FISHERIES MANUAL

DEPARTMENT OF FISHERIES
PUNJAB

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PUNJAB FISHERIES MANUAL

FOREWORD

The framing of laws, rules, regulations and notifications are essential to the organization for any activity, Department or State. The Department of Fisheries Punjab has been performing its functions under the provisions laid down in the Punjab Rules of Business, 1974, The Punjab Fisheries Ordinance, 1961 and The Punjab Fisheries Rules, 1965. With the passage of time, new challenges emerged in the conservation, extension, management and biodiversity of aquatic resources in the province.

Dr. Muhammad Ayub, Director General Fisheries, an eminent fisheries scientist is endeavouring his best alongwith his team of Fisheries Scientists and experts to develop the fisheries sector in the province and making it at par with the developed countries. The department has made concerted efforts to bring Quality Control legislation, which was previously lacking but was the need of the hour. The present effort to thoroughly update and revise the manual after 47 years (The last manual was printed in 1962) is indeed a matter of great appreciation.

This manual has been compiled by the Department of Fisheries Punjab for the future guidance of the masses. It is therefore, recommended as a must to read for the interested persons in fish, fisheries, aquaculture and biodiversity etc. for a future prosperous Pakistan.

MAJ. (R) AZAM SULEMAN KHAN
SECRETARY
GOVERNMENT OF THE PUNJAB
FORESTRY, WILDLIFE & FISHERIES DEPTT

PREFACE

Aquaculture today is considered as an important source of production to meet the world's increasing demand for protein. Aquaculture development projects are being initiated in many parts of the world especially in the developing countries. In many cases, the main constraint to their success is a lack of knowledge about the basic principles and the technical skills involved.

Aquaculture in Punjab, developed over the last two decades has given very encouraging results with a sustainable increase in production as well as in farm area. This success has created much interest and has led to many requests from other provinces and private sector to share the knowledge gained in the Punjab. However methods practiced have not been well documented and unfortunately most of the information is scattered.

It was, therefore, decided to develop a Manual on Fish & Fisheries that may bring together the scattered knowledge and help to educate the field workers, experts fish farmers and general masses. This can prove to be a milestone in the development of Fisheries in the Punjab. In this respect, it is worth mentioning that the first compilation of manual was made in 1962 with the auspicious and commendable effort of Late Dr. Nazir Ahmad, Director Fisheries, West Pakistan.

An exhaustive exercise has been made in this regard and the new manual has been prepared as ready reference for field officers for use in courts, as a manual for fish farming, hatchery management. Similarly, it contains useful information for the anglers, farmers, contractors and researchers.

It will not be just if I do not recall the memorable services rendered by my predecessors, Dr. Hamid Khan Bhatti, Khalifa Amjad Hussain, Dr. Nazir Ahmad, Zahid Hussain, Dr. Muhammad Yaqub Javaid, Dr. Muhammad Sharif Bhutta and Dr. Muhammad Nazir Bhatti who worked in the field to boost up the Fish and Fisheries in public as well as private sector.

I would also like to place on record the efforts made by Mr.Akhtar Ali Shah, Mr. Rana Zahid Iqbal, Mr. Safdar Abbas, Mr. Amjad Rasheed and other officers at headquarter for preparation of this valuable document.

DR. MUHAMMAD AYUB
DIRECTOR GENERAL
FISHERIES, PUNJAB

Chapter I

LEGISLATION

I. LEGISLATION
I.1. THE PUNJAB GOVERNMENT RULES OF BUSINESS, 1974

FORESTRY, WILDLIFE, FISHERIES AND TOURISM DEPARTMENT

8. Regional research in various disciplines of forestry, wildlife, sericulture and fisheries.

11. Conservation and promotion of fisheries in private and public sectors.

I.2. FISHERIES ORDINANCE 1961 (AMENDED UPTO 2001)

[1]THE [2][PUNJAB] FISHERIES ORDINANCE, 1961
(W.P. Ordinance XXX of 1961)

[13th December, 1961]
(Amended upto December 2007)

An Ordinance to amend and consolidate the law relating to fisheries in the Province of [2][the Punjab];

WHEREAS it is expedient to amend and consolidate the law relating to fisheries in the Province of [2][The Punjab]

Preamble.

NOW, THEREFORE, in pursuance of the Presidential Proclamation of the seventh day of October, 1958, and having received the previous instructions of the President, the Governor of West Pakistan is pleased, in exercise of all powers enabling him in that behalf, to make and promulgate the following Ordinance:-

SHORT TITLE AND EXTENT

1.(1) This Ordinance may be called the [2][The Punjab] Fisheries Ordinance, 1961.

(2) It extends to the whole of the Province of [2][The Punjab] except the [3][Tribal Areas].

DEFINITIONS

2. In this Ordinance, unless the context otherwise requires, the following expressions shall have the meanings hereby respectively assigned to them, that is to say:-

a) "Director of Fisheries" means the Director [4][General] of Fisheries, [2][Punjab], and includes any person appointed by Government to discharge the functions of the Director of Fisheries under this Ordinance;

b) "fish" includes shell-fish;

c) "fixed engine" means any net, cage trap, or other contrivance for taking fish fixed in the soil or made stationary in any other way;

d) "Government" means the [5][Provincial Government of the Punjab];

e) "licence"," permit", "special licence" and "special permit" means respectively, a licence, permit, special licence

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[1]This Ord. was promulgated by the Governor of W.P. on 17th Oct., 1961; published in the W.P. Gazette (Extraordinary), dated 13th Dec., 1961 pages 2945-2952 saved and given permanent effect by Article 225 of the Constitution of the Islamic Republic of Pakistan (1962).

[2]Subs. by Pb A.O. I of 1974, for "West Pakistan".

[3]Subs. by W.P.A. Order, 1964, for "Special Areas".

[4] Inserted by the Punjab Gazetteer Notification No.Legis. 13-61/2001 dated 13-11-2001

[5]Subs, for "Government of West Pakistan", by Pb A.O. of 1974.

and special permit, issued under this Ordinance or any rule made, thereunder;

[6][EXPLANATION] Provincial licence shall be issued by the provincial Fisheries Department.

f) "prescribed" means prescribed by rules made under this Ordinance;

g) "private Water" means water which is the exclusive property of any person, [7][a water area which is land locked by his own survey numbers] or in which any person has for the time being an exclusive right of fishery, whether as owner, lessee or in any other capacity;

Explanation

Water shall not cease to be "private Water" within the meaning of this definition by reason only that other persons may have by custom a right of fishery therein;

h) "water" includes the sea within a distance of one marine league of the sea coast;

i) [8]["Provincial Water" means rivers, canals and barrages/pond areas which are not confined within the district boundary or which receives water from the river, canal;]

j) [8]["District Water" means a water except rivers, canals, barrages/pond areas and all those waters which have no permanent or seasonal link with rivers etc;]

[8][Explanation

District Fisheries Officer shall be responsible for the conservation and management and development of district water areas and will be empowered to lease out fishing rights of the water areas exclusively confined within the district boundary].

Appointment of Inspectors of fisheries

3(1) Government may by Notification, appoint such persons as it thinks fit to be Inspectors of Fisheries for the purposes of this Ordinance within such local limits as may be specified.

XLV (2) Inspectors of Fisheries shall be deemed to be public servants within the meaning of section 21 of the Pakistan Penal Code.

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[6] The "EXPLANATION" added by the Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

[7] Inserted vide Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

[8] Added vide Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

Powers of the Director to lease out any water other than private water

4(1) The Director [9][General] of Fisheries or such other officer as he may empower in this behalf by general or special order in writing, may, for a period not exceeding three years, lease out, on such conditions as may be prescribed, the right to catch fish in any water other than private water.[10] [and district water].

(2) Any amount due to Government, under the provisions of sub section (i) and remaining unpaid one month after it has become so due, may be recovered as arrears of land revenue.

Powers of the Lessee to issue permits

5(1) The person in whose favour a lease under section **(4)** is granted, may issue permits in such form, subject to such conditions and on payment of such fees, as may be prescribed, for the taking of fish in the water, the right **of** fish wherein has been leased to him.

(2) A permit issued under sub-section (1) shall cease to be valid upon the termination or cancellation of the lease in favour of the person issuing the Permit.

Destruction of fish by explosives.

6. No person shall use any dynamite or other explosive substance in any water with intent thereby to catch or destroy any of the fish that may be therein.

Destruction of fish by poisoning water.

7. No person shall put any poison, lime or noxious material into any water with intent thereby to catch or destroy any fish that may be therein.

Fish that shall not be taken.

8. No person shall kill, capture, or possess any species of fish specified in the second column of the First Schedule, of a size less than that specified in the third column of the said Schedule against such species.

Net, fixed engine, traps etc., shall not be employed without a permit or licence.

9(1) No person shall use or employ for the capture of any species of fish specified in the First Schedule, in any water other than private water, any net, cage, trap or other contrivance for taking fish, or fixed engine, except during the period permitted in respect of such species under the fourth column of the said Schedule and under a licence or permit issued under this Ordinance.

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[9] Inserted by Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

[10] Inserted by Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

(2) Licences under sub-section (1) shall be issued by such authorities, on payment of such fees and on such conditions as may be prescribed.

Quality[11] Control

9-A(1) The Government may prescribe standards and quality of fish and require inspection of fish.

(2) A person shall not sell or commercially transfer a fish unless it conforms to the prescribed standards and quality.

Duty to produce licence or permit on demand made by employees of Fisheries Department

10. Every person in possession of any fishing licence or permit shall produce his licence or permit as the case may be, on demand made by the Inspector of Fisheries or any other person authorised in this behalf by the Director [12][General] of Fisheries.

Powers to declare any water to be a sanctuary for fish.

11(1) Notwithstanding anything contained in this Ordinance, Government may, by notification, declare any water to be a sanctuary for fish mentioned in the First Schedule for a period which may be specified, and during such period no person shall kill, capture or possess such fish without a special permit issued under this Ordinance by the Director [11][General] of Fisheries.

(2) The water in respect of which a notification under this section is made shall be demarcated in such manner as may be prescribed.

Duty of Lambardars Village Watchmen, etc.

12. Every Lambardar, Village Watchman, Canal Patwari, Public Works Department Darogha, Zilladar, Revenue Patwari, Tapedar, Supervising Tapedar and Qanungo shall be bound in the absence of reasonable excuse to give to Inspector of Fisheries or any other person authorised in this behalf by the Director [11][General] of Fisheries, information in respect of any unauthorised netting, killing, or other offence under this Ordinance committed within the limits of his village or circle, as the case may be, as soon as the commission of such offence comes to his knowledge.

Powers of Magistrate to issue search warrants.

13. If a Magistrate has reasons to believe that an offence under this Ordinance has been, is being, or is likely to be committed, he may issue a warrant for the search of any place in which any fish, net, trap, cage or other contrivance for taking fish, or fixed engine is kept or concealed.

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[11] Inserted vide Punjab gazette Notification No.Legis.13-61/2001 dated 01-12-2007

[12] Inserted by Punjab gazette Notification No.Legis.13-61/2001 dated 13-11-2001

Power to search without warrants.

14. An Inspector of Fisheries, may without a warrant from a Magistrate, search any person, vessel, rack, vehicle, ship, boat, raft, package, receptacle or covering so as to satisfy himself as to whether or not an offence under this Ordinance has been committed.

Arrest without warrant for offences under this Ordinance

15(1) An Inspector of Fisheries may without a warrant arrest any person committing in his view any offence under section 6,7,8,9 or 11.

(a) if the name and address of such person are unknown to him; and

(b) if such person declines to give his name and address, or there is reason to doubt the accuracy of the name and address given.

(2) A person arrested under this section may be detained until his name and address have been correctly ascertained. Provided that no person so arrested shall be detained longer than may be necessary for bringing him before a Magistrate, except under the order of a Magistrate.

Power of seizure.

16. An inspector of Fisheries, or any person authorised in this behalf by the Director [13][General] of Fisheries may take possession of any fish, net, trap, cage or other contrivance for taking [14][fish], or fixed engine used or suspected to have been used in the commission of an offence under this Ordinance.

Penalties

17. Whoever.....

(a) contravenes the provisions of section 6,7, or 11 shall be punished with imprisonment of either description which may extend to [15][two years] or with fine which may extend to [16][ten thousand] rupees or with both

(b) contravenes the provisions of section 8,9,10 or 12 shall be punished with fine which may extend to [17][three thousand] rupees.

