COUNTRY REPORT
PAKISTAN

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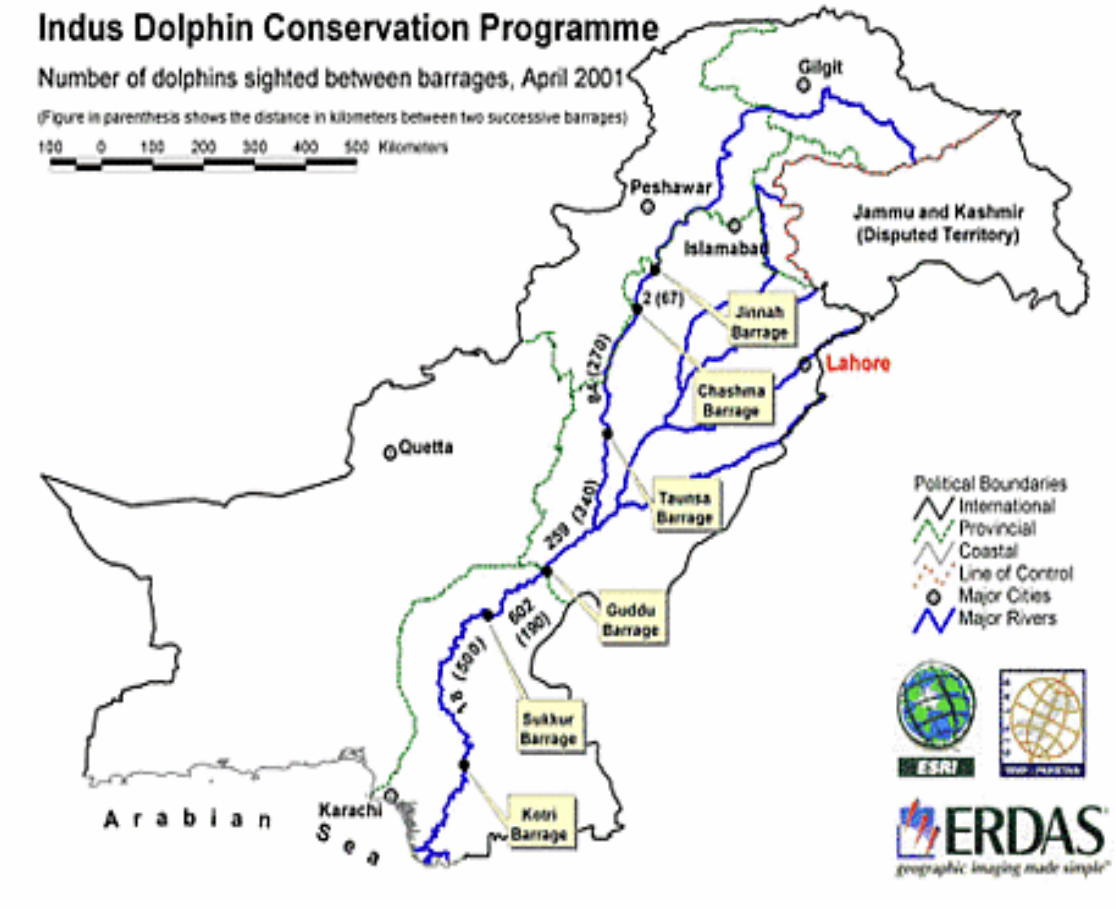
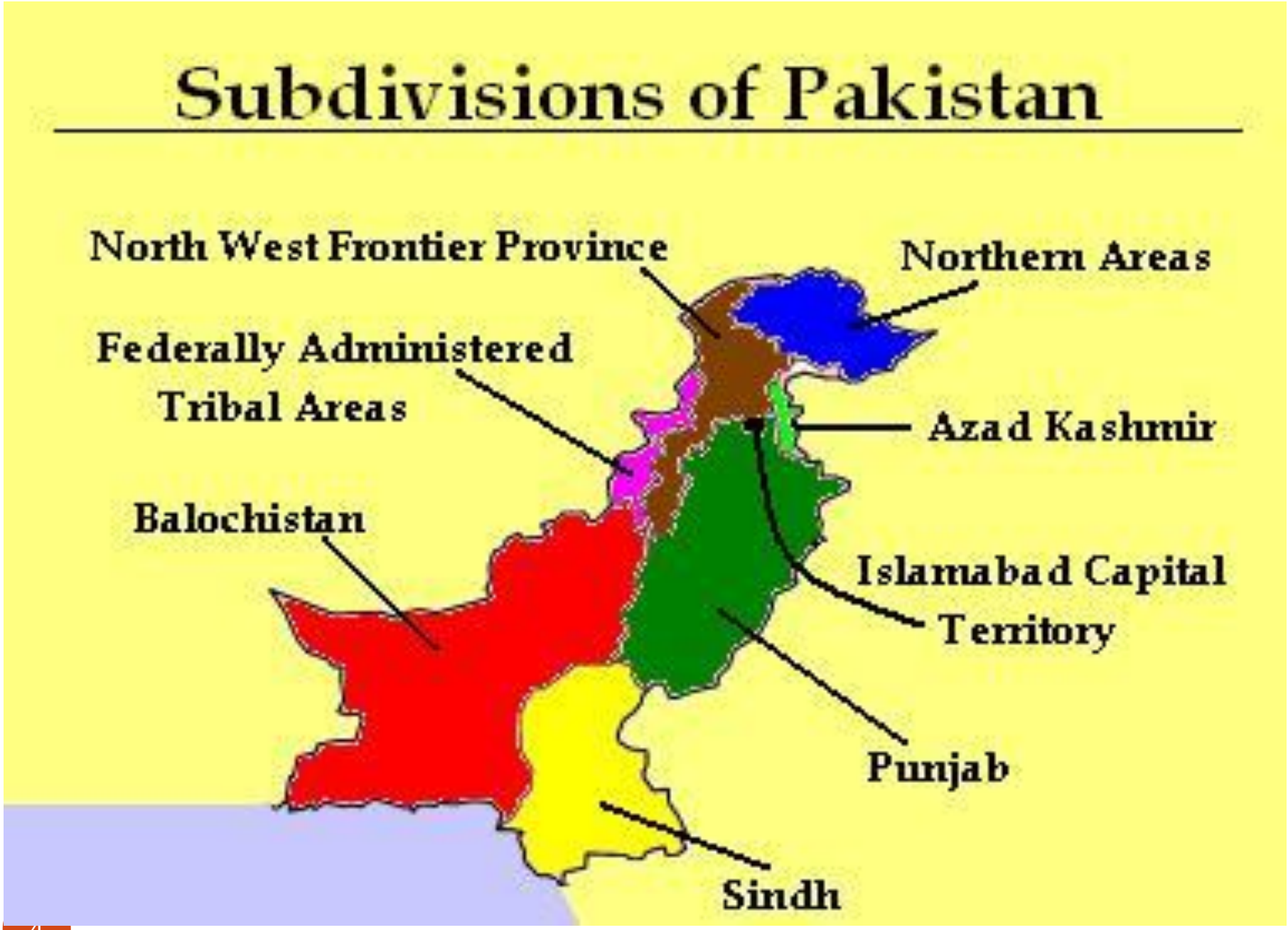
COUNTRY PROFILE/LOCATION

East:	India
North:	China
Northwest:	Afghanistan
West:	Iran
South:	Arabian Sea
Land Area:	79.6 million hec.
Climate:	Tropical
Provinces:	Four
Economy:	Agricultural



Indus dolphin is distributed throughout the Indus River. A sanctuary was developed this species in 1974. A survey coordinated by WWF carried out in 2001 showed that the total population of the Indus dolphin is approximately 1,100.

