillingness of banks to grant loans to the farmers. The number of operational farms have reduced drastically due to lack of funds, this has led to decrease in fish production.

· Unstable Government and Defective Government Policies

The instability and lack of continuity of governance in country has prevented successive governments from implementing national aquaculture policies and this has led to a haphazard pattern of development of aquaculture especially in Nigeria (Omitoyin, 2007).

Some programmes such as The National Accelerated Fish Production, Integrated Rural Fisheries Development Project, Fish seed multiplication Projects, pilot fish farms Project and Fresh water Fish Farming Demonstration and Development etc, however most of these programmes failed due to poor policy formulation, implementation and misplaced priority, financial mismanagement, lack of motivation among extension officers and lack of feasible time frame within which to accomplish stated policy objectives.

· Faulty data Collection

No adequate record keeping of aquaculture production in Nigeria. Most fish farmers do not keep the records of yearly production. Federal and State Fish Departments are not motivated to assist in collation of reliable and accurate data on aquaculture production.

· Lack of environmental Impact Consideration

Environmental impact Assessment of most farms on the neighbourhoods and on the farms are not done by most farms, the result is that farms are wrongly located where domestic effluents or those from industries enter directly into ponds leading to pollution, poor growth and mass mortality of fish.

· Marketing of Aquaculture Products

Marketing of aquaculture products to some extent has become a problem in Nigeria. This is not because the supply is in excess of demand but because of

uncoordinated marketing programmes. Many fish farmers sell their fish in fresh forms to middle men at very low prices. This means there must be need for networking and marketing information among fish farmers, processors and consumers on availability of fish and current market prices all over the country to prevent the farmers from being ripped off. There is also need to add value to aquaculture products in order to increase profit margin. Modern fresh fish distribution chains should be developed in order to make fish available to consumers no matter where they are in the country.

- Poor road

Many roads leading to farm locations are generally bad and inaccessible due to poor state. This has made the movement of materials to and from the farm difficult thus discouraging the farmers from this may lead to the fish venture being abandoned. Other constraints include:

- Erratic power supply
- Lack of adequate technical know-how

### **Capture fisheries**

Free access fisheries

Free access or open access is the condition where access to the fishery for the purpose of harvesting fish is unrestricted, that is the right to catch fish is free and open to all.

The implementation of the rule of the United Nations of a 200 mile fishery conservation zone provided a striking illustration of the need for a common conservation policy for these new community resources. The principles of free access to the fishery zones of member states under the free access policy the total allowable catch should be shared out in accordance with the golden rule of the common market, that is, freedom from all form of discrimination. The amount to equality of access of vessels of member states. However there is a fact that fishermen consider fishing at the strip of coastal waters their exclusive rights and even cross carpet to fish in areas where the rule no longer covers which often lead to conflicts among member states. This conflicts led to the establishment of laws which include:

Selective conservation measures, Catch quotas and fishing licenses

Selective conservation measures include measures put in place to stop or restrict fishing at certain periods, to define types of fishing vessels, sets norms for the mesh sizes of fish nets or define the minimum size and weight for each species fished.

Catch quotas

This represents sharing out between the member states of total allowable catch

Fishing licenses refers to manner in which national quotas are shared out of national level with the registration and granting of a license to each fishing vessel.

Open access fishery however suffers from two fundamental problems

1. No way of controlling new comers in terms of extent of exploitation
2. Resource rents that supposed to accrue to resource owner is meager compare to what accrue to the resource user making exploitation artificially attractive and thus encourage overexploitation

These fundamental problems led to Economic and ecological consequence in free access fishery which are:

Overexploitation of two types:

Economic overexploitation in which fisheries become more vulnerable to fish prices, fishing cost or stock availability.

Fish exploited beyond optimal level.

Biological overexploitation: Increase in effort decrease the size of fish stock to the point where long term productivity declines.

### **PRODUCTION AS RELATED TO FISHERIES ENTERPRISES**

- The process of transforming inputs into outputs or products –

production.

- Production is the creation of utility. Utility types are time, place, form and possessions i.e the satisfaction derived from consuming a commodity (goods & services).
- Inputs are also sometimes termed resources or factors of production.
- Output and product means the something.
- There is nothing that is permanently an output or permanently an input.
- Inputs or factor of production can be categorized into four, natural resources; human resources; capital resources and management or entrepreneurship which is a qualitative kind of input. It is simply the effective harnessing of land, labour and capital resources through management.
- The relationship between factors of production (input) and product (output) is what is termed production.
- Production is converting raw materials to finished products.

