

4. FISHERIES ASSISTANT

1. Introduction:

Aquaculture has acquired a special significance not only because of its contribution to food resources but also for contribution to qualities of our diet. India is getting good amount of foreign exchange by exporting the aqua products (6300 crores by exporting 4,23,000 tons during 2000 -01). By adopting scientific management this production can be enhanced.

Aquaculture is a fast growing subject especially in Andhra Pradesh where adequate water facilities, infrastructure facilities and entrepreneurship are abundantly available. This has resulted in the production of large quantities of fresh water carps and brackish water shrimps. Recently scampi culture and pearl culture are becoming popular. However, enough manpower at the field level is badly needed. Hence a short-term course is formulated for the students who possess higher secondary education. This course is also useful for self-employment for unemployed youth.

This course is divided into three modules where enough provision is made for both theory and practical aspects. More emphasis is focused on practical orientation.

2. Objectives of the course:

- To develop manpower with scientific knowledge and skills for sustainable fish production.
- To develop capabilities for gain full employment.
- To provide the elements and principles of fish production.
- To develop all necessary skills in practical aquatic animal production.
- To develop abilities for organization of farmers meeting, field days, seminar and such other extension facilities.
- To train students for developing entrepreneurship in seed production and agro input supply.
- To provide knowledge about the functioning of the co-operative societies.
- To provide knowledge about credit facilities and supporting schemes.
- To acquaint with farm accounting record maintenance.

3. Skills to be provided to students:

- Identification of field problems - nature and extent.
- Identification of aquatic animals.
- Identification and quantification of various Fishery - inputs.
- Methodology of fisheries input use.
- Safety measures in input use
- Calibration of farm machinery.
- Assessment of labour requirement for farm operation.
- Lay out of field experiments.

- Identification of diseases.
- Calculation of requirement of manure and feed.
- Weighing samples and chemicals, preparation of samples, laboratory reagents, handling and operation of lab equipment.
- Managerial skills, ability to convince, exposure to different communication media.

4. Employment Opportunities:

[a]. Wage employment:

- Field Assistant/ Farm Assistant/ Field man/ Supervisor/ Sub- inspector including equivalent position in Fish and Shrimp farms.
- Field Investigator/ Field demonstrator/ Village co-coordinator.
- Farm Manager.
- Laboratory Assistant in Aqua farms, Hatcheries and processing plants.
- Field Marketing Assistant.
- Seed Production Assistant.
- Farm storage Assistant.
- Jobs in Fishery Co-operatives.
- Opportunities in State Fishery Department.

[b]. Self Employment:

- Fishery -input Supplier.
- Seed producer.
- Fish producer.

5. Schemes Of Instruction Per Module

Module	Theory		On Job Training		Total	
	Hours	Weightage	Hours	Weightage	Hours	Weightage
I	72	30	216	70	288	100
Total	72	30	216	70	288	100

Schemes Of Instruction Per Week

Module	Theory	On the Job Training	Total
Modules I/II/III	6 Hours	18 Hours	24 Hours

6. SYLLABUS

MODULE - I: BIOLOGY OF FISH AND PRAWN AND BASIC CONCEPTS OF FISHERIES

Theory - 72 hours – Each period of one-hour duration.

1. Introduction - Importance of fish, Definition, History, Purpose, Advantages, Classification, Present status. **(6 periods)**
2. General characteristics and taxonomy of Pisces and prawn. **(6 periods)**
3. External morphology of fish and prawn - structure; shape; appendages; scales; fins and tail. **(10 periods)**
4. Growth and age determination in fishes. **(3 periods)**
5. Reproductive biology of fish and prawn - fecundity; spawning and its periodicity; maturation stage and life cycle of fish and Prawn. **(12 periods)**
6. Pond Ecology - Water as bio resources - A biotic and biotic components, Food chains and Food web; Ecological pyramids; energy flow; productivity. **(6 periods)**
7. Culture systems- Ponds, Cages, Reservoirs, and Pens. **(6 periods)**
8. Construction of fish and prawn farms- site selection, construction. **(8 periods)**
9. Fishing craft and gear - types of crafts and gear; gear material; gear preservation. **(15 periods)**

MODULE - I

ON THE JOB TRAINING

HOURS - 216

1. Identification of types of fins
2. Identification of types of scales.
3. Identification of types of appendages in prawns.
4. Identification of types of tails in fishes.
5. Differentiation of different shapes of fish and their advantages.
6. Study of the position of mouth and snout region in relation to feeding habit.
7. Age determination by scale, opercular bone, vertebrae, otolith.
8. Estimation of fecundity.
9. Identification of different maturity stages of fish and prawn.
10. Water quality analysis - Temperature; pH; Dissolved oxygen; Total alkalinity; Calcium; Magnesium; Total hardness; Chlorides, Nitrates; phosphates; Turbidity, Total dissolved solids; color.
11. Estimation of primary productivity.
12. Identification of craft - Indigenous and mechanized craft models.
13. Identification of different gear models.
14. Fabrication of nets.