Subdivisions of Pakistan



FISHERIES AND AQUACULTURE SECTOR OF PAKISTAN

Present status, issues/challenges and future vision

Fisheries and Aquaculture Sector in Pakistan

Length of Pakistan coast line	1100 kilometers Baluchistan coast 772 km 70% Sindh cost 348 km 30%.
EEZ	1,10,000 Sq.NM
Gross Domestic Product (GDP)	1%
Contribution to Agriculture ADP	4%
Annual Growth Rate	11%
No. of people engaged in fishery sector	400,000 direct 600,000 ancillary industry .
Average annual landing of seafood at KFH	600,000 Metric Tons
% wise seafood landing in the country	65% Marine Fish, 35% Inland Fish
Consumption	40% Local, 21% Export & 10% Subsistence
Per capita consumption	2.3 Kg per person per year (FAO, 2014)

Fisheries and Aquaculture Resources of Pakistan

Fresh water resources	Area in ha.
➢ Rivers/ streams	160,000
➢ Canals, Drains & Abandoned canals	321,340
➢ Lakes	110,000
➢ Dams/ reservoirs	97,000
➢ Waterlogged areas	3,000,000
➢ Deltaic Area	700,000
➢ Flood Water Area	1000000
➢ Fish farms	49,170
TOTAL (Excluding Marine)	5,437,510

Pakistan Fisheries Resources

Pakistan Inland water resources	8.4 million hec
No. of fish farms	10,000 (app)
No. of private fish hatcheries	140
No. of trout hatcheries	45

Fish Processing units In Pakistan	45
Freezing Capacity	800 m. tons/day
Storage Capacity:	10,000 m. tons
Location:	Karachi, Pasni, Gwadar, etc.

Fish Production

- Fish Production 873,900 M.tons
  Marine 503,400 M.tons
  Inland Water 370,500 M.tons

- Export

Production (m.t)	Revenue (US$)
100,725 M.tons	195 million

Water Resources

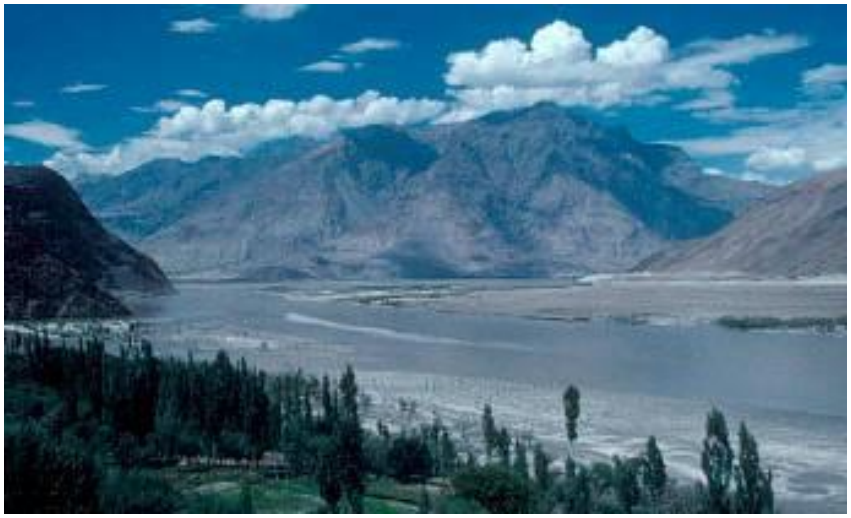
Arabian sea

Man made Lake

Small Dam

Trout Lake

Water Resources



Experimental Cage culture

Fish farm in sub-hilly areas

Organizational Structure

Federal Government Ministry of Livestock & Dairy Development Managing Director/ Fisheries Development Commissioner Fisheries Development Board			
Punjab province Secretary	Sindh province Secretary	Khaiber Pakhtoon Khuwah province Secretary	Balochistan province Secretary
Director General Fisheries, Wildlife and forestry Department	Director General Livestock & Fisheries Department	Director General Livestock & Fisheries Department	Director General Livestock & Fisheries Department
Director Fisheries 4 Positions	Director Fisheries 4 Positions	Director Fisheries 2 Position	Director Fisheries 2 Positions

Institutional Framework for Fisheries and Aquaculture Development

- Fisheries Development Board (FDB)
- Marine Fisheries Department
- Provincial Fisheries Departments
- Regional Fisheries Departments (AJK, NA, ICT, FATA)
- District Government Fisheries Departments

Research Organisations

- Pakistan Agricultural Research Council
- National Institute of Oceanography
- Provincial Fisheries Research Institutions
- Public Sector Universities
  - ✓ University of veterinary and Animal Sciences, Lahore
  - ✓ Bahaudin Zakriay University, Multan
  - ✓ University of Agriculture, Faisalabad
  - ✓ Karachi University Karachi
  - ✓ Punjab University Lahore
  - ✓ Govt. College University, Faisalabad
  - ✓ Govt. College University, Lahore
  - ✓ University of Agriculture, Jamshoro, Sindh