### **FACTOR RENTS**

- **Rent** is a payment for natural gifts like land whose supply is fixed both in the short and long run.
- In other words rent is seen as an economic surplus which is an earning of a factor of production in excess of the minimum amount necessary to keep in its present use.
- It is the distribution paid to free holders for “allowing” production on the land they control or “the part of the produce that accrues to the owners of land (or other natural resources/capabilities) by virtue of ownership” and as “share of wealth” given to land owner because by have an exclusive right to the use of those natural capabilities.
- It is the price of a factor whose supply is fixed/completely inelastic.
- **Factor rent** is the same as factor of production which is an economic resource which goes into the production of goods and services.
- Production is the process of transforming inputs into outputs. Inputs are also sometimes termed resources or factors of production. There is nothing that is permanently an output or permanently an input. What some body considers as his output could be another input and vice versa.
- **Economic rent (ER)** is typically defined by economists as payment for goods and services beyond the amount needed to bring the required factors of production into a production process and sustain supply. A recipient of economic rent is a **rentier**.
- ER are “excess returns” above “normal levels” that take place in competitive markets (Tollison, 1992), more specifically, it is a return in excess of the resources owner’s **opportunity cost**.
- **Terminology relating to Rent**
- **GROSS RENT: GR** refers to the rent paid to the services of land and the capital invested on it. It consists of economic rent, interest on capital invested for improvement of land and reward for the risk taken by the landlord in investing his capital.
- **SCARCITY RENT: SR** refers to the price paid for the use of the homogeneous land when its supply is limited in relation to demand. If all units of land and homogeneous but demand exceeds supply, the entire land will earn economic rent by virtue of its scarcity.
- **DIFFERENTIAL RENT: DR** refers to that rent, which arises owing to differences in fertility of land. The surplus that arises due to different between the marginal and intra-marginal and is the differential rent, it is accrued generally under extensive cultivation of land. The term was first stated by David Richard.
- **CONTACT RENT: CR** refers to the rent which is mutually agreed

upon between the land owner and the user. It may be equal to the economic rent of the factor.

### **Different types of factors of production**

- Natural resources – Land, soil conditions, fish, water, climate and mineral resources.
- Human resources – Labour
- Capital resources – Capital
- Management or entrepreneurship

Since all the economic resources are relatively scarce and limited in supply. They all receive some types of income for their services.

### **The rewards of different types of factor rents**

- Land - rents
- Labour - salaries or wages
- Capital - Interest
- Entrepreneur ability (skills) – Profits

### **LAND**

- Land includes all materials and forces that are supplied by nature for use in the production of goods and services.
- In economic sense, land includes water, forests, fish, soil, climate, mineral resources etc.
- Factors determine land yield; inherent fertility of the soil, the topography of the land and the climate especially rainfall
- Land has economic, religious, cultural and tribal importance.
- The supply of land is fixed and therefore cannot be replaced when exhausted.
- It is a free gift of nature.
- Land for agriculture is subject to the law of diminishing returns.
- The reward for land is rent and free gifts of nature
- Land availability is subject to the provision of land use act in Nigeria.
- Reward income from land is rent.
- Land is heterogeneous as no two parcels of land are the same in fertility on other characteristics.
- Land is recognized as an inelastic factor of production.

### **WATER**

- Rainfall - Building of dams and irrigation schemes
- H<sub>2</sub>O is very vital for sustaining life
- Medium of enzymatic activities
- Used in hydrolyzing food

### **LABOUR**

- The effort of human being or work done.
- Labour is combination with other factors of production is utilized to produce outputs.
- The number of man-day (labour units)
- Three types of labour: Family, hired (paid) and exchange labour
- Reward for labour is wages or salaries.
- All forms of human efforts put into or utilized in production.
- Man's mental and physical exertions generated in the process of production.

### **CAPITAL**

- Capital may be defined as man-made assets used in production.
- Man-made wealth or goods used to produce other goods and services
- The stock of previous invested in order to produce future wealth.
- The reward for capital is Interest.