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[13] Inserted by Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

[14] Inserted vide the Punjab gazetteer Notification No.Legis.13- 61/2001 dated 13-11-2001

[15] Sub., for the words "Three months" by the Punjab Fisheries (Amendment) Act 1999 (Act IV of 1999)

[16] Subs., for the words "five hundred" by the Punjab Fisheries (Amendment) Act 1999 (Act IV of 1999)

[17] Subs., for the words "One hundred" by the Punjab Fisheries (Amendment) Act 1999 (Act IV of 1999)

Police

18. Every Police Officer shall upon request made by a person employed under this Ordinance assist him in the due discharge of his duties under this Ordinance.

Persons who may lodge complaints

19. No court shall take cognizance of any offence under this Ordinance except on the complaint in writing of an Inspector of Fisheries.

Confiscation of any net, trap, cage, etc.

20. The Court may order the confiscation of any [13][fish], net, trap, cage, or other contrivance for taking fish, or fixed engine employed in the commission of an offence under this Ordinance.

Jurisdiction in respect of offences within one league of sea coast.

21. If an offence in respect of this Ordinance is committed within a distance of one marine league of the sea coast than such offence may be tried, punished and in all respects dealt with as if it had been committed on the land abutting such coast.

Protection taken under this Ordinance.

22. No suit, prosecution or other legal proceeding shall lie against any person for anything which is in good faith done or intended to be done in pursuance of any provisions of this Ordinance or the rules made there under.

Power of Govt. to add or exclude from First Schedule

23. (i) Government may, by notification.
add to or exclude from the First Schedule any species of fish subject to such conditions as it may impose in each case;

(ii) alter the period during which any fish specified in the First Schedule may be killed or captured.

Power to compound certain offences

24(1) Government may, by notification, empower an Inspector of Fisheries.

(a) to accept from any person concerning whom evidence exists which if unrebutted would prove that he has committed any offence as described in the first column of the Second Schedule a sum of money by way of composition for the offence with regard to which such evidence exists, and on the payment of such sum to such officer such person if in custody shall be discharged and no further proceedings shall be taken against him;

(b) when any property has been seized as liable to confiscation, release the same without further payment, or on payment of the value thereof as estimated by such officer, and on the payment of such value, such property shall be released and no further proceedings shall be taken in respect thereof.

(2) The sum of money which may be accepted by way of composition under clause (a) of sub-section (1) for any offence shall in no case exceed the amount mentioned against such offence in the second column of the Second Schedule.

Delegation of Powers

25. Government may, by notification, delegate all or any of the powers conferred upon it under the provisions of this Ordinance to any Officer subordinate to it.

Power to make rules

26(1) Government may make rules[18] for the purpose of carrying into effect the provisions of this Ordinance.

(2) In particular and without prejudice to the generality of the foregoing power, such rules may prescribe

(a) the form in which, and the terms and conditions on which, a licence or a permit or a special licence or a special permit may be granted;

(b) the authority by which licences under this Ordinance may be granted;

(c) the fees to be charged for any licence or permit or special licence or special permit;

(d) the conditions subject to which the Director [19][General] of Fisheries may lease the right to catch fish under this Ordinance;

(e) in the case of any species of fish, the number and sex that may be killed under a licence;

(f) the rewards to persons who render help in detection of offences under this Ordinance;

(g) the utilization of receipts recovered under this Ordinance;

(h) prohibit or regulate all or any of the following matters and;

(i) the erection and use of fixed engines;

(ii) the construction of weirs; and

(iii) the dimension and kind of nets, cages, traps or other contrivances for taking fish to be used and the modes of using them.

(i) the standards and quality of fish.[20]

(3) Such rules may provide that a breach thereof shall be punished with a fine not exceeding fifty rupees.

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[18]For rules, see W.P.Gazette, Part I, dated Ist October, 1965,p.1205.

[19] Inserted vide Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001f

[20] Inserted vide Punjab Gazette Notification No.LEGIS-61/2001 dated 01-12-2007.

Repeal and Savings

27(1) The following enactments are hereby repealed:-

Punjab II of 1914.

(a) The Punjab Fisheries Act, 1914; and
(b) The Bahawalpur State Fisheries Act, 1951.

(2) Notwithstanding the repeal of the enactment mentioned in sub-section (1), everything done and all action taken, obligation, liability, penalty or punishment incurred, inquiry or proceeding commenced, officer appointed or person authorised, jurisdiction or powers conferred, rule made and licence or order issued under any of the said enactments, shall, if not inconsistent with the provisions of this Ordinance, continue in force and be deemed to have been respectively done, taken, incurred, commenced, appointed, authorised, conferred, made or issued under this Ordinance.

FIRST SCHEDULE

(Section-8)

SPECIES OF FISH AND PROHIBITIONS

S.No	Species of Fish	Size (inches)	Period during which taking of the fish by any net, cage, trap or fixed engine is prohibited.
1	2	3	4
1-	Trout	9	10th October to 9th March.
2-	Mahashair	12	1st June to 31st August.
3-	Rahu	12	1st June to 31st August.
4-	Mori	12	1st June to 31st August.
5-	Thaila	12	1st June to 31st August.
[21][6-	Calbans	12	1st June to 31st August.]

[21] Added vide the Punjab gazetteer Notification No.Legis.13-61/2001 dated 13-11-2001

SECOND SCHEDULE

(SECTION-24)

MAXIMUM AMOUNT ACCEPTABLE BY WAY OF COMPOSITION FOR CERTAIN OFFENCES.

S.No	Description of Offences	Maximum amount which may be accepted as composition.
1-	Fishing with a net having a smaller mesh than the prescribed mesh.	[22][Five thousand] rupees.
2-	Fishing without a licence.	[20][Five thousand] rupees.
3-	Killing fish of a size less than the prescribed size.	[20][Five thousand] rupees.
4-	Fishing with any gear or method other than permitted under the rules.	[20][Five thousand] rupees.
5-	Using at any one time more than two of either or any of the gears permitted under the rules.	[20][One thousand] rupees.
6-	Licences holder employing or engaging non-licencees to help him with his nets while fishing.	[20][One thousand] rupees.
7-	Offering or exposing for sale or barter any fish in contravention of the provisions of this Ordinance.	[20][One thousand] rupees.

[22]Subs., for the words "twenty five" by the Punjab Fisheries (Amendment) Act 1999 (Act IV of 1999).

I.3. FISHERIES RULES 1965 (Amended upto 2001)

GOVERNMENT OF THE WEST PAKISTAN
AGRICULTURE DEPARTMENT
NOTIFICATION
The 8th September, 1965
(Amended upto 2001)

No.4(107) S.O.(F&G)/64-In exercise of the powers conferred by section 26 of the Punjab Fisheries Ordinance, 1961 (Ordinance No.XXX of 1961), and in supersession of all previous rules on the subject in force in any part or area of West Pakistan, the Governor of West Pakistan is pleased to make the following rules, namely:-

THE PUNJAB FISHERIES RULES, 1965
(Amended upto 2001)
PART-I PRELIMINARY

Short title and commencement.

1. (1) These rules may be called the Punjab Fisheries Rules, 1965
(2) They shall come into force at once.

Definitions.

2. In these rules, unless the context otherwise requires, the following expressions shall have the meanings hereby respectively assigned to them, that is to say

(a) "Appendix" means an appendix to these rules;
(b) "Chief Engineer" means a Chief Engineer of the Irrigation Department;
(c) "Form" means a form appended to these rules;
(d) "Licencee" means a person to whom a licence is granted under the Ordinance and these rules;
(e) "Ordinance" means the West Pakistan Fisheries Ordinance, 1961(Ordinance No.XXX of 1961).
(f) "Public Water" means water other than the "Private Water" and includes:
  (i) all natural bodies of water, such as rivers and their tributaries, creeks, brooks, lakes, bayous, bays, channels, canals or lagoons or dug dredged or blasted canals;
  (ii) any water impounded by the construction of any lake or dam or other impounding device across the channel of a navigable stream;
  (iii) flowing water within which fish are free to move across property lines, and which are not by law or customs property of any person;
(g) "Sanctuary" means an area declared under section 11 to be a sanctuary for fish;
(h) "Schedule" means schedule to the Ordinance; and
(i) "Section" means a section of the Ordinance.

PART-II LICENCES

Licences to be issued by the Director General.

3. All licences under section 9 including seasonal, monthly and daily licences to fish in the water mentioned in Appendixes I, II, III, IV and V will be issued by the Director [23][General] of Fisheries or any other officer authorized by him in this behalf on payment of fees prescribed under these rules.

Provided that the Chief Engineer or any officer authorized by him in this behalf may issue seasonal licences, not exceeding four in number to fish in waters mentioned in Appendix III, in favour of his subordinates, free of charge.

Provided further that no licence other than daily licence shall ordinarily be issued for fishing in waters mentioned in Appendix IV.

Duration of validity of a licence.

4. (1) A seasonal licence shall be valid for one year, and irrespective of the date of issue shall remain in force from the 1st day of September to the 31st day of August in the following year.

Provided that the period from 1st June to 31st August each year shall be closed season during which no fishing except with Rod and Line and Long Line shall be permissible.

(2) A monthly licence shall be valid for a calendar month from the date of issue.

(3) A daily licence shall be valid for the date mentioned in the licence from half an hour before sunrise to half an hour after sunset.

Area to which a licence extends.

5. A licence shall entitle the holder to fish in any of the waters mentioned in Appendices I, II, III, IV and V:

Provided that a licence for one water shall not entitle the holder to fish in another water except waters mentioned in Appendix III which for the purposes of this rule shall be deemed to be one water.

Provided further that a licence to fish in the waters of a river in a District mentioned in Appendix I shall entitle the holder to fish on both banks of the river upto the limits of that District unless the fishing rights in the District of the opposite bank; have been leased out.

[23]Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(II) dated 12-11-2001

ILLUSTRATION

A licencee of Sialkot District shall be entitled to fish on both banks of the Chenab River upto the limits of Sialkot District, and similarly a licencee from Gujrat District shall be entitled to fish on both banks of the Chenab upto the limits of Gujrat District, but shall not be entitled to fish on the opposite bank in the District of Gujrat in the former case and in the Districts of Sialkot and Gujranwala in the latter case, if the fishing rights in these Districts have been leased out.

Kind of fishing gears.

6. (1) Subject to the provision of sub-rule (2), a licencee shall be entitled to fish with the following kinds of gears only:-

(a) Nets of all kinds; provided that no net shall have at any portion of it a mesh of less than 1½ inch bar measured from knot to knot, or 6 inches all round;
(b) Long line with hooks;
(c) Rod and line;
(d) Khurli; and
(e) Dhangla

(2) Notwithstanding anything contained in sub-rule (1):
(a) A licencee may either use a maximum of two numbers of the same gear or of all the gears permitted to him under these rules at one time provided that when the licence entitles its holder to the use of one gear only, the licencee may use only that gear and in addition may also use a net for catching chaulwa for baiting purposes only;
(b) No gear other than rod and line shall be used for catching fish in any river within a distance of 100 yards from any bridge or in any waters specified in Appendices II,III and IV;
(c) A daily licence shall not entitle its holder to fish with more than one rod in waters mentioned in clause (b).

Fees for the licences.

7. (1) The fees for various types of licences except licences specified in sub-rule (2), (3) and in Parts IV, V and VI shall be as follows :-

(i)	For all kinds of fishing gears mentioned in rule 4.	Rs.[24][120.00] per season in all waters except in the tributaries of the Ravi and Chenab rivers In the Sialkot District namely, Palkhu, Basantar, Aik and Deg, the fee for which shall be Rs.[80.00] per season.
(ii)	For rod & line fishing only.	Rs.[60.00] per season.
(iii)	For dip net Kurli	Rs.[40.00] per season.

[24] Substituted by the Government Notification No.SOF(B&P)11-1/88-II dated 26-12-1996

(iv) For hand net (Dhangla) fishing only. — Rs.[60.00] per season.
(v) For Casting net Fishing only — Rs. [80.00] per season
(vi) For long line with hooks (Lang) only. — Rs. [80.00] per season

(2) A licencee holding a licence to fish in the waters in the District of Gujranwala specified in Appendix I, shall in addition to the fees specified in sub-rule (1), give on demand by the lambardar of the village, half of the number of fishes as and when caught from the waters located within the limits of the villages Chaki Khurd, Hayati, Pul Shah Dola, Manjput, Mangal Dana Singh and Ghona Ur of Gujranwala District if the licence holder is not resident of the village, within precincts of which fish is caught.