15. Field visit to local fish farms to study the various constructed fish farms and their maintenance

MODULE - II: FRESH WATER & BRACKISH WATER FISHERIES AND MANAGEMENT PRACTICES.

Theory - 72 periods – each period of one hour duration

1. Introduction to fresh water and brackish water fisheries. **(2 periods)**
2. Riverine fisheries; Reservoir fisheries - Dams and their effect on fisheries; role of wind energy in aquaculture. **(6 periods)**
3. Cultivable fresh water and brackish water organisms - Major carps; minor carps, air breathing fishes and other fishes; fresh water and brackish water prawns. **(10 periods)**
4. Fish and prawn seed resources in India. Seed procurement and production-Carp seed Collection from rivers, Induced breeding, Bundh breeding. Identification and Transportation of seed **(10 periods)**
5. Hatchery -Types of hatcheries, Modern CIFE carp hatchery and Chinese hatchery management, Scampy and penaeid hatchery management. **(8 periods)**
6. Sewage fed fisheries. **(2 Periods)**
7. Pond management - Nursery ponds; rearing ponds and stocking ponds; Lime and its applications in aquaculture; Types of manure and their applications in pisciculture practices; aquatic weeds; Insects, predators and trash fishes and their control. **(10 periods)**
8. Water quality management; Food management - natural fish food organisms; supplementary feeds, feed management and culture of phyto and zooplanktons. **(6 periods)**
9. Health management - collection of disease infected samples. Parasitic and non- parasitic diseases of fish and prawn, Disease diagnosis, therapeutic measures. **(8 periods)**
10. Types of cultures and integrated farming - composite fish culture; Air breathing, scampy farming, fish cum agriculture, fish cum live stock and polyculture ; Sea bass and Milk fish culture. **(10 periods)**

MODULE - II

ON THE JOB TRAINING

HOURS - 216

- 1). Identification of Major and minor carps from rivers and ponds.
- 2). Identification of air breathing and brackish water fishes.
- 3). Identification of other food fishes.
- 4). Identification of fresh water and brackish water prawns and crabs.
- 5). Carp seed collection from rivers and identification.
- 6). Induced breeding techniques- Pituitary gland extract.
- 7). Induced maturation.
- 8). Seed production.
- 9). Management of fish farm.
- 10). Identification of Natural food.
- 11). Identification and formulation of supplementary feeds and their applications.

- 12). Preparation of supplementary feeds.
- 13). Collection of infected parts of fish and their processing for identify the type of disease and they're controlling measure.
- 14). Culture of phyto zooplankton]
- 15). Mounting and identification of plankton organisms.
- 16). Artemia culture
- 17). Visit to local fish seed farms to study the different types of hatchery units.
- 18). On job training.

Module - III : POST HARVEST TECHNOLOGY AND FISHERY ECONOMICS.

Theory - 72 hours –Each period of one hour duration

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|---|---------------------|
| 1) Introduction to post harvest technology. | (3periods) |
| 2) Preservation, processing and packing. | (12 periods) |
| 3) By-products of fish and prawn, Value added products. | (10 periods) |
| 4) Marketing and trade. | (8 periods) |
| 5) Fisheries institutions and agencies. | (2 periods) |
| 6) Maintenance and management of fishing harbors and Importance of jetties. | (6 periods) |
| 7) National economy through fishery sector; Export of aqua products and quality control. | (6 periods) |
| 8) Co-operatives; Socio-economic status of fishermen. Institutional support to fisheries; Crop insurance. | (10 periods) |
| 9) Employment generation and role of Government in fishery sector. | (3 periods) |
| 10) Training and extension programs. | (4 periods) |
| 11) Economics of a model fish, prawn and shrimp seed and farm model. | (9 periods) |

MODULE - III

ON THE JOB TRAINING

HOURS - 216

- Visit to processing and preservation plants.
- Marketing survey and identification of marketing channels.
- Visit to wholesale and retail fish markets.
- Fishery data collection and processing the data.
- Value added product identification.
- Preparation of flow-charts on harbor maintenance.
- Visit to various national fisheries institutes.
- Socio economic survey of fish flock and cooperatives.
- Economics of a model farms.
- On job training.

7. List of Tools and Equipment

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| 1). Microscope | 2). Centrifuge |
| 3). Sechi disc | 4). Balance. |
| 5). Calorimeter | 6). PH meter |
| 7). Thermometer. | 8). Dissection Box. |

Non - consumables(Glass ware).