### **ENTREPRENEUR**

- Co-ordinates and organizes other factors of production (Labour and Capital) in order to produce goods and services.
- Bear risk and takes major decisions of the business
- He risks his capital in setting up the business with the aim of obtaining maximum profit.
- Is the person who co-ordinates, controls and organizes the process of production in order to make maximum output at minimum cost thereby making profits.
- The reward for entrepreneur skills is profit.

### **THE LAW OF DIMINISHING MARGINAL RETURN IN FISH BUSINESS**

- The law of diminishing returns state that successive units of a variable factor (e.g. labor or capital) is applied to a given fixed factor (e.g. land), output will be at 1st but it will get to a point at which the addition of one more unit of a variable factor will unit in less additional units of outputs = The law of variable production.
- The law of diminishing marginal returns states that if the quantity of one variable factor is increased by equal amounts while the quantity of other factors are kept constant, the corresponding increment to total products (output) will start to decrease after a certain point ( the point of inflexion) and will continue to decrease from that point.
- As more and more of a variable factor of production (labour) is added upon a fixed factor of production (land), the output tends to increase up to a point above which such successive unit of the variable factor makes smaller and smaller addition to the total output and finally total output may even decrease.
- This infer that if a change in input is less than a proportionate in outputs, the marginal returns on the product diminish marginal returns are the most often observed in production for most inputs especially at normal production levels.

#### **Relevance**

- Enable manager to know wages and salaries to be paid to employee.
- It determines the best proportion to combine the various factor of production.
- Enable the manager to know when to stop adding inputs of the variable factor fixed factor.
- It determines the actual cost of inputs to be used for optimum returns.

#### **Important of Law of Diminishing returns**

- Proper combination of factor of production.
- Changes in scale of production.
- Ensures efficiency.

#### **COST FUNCTIONS**

- Cost refers to the value of the inputs used in production or is the expenses incurred in producing a particular amount of the product in a particular time period.
- Profit = revenue – cost
- Cost functions help the producer to determine the most profitable level of production (i.e. the output which gives the maximum profit) as well as the level of output at which production must cease.
- Costs of production accounting costs i.e. cost of materials used in the production process (such as labour, costs, fertilizers costs, feed costs,

depreciation costs, maintenance and repair costs, selling and administrative costs, taxes and interest payments on borrowed funds etc)

- Costs of production in economics mean alternative cost of opportunity cost forgone return (economic cost) + accounting cost.
- Cost functions are derived from production functions.
- Where  $Q = F(x) F(P_x X)$
- Where  $Q = \text{Output}$ ,  $X = \text{Input}$ ,  $P_x = \text{Price of the input}$ ,  $X = \text{Output}$  is a function of cost of the variable input.
- Quantity of Output ( $Q$ )
- Quantity of variable Input ( $X$ )
- Cost function is  $Q = F(P_x X)$
- **Average Cost (AC):** AC is the total per unit of output
- $AC = \text{Total cost/Total Product} = TC/Q$
- 
- $AC = ATC + AVC$
- 
- **Marginal Cost (MC):** MC is the addition to total cost due to the production of an additional unit of total product.
- $MC = \text{Change in Total cost/Change in Total Product} = \Delta TC/ \Delta Q$
- 
- Since  $TC = VC + FC$
- $ATC = AVC + AFC$
- Or  $TC/Q = VC/Q + FC/Q$
- 
- $AVC = VC/Q P_x X/Q = P_x = P_x/AP$
- $Q/X$
- $AVC = 1/AP$  i.e. AP increases as AVC decreases.
- AP increases at the region of increasing returns which implies that AVC increases returns. Also, AP increases at the region of increasing returns, implying that AVC increases at the region of increasing returns.
- Marginal Cost (MC):  $\Delta TC/ \Delta Q = \Delta FC/ \Delta Q + \Delta VC/ \Delta Q$
- But  $\Delta FC$  is zero,
- $\Delta Q$
- Therefore,  $MC = \Delta VC / \Delta Q = P_x \Delta X / \Delta Q = P_x / \Delta Q/ \Delta X = P_x/MP$
- 
- 
- $MC = 1/MP$  “at a constant price of input”
- i.e. MC increases as MP increases
- Fig. Relationship between AC & MC curves to TP, AP and MP curves.
- AFC curves fall continuously though at an increasing rate as output increases. The per unit fixed costs of a fisheries enterprises e.g. increases as many more fishes are reared in the same fish pond. Secondly, AVC and ATC curves continue to increase as long as the MC curve is below them. Also, AVC and ATC continue to increase when MC is greater than them. MC is not related to AFC in any way.
- Average variable cost (AVC) = Total variable cost = TVC/CP
- Output
- ii. The Average Total Cost (ATC) = Total cost = TC
- Output Q
- 
- or  $ATC = AFC \times AVC$
- iii. The Marginal Cost (MC) = Change in Total cost =  $\Delta TC$   
Change in output =  $\Delta Q$