(3) Seasonal licence fee for fishing in Deg Nullah in Sheikhupura District shall be at the following rates:-

(1) Casting net	..	Rs. [500.00]
(2) Long Line	..	Rs. [300.00]
(3) Kurli or Dhangla	..	Rs. [200.00]
(4) Rod and Line	..	Rs. [60.00]

(4) The licence fee for waters reserved for rod and line gear under clause (b) of sub-rule (2) of rule 6 shall be as under:-

(1) Seasonal licence	..	Rs. [100.00]
(2) Monthly licence	..	Rs. [20.00]
(3) Daily licence	..	Rs. [10.00]

(5) Full fees shall be charged for any broken periods.

Free licences

8. (1) Notwithstanding anything contained in rule 7, licences not exceeding six in number for all kinds of fishing gears may be granted free of charge to the residents of each of the following in District Gujranwala:
Chaki Khurd, Hayati, Pul Shah Dola, Manjpur Nangal Dona Singh and or Gunna Ur.

(2) The licences granted under sub-rule (1) shall remain in the possession of the respective Lambardars, and shall entitle the residents of every village specified in sub-rule (1) to fish within the precincts of their own village but not beyond that. Every resident who wants to fish shall take a licence from the Lambardar of his village and must have the licence with him when fishing and shall, on demand be bound to show it to any person empowered under section 10.

Duplicate licence

9. The authority empowered to grant licences may if the licence granted under these rules, is lost or destroyed accidentally, grant a duplicate copy of the original licence on payment of fee of one rupee or the fee for the licence, whichever is less.

Refund of licence fee.

10. The licence fees paid under rule 7 may be refunded to the licencee or his legal heirs on the presentation of a claim for refund within one week from the date of the issue of the licence if it is proved to the satisfaction of the Officers issuing the licence that the licence was not availed of under special circumstances, such as, change of residence of the licencee to a place where the licence could not be make use of, or the death of the licencee immediately after the licence was issued to him.

Licencee to report breach of rules.

11. Every licencee shall be bound to report; to the [25][District Officer (Revenue),] Tehsildar or any officer of the Fisheries Department any breach of Ordinance or rules that come to his notice.

Licence not transferable
No adult to be engaged as helper.

12. (i) A licence, unless otherwise provided in these rules, shall not be transferable.

(ii) A licencee shall not employ or engage any person (other than his own children under the age of sixteen) to help him with his nets unless the person so employed is also a licencee.

Method of payment of Fees

13. Payment of fees under these rules shall be made in cash or by means of non-judicial stamps of appropriate value which shall be affixed on the applications addressed to the licencing authorities.

No erections of fixed engines.

14. No licencee shall

(a) erect fixed engines, except stake nets temporarily fixed in conjunction with drag nets; or

(b) construct dams or weirs; or

(c) divert water for catching fish.

Seizures

15. All apparatus erected or used for fishing in contravention of the Ordinance or these rules, when seized under section 16, shall be taken to the nearest police station by the person empowered under the said section.

Cancelling of licences

16. The Director General of Fisheries may cancel any licence granted under section 9, if the holder contravenes or instigates contravention of any of these rules or is convicted of an offence under the Ordinance.

Restrictions on Size and number of fish to be caught

17. (i) Any fish of the species mentioned in the First Schedule, which is less than 12 inches in length if caught from waters mentioned in Appendix-IV, shall be put back in the said water.

(ii) A licencee shall not catch from waters mentioned in Appendix IV any species of fish mentioned in the First Schedule exceeding five in number, excepting those put back in water under sub-rule (i).

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[25] Substituted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 3-11-2001

PART – III – LEASES

Auction of fishing rig`hts

18. On or after the first of August each year the Director [26][General] of Fisheries or any other officer empowered by him in accordance with the provisions of section 4, may after giving it sufficient publicity, put to auction the right of fishing in any of the public waters in the Districts mentioned in Appendices VI and VII or any other public waters and shall execute a lease deed with the highest suitable bidder in respect of each public water on payment of the amount offered by him in full or by installments in accordance with these rules:

Provided that the Director [27][General] of Fisheries may at his discretion, lease any water located within a Union Council area to that Union Council for a period not exceeding three years without putting it to auction. The lease money in such cases shall be fixed by the Director [24][General] of Fisheries on the basis of average of fish caught in the said water during the preceding five years and the prevailing local market rates for such fish.

[28][Provided further that if at any stage the nature/status of provincial/district water as mentioned in section 2(i) and 2(j) of the Ordinance is required to be changed, Director [24][General] of Fisheries shall be empowered to make such change.]

Departmental Operation.

19. In case the highest bid at the auction is lower or the water area is bonafide required for development purposes, the auctioning authority may reserve it for departmental operations.

Units for Auction.

20. River waters may be leased in small portions coinciding with the boundaries of the Districts, while the lease of Dhands, Lakes and Reservoirs (where the flood water enters), tanks and ponds may be auctioned unit-wise separately.

Payment of Lease money

21. (1) The lessee shall at his option, either pay the full amount offered by him for fishing rights, at the time of auction or by three equal installments to be paid

(i) The first, on the date of the auction;
(ii) the second, two months after execution of the lease deed; and
(iii) the third, four months after execution of the lease deed.

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[26] Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 12-11-2001

[27] Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 12-11-2001

[28] Added vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 3-11-2001

(2) When the lease money is to be paid by installments, the lessee shall be required to furnish security to the satisfaction of the auctioning authority for the amount to be paid by him.

Refund of lease money.

22. The lease money or any installment thereof paid under rule 21 may be refunded to the legal heirs of the lessee on presentation of the claim for refund, if it is proved to the satisfaction of the Officer executing the lease deed that the lessee died immediately after execution of the lease deed.

Report of breach of rules.

23. The lessee or his agents or nominees shall report to the Inspector of Fisheries any breach of the `Ordinance or rules relating to fishing that may come to his or their notice.

Cancellation of lease due to non- payment of installments.

24. (1) If the lessee or any person holding a permit under section 5 is convicted of an offence under the Ordinance of these rules, the Director [29][General] of Fisheries may cancel the lease or permit, as the case may be, of the person so convicted.

(2) If the lessee fails to pay the installments on the due dates, the Director [7][General] of Fisheries may cancel the lease after giving the lessee an opportunity to clear the arrears.

(3) On cancellation of a lease under sub-rule (1) of sub-rule(2) all permits issued by the lessee shall automatically stand cancelled, and the amount already paid by the lessee shall not be refunded to him.

(4) When a lease is cancelled, the Director [General] of Fisheries may re-auction the fishing rights in that water in the manner herein provided and any deficiency in the lease money shall be recovered from the first lessee as if it were an arrears of land revenue.

25. An Appeal shall lie to Government against the order of the Director [7][General] of Fisheries canceling a lease or permit under rule 24, within one month from the date, the order canceling the lease or permit, as the case may be, were communicated to the party concerned.

PART IV ---- DEPARTMENTAL OPERATION

Licences for reserved waters.

26. Licences to fish in waters specified in Appendices VI and VII, if reserved for Departmental operations under rule 19 shall be granted on payment of Rs.5 by the Director [7][General] of Fisheries or any officer authorised by him in this behalf under section 9.

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[29] Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 12-11-2001

Validity of licences

27. A licence issued under rule 26 shall, remain in force from the 1st day of September to the 31st day of August in the following year.

Sale of fish

28. (1) The holder of a licence under rule 26, shall at his own cost, bring all catches of fish at the landing centres specified in Appendix VIII or at those fixed by the Director [7][General] of Fisheries or any officer authorized by him in that behalf. Sale of catches before these are brought to the landing centres, shall be unlawful.

(2) The fish brought to the landing centres shall be disposed off by the representative of the Fisheries Department, who shall issue a receipt for the amount to the purchaser realize the Government share of sale proceeds prescribed under rule 29 and hand over to the licencee his share of the sale proceeds.

Share of licencees

29. The licencee shall receive such percentage of the sale proceeds of his catches, from all waters mentioned in Appendices VI and VII, as the Director [30][General] of Fisheries may, with the previous approval of Government, notify in this behalf in the official Gazette, and different percentages of sale proceeds of catches to be received by licencees may be notified for different waters.

Confiscation

30. All fish in possession of a licencee who has failed to deliver the same to a representative of the Fisheries Department at the prescribed landing centre or is not in possession of a receipt issued under rule 28 may be confiscated to Government.

PART V ..... TROUT WATERS

Division of Khunhar river and its tributaries

31. (1) The waters of the Kunhar River and its tributaries situated between Balakot Pacca Bridge and Lolusar Lake in the Kaghan Valley shall, for the purpose of these rules, be divided into five reaches as under :-

(a) Reach No. 1 from the commencement of mile one to the end of mile 42 on the Kaghan Valley Road;
(b) Reach No.2 from the end of mile 42 to the end of mile 48 on the Kaghan Valley Road;
(c) Reach No.3 from the end of mile 48 to the end of mile 54 on the Kaghan Valley Road;
(d) Reach No.4 from the end of mile 54 to the end of mile 84;
(e) Reach No. 5 Saif-ul-Maluk Lake.

[30] Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 12-11-2001

(2) The Director [8][General] of Fisheries may at any time, by notification in the official Gazette revise the limits of the reaches mentioned in sub-rule (1) or divide the entire stretch of the said waters in any other number of reaches as he may deem fit.

Licences for Trout waters.

32. (1) A licence to fish in any of the reaches specified in rule 31 may be granted by the Extra Assistant Director of Fisheries, Kaghan Valley, on payment of the prescribed fee and the licence so granted shall entitle the holder to fish only in the reach specified in the licence.

(2) A licence granted under this rule may after giving the licencee an opportunity of being heard, be cancelled by the Extra Assistant Director of Fisheries, Kaghan, for breach of any condition of the licence, these rules or the provisions of the Ordinance.

Number of licences to be granted by Extra Asstt: Director.

33. (1) The Assistant Director of Fisheries incharge of Kaghan Valley shall fix the number of licences that may be granted by the Extra Assistant Director of Fisheries, Kaghan, at any one time for the reaches mentioned in rule 32.

(2) The Director [31][General] of Fisheries may at any time revise the number of licences fixed, under sub-rule (1) and also fix by a notification in the official Gazette …

(a) The size and weight below which no trout shall be killed; and

(b) The maximum number of trout, of the permissible size or weight, which may be caught during the term of the licence.

34. The fee for a licence under this part shall be charged at the following rates:-

(a)	For single rod and single licence:-		
	(i) per day	..	Six rupees
	(ii) per week	..	Thirty rupees
	(iii) per month	..	One hundred and twenty rupees.
(b)	For double rod and family licence		
	(i) per day	..	Ten rupees
	(ii) per week	..	Sixty rupees
	(iii) per month	..	One hundred and twenty rupees.

Explanation ---- For the purpose of this rule, family means husband, wife and their children below fourteen years of age in any combination not exceeding two whose names are entered in the licence.

[31] Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 12-11-2001

Fees or condition of licences not to be refunded or altered.

35. The licence fee paid under rule 34 shall in no case be refunded nor shall the period of the licence nor the name of the reach for which the licence has been issued be varied.

Licences not to be transferred or shared

36. A licence granted under this Part shall be non-transferable and shall not be shared with any person.

Duplicate licences

37. Where a licence granted under this Part is lost or accidentally destroyed, the Assistant Director of Fisheries, Kaghan, may, on payment of a fee of one rupee, issue a duplicate copy of such licence.

Kinds of lures to be used

38. A licencee shall use either of the following lures only:-

(a) artificial fly.
(b) artificial spinning bait, including spoons; and
(c) artificial worm

No fish to be killed during the closed season

39. No fish shall be killed in the waters to which this part applies during the period from the 10th day of October to the 9th day of March in the following year (both days inclusive) excepting under the authority of the Director [32][General] of Fisheries.

Seizures

40. All apparatus erected or used for fishing in contravention of these rules and the fish so caught may be seized and taken to the nearest Police Station by the person empowered under section 16.

PART VI ---- PROVINCIAL ANGLING LICENCE

Grant of Angling licence

41. Notwithstanding anything contained in these rules the Director General of Fisheries may, on payment of a fee of Rs. [33][300/-] grant a Provincial Angling Licence which shall enable its holder to fish with Rod and Line in any of the waters mentioned in rule 42. (Licence Fee raised vide Government of the Punjab, FWF&T Department Notification No.SOF(B&P)11-1/88-II dated 26-12-1996).