Fish Hatcheries in Pakistan Excluding Private

Sindh	Punjab	Khaber Pakhton	Balochistan
1. Hawks Bay Fin fish and shell fish hatchery, Karachi 2. Fish Hatchery Chilya Thatta 3. Fish Hatchery at Badin 4. Prawn and Fin fish Hatchery Jamshoro 5. Carp hatchery Bubak Dadu 6. Carp hatchery Mandodero Sukkur 7. Carp Fish Hatchery Dokri, Larkana	1. Hasilpur Bahawalpur 2. Fish Nursing Unit, Rakh Khanpur Muzaffargarh 3. Carp & Fish Trout Fish Hatchery Murree Rawalpindi 4. Kotli Arian Sialkot 5. Mahseer Fish Hatchery Hattian, Attock 6. Central Fish Seed Hatchery Lahore 7. Fish Seed Hatchery Chhenawan Gujranwala 8. Fish Seed Hatchery Rawal Town Islamabad Rawalpindi 9. Fish Seed Hatchery Faisalabad Faisalabad 10. Fish Seed Hatchery Mianchannu Khanewal 11. Fish Seed Hatchery, Bahawalpur Bahawalpur 12. Fish Nursing Unit, Kotli Arian Sialkot 13. Fish Nursing Unit, Farooqabad Sheikhupura 14. Fish Nursing Unit, Shahpur Sargodha 15. Fish Nursing Unit, Fateh Jang Attock 16. Fish Nursing Unit, Pir Mahal T.T. Singh 17. Fish Nursing Unit, Pirowal Khanewal	1. Shinu Mansehra 2. Madyan Swat 3. Alpuri Swat 4. Dubair Kohistan 5. Kalkot Dir 6. Jaghoor Chitral 7. Bombret Chitral 8. Allai Batgram 9. Ichrian Mansehra 10. Charbanda Mardan 11. Tanda Kohat 12. Ratta Kulachi D.I. Khan 13. Sher Abad Peshawar 14. Badakhel 15. Mahseer Hatchery Malakand Agency	1. Fish hatchery Quetta 2. Fish hatchery Dera Murad Jamali

Total- 41

Major Fisheries Research & Training Centers in Pakistan

Sindh	Punjab	Khaber Pakhtonkhan	Balochistan
1. Hawks Bay Fin fish and shell fish Hatchery & Training Center, Karachi 2. Fish Hatchery &Training Institute, Chilia, Thatta 3. Fish Hatchery & Training Center Badin 4. Prawn and Fin fish Hatchery & Training Center Jamshoro 5. Carp hatchery & Training Center Mandodero Sukkur	1. Fish hatchery and Training Center at Manawa, Lahore 2. Fisheries Research and Training Institute, Rawalpindi 3. Fisheries Research and Training Institute, Faisalabad 4. Fisheries Research and Training Institute, Multan	1. Fisheries Training and Research Center Peshawar 2. Fisheries Research and Training Institute, Bannu	1. Fish hatchery & Training Center, Quetta 2. Fisheries Research and Training Center, Makran **Total-13**

PRODUCTIVITY ANALYSIS OF POND FISH CULTURE (Tons/Ha./Year)

NAME OF PROVINCE	PRODUCTIVITY
PUNJAB	2.5 – 3.7
SINDH	1.5 – 2.5
NWFP	1.2 – 2.0
BALUCHISTAN	–

Source: FAO Mission Report, 2003

AQUACULTURE TYPES

- **Warm water Aquaculture:** Indian major carps & Chinese carps are commonly practiced including Tilapia.
- **Cold water Aquaculture:** Practiced in Race ways in Northern parts of the country where climatic conditions are cold. Mostly Brown trout and Rainbow trout (*Salmo trutta)* are cultured.
- **Size of Fish Farms/ponds:** An average from 0.5 to 2.0 ha (Northern) 2.5 ha (Southern Plain).
- **Type of water used for culture:** Generally the running water is used in Fish farms in southern part & Northern plains (small ponds) mostly the water from tube well is used.

Types of Fish culture System

- Extensive: Reservoirs, dams, rivers, lakes
- Semi Intensive: Semi controlled pond cultures
- Intensive: Does not exist before now has started as joint venture with private company
- Flow through: Non very few farmers practice as an experiment
- Pen culture : Non possible in ocean
- Cage culture : Has started as an experiment
- Integrative Fish farming: Hit and trial traditional method, not on proper scientific lines

FRESHWATER FISH FAUNA

INDIGENOUS

- Known number of Freshwater fish species: 197 including all edible and non-edible species. While marine species are 786 in the water territory of Pakistan
- Out of 197 species of freshwater, only 17-20 are palatable
- Although culturable species are many, but in Pakistan mostly and widely culture species are 8-10 under polyculture or composite culture system.

Culturable Fish Species of Pakistan

Indigenous Fish Species

Rohu (*Labeo rohita*)

Thaila (*Catla catla*)

Mori (Cirrhinus mrigala)

Exotic Fish Species

Common carp, *Cyprinus carpio*

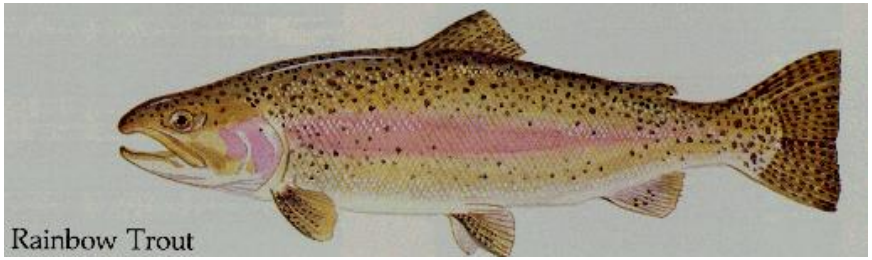
Silver carp, *Hypophthalmichthys molitrix*

Grass carp, *Ctenopharyngodon idella*

Bighead Carp, *Aristichthys nobilis*

Other Exotic Fishes Introduced for Culture in Pakistan

- **Rainbow trout, *Onchorhyncus mykiss***



- **Brown Trout, *Salmo trutta fario***

American Channel Catfish (*Ictalurus punctatus*)

ECONOMICALLY IMPORTANT FISH FAUNA OF PUNJAB

Comprising about eight million hectares, Pakistan's inland water bodies including network of rivers, canals, dams, lakes and water logged areas are home to a range of freshwater fish resources. The freshwater fish diversity of Pakistan constitute 183 species, however, some experts have reported 202 fish species. The fish fauna of Punjab constitute 121 species with only a few of them are commercially important. These fish resources are not only supporting country's need but also a good source of protein for fishermen and other riverine communities of Pakistan.

An important native fish commonly known as Mori or Mrigal, inhabits lakes, rivers and ponds, bottom feeder and feeds on phytoplankton, zooplankton and other small insects, breeds from June to August, in aquaculture fish can gain a weight of 1.5 to 2.0 kg per year, in wild maximum length recorded 99.0 cm with 12.7 kg body weight.

An exotic fish, commonly known as Grass Carp, native of East Asia, introduced in Pakistan from China; early fry feeds on microscopic aquatic animals and plants; breeds in running water from April to July; maximum length recorded up to 150.0 cm with 32 kg body weight. It has dual role, consumed as food and also controls the aquatic vegetation.

An important native fish commonly called as Thalla, inhabits rivers, lakes and ponds of Punjab, Sindh, Baluchistan, introduced in Khyber Pakhtunkhwa and Azad Kashmir; surface feeder and feeds on small aquatic animals and plants; breeds from June to August, maximum length recorded in wild and culture system is 182 cm and 120 cm respectively.