Discuss the total cost (TC) with a diagrammatical presentation

- $TC = FC + VC$  or  $TC = ATC \times Q$

### **Average Product (AP)**

• The average product (AP) of an input is the ratio of total product (TP) to the quantity of input used in producing that amount of output. It is the amount of product obtained per unit of input at a particular level of production or level of input use.

• Thus,

- $AP = TP/X = Q/X$

• AP can however never be negative because negative amount of produce can never be produced.

### **Marginal Product (MP)**

• MP is the additional to total product due to the condition of one unit of a variable input.

• **That is:**  $MP = \Delta Q / \Delta X$  or  $dq/dX$

• MP is the rate of change in total product as the quantity of input increases.

• It is the first derivative of the total product functions

• MP is positive when the TP is increasing

• MP is zero when the TP is constant

• MP is negative when the TP is decreases

• If TP is increasing at any increasing rate (i.e. in the region of increasing marginal returns, MP will be increasing).

• If TP is increasing is increasing at a increasing rate (i.e. in the region of diminishing returns), MP will be increasing (but will be positive).

• The MP function therefore rises up to a maximum ( at the point inflexion) and then decreases to zero when TP

is maximum, MP finally becomes negative when TP increases.

• When AP is increasing, MP is greater than AP because for AP to increase as inputs are added, the addition to the product from each additional input (MP) must be greater than the AP from the preceding input.

• When AP is increasing, MP is less than AP.

• If AP does not change when additional inputs are used, AP and MP are equal ( $MP = AP$ ) when AP is maximum

**Cooperative Association** is a voluntarily organization of persons with a common interest formed and operated along democratic principles for the purpose of supplying services at costs to its members who contribute both capital and business.

The **salient points** to examine in the definition are:

Cooperative is a form of organization”.

Wherein persons voluntarily associate together”. This is the free-will not compulsion.

As human beings” could be puzzling.

On the basis of equality” connotes democracy.

For the promotion of the economic interests of themselves”

The membership common interest as user of commodities

Cooperators are the contributors of capital and business and

lastly perform services at cost with under payment of overcharge

cooperative society is not a philanthropic institution; it

**Principles of Fisheries Cooperative Societies are:**

Democratic control

Open and voluntary membership

Limited return on capital

Sharing savings in proportion to share contributions



Political, race and religious neutrality  
Cash trading  
Promotion of education  
Encouragement of the production (and supply) of  
pure and unadulterated goods.

### **OBJECTIVES OF COOPERATIVE SOCIETIES**

Exploitative tendencies of middlemen in marketing: Cooperative produces marketing societies and perform marketing functions both to assist their members and to eliminate the unnecessary profits of middlemen in trade and commerce.

Provision of goods and services at cost leading to increased income.

Acquisition of production and consumption loans and mobilization funds. E.g. Thrift and Credit Cooperative Societies mobilize funds for productive use by their members at low interest rates.

They promote mutual understanding and education among their members and in the long run, among people in general.

Take advantage of economics of scale in production, processing and marketing of agricultural produce.

They aim to protect the rights of people both as producers and consumers.

They seek to prevent the exploitation of the weaker members of the society.

### **CHARACTERISTICS OF CO-OPERATIVES SOCIETIES**

co-operative society is an association of people who joined together to perform certain functions they could not have been able to perform individually  
strives at improving the standard of living of the members

is a self-help association formed to provide solution the common problems of its members

permits group actions amongst the members

The association attempts to provide some services that are desirable and important to the life of its members

Although it undertakes profitable ventures, its main goal is the provision of services rather than a profit making motive.