Application for Angling Licences

42. A licencee holding a licence granted under rule 41 may fish in the waters of rivers Sutlej, Ravi, Chenab, Jhelum, Indus and their tributaries, and streams, Choha Saidan Shah and its tributaries, and all Government canals situated in the Province and head works excepting -

(a) Water which have been or may hereafter be closed to fishing under section 11;
(b) All Government Fish Farms and Deg Nallah in Sheikhupura District.

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[32] Inserted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 12-11-2001.

[33] Subsituted vide Government Notification No.SO(E-I)(FT)2-14/2001(III) dated 03-11-2001

Validity, etc. of licences

43. A licence granted under rule 41 shall be non-transferable and shall remain in force from the 1s^{t} day of September in each year to the 31st day of August in the following year.

Licence to foreign diplomats

44. A foreign diplomat may be granted a licence for angling free of charge.

Refund of licence fee

45. The fee paid for a licence under rule 41 may be refunded to the licencee or his legal heir on the presentation of a claim for refund made within one week from the date of the issue of licence if it is proved to the satisfaction of the officer issuing the licence that the licence could not be made use of, on account of the death of the licencee immediately after the licence was issued.

Condition for fishing.

46. A licencee to whom a licence has been granted under this Part be entitled to fish with rod and line only and shall not use more than two rods at any one time.

Permission of owners of private waters necessary.

47. A licence granted under rule 41 shall be subject to the permission of the riparian owners for fishing in waters---

(a) which have been or may hereafter be declared as "private" waters; or

(b) which though public waters require permission for fishing therein according to the entries in Wajib-ul-Arz or Record of rights of the village concerned.

Entrance to Headworks of canals prohibited.

48. A licence granted under this Part shall not entitle its holder to enter on the Headworks of Canal without the prior permission of the Executive Engineer or any officer authorized by the Irrigation Authorities in this behalf.

Amendments in Rule 3, 11, 16, 18, 24, 25, 26, 28, 29, 31, 33, 39 and 41 have been made vide Government of the Punjab, Forestry, Wildlife, Fisheries and Tourism Department Notification No.SO(E-I)(FT)2-14/2001(III) dated 03-11-2001.

APPENDIX – I

LIST OF WATER FOR WHICH FISHING LICENCE MAY BE ISSUED RULE 3.

1. Peshawar District—Rivers—Kabul River with branches and Adeai River, Michni or Naguman River, Shahalam River and Budni Stream, Swat River with branches as Abazai or Jundai and Khaiyali, Bara River and Indus River.
Nallas—Loe Khawar, Buddar Khawar, Ghunu Khawar, Ghaura Khawar, Takanta Beg Khawar, Palosai Khawar, Zaindai Khawar, Aza Khel Khawar, Chela Khawar, Chinkas Khawar, Naki Khawar, Natkai Khawar, Arand Khawar, Dheri Khawar, Banda Khawar, Palosin Khawar, Talab Khawar, Kahkam Khan Khawar, Jundai Khawar, Subhan Khawar, Uch Nala, Kalghi Nala, Najji Nala, Turpai Nala, Arandai Nala, Turpai Nala, Lukarai Nala, Amar Kali Nala, Mursi Nala, Shahida Nala, Juria Nala, Jina Kore Nala, Jabba Nala, Magad Nala, Balos Nala, Kalpani Nala.

2. Mardan District—River Indus, Badri Khawar and its tributaries as Zandai Khawar, Totai Nala, Tigrai Khawar.
Bada Khawar and tributaries as Kundai Khawar, Pola Khawar, Ameri Khawar, Wuch Khawar, Sargari Khawar, Jammu Khawar, Budga Khawar.
Kalpani Nulla and its tributaries, Bhagiari Khawar, Lundi Shah Khawar, Haiki Khawar, Bura Khawar, Bharyo Khawar and Khul Khawar.
Muam Nalla and its tributaries as Narai Khawar, Dagi Khawar, Bakarai Khawar, Jua Khawar, Badami Khawar, Pacha Tangi Khawar and Sinawar of Mandu Kar Khawar.

3. Kohat District—Tori Toi and its branches as Lagrai Toi, Narai Ober Algad, Fit Kirmar Alged, Mithan Alged and Lilian Alged.
Khakh Toi, Kohat Toi as Lachi Toi, Marmazai Toi, Sumar Toi, Nasar Toi, Safi Alged, Jabi Toi and Sarai Toi.
Shkalai Nullah as Randokha Nullah, Inzar Nullah, Khawar Alged, Star Alged, Ugda Alged, Shugga Alad (Khawar).
Landa Toi, Shaga Toi, Gaz Dera Toi, Khanki Toi, Kurmatang Khawar, Akhtar Nullah, Tarkhabi Alged, Narai Alged, Roshu Alged, Jour Nullah, Launghar Alged, Tukha Alged, River Indus.

4. Hazara District—River Sind, Kinhar River upto mile No.35 in Kaghan Valley upstream, Siran River, Daur River, Haro River, Ichar Nullah, Booth Nalla, Ilayai Nalla, Nalla Darkan, Nalla Karpani, Beeran Gali Nala, Nandi Sialkot Nalla, Tirairi Nalla, Nalla Mangal.

5. Attock District—Indus River and its tributaries such as Ghel, Haro Rashi (Attock), Soan and their tributaries. The Chablat and its tributaries, Saggar, Nandara and its tributaries. Shakardara, Fetehjanng Sil and its tributaries Wadala and Pindigheb Sil and its tributaries excluding the portion of the Dhamrah Stream which flows within the limits of the Wah Estate, namely from the bridge on the Grand Trunk Road down to the boundry of Hassan Abdal Village, Khasra No.767 of Wah Estate measuring 473 Kanals and 7 marlas.

6. Rawalpindi District—Jhelum River and its tributaries, Haro and its tributaries, the Swan River and its tributaries, Leh and its tributaries, Kurang and its tributaries, Ling situated in Rawalpindi.
(The Kurang River from the Rawal water fall down to the tail of the Gangal Pool).
The Swan River from the Grand Trunk Road bridge to the tail of the Jalalia pool below Shahpur village, Kansi Nullah and its tributaries, Sirin Nullah with its tributaries and Sang Jami Nullah with its tributaries.

7. Sialkot District—The Chenab River and its tributaries, such as nalas Palkhu, Don, Sabskot, Gadgor and Lunda, etc.
The Ravi and its tributaries such as Basantar, Aik and Degh.

8. Gujrat District—The Chenab River and its tributaries such as Tawi, Bhimber, Bhandar. The Jhelum River and its tributaries such as Jaba etc.

9. Jhelum District—The Jhelum River and its tributaries such as Kahan Bunha, Sohan Nala and its tributaries Dharb, Tow Ghabirs, Choha Saidan Shah stream excluding the portions of the Jhelum River mentioned in Appendix III.

10. Gujranwala District—The Chenab River and its tributaries such as Palkhu Nala, Aik Nala, Deg nala and their tributaries excluding that portion of the Wandho Nala which flows within the bounds of the Revenue Estate of Nassoke.

11. Lahore District—River Ravi and its tributaries which are situated in the Lahore District excluding :-
Twenty-nine Kanals and 14 marlas of the areas owned by one Mahanda, under the management of Bawa Ram Dass, adjacent to the parade Nala in Lahore District, and the portion from stone mile No.5 to half a mile down stream of the wier at Balloki in Lahore District.

12. Sheikhupura District—River Ravi and its tributaries which are situated in Sheikhupura District excluding--
    (1) The portion from spur No.5 to half a mile downstream of the weir at Balloki in Sheikhupura District.
    (2) The portion of Deg Nala and its tributaries situated in the Sheikhupura District.

APPENDIX – II

WATERS RESERVED FOR ROD AND LINE GEAR- RULE 6.

River Indus from Village Swabi to Turbela Jhal and River Siran from Thapia village to its junction with River Indus in Tehsil Haripur, District Hazara, River Kabul from Attock bridge to Public Works Department Rest House, near village Kund in Tehsil Nowshera, District Peshawar, River Indus from Attock bridge to Khattak village in Tehsil Haripur, District Hazara, and River Kabul from village Pir Sabak to Additional Police Training, near village Khatak Kaley, Tehsil Nowshera, District Peshawar and Sohan River from Grand Trunk Road Bridge to the tail of the Jala post Shahpur Village.

(i) The Dhamrah stream from the boundary of Wah Estate and Hassan Abadal Village down to the confluence of Kala Stream and Chablat Stream, (ii) Chablat Stream from its confluence with Kala Stream down to the Road and Railway bridge about two miles from Hassan Abadal. (iii) the Kala stream upto a distance of two miles from its confluence with the Chablat stream and (iv) Haro River from its junction with Shakardara Nala upto its confluence with Indus River.

APPENDIX – III

WATERS RESERVED FOR ROD AND LINE GEAR- RULE 6.

Rivers at Headworks within the limits given below excluding the compartments by the fish ladders, if any constructed in the weir, and the portion of the river within 20 feet of the lowest compartment of the ladder on the downward stream side :-

(1) Jhelum River from 1 mile upstream to ½ mile downstream of the Mangla Head Regulator.

(2) Jhelum River from 1½ mile upstream to ¾ mile downstream of the Rasul Weir.

(3) Chenab River from 1 mile upstream to ½ mile downstream of the Marala Weir.

(4) Chenab River from 1½ mile upstream to ¾ downstream of the Khanki Weir.

(5) Ravi River from 1 mile upstream to ½ mile downstream of the weir at Balloki.

(6) Ravi River from ½ mile upstream to ¾ mile downstream of the Sidhnai Weir.

(7) Sutlej River from 1 mile upstream to ¾ mile downstream of the weir Sulemanki.

(8) Both banks of River Sutlej, Chenab, or Panjnad from 1 mile upstream of the weir at Panjnad to ¾ mile downstream.

(9) Both banks of River Sutlej from 1 mile upstream to ¾ mile downstream of the Weir at Head Islam.

(10) Both banks of River Chenab and Jhelum from 1 mile upstream to ¾ mile downstream of the Emerson Barrage at Trimmu.

(11) Indus River from 1 mile upstream to ½ mile downstream of the centre line of the Weir at Kalabagh.

(12) Indus River at Taunsa Barrage from 1 mile upstream to ½ mile downstream.

(13) Indus River at Sukkur Barrage from 1 mile upstream to ½ mile downstream.

(14) Indus River at Guddu Barrage from 1 mile upstream to ½ mile downstream.

(15) Indus River at Ghulam Muhammad Barrage from 1 mile upstream to ½ mile downstream.

(16) River Nari from 1 mile upstream to ¾ mile downstream of the Nari Works.

(17) River Bolan from 1 mile upstream of the Bolan Weir.

(18) River Bolan 5 miles upstream of the Bolan Dam.

APPENDIX – IV

WATER RESERVED FOR DAILY LICENCES, RULE 6

Government Fish Farms, (I) Panjtirath, (ii) Sohawa, (iii) Ghorakhibbi, (iv) Kheshki Reservoir, (v) Chhenawan, (vi) Hiran Minar, (vii) Bansi Sagar, (viii) Waris Road, (ix) Santkotia, (x) Surajkund, (xi) Old Ghar Fish Farm, larkana, (vii) Old Nara Fish Farm, (xiii) Pathan Village, (xiv) Dhokeri, (xv) Old Sukkur Wah, Sukkur, (xvi) Mehr Fish Farm, Sukkur.

…….

APPENDIX – V

SPECIAL WATERS FOR LICENCES, RULE 7

Deg Nallah in Sheikhupura District

…….

APPENDIX – VI

WATERS WHICH ARE TO BE LEASED, RULE 18

The public waters (including Dhands and Dhoras) in the district of Thatta, Hyderabad Dadu, Mirpurkhas, Sanghar, Nawab Shah, Khairpur, Sukkur, Jacobabad, Larkana, Quetta, Pishin, Loralai, Zhob, Sibi, Chaghai, Kalat, Mekran, Kharan excluding Special Areas, Rahimyar Khan and Bahawalnagar, Muzaffargarh, Multan, Montgomery, Lyallpur, Jhang, Sargodha, Mianwali, and Dera Ismail Khan.

…….

APPENDIX – VII

WATERS RESERVED FOR LEASES, RULE 18.

1. All creeks, pools or other collections of waters lying upstream of the Weir in the areas between the marginal Bunds and below the upper limits on the river specified in Appendix-III and all creeks, pools and other collections of water lying in canal land downstream of the Weir, upto the down limits of the river specified therein.
2. All supply channels, escape channels and all drainage canals whether seepage or natural under the administrative control of the Irrigation Department except such waters in which the fishing rights are not controlled by the Fisheries Department.
3. All canals belonging to the Government in the West Pakistan.
4. The pond areas in the West Pakistan at Islam Headworks extending from a distance of one mile upstream from Weir to the canal lane boundaries.