Locally known as Kalbans, a native fish, inhabits ponds and rivers in Punjab, Khyber Pakhtunkhwa and Sindh; feeds on mollusks and decayed matter; fry on unicellular algae and zooplankton; breeding season from June to August, grow up to 100 cm in the wild; growth rate is poor in aquaculture fisheries; consumed as food fish from the wild.

A native fish locally known as "Sereeha" found in Punjab and Sindh; inhabits rivers, canals and lakes; an omnivorous fish that feeds on planktons, insects and crustaceans; breeds from April to late July; breed through induced breeding; not introduced in polyculture due to poor growth rate; maximum length recorded up to 150.0 cm in wild.

Most important, native, commercial and major carp commonly known as Rohu and Dambra; liked by the consumers; found in Punjab, Sindh and Azad Kashmir; inhabits rivers and culture ponds; breeding season extends from April to late July; popular fish due to excellent flesh with high price and market demand; maximum length recorded up to 100.0 cm.

An exotic fish, commonly named as common carp, native of temperate regions of Asia; introduced in Pakistan from Thailand and UK; very hardy fish, can breed in open as well as closed water bodies from January to April; omnivorous, feeds on phytoplankton, zooplankton and other small insects; grows up to 1.25 kg per year depending upon feeding and temperature.

Commonly known as Silver Carp, native of China; introduced in Pakistan from Nepal for rapid growth rate, angling and aquaculture; herbivorous in feeding; breed from April to July through induced spawning; fast grower and can attain the weight of 2.0 to 2.5 kg per year; cultured with other major carps in aquaculture fisheries.

A native catfish commonly called as Singhari, inhabits large rivers, canals, lakes and inundated fields; being carnivorous, feeds on aquatic animals including crustaceans, molluscs, frogs and small fishes; breeds during May to July; maximum length recorded up to 122.0 cm but commonly grows up to 40.0 cm; liked by the consumers for its flesh taste and sport.

A native catfish known as Khagga, inhabits rivers and tidal freshwaters in Punjab, Sindh, Khyber Pakhtunkhwa and Baluchistan; carnivorous, feeds on different aquatic animals including small fishes; breeds during rainy season; maximum length recorded up to 150.0 cm but normally remains small in size; flesh is very tasty but with fat contents; being carnivorous not cultured in aquaculture fisheries.

A native catfish community known as Gonch and Tauji Khagga; inhabits rivers, rocky pools and estuaries; a carnivorous and voracious fish, feeds on a variety of small fishes, frogs, shrimps and other alive food; one of the largest Asian catfish with pointed teeth on jaws also called as Freshwater Shark; maximum length recorded up to 200.0 cm with 120 kg weight.

A native catfish, commonly called Mullee; inhabits large rivers and estuaries; feeds on aquatic animals, and dead organisms; breeds during July and August; maximum length recorded up to 200.0 cm with 55 kg body weight; noticultured in polyculture with other major carps due to its carnivorous habit; very good sport fish.

A native catfish called Malli; inhabits large rivers and estuaries of Punjab, Khyber Pakhtunkhwa and Sindh; feeds on aquatic insects and small fishes; not introduced in aquaculture fisheries due to its carnivorous nature; breeds during rainy season; maximum length recorded up to 30.0 cm; its flesh is very tasty and liked by the consumers.

A native snake-head fish, commonly known as Soal; inhabits large lakes and rivers of Pakistan; carnivorous, usually feeds on small fish, frogs, snails and other aquatic animals; breeds from April to June; maximum length recorded up to 120.0 cm with 30 kg body weight; a very popular and tasty fish with higher market value.

An exotic fish commonly called as Tilapia, native to Africa; introduced in Pakistan for culture in brackish and saline water bodies; matures at an age of 2 to 3 months; breeds in running and standing water bodies 3 to 4 times in a year; farming of Tilapia is in practice in Punjab as the males grow faster than females; maximum length recorded up to 39.0 cm with 1.0 kg body weight.

It is an exotic fish and commonly known as Bighead carp or Chinese major carp; introduced in Pakistan for increased fish production, angling and aquaculture; inhabits freshwater rivers and culture ponds; feeds on phytoplankton primarily; naturally breeds in open water during rainy season; fast grower and animportant part of aquaculture fisheries.

A native catfish, common name Bachwa; inhabits large freshwaters and tidal rivers of Punjab, Sindh and Azad Kashmir; feeds on aquatic animals including small fishes; breeds during rainy season; maximum length recorded up to 60.0 cm; liked very much by the consumers due to its taste and less spines; being carnivorous not introduced in aquaculture fisheries.

UK Aid leads Britain's fight against global poverty delivering the aid around the world. This project is being implemented by WW - Pakistan with the generous support of UK Aid under their Global Poverty Action Fund.

Tilapia species in Pakistan

Aquaculture in Pakistan

Tilapia Aquaculture in Pakistan

- Tilapia was introduced in Pakistan from Singapore in December, 1950 for transplantation in saline water (Ahmad, 1962).
- From Malaysia on 10th January 1951 but could not survive for more than a month.

Once again imported from Bangkok, Thailand in 1954 by the Department of Marine Fisheries Karachi stocked in different water areas

- Its culture was started in Pakistan during sixties (Bhatti,M.N.1966) Pakistan)

- Government introduced Tilapia in Khubeki Lake in 1964 to assess the feasibility of its culture in saline water area under a pilot project. It grew to maximum length of 29 cm next year (Naik,1973).

- In 1985 Department of Fisheries, Punjab imported *Oreochroms aurius* and *Oreochroms niloticus* from Egypt and launched a Research project " Investigation into the feasibility of fish culture in saline/brackish water in Punjab". It was successfully bred and transplanted in different lakes of saline areas.

- In 1990 Kharal lake (250 ha) and Budh Mahiwali (140 ha) yielded 7780 kg and 4670 kg of tilapia respectively.

- Later on, considering successful production of tilapia in different waters, Punjab Fisheries Department launched a Research Project entitled “Creation of culture facilities for tilapia to promote aquaculture in saline /brackish waters” for the period 1987-90.

- It is a matter of great concern that even after passing about 56 years of introduction of tilapia in Punjab this fish could not attain any position in aquaculture in the country.
- In Pakistan farmers take tilapia as a pest rather than a cultureable species.
- Fisheries Department started genetic research on tilapia in Late Nintees to control prolific breeding in the fish (Bhatti, M.N.1990). Hydraulic shock triploidy was induced in *Oreochromis niloticus* .

- During my M.Sc. And M.Phil. studies, I along with my supervisor Prof. Dr. Iftikhar Ahmed conducted many research trials on the monosex culture, predatory prey control (Tilapia with saul, *Channa marulius*), Sex reversal of tilapia and hyberdization to control its population (2001-2005).