### **TYPES OF COOPERATIVE SOCIETIES IN NIGERIA**

Agricultural Produce Cooperative societies

Fish Marketing Cooperative Societies

Cooperative Consumers' Societies

Cooperative Thrift and Loans Societies

Cooperative Thrift and Credit Societies

Cooperative Craftsmen's Societies

Multi-purpose Cooperatives

### **MERITS OF FISHERIES COOPERATIVE SOCIETIES**

Protection from the constant fluctuation in price

Selling commodities to customers at lower prices due to the elimination of middlemen

Democratically managed

Creation of employment opportunities

Stability of trade, since members are customers

Pooling of members resources (e.g. capital) for mutual benefit such as establishment of business enterprises.

Community development.

Acquisition of modern technologies/tools and technical-know-how

Education training of members and families

Collective solution to members problem

### **DEMERITS**

Management of the societies falls on only the elected members or small group who have little experience in organizing and running fisheries business i.e. leadership and management skills inadequacy.

the profits accrue to the society and not to those who manage, there is lack of personal commitment and incentive which may lead to slackness and inefficiency.

Poor management

Inadequate educational background

### **PROBLEMS OF AGRICULTURAL COOPERATIVE DEVELOPMENT IN NIGERIA**

Lack of capital

Low level of Education of Members

Lack of good leadership and management

Lack of well-informed guidance: Government guidance of cooperatives is at time very wanting. Government policy, well-defined administrative structure should be in circulation widely for cooperative organizations.

Lack of Patronage: The education standard of members should be properly looked into, to enhance adequate involvement of members

Lack of storage facilities and marketing outlets

Keen competition and monopoly in retail trade making consumer cooperation almost impracticable as well as poverty and disloyalty

### **ACHIEVEMENTS**

Economic Improvement

Business Education and Enlightens

Community Development

Link between the people and the Government

Democratic control: Training in democratic procedures and principle are given which is useful in all sphere of life

Agency for International Understanding

Acquisition of Assets

Cooperative Bargaining Power: Accumulation of assets/ output to enhance sale at cost.

### **Importance of fisheries cooperative society in your country**

Elimination of exploitative tendencies of middlemen in marketing

Provision of goods and services at cost leading to increased income generation.

Acquisition of product and consumption loans and mobilization of funds.

Promotion of mutual understanding and education among their members and in the long run among people in general.

Take advantage of economics of scale of production, processing and marketing of fisheries produce.

Protection of the right of people (producers and consumers).

Prevent the exploitation of the weaker member of the society.

Breaking the poverty cycle of the farmers.

### **Contributions of fisheries cooperative societies to the national economy of Nigeria**

Economic improvement (Revenue/income)

Business education and enlighten of their members

Community development

Link between the people and the government

Agency for international understanding affiliation.

Democratic control  
Creation of strong and effective marketing channel  
Accumulation of assets  
Source of money for fisheries business.

### **VARIOUS WAYS OF FINANCING A NAMED FISHERIES COOPERATIVE IN NIGERIA**

**Owned capital** (i.e. from which the cooperative complex) i.e. internal source.

Share capital C equity or risk capital and reserves – undistributed surplus.

Retained annual surplus

Admission/entrance fees

Uncollected or lapsed share capital

Uncollected or lapsed dividends patronage refunds

Penalties

Grants and gifts

Special earnings from assumption of member liabilities to private outside lenders.

Manipulation of valuation

**Borrowed capital – External source**

Loans and grants from governments

Overdrafts

Credits from financial institution (commercial, merchant, community, mortgage, dent etc)

Borrowed capital from other cooperative institution

Trade credits

Other external sources include: money lenders, non-bank public institution and

### **LOAN RECOVERY FROM DEFAULTED COOPERATORS**

**Internal method**

Ensuring that all loan records are carefully kept.

Issuance of demand notice

Personal visits to the debtor by officials of the cooperative.

Supplying arbitration forms promptly and assisting the committee in filling the forms

Processing the forms and promptly handing them over to the divisional cooperative officer

Helping the society trustee to prepare their case.

Arbitration Enforcement of the arbitration award in a court of law

Disposal of collateral deposited by the debtor(s)

**External method:** court of law

### **ASSIGNMENTS**

Compare and contrast fisheries cooperative societies and trade union of fish mongers.

What are the differences between fisheries cooperative societies and ordinary business organization.

How can a named fisheries cooperative societies be formed step by step and formally registered in your state.

How will you monitor the operations, performance and sustenance of a fisheries cooperative societies.