……..

APPENDIX – VIII

LANDING CENTRE, RULE 30

Mancher Lake---(I) Miani Tar, (ii) Carkan Tar, (iii) Mandi Pur, (iv) Tehni, (v) Lal Wah Khad, (vi) Shah Kassam, (vii) Aroni, (viii) Mahji.

Jamshoro near Power Houe, Jamshoro.

I.4 PUNJAB FISHERIES (AMENDMENT) RULES, 1996

GOVERNMENT OF THE PUNJAB
FORESTRY, WILDLIFE, FISHERIES & TOURISM DEPARTMENT

NOTIFICATION

No.SOF(B&P)11-1/88-II. In exercise of the powers conferred by Section 26 (2) c of the Punjab Fisheries Ordinance, 1961 (Ordinance No.XXX of 1961) the Governor of the Punjab is pleased to raise the licence fee prescribed under Rule 7(I) 7(3) 7(4) and 41 of Fisheries Rules, 1965 as under:-

7(I)	i- For all kinds of Fishing gears mentioned in Rule,4.	Rs.120/- per season in all waters except in the tributaries of the Ravi and Chenab rivers in the Sialkot district, namely Palkhu, Basanter Aik and Deg, the fee for which shall be Rs.80/- per season.
	ii-For Rod & Line fishing only.	Rs.60/-
	iii-For Dip net (Kurli)	Rs.40/-
	iv-For hand not Dhangla)fishing	Rs.60/-
	v-For casting net fishing only.	Rs.80/-
	vi-For long line (Lang)	Rs.80/-
7(3)-	i-Casting net.	Rs.500/-
	ii-Long Line,	Rs.300/-
	iii-Kurli or Dhangla	Rs.200/-
	iv-Rod and Line.	Rs.60/-
7(4)-	The licence fee for waters reserved for rod and Line gear under Clause (b) of Sub rule (2) of rule,6.	Rs.100/-
	i-Season licence.	
	ii-Monthly licence.	Rs.20/-
	iii-Daily licence.	Rs.10/-
	Full fees shall be charged for any broken periods.	
41-	Grant of Angling licence (Provincial)	300/-

SECRETARY
GOVERNMENT OF THE PUNJAB

No.SOF(B&P)11-1/88-II dated 26-12-1996

Copy is forwarded for information and necessary action to:-

1. The Director General Fisheries Punjab, Lahore.
2. All Directors Fisheries in Punjab.
3. All Deputy Directors Fisheries in Punjab.
4. All Assistant Directors Fisheries in Punjab.
5. Section Officer (Taxation) Government of the Punjab Finance Department.
6. The Superintendent Government Printing Press Punjab, Lahore for publication in the next gazettee.

UNDER SECRETARY FISH(B&P)

I.5. THE PUNJAB FISHERIES (AMENDMENT) ACT, 1999

EXTRAORDINARY ISSUE **REGISTERED NO. L-7532**

THE PUNJAB GAZETTE
PUBLISHED BY AUTHORITY

LAHORE WEDNESDAY FEBRUARY 10, 1999

PROVINCIAL ASSEMBLY OF THE PUNJAB

NOTIFICATION
9th February, 1999

No.Legis-2(36)/98/116. The Punjab Fisheries (Amendment) Bill 1999, having been passed by the Provincial Assembly of the Punjab on 1 February 1999 and assented to by the Governor of the Punjab on 4 February 1999, is hereby published as an Act of the Provincial Assembly of the Punjab.

THE PUNJAB FISHERIES (AMENDMENT) ACT 1999
ACT IV OF 1999

First published, after having received the assent of the Governor of the Punjab, in the Gazette of the Punjab (Extraordinary) dated 9 February 1999.

An
Act

Further amend the Punjab Fisheries Ordinance, 1961 (XXX of 1961).

Preamble.-Whereas it is expedient further to amend the Punjab Fisheries Ordinance, 1961 (XXX of 1961) in the manner hereinafter appearing;

It is hereby enacted as follows-

1. Short title and commencement.

(1) This Act may be called the Punjab Fisheries (Amendment) Act 1999.

(2) It shall come into force at once.

2. Amendment of section 17 of Ordinance XXX of 1961. In the Punjab Fisheries Ordinance, 1961 (XXX of 1961), hereinafter referred said Ordinance, in section 17, for the words "three months", "five hundred" and "one hundred", the words "two years", "ten thousand" and "three thousand" shall respectively be substituted.

3. Amendment of Second Schedule of Ordinance XXX of 1961. In the said Ordinance, in the Second Schedule.

(i) against Serial Numbers 1, 2, 3 and 4, for the words "twenty-five", the words "five thousand" shall be substituted; and

(ii) against Serial Numbers 5, 6, and 7, for the words "twenty-five", the words "one thousand" shall be substituted.

4. **Repeal.** The Punjab Fisheries (Amendment) Ordinance, 1998 (XXXVI of 1998) is hereby repealed.

DR SYED ABUL HASSAN NAJMEE
Secretary

I.6. PUNJAB FISHERIES (AMENDMENT) ORDINANCE, 2001

EXTRAORDINARY ISSUE **REGISTERED NO. L-7532**

THE PUNJAB GAZETTE
PUBLISHED BY AUTHORITY

LAHORE WEDNESDAY NOVEMBER 14, 2001

GOVERNMENT OF THE PUNJAB
LAW & PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
13th November, 2001

No.l.egis.13-61/2001. The following Ordinance promulgated by the Governor of the Punjab is hereby published for general information:

THE PUNJAB FISHERIES (AMENDMENT) ORDINANCE, 2001
PUNJAB ORDINANCE NO. XXXVI OF 2001

AN
ORDINANCE

further to amend the Punjab Fisheries Ordinance, 1961.

Whereas it is expedient further to amend the Punjab Fisheries Ordinance 1961 (XXX of 1961), for the purposes hereinafter appearing:

And whereas under Article 4 of the Provisional Constitution (Amendment) Order No. 9 of 1999, as amended by the Chief Executive Order No. 11 of 2000 the Governor of a Province may issue and promulgate an Ordinance:

Now, therefore, in exercise of the aforesaid powers and all other powers enabling him in that behalf, the Governor of the Punjab, is pleased to make and promulgate the following Ordinance:-

1. **Short title and commencement:-** (1) This Ordinance may be called the Punjab Fisheries (Amendment) Ordinance, 2001.
   (2) It shall come into force at once.
2. **Amendment in section 2 of Ordinance XXX of 1961**:- in the said Ordinance in section 2.
   (i) in clause (a) after the word "Director" and before the word of wherever occurring the word "General" shall be inserted.
   (ii) after the entry at clause (e) the following explanation shall be added:
   "Explanation"
   Provincial licence shall be issued by the Provincial Fisheries Department."

   (iii) in clause (g) after the word "person" occurring for the first time and the comma and before the word "or " the following shall be inserted.
   "a water area which is land locked by his own survey numbers".
   (iv) After clause (h) the following new clauses shall be added:

(i) "Provincial water" means rivers canals and barrages/pond areas which are not confined within the district boundary or which receives water from the river canal:

(j) "District Water" means a water except rivers, canals, barrages/pond areas and all those waters which have no permanent or seasonal link with rivers etc:

Explanation

District Fisheries Officer shall be responsible for the conservation and management and development of district water areas and will be empowered to lease out fishing rights of the water area exclusively confined within the district boundary."

3. **Amendment in section 4 of Ordinance XXX of 1961:-** In the said Ordinance in section 4 sub section (1) after the word "Director" wherever occurring the word "General" shall be inserted and after the word "water" and before the full stop at the end the words "and district water" shall be inserted.

4. **Amendment in section 10, 11, 12, 16 and 26 of Ordinance XXX of 1961:-** In the said Ordinance in sections 10, 11, 12, 16 and 26 after the word "Director" and before the word "of" wherever occurring the word "General shall be inserted.

5. **Amendment in sections 16 and 20 of Ordinance XXX of 1961.** In the said Ordinance in sections 16 and 20 after the word "any" and before the word "net" wherever occurring the word "fish" and a comma shall be inserted.

6. **Amendment in the First Schedule of Ordinance XXX of 1961.** In the said Ordinance in the First Schedule after the entry at serial No. 5 the following new entry shall be added:

"6 Calbans 12 1st June to 31st August."

Dated:

LT. GEN.(RETD) KHALID MAQBOOL
GOVERNOR OF THE PUNJAB

(MUHAMMAD LATIF QURESHI)
Secretary to
Government of Punjab
Law & Parliamentary Affairs Department

I.7. THE PUNJAB FISHERIES (AMENDMENT) RULES, 2001

GOVERNMENT OF THE PUNJAB
FORESTRY, WILDLIFE, FISHERIES
AND TOURISM DEPARTMENT

Dated Lahore, the 3rd November, 2001

NOTIFICATION

No.SO(E-I)(FT)2-14/2001(III). In exercise of the powers conferred upon him under section 26 of the Punjab Fisheries Ordinance, 1961 (XXX of 1961), the Governor of the Punjab is pleased to direct that in the Punjab Fisheries Rules, 1965, the following further amendments shall be made:-

AMENDMENTS

1) In Rules 3, 16, 18, 24, 25, 26, 28, 29, 31, 33, 39 and 41, the words Director of Fisheries" wherever occurring shall be substituted by the words "Director General of Fisheries.
2) In Rule 11 for the words "Deputy Commissioner" the words "District Officer (Revenue)" shall be substituted.
3) In Rule 18, after the first proviso the following new proviso shall be added:-
"Provided further that if at any stage the nature/status of provincial/district water as mentioned in Section 2(i) and 2(j) of the Ordinance is required to be changed, Director General of Fisheries shall be empowered to make such change".

SHAHID HUSSAIN RAJA
SECRETARY FWF&T

NO. & DATE EVEN:

A copy is forwarded for information and necessary action to:-

1. The Secretary to Governor of the Punjab, Lahore.
2. The Secretary, Government of the Punjab, LG&RD Department.
3. The Secretary, Government of the Punjab, Law & PA Department.
4. The Secretary, Government of the Punjab, Finance Department.
5. The Secretary (I&C), Government of the Punjab, S&GAD.
6. The Director General Fisheries, Punjab, Lahore.
7. All District Coordination Officer in the Punjab.
8. All Director Fisheries in the Punjab.
9. The Director Budget & Accounts (Forests), Lahore.
10. The Incharge SMIT, 18-Signal Battalion, Lahore.
11. PRO to Secretary, FWF&T Department.
12. PS to Secretary, FWF&T Department.
13. PA to A.S., D. S. (A) & D. S. (P), FWF&T Department.
14. All U.Ss./S.Os./STOs, FWF&T Department.

SECTION OFFICER (E-I)

I.8. THE PUNJAB FISHERIES (AMENDMENT) ORDINANCE, 2007

EXTRAORDINARY ISSUE REGISTERED NO. L-7532

THE PUNJAB GAZETTE
PUBLISHED BY AUTHORITY

LAHORE SATURDAY DECEMBER 01, 2007

GOVERNMENT OF THE PUNJAB
LAW & PARLIAMENTARY AFFAIRS & HUMAN AFFAIRS DEPARTMENT

NOTIFICATION
1st December, 2007

No.Legis.13-61/2001. The following Ordinance promulgated by the Governor of the Punjab is hereby published for general information:

THE PUNJAB FISHERIES (AMENDMENT) ORDINANCE, 2007
ORDINANCE NO. XXIII OF 2007

AN
ORDINANCE

further to amend the Punjab Fisheries Ordinance, 1961.

Whereas it is expedient further to amend the Punjab Fisheries Ordinance 1961 (XXX of 1961), for the purposes hereinafter appearing:

And whereas the Provincial Assembly of the Punjab is not in session and the Governor of the Punjab is satisfied that circumstances exist which render it necessary to take immediate action;

Now, therefore, in exercise of the powers conferred by clause (1) of Article 128 of the Constitution of the Islamic Republic of Pakistan, the Governor of the Punjab is pleased to make and promulgate the following Ordinance:-

1. **Short title and commencement:-** (1) This Ordinance may be cited as the Punjab Fisheries (Amendment) Ordinance, 2007.

(2) It shall come into force at once.

2. **Insertion of section 9-A in the Ordinance XXX of 1961** – In the Punjab Fisheries Ordinance, 1961 (XXX of 1961), hereinafter referred to as the said Ordinance, after section 9, the following section 9-A shall be inserted:.