From the last 5 years
Development of Tilapia Aquaculture in Pakistan

- In 2011, Fisheries Development Board (FDB) a non profit organization and FEEDing Pakistan project of World Initiative for Soy in Human Health (WISHH) funded by USDA, helped to import 200,000 (GIFT - *Oreochromis niloticus*) fry from Thailand.
-
- By 2014 farmers were stocking 3,000,000 fry from a mix of imports and local hatchery production. Both of the projects provided tilapia seed and feed to hundreds of farmers free of cost for trial production.

- The tilapia reared in this demonstration project ranged from 600 to 900 grams per fish. This was much larger than the few feral *O. mossambicus* that had been released in various water courses in Pakistan 56 years earlier.

- The farmed GIFT tilapia received a premium in the domestic market place. The market value of tilapia produced went from zero at the beginning of the project to an estimated $4.5 million in 2014

- Consumer demand for tilapia has also spilled over to an increased demand for better quality carp and trout as an added benefit of the project.

- Some farmers have added their own retail outlets for fresh tilapia in an effort to capture more of the value chain.

- The project also included training programs at the Asian Institute of Technology, Thailand, covering intensive hatchery techniques for tilapia, at the University of Arizona on intensive tilapia farming and best management practices, and at Kansas State University on feed manufacture.

- Two private sector company, Oryza Organics Pvt. Ltd. and Ayefa (Pvt), imported extruder,s dedicated to the production of floating fish feed supplying tilapia, carp and trout farmers.

- One of the faremer, Tawakkal Fish Farms, has made multiple investments creating the first private-sector tilapia hatchery in Pakistan.

- In 2015 Tawakkal sell approximately 3 million young tilapia to other farmers and in the future to expand to 10 million tilapia fry per annum.

Ayefa Feed Mill Extruder (pvt) Pakistan

Trout Culture

Historical Perspective

- Brown trout was Introduced in Kashmir valley 1910, Kaghan in 1928, in Chitral in 1945, and subsequently extended to other suitable places of Pakistan.
- Slow growth and behavior of brown trout prompted importation of Rainbow Trout Fish from Japan in 1973
- Till 1983 trout fisheries focused on only enrichment of water bodies through stocking
- Importation of Rainbow Kamloop trout from Canada for intensive commercial fish farming in 1983-84

- First private fish farm established in Madyan in 1986-87
- 60 trout farms established in private sector so far with approximately 120,000 kilograms collective production capacity per annum
- More than half of the farms have either closed or running at bare minimum, highlighting the problems due to which in 29 years only 60 farms could be established


TROUT CULTURE
TRAINING CENTRE

Shell Fish

Giant Freshwater Prawn
Macrobrachium rosenbergii

Fish disease and diagnosis

Protecting animals preserving our future

- Like in other countries of the world fish culture prone to to a wide range of pathogens e.g. bacterial, fungal, viral and parasitic
- They pose a major threat to a thriving aquaculture resulting in considerable economic losses
  Environment poses different levels of stress making fish susceptible to infection through immune suppression

COMMON FRESHWATER FISH DISEASES

- White spot disease(Ichthyophthirius also called Ich disease)
- Whirling disease
- Fungus(saprolegnia)
- Digenetic flukes(Metacercaria)
- Tapeworm larvae(Cestoda)
- Red spot(Bacterial)(ulcerations on skin or tail and fin rot)
- Fin rot
- Columnaris disease(Flavobacterium columnare), frayed and ragged fins, ulcerations on skin, cloudy or white fungus like patches on the skin

- Pop-eye(exophthalmia) may be excess gas or dropsy
- Argulus, Ergasilus
- Lernaeosis
- Gyrrodactylus(Monogenetic flukes)
- Dropsy(Aeromonas)
- Furunculosis (Aeromonas salmonicida) external and internal hemorrhaging, swelling of vents and kidneys, boils, ulcers, gastroenteritis
- Gill rot
- Lymphocystsis(cells swell up to tumors; viral)

Issues and Challenges of Pakistan Fisheries sub-sector

- Since 1998, overall fish production has decreased by nearly 2% per year. Although this downward trend may be attributed mainly to the marine capture sector, inland freshwater resources of NWFP, Northern Areas and Baluchistan are exploited below potential, with low productivity and high poverty levels encountered amongst inland fishing communities.
- Pakistan ranks 28th among fishing nations in terms of production, and 50th in terms of export earnings.

- Lack of land, seed, feed and technology for aquaculture production are necessary steps, along with addressing post-harvest losses and improving hygienic conditions are one of the main constraints to export earnings.
- In addition to the supply of sub-optimal quality fish products on domestic markets, consumer's awareness of the benefits linked to increased fish consumption needs raising.
- Institutional weaknesses, skilled manpower in and outside the Fisheries sub-sector, and inadequate capacity of its stakeholders, poor marketing system, credit facilities, foreign collaboration etc., need to be rectified.

Technological advancement in the sector and its effects on production and consumption:

- Tilapia hatchery in private sector is operative (Tawakkal Fish Farms) since 2014 for mono-sex (sex reversed fry).
- Fisheries Development Board imported tilapia seed from Thailand since 2011 imported seed for fish farmers and got about 4 tons/acre production as compared to carps 1000-1200 kg/acre.
- Oryza Organics and Ayefa Aquafeed Manufacturing Units has started producing commercial aquafeed in Pakistan since 2013-14 for tilapia carps, trout, *Pangasius,* shrimp in Pakistan.

Issues and Opportunities:

Management of natural water resources, diversification of culture system and disease monitoring to enhance fish production.

- Low per acre fish production.
- Over and un-controlled and unregulated exploitation of natural resources such as reservoirs, dams, lakes; introduction of cage culture can recoup this issue.
- Conversion from extensive and semi-intensive to intensive culture systems.
- Poor excess of common man to huge marine water resources; Leasing of coastal land at soft terms and conditions.
- Provision of easy and interest free loans for development of infrastructure for coastal/mariculture.
- Disease monitoring and surveillance in the country.

Conservation, diversification and genetic improvement of local fish fauna

- Diversification of carp culture with tilapia and high value species like catfishes, murrels and freshwater prawns for higher profitability per unit area.
- To improve the performance of local fish fauna through gene manipulation, transgensis and population genetics.
- Sex reversal of tilapia and introduction of mono-sex culture of this fish in saline areas.

Enhancement of fish consumption

- Non-availability of fish throughout year in our local markets and super stores due to various myths about fish consumption.
- Awareness of fish consumption through media and syllabi and its health benefits.

Production of quality fish seed

- Non-availability of quality healthy seed with good genetic characteristics limited availability of fish varieties to select the best one
- Establishment of various hatcheries with range of fish species

Development of cost effective quality aqua-feeds

- Development and provision of cost effective aqua-feeds which presently are non-existent with the assistance of public private partnership to fish farmers at subsidized rates.