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| 1). Beakers | 2) Conical flasks | 3). Pipettes | 4). Burettes |
| 5). Funnels | 6). Watch glasses | 7). Slides | 8). Cover slips. |
| 9). Measuring jars | 10). Reagent bottles. | | |

Consumables (Chemicals).

(Glaxo/ E-merck/ Sarabhai/ BD/ Sd-fine)

Sl.No.	Item	Quantity.
1.	Formaldehyde	40 lit
2.	Potassium Dichromate	500 gm.
3.	Absolute Alcohol	5 lit
4.	Borax Caramine	200 ml
5.	DPX	200 ml
6.	Acetic Acid	500 ml
7.	Sodium Nitrate	500 gm
8.	Phenol	5 lit
9.	EDTA	500 gm
10.	Muroxide powder	50 gm
11.	Erichrome Black	50 g
12.	Sodium thio Sulphate	50 g
13.	Manganese Sulphate	500g
14.	Potassium Iodide	500g
15.	Potassium Hydroxide	500 g.
16.	Starch powder	500 g.
17.	Sulphuric Acid	2lit.
18.	Hydrochloric Acid	2lit
19.	pH papers (Assorted)	5 Pkt
20.	pH Indicator	500 g
21.	Silver Nitrate	10 g
22.	Sodium Hydroxide	1000 g
23.	Sodium Carbonate	500g
24.	Methyl orange	100ml
25.	Phenapthylene Indicator	100ml
26.	Copper Sulphate	250 g
27.	Cotton	2 bundles
28.	Ovaprim	2 bottles
29.	Glycerol	500ml
30.	Ethanol	100ml
31.	Filter papers (Assorted)	
32.	Malachite Green	500g.
33.	C IFAX	500 ml.
34.	Cobalt Chloride	100 g
35.	Buffer tablets	100nos
36.	Chloram Phenicaol	200 g
37.	Boric acid	500 g
38.	Xylene	500 ml.

8. Teacher Qualification:

Teachers with M.Sc Zoology with Fisheries and Aquaculture specialization's or B.F.Sc. or B.Sc. with Fisheries one of the subjects are eligible for teaching.

9. Reference Books:

1. Fish and Fisheries -V.G. Jhingran, Hindustan Publishing Corporation.
2. Inland Fishes - Vol.1 and 2. P.K. Talwar and A.G. Jhingran.
3. Aquaculture - Principles and Practices- T.V.R.Pillay, Fishing News Books.
4. Prawn and Prawn fisheries - Kurian. C.V, and V.O.Sebastian, Hindustan Publishing House.
5. Marine Fisheries - D.V.Bal and K.V. Rao, Tata Mc Grawhill Publishing Company.
6. The Wealth of India - Vol. IV, Fish and Fisheries- CSIR.
7. The Fishes of India - Vol. 1 & 2- F, Day.
8. Fisheries and Aquaculture - Ravi Shankar Piska, Lahari Publications, Hyderabad.
9. Concepts of Aquaculture - Ravi Shankar Piska, Lahari Publications, Hyderabad
10. Fresh Water Aquaculture - R.K. Rath, Scientific Publications.
11. Fish Biology and Indian Fisheries - R.P. Parihar, Central Publishing House.
12. Fisheries (Telugu) - Ravi Shankar Piska and Others- Telugu Academy, Hyderabad.
13. Fisheries - Open University, Hyderabad.
14. An Introduction to Fisheries - S.S.Khanna, Central Book Depot, Allahabad.
15. Fauna of A.P. (Fishes) - ZSI, Calcutta (Zoological Survey of India).
16. Ecology and Environment - P.D. Sharma, Rastogi Publications, Meerut.
17. Fish Breeding- NCRT Publications, New Delhi.
18. Fish Culture - NCRT Publications, New Delhi.

10.List of Participants

Dr. Ravi Shankar Piska

Associate Professor
Department of Zoology, University College of Science,
Osmania University, Hyderabad - 500 007.

Dr. S. Jithender Kumar Naik

Assistant Professor
Department of Zoology, P. G. College of Science,
Osmania University, Saifabad, Hyderabad - 500 004.

List of Institutions involved in conduct of Practical:

The following Institutions are help full for conducting the practical and on Job training (OJT) of all the papers.

1. Fisheries Department , Govt. Of Andhra Pradesh
2. State Institue of Fishery Technology, Kakinada.
3. CIFE, Centre, Kakinada.
4. CIFE centre, Balabhadrapuram.
5. CMFRI, Vishakapatnam.
6. Krishi Vignan Kendra, Jammikunta, Karimnagar.
7. Fisheries centers of ANGR agriculture University.
8. TASPARK, Visakapatnam.
9. Private Fish farms and Hatcheries.

Suggestions:

This course is meant for school dropouts and S.S.C failed students. Hence it is better to conduct this course in Telugu medium.