"**9-A Quality control** – (1) The Government may prescribe standards and quality of fish and require inspection of fish.

(2) A person shall not sell or commercially transfer a fish unless it conforms to the prescribed standards and quality".

3. **Amendment in section 26 of the Ordinance XXX of 1961** – In the said Ordinance in section 26, in sub-section (2), –

(i) in clause (h), the full-stop at the end shall be substituted by a "semi colon" and the word "and" shall be inserted after the semi-colon; and

(ii) after clause (h), the following clause (i) shall be inserted:

"(i) the standards and quality of fish".

Dated:

LT. GEN.(RETD) KHALID MAQBOOL
GOVERNOR OF THE PUNJAB

(SH. AHMAD FAROOQ)
Secretary to
Government of Punjab
Law, Parliamentary Affairs & Human Rights
Department

I.A REPEALS

I.A.a. THE INDIAN FISHERIES ACT NO.IV OF 1897

THE INDIAN FISHERIES ACT
ACT No. IV OF 1897
PASSED BY THE GOVERNOR GENERAL OF INDIA IN COUNCIL
(RECEIVED THE ASSENT OF THE GOVERNOR GENERAL ON THE 4TH FEBRUARY, 1897)

An act to provide for certain matters relating to Fisheries in British India

Whereas it is expedient to provide for certain matters relating to fisheries in British India; it is hereby enacted as follows:-

Title, extent and commencement.

1. (1) This act may be called the Indian Fisheries Act, 1897.

(2) It extends to the whole of British India; and
(3) It shall come into force at once.

Act to be read as supplemental to other Fisheries Law.

2. Subject to the provisions of sections 8 and 10 of the General Clause Act, 1887, this Act shall be read as supplemental to any other enactment for the time being in force relating to fisheries in any part of British India.

Definitions.

3. In this Act, unless there is anything repugnant in the subject or context:-
(1) "fish" includes shell-fish;
(2) "fixed engine" means any net, cage, trap, or other contrivance for taking fish, fixed in the soil or made stationary in any other way; and
(3) "private water" means water which is exclusive property of any person, or in which any has for the time being an exclusive right of fishery whether as owner, lessee or in any other capacity.

Explanation--Water shall not cease to be "private water" within the meaning of this definition by reason only that other persons may have by custom a right of fishery therein.

Destruction of fish by explosives in inland waters and on coasts.

4. (1) If any person uses any dynamite or other explosive substances in any water with intent thereby to catch or destroy any of the fish that may be therein, he shall be punishable with imprisonment for a term which may extend to two months, or with fine which may extend to two hundred rupees.

(2) In sub-section (1) the word "water" includes the sea within a distance of one marine league of the sea-coast and an offence committed under that sub-section in such seas may be tried, punished and in all respects dealt with as if it had been committed on the land a butting on such coast.

Destruction of fish by poisoning of waters.

5. (1) If any person puts any poison, lime or noxious material into any water with intent thereby to catch or destroy any fish, he shall be punishable with imprisonment for a term which may extend to two months, or with fine which may extend to two hundred rupees.

(2) The Provincial Government may by notification in the official gazette, suspend the operation of this section in any specified area, and may in like manner modify or cancel any such notification.

Protection of fish in selected waters by rules of Provincial Government.

6. (1) The Provincial Government may make rules for the purpose hereinafter in this section mentioned, and may by a notification in the official Gazette apply all or any of such rules to such waters, not being private waters, as the Provincial Government may specify in the said notification.

(2) The Provincial Government may also, by a like notification, apply such rules or any of them to any private water with the consent in writing of the owner thereof and of all persons having for the time being any exclusive right of fishery therein.

(3) Such rules may prohibit or regulate all or any of the following matters, that is to say:-

(a) the erection and use of fixed engines;

(b) the construction of weirs; and

(c) the dimension and kind of the nets to be used and the modes of using them.

(4) Such rules may also prohibit all fishing in any specified water for a period not exceeding two years.

(5) In making any rule under this section the Provincial Government may--

(a) direct that a breach of it shall be punishable with fine which may extend to one hundred rupees, and, when the breach is a continuing breach, with a further fine which may extend to ten rupees for every day after the date of the first conviction during which the breach is proved to have been persisted in; and provide for:

(b) (i) the seizure, forfeiture and removal of fixed engines erected, or used or nets used, in contravention of rule, and

(ii) The forfeiture of any fish taken by means of any such fixed engine or net.

(6) The power to make rules under this section is subject to the condition that they shall be made after previous publication.

Arrest without warrants for offences under this Act.

7. (1) Any police officer or other person specially empowered by the Provincial Government in this behalf either by name or as holding any office, for the time being may, without an order from a Magistrate and without warrant, arrest any person committing in his view any offence punishable under section 4 or 5 under any rule under section 6:

(a) if the name and address of the person are unknown to him, and
(b) if the person decline to give his name and address, or if there is reason to doubt the accuracy of the name and address if given

(2) A person arrested under this section may be detained until his name and address have been correctly ascertained;
Provided that no person so arrested shall be detained longer than may be necessary for bringing him before a Magistrate, except under the order of a Magistrate for his detention.

I.A.b THE PUNJAB FISHERIES ACT 1914

THE PUNJAB FISHERIES ACT, 1914
(As modified upto the 30th November 1923)
Punjab Act No.II OF 1914
PASSED BY THE LIEUTENANT GOVERNOR OF THE PUNJAB IN COUNCIL

(Received the assent of His Honour the Lieutenant Governor on the 15th January 1914 and that of His Excellency the Viceroy and Governor General on the 29th January 1914, and was first Published in the Gazette of the 13th February 1914)

AN ACT TO EXTEND THE LAW RELATING TO FISHERIES IN THE PUNJAB

WHEREAS it is expedient to extend the Law relating to Fisheries in the Punjab;

It is hereby enacted as follows:-

Title

1 (1) This Act may be called the Punjab Fisheries Act, 1914
(2) It extends to the whole of the Punjab.

Meaning of terms

2. In this Act and the Rules there under unless there is something repugnant in subject or context, the expressions, "fish" and "private water" shall have the meanings assigned to them in section 3 of the Indian Fisheries Act, 1897.

Definitions.

(2-A) In this Act, unless there is anything repugnant in the subject or context:

In India Act IV of 1897

(1) "Fishery Officer" means any person whom the Provincial Government or any Officer empowered by the Provincial Government in this behalf may from time to time appoint by name, or as holding an office, to carry out all or any of the purposes of this Act or to do anything required by this Act or any rule made there under to be done by a Fishery Officer:
Provided that no police officer below the rank of Sub Inspector shall be so empowered.
(2) "fishing offence" means an offence punishable under Act or under any rule made there under.]

Prohibition and licensing of fishing in selected waters by rules of Provincial Government

3. (1) The Provincial Government may make rules for the purposes hereinafter in this section mentioned, and, shall in such rules declare the waters, not being private waters, to which all or nay of them shall apply.
(2) The Provincial Government may be notification apply such rules or any of them to any private water with the consent in writing of the owner of the owner thereof and of all persons having for the time being any exclusive right of fishery therein.
(3) Such rules may:
(a) prohibit fishing except under licence and regulate the granting of such licenses, the fees payable therefore, and the conditions to be inserted therein;
(b) prescribe seasons in which the killing of any fish of any

prescribed species shall be prohibited; and

(c) prescribe a minimum size or weight below which no fish of any prescribed species shall be killed.

(4) In making any rule under this section the Provincial Government may provide for:

(a) the seizure, forfeiture and removal of any apparatus erected or used for fishing in contravention of the rules, and

(b) the forfeiture of any fish taken by means of any such apparatus.

(5) The power to make rules under this section is subject to the condition that they shall be made after previous publication.

Power to prohibit sale of fish.

4. The Provincial Government may by notification prohibition any specified areas the offering or exposing for sale or barter of any fish killed in contravention of any rule made under section 3(3)(b) and (c) (1) of this Act.

Penalty

5. The breach of any rule made under section 3 or any prohibition notified under section 4 shall be punishable with fine which may extend to one hundred rupees, and when the breach is a continuing breach, with a further fine which may extend to ten rupees for every day after the date of the first conviction during which the breach is proved to have been persisted in.

Arrest without warrant for offences under the Act.

6. (1) Any Police Officer, or other person specially empowered by the Provincial Government in this behalf, may without warrant arrest any person committing in his view a breach of any rule made under section 3 or of any prohibition notified under section 4:

(a) of the name and address of the person are unknown to him, and

(b) if the person declines to give his name and address, or if there is reason to doubt the accuracy of the name and address, if given.

(2) A person arrested under this section may be detained until his name and address have been correctly ascertained.

Provided that no person so arrested shall be detained longer than may be necessary for bringing him before a Magistrate, except under the order of a Magistrate for his detention.

Saving of powers under Indian Fisheries Act. (India Act IV of 1897)

7. Nothing in this Act shall be deemed to limit the powers of the Provincial Government to make rules under section 6 of the Indian Fisheries Act, 1897.

India Act IV of 1897.

Power to compound certain offences.

8. (1) The Provincial Government may be notification empower a fishery officer by name or as holding an office:

(a) To accept from any person concerning whom evidence exists which if un-rebutted would prove that he has

committed any fishing offence as described in the first column of the Schedule a sum of money by way of compensation for the offence with regard to which such evidence exists and on the payment of such sum to such officer. Such person if in custody shall be discharged and no further proceedings shall be taken against him;

(b) when any property has been seized as liable to confiscation, to release the same without further payment, or on payment of the value thereof as estimated by such officer, and on the payment of such value such property shall be released and no further proceedings shall be taken in respect thereof.

(2) The sum of money acceptable as compensation under clause (a) of sub-section (1) shall in no case exceed the amount mentioned in the second column of the Schedule as the amount acceptable as compensation for the particular offence described in the first column of the Schedule.

THE SCHEDULE

(See SECTION 8)

Description of offence	Maximum amount acceptable as compensation
1. Fishing with a net having a smaller mesh than that prescribed under the rules made under the act.	Rupees ten.
2. Fishing without licence	Rupees ten.
3. Killing fish of a size or weight less than the standard prescribed under this Act.	Rupees ten.
4. Killing any fish of a prohibited species during a close season	Rupees ten.
5. Fishing with any gear or method other than that permitted under the rules.	Rupees ten.
6. Using at any one time more than two of either or any of the gears permitted under the rules.	Rupees ten.
7. Licence holders employing or engaging non licencee to help them with their nets while fishing.	Rupees ten.
8. Fishing prohibited waters.	Rupees ten.
9. Offering or exposing for sale or barter any fish, the sale of which is prohibited in any specified area by a notification issued under section of the Act.	Rupees ten.

I.A.c. i. The Punjab Fisheries (Amendment) Ordinance 1998

EXTRAORDINARY ISSUE **REGISTERED NO. L-7532**

THE PUNJAB GAZETTE
PUBLISHED BY AUTHORITY

LAHORE TUESDAY SEPTEMBER 8, 1998

GOVERNMENT OF THE PUNJAB
LAW & PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
8th September, 1998

No.Legis.3(XXXIV)/98- The following Ordinance promulgated by the Governor of the Punjab is hereby published for general information:

THE PUNJAB FISHERIES (AMENDMENT) ORDINANCE, 1998

PUNJAB ORDINANCE NO. XXV OF 1998

AN

ORDINANCE

further to amend the Punjab Fisheries Ordinance, 1961 (XXX OF 1961).

Preamble-WHEREAS it is expedient further to amend the Punjab Fisheries Ordinance, 1961 (XXX of 1961) in the manner hereinafter appearing;

AND WHEREAS the Provincial Assembly of the Punjab is not in session and the Governor of the Punjab is satisfied that immediate action is necessary;

NOW, THEREFORE, in exercise of the powers conferred on him under Article 128 of the Constitution of the Islamic Republic of Pakistan, the Governor of the Punjab is pleased to make and promulgate the following Ordinance:-

1. **Short title and commencement**:-
   (1) This Ordinance may be called the Punjab Fisheries (Amendment) Ordinance 1998.
   (2) It shall come into force at once.

2. **Amendment of section 17 of Ordinance XXX of 1961**:- In the Punjab Fisheries Ordinance 1961 (XXX of 1961) hereinafter referred to as the said Ordinance in section 17 for the words "three months", "five hundred" and "one hundred", the words "two years", "ten thousand" and "three thousand" shall respectively be substituted.