Credit facility to fish farmers

- To maintain the farming unit for better production through conservation of water, intensification, hygiene and phytosanitation.

Value addition, processing and improvement in marketing setup of fishery products

- Poor marketing facilities
- reduce profit margins discouraging producers to produce less
- Establishment of freshwater fish processing plants, cold storage and modern fish markets.

Improvement of landing sites, fishing vessels and harvesting gears

- Poor condition of existing fishing gears and inadequate financial capability to purchase new gears equipped with proper handling and storage facilities
- To enhance the product quality through improvement in handling, storage and vessel conditions

Capacity building, extension services and production of qualified and skilled manpower (degrees/diploma)

- Non-availability of skilled manpower in this sector and its non-absorption with adequate awards
- Skilled manpower is backbone of this sector like others if this issue is addressed carefully at both public and private levels
- There is lot of opportunities to produce this manpower which has been practiced by UVAS in fisheries & aquaculture who started BS (Hons.), M. Phil/Ph.D. and various short courses/diplomas in fisheries and aquaculture since 2007 to technically augment and strengthen this sector.

To Strengthen and establishment of fish farmers and fishermen cooperatives, associations and unions

- Lack of fish farmers' cooperatives and associations in the country.

A Way Forward

- Introduction of Intensive Aquaculture e.g. GIFT(Tilapia), *Channa marulius*, *Clarius spp. Pangasius*
- Improvement of Fish Feed Technology
- Genetic Improvement of Aquaculture Species (Establishment of Genetics Resource Centre)
- Tilapia mono-sex culture and catfish farming
- Introduction of freshwater prawn culture
- Linkage with industry for R & D
- Promotion of food safety and quality control
- Value addition and export promotion

MARINE AQUACULTURE PROJECTS AND ON GOING DEVELOPMENT SCHEMES


Green mussel rafts
Google earth

MARINE FISHERIES RESOURCES

- Small Pelagics
- Large Pelagics
- Demersal
- Shellfish

SMALL PELAGICS

- Sardinellas
- Indian mackerel
- Scads
- Miscellaneous clupeoids
- Thryssas and anchovies

LARGE PELAGICS

- Kingfish
- Spanish mackerel
- Tuna
- Dolphinfish

DEMERSALS

- Sharks, Rays
- Sea catfishes
- Barracudas
- Eels
- Croakers
- Grunts
- Snapper
- Threadfins
- Pomfrets

SHELLFISH

- Shrimps
- Lobsters
- Cuttlefishes
- Jellyfish
- Squids
- Clams
- Ivory shell
- Crabs

MESOPELAGICS

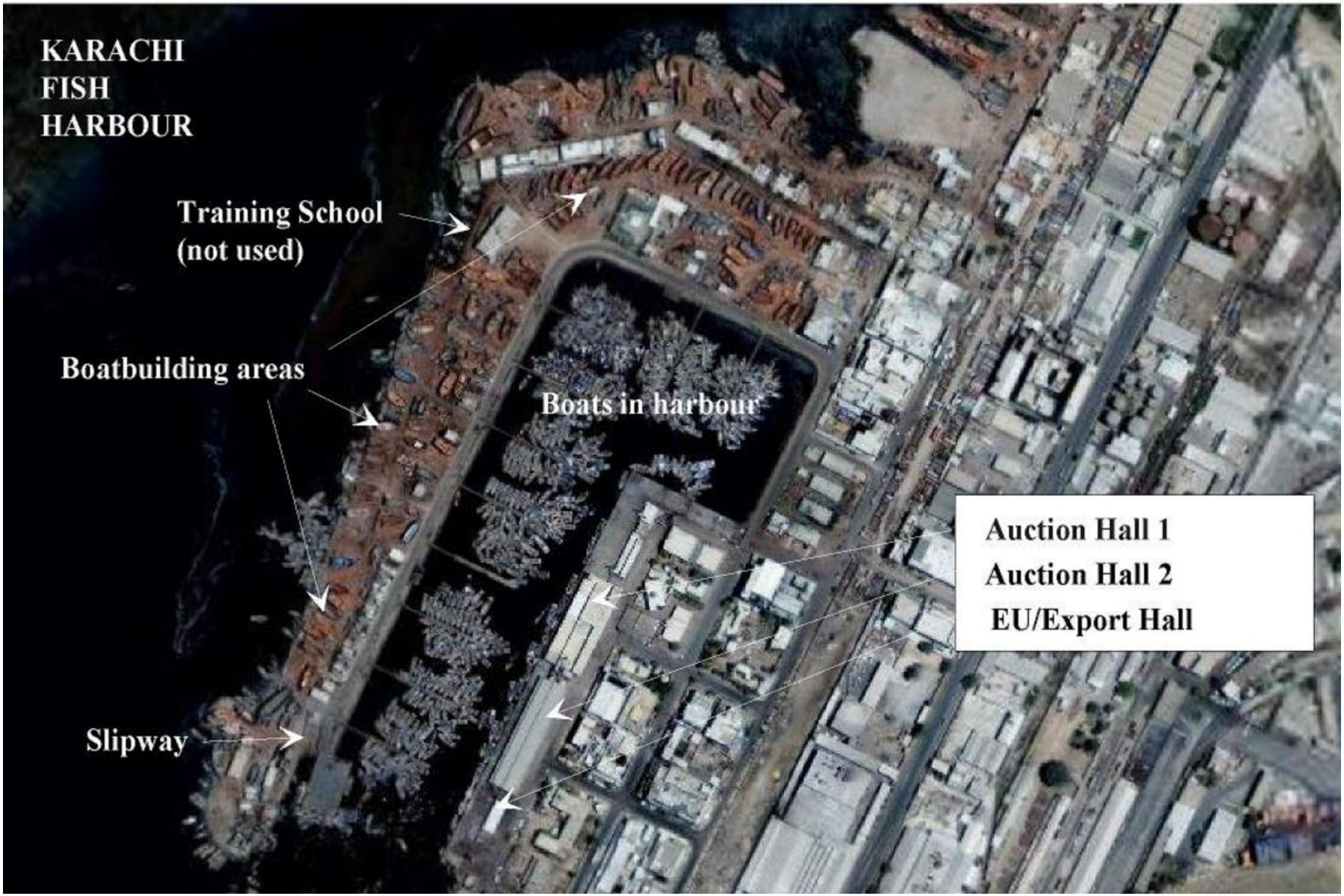
Lantern fish

Resource Potential

	Biomass	MSY (Maximum Sustainable Yield)	Landings (2007)	Incremental Potential
Small Pelagic	700,000	235,000	96,658	130,000
Large Pelagic	88,000	60,000	47,141	13,000
Demersals	500,000	235,000	168,225	168,000
Shellfish	171,000	47,500	28,166	19,000
Meso-pelagics	10,000,000	5,000,000	-	5,000,000
Total	11,407,300	5,717,600	340,190	5,232,000

Fish Harbour Karachi Sindh Pakistan

FISH PROCESSING UNIT AT KARACHI SINDH PAKISTAN


KARACHI
FISH
HARBOUR
Training School
(not used)
Boatbuilding areas
Boats in harbour
Auction Hall 1
Auction Hall 2
EU/Export Hall
Slipway

UNCONTROLLED FLEET SIZE

ROLE OF
DEPARTMENT OF FISHERIES & AQUACULTURE
IN THE DEVELOPMENT OF SECTOR

DEPARTMENT OF FISHERIES & AQUACULTURE, UVAS, RAVI CAMPUS

Department of Fisheries and Aquaculture, UVAS was established in 2002 with the up gradation of CVS to UVAS. Before that there was no specific Departments in any Public Sector Universities of Pakistan.