3. Amendment of Second Schedule of Ordinance XXX of 1961:- In the said Ordinance in the Second Schedule:-
   (i) against Serials Number 1,2,3 & 4 for the words "Twenty five" the words "Five thousand" shall be substituted; and

(ii) against Serials Number 5, 6 & 7 for the words "Twenty five" the words "One thousand" shall be substituted.

SHAHID HAMID
GOVERNOR OF THE PUNJAB

Dated: 3rd September, 1998

SHEIKH ABDUL RASHID
Secretary to
Government of the Punjab
Law & Parliamentary Affairs
Department

I.A.c. ii. The Punjab Fisheries (Amendment) Ordinance 1998

EXTRAORDINARY ISSUE **REGISTERED NO. L-7532**

THE PUNJAB GAZETTE
PUBLISHED BY AUTHORITY

LAHORE WEDNESDAY DECEMBER 30, 1998

GOVERNMENT OF THE PUNJAB
LAW & PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
30th December, 1998

No.Legis.3(XXXVI)/98- The following Ordinance promulgated by the Governor of the Punjab is hereby published for general information:

THE PUNJAB FISHERIES (AMENDMENT) ORDINANCE, 1998

PUNJAB ORDINANCE NO. XXXVI OF 1998

AN

ORDINANCE

further to amend the Punjab Fisheries Ordinance, 1961 (XXX OF 1961).

Preamble-WHEREAS it is expedient further to amend the Punjab Fisheries Ordinance, 1961 (XXX of 1961) in the manner hereinafter appearing;

AND WHEREAS the Provincial Assembly of the Punjab is not in session and the Governor of the Punjab is satisfied that immediate action is necessary;

NOW, THEREFORE, in exercise of the powers conferred on him under Article 128 of the Constitution of the Islamic Republic of Pakistan, the Governor of the Punjab is pleased to make and promulgate the following Ordinance:-

1. **Short title and commencement**:-
   (1) This Ordinance may be called the Punjab Fisheries (Amendment) Ordinance 1998.
   (2) It shall come into force at once and shall be deemed to have taken effect on the day the Punjab Fisheries (Amendment) Ordinance 1998 (XXV of 1998) stands repealed under Article 128(2) of the Constitution.

2. **Amendment of section 17 of Ordinance XXX of 1961**:- In the Punjab Fisheries Ordinance 1961 (XXX of 1961) hereinafter referred to as the said Ordinance in section 17 for the words "three months", "five hundred" and "one hundred", the words "two years", "ten thousand" and "three thousand" shall respectively be substituted.

3. Amendment of Second Schedule of Ordinance XXX of 1961:- In the said 7Ordinance in the Second Schedule:-

(i) against Serials Number 1,2,3 & 4 for the words "Twenty five" the words "Five thousand" shall be substituted; and

(ii) against Serials Number 5, 6 & 7 for the words "Twenty five" the words "One thousand" shall be substituted.

SHAHID HAMID
GOVERNOR OF THE PUNJAB

Dated: 15th December, 1998

SHEIKH ABDUL RASHID
Secretary to
Government of the Punjab
Law & Parliamentary Affairs
Department

No.A-7/319-22 / Dated 09-01-1999 /

Copy forwarded to all Director of Fisheries in Punjab for information and circulation to the field formation under their control.

(HABIB AHMED)
EVALUATION OFFICER
For DIRECTOR GENERAL

Chapter II

DEPARTMENT OF FISHERIES
GOVERNMENT OF THE PUNJAB

II.1. THE DEPARTMENT OF FISHERIES, PUNJAB

II.1.a. MISSION STATEMENT

Department of Fisheries, Punjab is responsible for the conservation, management and development of natural Fisheries resources through the enforcement of Punjab Fisheries Ordinance and Rules, promote aquaculture practices in private sector to bridge up gap of protein deficiency in the diet of common man, provide white meat to improve the health of people, utilize the untapped Fisheries resources to obtain maximum production to increase GNP share in the national economy.

II.1.b. HISTORICAL PERSPECTIVE

Development of Fisheries and Aquatic Resources of Punjab, Pakistan

Pakistan is located in the South Asian region and is very much blessed by Almighty Allah in having both terrestrial and aquatic resources in abundance. These now need to be very efficiently and effectively exploited so that sustainability of life on land and water may not be significantly threatened.

The Department of Fisheries was established in 1912 and was attached to the Agriculture Department. At that time the main function was regulatory i.e., conservation of the natural water bodies. The fish eggs and seed were collected from natural spawning grounds and stocked in the ponds. Then a need for establishment of training centre was realized and a training centre was established in 1958. Training was imparted to pre service personnel but there was no provision for people in the private sector.

In 1961, the Punjab Fisheries Ordinance was promulgated wherein rules and regulations were formulated for fishing, angling, curbing of illegal fishing so as to conserve national fisheries resources.

These regulatory functions and training for in-service personnel remained the main activities of the Department till 1970-71. Training is being regularly imparted covering the major disciplines of fish farming, fish hatchery management, lakes and reservoir management, fish pathology and water & soil quality management to different categories of in-service personnel and private fish farmers. The department has imparted several trainings to women and youth in distant areas to uplift the living standards of fishermen community enabling them to become economically independent as well as to introduce the fish farming and ornamental fish culture as a small industry.

During the year 1947 the Indo Pak sub-continent was divided and two independent states i.e., Pakistan & India emerged on the globe. All the rivers flowing into Pakistan had their sources in India. India started constructing dams on these rivers thereby restricting the entry of water into Pakistan. As economy in Pakistan is mainly agro based, a need for development of an extensive and intricate irrigation system was realized. So, after Indus Basin Treaty in early seventies, dams and barrages were constructed across the main rivers primarily for irrigation and hydropower generation. This brought great benefits to Pakistan but at the same time altered the natural habitats and ecosystem for the aquatic life thriving therein.

The construction of Kotri and Sukkur barrages has restricted the migration of anadromous fish for breeding as fish ladders constructed in these

barrages are ineffective and are not designed to accommodate the habitat and behaviour of fish.

Construction of huge water reservoirs resulted in the extinct of sufficient natural spawning grounds. The aquatic vegetation flourished in the water bodies. Huge area of land turned saline and water-logged. This alteration in the ecology of rivers resulted in a change in the breeding activity/ breeding behaviour of fish. The seed stocks naturally available started to deplete and so there was need for development and adoption of artificial breeding technology for rehabilitation/ reclamation of fish stocks. In order to overcome the menace of excessive aquatic vegetation an exotic fish species named grass carp (*Ctenopharyngodon idella)* was imported from China and was introduced into our culture system. It mainly feeds on grass and other aquatic weeds/vegetation. Other fish species namely Gulfam (*Cyprinus carpio*), silver carp (*Hypophthalmichthys molitrix*), big head (*Aristichthys nobilis*) and tilapine fishes were also imported on the basis of their specific qualities to maximize fish production. Similarly activities on artificial fish breeding began with the adoption of techniques like hypophysation and extraction of hormones from pituitary gland, its preservation and injection into fish. Research studies on fish breeding behaviour started and its physiological functions, maturity, conditions required during breeding and water quality monitoring also started.

The department made a breakthrough in sixties and succeeded in induced spawning of fish under which HAPPAS were erected in flowing waters to breed fish. However, the response to hypophysation remained poor (very low survival 2-3% vs 1% in wild). The department started establishment of Nursery Units in 1973 and later on established fish hatcheries. Earlier there were no significant advancements, only a single species i.e., *Cirrhinus mrigala* used to be bred. Then the department adopted the Chinese system of induced spawning and success was achieved in breeding of rohu. Research on fish seed and fry rearing, fish diseases and prophylactic measures and water quality management continued.

During the year 1982 the department merged the two separate wings of research and training and regular research on fish biology and ecology, fish nutrition, water and soil chemistry and fish pathology, fisheries management and aquaculture began with. Presently, the infrastructural facilities at Fisheries Research and Training Institute include a computer lab, separate hostels for men and women, an auditorium, a library having collection of latest literature of fisheries and aquaculture in the country that is being availed by students and research workers from different organizations, six modern disease diagnostic laboratories with latest equipment and an elaborate pond complex for research and training.

The post of Director Fisheries BS-19 was upgraded to Director General Fisheries BS-20 in 1988.

II.1.c. BRIEF REGARDING FIRST AQUACULTURE DEVELOPMENT PROJECT, PUNJAB w. E. F. 01-07-1981 TO 30-06-1986

A scheme entitled "Pakistan Aquaculture Development Project" was launched in 1981 with a gestation period of five years (1981-86) at a total cost of Rs.44.986 million (with ADB share of Rs.21.129 million).

The project aided by Asian Development Bank envisaged improvement/ strengthening of existing hatcheries, nurseries and extension of facilities for

promotion of aquacultural practices including incentives to private sector in fish farming. It also included creation of proper infrastructural/institutional and technical inputs to develop fish culture, fish seed production, technical aspects and training (Foreign) of personnel working in the field of management and extension.

Moreover, services of foreign consultants, viz. project advisor, aquaculturist and fish nutritionist were also provided for improved management of fisheries in lakes and reservoirs on scientific basis for obtaining better/ sustained production.

The physical achievements through this project are as under:-

1. Four Glass Jar Hatcheries, rearing tanks and Feed rooms were constructed and provided on four hatcheries and Nursery Units.
2. Eighteen (18) residential quarters were constructed at different nursery units and Dams for the utilization of the Fisheries Staff.
3. A Library-cum-Museum Hall building was constructed at FR&TI Manawan, Lahore.
4. Different kinds of scientific equipment and Machinery were provided and installed at Fisheries Research Institute Manawan, Lahore and all hatchery units in the province.
5. Eleven fellowships were availed as per prescribed schedule of the project. Two senior officers also completed their study tours.
6. The services of three Consultants i.e. Project Advisor, Warm Water Aquaculturist and Fish Feed Expert were utilized as per scheduled programmes.
7. A documentary film entitled "Mahi Parwari" was prepared and shown on different occasions in fairs, exhibitions, etc.
8. A bench-mark survey on fish farming was conducted by PERI and the report thereof was published.
9. Fish Seed Production was increased from 4.010 million (1979-80) to 77.900 million (2006-07).
10. Fish production was increased from 10500 m. tons (1979-80) to 73100 m. tons (2006-07).

II.1.c.i. AQUACULTURE DEVELOPMENT PROJECT

A brief on the progress of implementation of "Second Pakistan Aquaculture Development Project, Punjab" (1990-1996)

This project, assisted by the Asian Development Bank was approved by the ECNEC with a total cost of Rs.147.350 million (GOP share Rs.36.840 million ADB share Rs.110.510 million) for a period of five years i.e., 1989-90 to 1993-94.

Later on due to appreciation in dollar value and late selection of consultancy firm by more than two year the project was revised as per recommendation of Asian Development Bank for another period of two years i.e., 1994-95 to 1995-96. The revised PC-I was accordingly approved by the Planning and Development Department at the total cost of Rs.267.124 million (GOP share Rs.66.511 million, ADB share Rs.200.284 million)

The project aims at providing adequate technical, institutional and infrastructural inputs to the Fisheries Sector for enhancing fish production in all categories of inland water resources in the public and private sectors.

Furthermore, it envisages to generate additional income and employment opportunities to the rural communities, besides providing them with protein rich food.

The main components of the Project and the achievements made against each are as follows:-

c.i.1. STRENGTHENING OF SUPPORT SERVICES

a) Upgradation of Extension Services

This discipline aims at transfer of technology to private sector, establishment of Model/Demonstration Fish Farms with an area of 300 acres and provision of advisory and technical assistance on fish farming to the private sector.

Model Fish Farm on 180 acres have been established in private sector on the guidelines of the foreign consultant, i.e., Carp Culturist with provision of all necessary inputs whereas Model Fish Farms on remaining 120 acres were selected, but inputs such as fish seed, fertilizers/manures etc. could not be supplied to these farms as A. D. B. closed the loan on 30-09-1995 instead of 30-06-1996.

Technical and advisory services on fish culture techniques have been provided to 18956 farmers/interested persons.

b) Producer and Consumer Education Programme

This discipline envisages to educate the fish farmers, fishermen, fish dealers, consumers etc., through electronic media, press, brochures, pamphlets, hand bills etc. In this connection various T.V. programmes, radio talks and film shows were arranged and telecast. In addition the jingles from 7 to 30 seconds duration were also prepared and telecast for propagation of fish culture in the private sector and motivated the potential consumers to include the fish in their diet for health.