DEPARTMENT OF
FISHERIES & AQUACULTURE

- The vision of establishing this faculty was to produce fisheries and wildlife scientists, educationists and researchers to contribute food security and natural resource management.
- The faculty comprises two departments:
  - Department of Fisheries & Aquaculture
  - Department of Wildlife and Ecology

DEPARTMENT OF FISHERIES AND AQUACULTURE

OBJECTIVES

- Teaching and research in fisheries, aquaculture
- Provide knowledge on sustainable development of aquaculture, fish biodiversity and conservation.
- Scholarly research, extension education and public outreach programs.

FACULTY MEMBERS

Department of Fisheries & Aquaculture

1.	Prof. Dr. Muhammad Ashraf, Ph.D. (HEC approved Supervisor)	(Professor/Dean)
2.	Dr. Noor Khan, Ph.D. (HEC approved Supervisor)	(Associate Professor/Chairman)
3.	Dr. Muhammad Hafeez-ur-Rehman, Ph.D. (HEC approved Supervisor)	(Assistant Professor)
4.	Dr. Fayyaz Rasool, Ph.D. (Applied for HEC approved Supervisor)	(Assistant Professor)
5.	Dr. Sumaira Abbas, Ph.D. (HEC approved Supervisor)	(Assistant Professor)
6.	Dr. Hamda Azmat, Ph.D. (HEC approved Supervisor)	(Assistant Professor)
7.	Mrs. Shakeela Parveen, M.Phil	(Lecturer)
8.	Mr. Muhammad Akmal, BS(Hons)	(Lecturer)

ACADEMICS

- **Postgraduate Programs**
  - Ph. D Fisheries and Aquaculture
  - Ph. D Zoology
  - M. Phil Fisheries and Aquaculture
  - M. Phil Zoology
- **Undergraduate Programs**
  - M.Sc. Zoology (2-Year Program)
  - BS Zoology (4-Year Program)

- **Other Offering Courses**
  - One course in DVM Program (AQFS 601 Fisheries and Aquaculture)
  - One course in LA Class (LAD-Fisheries 208)
  - NAVTEC Diploma course in Fisheries and Aquarium Management
  - Short courses for fish farmers

UNDER GRADUATE AND POSTGRADUATE STUDENTS

Ph.D. (Fisheries and Aquaculture)

Passed students: 6

Enrolled: 3

M.Phil (Fisheries and Aquaculture)

Passed students: 13

M.Phil (Zoology)

Enrolled students: 8

Msc Zoolohy

Enrolled students: 120

BS Zoology

Enrolled students: 140

RESEARCH PROJECTS:

Completed Development Projects

Establishment of Research and Training Facilities for Fisheries & Aquaculture at new campus, Pattoki (HEC Funded worth Rs.39.331million

On-going Research Projects

1. Development of standard aqua feed for culturable major carps of Pakistan funded by HEC worth Rs. 6.157 million.
2. Prospectus of culturing and breeding of Catfish (*Pangasius pangasius*) in Pakistan funded by HEC worth Rs. 3.954 million.
3. Impact of water pollution on fish and fisheries of Punjab Pakistan funded by HEC-BC INSPIRE worth Rs. 2.97 million
4. Onsite training/education of fish farmers and local community about deleterious effects on fish in four districts of Punjab funded by British Council worth Rs. 1.4 million
5. Nitrogen and Phosphorous dynamics in fish ponds fed with various fertilizers funded by HEC worth Rs. 0.5 million
6. Development of cost effective feed for *Labeo rohita* to enhance productivity funded by PARB worth Rs. 7.0 million .

DEPARTMENT INFRASTRUCTURE

Existing Facilities

Class Rooms:	4
Class rooms cum Research Labs:	2
Fish Hatchery:	1
Diagnostics Lab.	1
Fish Ponds:	33
(Nursery, Rearing and Grow out)	

Approved Facilities with funding

Zoological Museum
Water Recirculation System
Fish Meat Processing Lab
Intensive Aquaculture Lab

PROGRAM

Monday, November 27, 2006

INAUGURAL SESSION (09:35 to 10:35)

08:30 Registration
09:35 Arrival of Chief Guest
09:38 National Anthem
09:40 Recitation from the Holy Quran
09:45 Welcome Address By Prof. Dr. Manzoor Ahmad (Vice Chancellor, UVAS, Lahore)
09:55 Keynote Address By Prof. Dr. Muhammad Nazir Bhatti (Chief Technical Resource Person)
10:10 Address By Mr. Iftikhar Elahi (Director, British Council)
10:15 Address By Dr. Saeed Ahmad (President, Agriculture Foundation of Pakistan)
10:20 Address By Lt. Gen. (R) Khalid Maqbool, HI (M).HI (Chief Guest)
10:30 Vote of Thanks By Prof. Dr. Muhammad Ashraf (Dean, Faculty of Fisheries & Wildlife)
10:35 Tea Break

TECHNICAL SESSION I (11:00 to 13:00)

Chairman: Prof. Dr. A. R. Shakoori
Co-Chairman: Prof. Dr. K.P. Lone
Alternate: Prof. Dr. Iftikhar Ahmed

11:00 Problems of freshwater fish farmers of Sindh
11:20 Development of fisheries in northern areas
11:40 Problems of freshwater fish farming in AJK
12:00 Farming in estuarine areas along Sindh coast: Problems and prospects
12:20 Production problems in aquaculture system in Sindh
13:00 Lunch Break

TECHNICAL SESSION II (13:40 to 15:40)

Chairman: Dr. Nasim Akhtar
Co-Chairman: Dr. Muhammad Hayat
Alternate: Mr. Yousaf Qureshi

13:40 Constraints in Tilapia culture, and use of advanced technology for increasing productions in freshwater ponds
14:00 Tilapia as a menace in carp fish ponds
14:20 Culture of exotic catfishes in freshwater fish ponds in Pakistan
14:40 Cold water fish farming: problems and solutions
15:20 Problems in trout culture in northern parts of Pakistan

TECHNICAL SESSION III (15:20 to 17:20)

Chairman: Prof. Dr. Afzal Kazmi
Co-Chairman: Dr. Muhammad Ayub
Alternate: Prof. Dr. Q.B. Kazmi

15:20 Prospects of palaemonids farming in Pakistan
15:40 Prawn culture in Islamabad
16:00 Non penaeid shrimps- Prospective competitors for the penaeid shrimps
16:20 Waste treatment through wetlands in aquaculture
16:40 A general study of the reproductive tactics of fish
17:00 Effects of cadmium exposure on some characters of *Labeo rohita*
17:20 Tea

Tuesday, November 28, 2006

TECHNICAL SESSION IV (08:30 to 10:30)

Chairman: Prof. Dr. Muhammad Ramzan Mirza
Co-Chairman: Prof. Dr. Muhammad Sharif Mughal
Alternate: Prof. Dr. Shahid Mahboob Rana

08:30 Role of fish as food in human nutrition
08:50 Canal System: A potential source for fish culture in Pakistan.
09:10 Problems in production and rearing of fish fry at fish hatcheries, and suggestions for their solutions
09:50 Major issues relating to post harvest activities, fish preservation, transportation & marketing of fish products.
09:30 Wetland resources of Pakistan: Conservation approach of the Pakistan Wetlands Programme
10:10 Export problems of freshwater fish products, byproducts and suggestions for improvement

TECHNICAL SESSION V (10:30 to 13:00)

Chairman: Prof. Dr. Abdus Salam
Co-Chairman: Mr. Qamar Baloch
Alternate: Mr. Muhammad Moazzam Khan

10:30 Assessment of growth potential in freshwater culturable fishes of Pakistan and suggestions for rejuvenation
10:50 An analysis of freshwater fish landings at Karachi harbour with special reference to aquaculture products
11:10 Issues of low production in open and man-made reservoirs of Pakistan
11:30 Institutional framework and issues in aquaculture resource management in Pakistan
11:50 Fisheries potential and practices in small dams.
12:10 Fish trade liberalization, and challenges for developing countries like Pakistan.
12:30 Culture performance of monosex and mixed-sex Tilapia in fertilized ponds
13:00 Lunch Break

TECHNICAL SESSION VI (13:50 to 15:50)

Chairman: Prof. Dr. William George
Co-Chairman: Prof. Dr. Muhammad Naeem Khan
Alternate: Prof. Dr. Shahid Mahboob Rana

13.50 Export of Aquaculture products from Pakistan: Prerequisites and legislative changes
14:10 Pakistan fishery and aquaculture policy development
14:30 The Development of new national fisheries and aquaculture policy in Pakistan
14:50 Roles of higher education institutions in addressing problems of fish farming
15:10 Role of micro credits in poverty alleviation through pond fish farming
15:30 Discussion and recommendations

CONCLUDING SESSION (16:30 to 17:00)

16:30 Address by the Chief Guest
Concluding remarks by the Vice Chancellor
Vote of thanks by the Dean, Faculty of Fisheries & Wildlife
17:00 Tea

BRITISH COUNCIL

International Conference on

"Solving Problems of Freshwater Fish Farming in Pakistan"

November 27-28, 2006

Faculty of Fisheries & Wildlife
University of Veterinary & Animal Sciences, Lahore-Pakistan

Conference Secretariat:

Department of Fisheries & Aquaculture
University of Veterinary and Animal Sciences, Lahore-Pakistan

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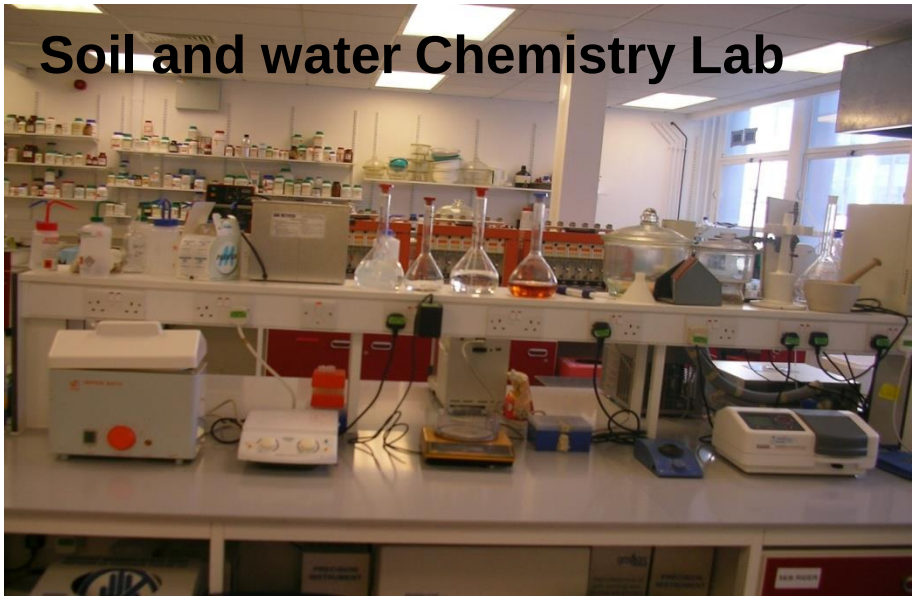
DEPARTMENT OF
FISHERIES & AQUACULTURE

Soil and water Chemistry Lab



Fish Aquariums

Fish Hatchery building
Fish Broodstock in holding tanks)

Hatchling in Circular tanks

Fish Hatchery

Research trial on *Pangasius pangasius spp.*

UVAS-Indusrty Liaison
A working group on Fisheries and Aquaculture

Research Activities on the Induce Spawning of Murrels (*Channa marulius*)

Trainings of the Fish Farmers


Fish Hatchery

Training under Women Skills Development program funded by Fisheries Development Board and GIZ, Germany


giz
FDP
FISHERIES DEVELOPMENT BOARD
WELCOME YOU ON
CERTIFICATION DISTRIBUTION CEREMONY OF
TRAINING PROGRAM
"TECHNOLOGY TRANSFER THROUGH TRAINING AND
TECHNICAL BACKSTOPPING IN THE FIELD OF FISHERIES SECTOR"
FUNDED BY TVET REFORM SUPPORT PROGRAM

Competition of Development of value added fish products under a "Fish Processing and Value addition" course

Promotion of Aquaculture and technology transfer through trainings

Promotion of Aquaculture and technology transfer through trainings

Cage culture installation

Chashma Biodiversity Hatchery

A Forum of Academia on the Conservation of Chashma Biodiversity (Fish Hatchery activities/research)

Thank You for Attention