A seminar on Aquaculture development in Pakistan was arranged at National level. Scientists from all over the country participated in this seminar and presented papers on Aquaculture and Fisheries. Proceedings of the seminar were published by the department.

c) Training

This discipline includes establishment of two Training Sub-Centres, one at Rawalpindi and other at Bahawalpur along with creation of hostel facilities for the participants of the training courses joining from the remote areas to alleviate the hardships of private fish farmers who are reluctant to come to Fisheries Research & Training Institute Lahore for this purpose.

c.i.2. DATA COLLECTION AND ANALYSIS

a) Under this discipline the establishment of an Inland Fisheries Statistical Unit was planned as per PC-I of the project. This unit has been established and Inland data on different disciplines is being collected, tabulated and analyzed. A better system for the collection of relevant data from the field and its analysis using statistical tools and methods

was developed by the expatriate consultant to make it useable for future planning.

b) Open Water Survey

This discipline aims at carrying out survey of Lakes, Small Dams, Rivers etc., and preparation of Management Plan for these water bodies. Biological and Limnological data of Small Dams of Rawalpindi Division, Dhand Ghazanfargarh District Muzaffargarh, Khabeki and Uchhali Lake District Khushab and Reservoirs attached to Chashma and Trimmu Headworks was collected and processed and their management plan has been prepared.

c.i.3. PRODUCTION PROGRAMME

Establishment of Fish Nursery Units

To increase the fish seed production commensurate with the increasing demand thereof in private sector, eight Nursery Units, one in each division of the Province (Lahore, Gujranwala, Rawalpindi, Multan, Bahawalpur, D.G. Khan, Faisalabad and Sargodha) have been established, according to the designs prepared by the expatriate consultant team.

Under this project, a drug with brand name "OVAPRIM" was imported and supplied to the existing and new fish hatcheries for fish seed production. Efficacy of this drug considerably enhanced the egg fertilization and hatchling rate.

The quality fish seed production has brought a revolution in fish farming. As a result of implementation of the project, transfer of technology to private sector has gained momentum at a remarkable pace. Consequently many hatcheries have been established by the private entrepreneurs.

Impact of the project is also visible in neighbouring provinces where warm water fish farmers have benefitted from fish fry supplied from Punjab.

c.i.4. INSTITUTIONAL DEVELOPMENT

a) Establishment of Project Management Office.

As per target set forth in the approved PC-I of the project Management Office was established, staff appointed and relevant equipment purchased.

b) Provision of overseas training (23 fellowships).

The category-wise detail of progress under foreign training fellowship programme is as below:-

Sr. No.	Name and No. of planned fellowships.	Fellowship completed
1.	Ph.D	2
2.	M.Sc/M.S.	8
3.	Short term courses	9
4.	Study tours	4
	Total:	**23**

c) Provision of foreign consultancy services.

This component comprises 39 manmonths of consultancy period by the expatriate consultants for the project.
The services of foreign consultants have been utilized under each discipline of the project. The recommendations of the consultants are being implemented by the department.

II.1.d WOMEN TRAINING

The project for the Training of Women in Fish Culture, Breeding & Rearing

DDWP, PDWP and CDWP approved a special project entitled as above in 1986 for five years i.e. 1986-1991. The project was formulated in line with the policy decision of Ministry for Social Welfare, Women Division Cabinet Secretariat, Islamabad. It was included in ADP 1986-87 & financed through special funds allocated for Punjab Province under Social Welfare Department & Women for Punjab Province under Social Welfare Department and Women Division. The total cost of the project was 22.44 (21.64) lacs. The execution and operating agency of the project was Department of Fisheries and Fisheries Research & Training Institute, Manawan, Lahore respectively. Initially two years were spent in completion of civil works in the form of women hostel, class rooms and allied works which continued in third year i.e., 1989 also. Project was actually implemented from last quarter of the third year i.e., March 1989. Due to this in 1991 Ministry of Women Division Islamabad granted three years extension to the project and the period was extended till March 1994 with the same cost i.e., 22.44 lacs. Three females and three males were employed in different cadres in this scheme. In this way the project was implemented for a period of seven years and four months at Fisheries Research & Training Institute Manawan, Lahore.

The objectives of the project were as under:-

1. To train 120 women per year in the discipline of fish culture & breading of culturable and ornamental varieties of fish, designing and decoration of aquaria, preparation of fish feed, net making techniques and other parameters of fish farming.
2. Special courses of short duration for the Lady Teachers during summer vacation in their educational Institutions.
3. Organization of training program for rural women in the above disciplines at community level.

The project was implemented on the envisaged objectives and completed its development phase in 1994 successfully. The following achievements were made:-

1) 394 ladies were trained at Fisheries Research & Training Institute, Manawan, Lahore. Three week i.e., 21 days course were conducted each month Rs.450/- stipend per course was given to each and every trainee as per PC-I.

2) 303 Lady teachers were trained in these disciplines in their educational institute.
3) 523 women were trained at community level in the discipline of fish culture, breeding and rearing at their doorstep throughout the Punjab.

1230 women were trained in this discipline throughout the Punjab. The women from far off places like Multan, Rahim Yar Khan and Bahawalnagar etc. participated in the 21 days training program at Fisheries Research and Training Institute, Manawan, Lahore, and all took keen interest & resided in the women hostel of Fisheries Research and Training Institute, Manawan, Lahore, which was constructed under the project.

The department conducted an impact survey of the project. The conclusion of the survey was as under:

I. The trainees used the knowledge in improving their dietary habits.
II. They adopt fish culture as a profession.
III. Some respondents showed their interest for adopting ornamental fish breeding and rearing as profession. Whereas in case of aquarium preparation and net making most ladies responded. Some trained ladies had installed ornamental fish aquaria at their homes that further generate interest amongst others to adopt ornamental fish culture as a cottage industry. One lady teacher established fish aquaria in her school.
IV. For raising income one trained lady established her own fish farm whereas six ladies started working on their established fish farms. Five ladies constructed aquaria for sale purpose.

II.1.e. UNIFEM PROJECT

The project was formulated on the recommendation of project formulation Mission of United Nations Development Fund for Women (UNIFEM). The project was launched with financial donation of UNIFEM in Maliwal Village and three other villages located near Head Works Balloki.

The main objectives of the project were to uplift the socio-economic conditions of fishermen communities and to provide them advanced technical know-how, which would ultimately provide increased momentum to department's efforts for the increase of fish production. It supplements to disseminate the post-harvest technologies and generate better economic gains for neglected communities. Vocational training was also imparted to 200 Women and Youth in the area of net making, aquaria making, fish culture, fish feed formulation, fish culture, ornamental fish breeding/rearing, duck and poultry husbandry, livestock rearing, agriculture, embroidery and handicrafts etc.

It was planned to provide avenues to women through the demonstration of viable Income generation activities, increased employment opportunities and income diversification options for Women and Youth.

Further it was planned:

a) To provide improved support services particularly in health care, nutrition and training of Women in fishing business.

b) To initiate, the Government and non-Government service providers in the area into awareness of women concerns and commitment to the mainstreaming of women in development activities.
c) To strengthen linkage amongst Government departments and N.G.Os. in the delivery of the benefits to fishing communities.

The gestation period of this project was 3½ years w.e.f. 1-7-1991 to 31-12-1994. It has almost achieved as planned targets.

There has been direct, indirect benefits and noticeably trickle-down in the form of female education, reduction in school drop-out technology transfer and greater awareness of environmental concerns. These features will further improve the living condition/quality of life of people in the area and impact on other villages in close proximity.

Major achievements are as under:

1. Motivation and awareness creation completed and a community based N.G.O's Swani Saanj was formed which is working successfully for sustainability of activities to uplift the socio-economic condition of rural areas.
2. Construction of Community Centre.
   The Community Centre has become limelite for all Women activities i.e. Symposia, Seminars, Group meetings and lectures on periodical basis.
3. Literacy and health education is a continuous practice on self help basis by "*Swani Saanj*".

In a ***Nut Shell*** the project was successful and torch bearer in development of Women and Youth.

II.1.f. MAJOR DEVELOPMENT INITIATIVES DURING 2001-09

There was no development initiative and ADP provision was absolutely nil during 2001-02 which has been considerably increased upto Rs. 300 million during 2009-10 with 10 development schemes. During the last 10 years, the department focused special attention for rapid growth of fish farming and culture practices. Besides, production/supply of quality fish seed, seven laboratories for fish diseases control, and water/soil tests/analysis have been established in the potential districts for delivery of better extension services/ support to the fish farmers at their doorsteps.

Moreover, the following strategic initiatives were made through development funding for promotion of fisheries on modern scientific lines.

Protection of Endangered Fish Species

Mahseer, an endangered fish which was included in the red list of IUCN, was successfully bred with induced spawning technique for the first time in the region.

Culture of Exportable Fish Species

Success in breeding and rearing of exportable local Cat fishes viz, Soul and Singhari was achieved and research work for promotion of Cat fish culture on commercial scale is in progress.

Intensive Rearing of Fish Seed

Initiatives have been taken first time in Asia for the intensive fish seed rearing of culturable species to enhance the productivity, quality assurance and availability of fish seed throughout the year.

Introduction of Shrimp Culture

Presently studies for culture of fresh water prawn/shrimp are under way at Taunsa Barrage district Muzaffargarh which would be helpful in culture of freshwater prawn/shrimp on commercial scale having great export potential.

Fish Quality Control Measures

Enactment for enforcement of fish quality measure in local markets and export was made and work on establishment of a quality control laboratories at Lahore is in progress and state of art is duly certified by UNIDO. The laboratory is likely to be functional in the nearest future with the technical assistance and support of UNIDO.

Post Harvest Management

Physical infrastructure of preliminary nature for post harvest management of fish is being developed at Qadirabad district Gujranwala and Chashma district Mianwali to reduce post harvest losses of fish.

Biodiversity Hatchery

Works for the establishment of a Biodiversity Hatchery is in progress at Chashma, district Mianwali for breeding and rearing of fish seed of commercially important species for stocking in the Chashma lake to have maximum sustainable yield.

II.2 SERVICES & CONVENTIONS

II.2.a. PROVINCIAL SERVICE

According to the Devolution Plan the Fisheries Service was splitted up in the following two cadres.

1. Provincial Service.
2. District Service.

It was decided by the Provincial Transition Team (PTT) that the functions of the Provincial Service will not be curtailed and it will continue to perform the following functions.

(a) Conservation, management and development of natural resources.
(b) Administrative, Planning, Survey, Monitoring/Evaluation, Statistical and Mass motivation.
(c) Fish seed production, distribution, supply in public and private sector.
(d) Distribution/supply of fish seed to other provinces, Azad Kashmir, WAPDA, CDA, and other organizations.
(e) Introduction of new exotic culturable species.
(f) Maintenance of installations created under aquaculture development project.
(g) Impart training at two training sub-centres.
(h) Preparation/implementation of management plan of public waters and survey management.
(i) Supervise and coordinate Research and Training programme at the Research & Training Institute and 2 Research/ Training Sub-Centres.
(j) Develop improved management parameters on various aspects of fish and fisheries.
(k) Coordination of research/training programmes with universities and linkages with other international institutions.

The following will be concurrent functions.

(a) Local publicity and awareness.
(b) Enforcement of fisheries enactment.
(c) Fish stock replenishment in natural water bodies.

(d) Supervision of seed production distribution and supply programme at 14 seed production, units/hatcheries.
(e) Aquaculture development activities.
(f) Collection of statistical data on fish and fisheries.

The resources and infrastructure has been devolved as under:-

Functional Items	Existing	Retained at Provincial level
I. RESOURCES		
- Rivers, major tributaries, reservoirs, barrages and water logged areas.	103	103
- Natural water bodies which have no links with rivers etc.	14	
- Canals	32	32
- Lakes.	10	
- Small Dams (private/public)	405	
- Fish seed rearing units.	36	36
- Government fish farm.	28	
- Extension services to Private Fish Farms.	5750	
- Hatcheries & Training	14	14
- Research & Training.	3	3
Total:	**6395**	**188**

The distribution of staff has been made as under:-

Category	Total	Retained at Provincial level
Officer BS-17 & above	120	100
Staff BS-1 to 16	1705	1447

II.2.b. DISTRICT SERVICE

After implementation of Devolution Plan, the district service was created and the following functions were devolved to district service.

(a) Extension services to private sector.
(b) Lease of fishing rights except River.
(c) Issuance of district angling licences.
(d) Conservation, management and development of natural resources except rivers, canals and barrages/pond areas which have no boundaries.
(e) Training through open training schools.

The resources & infrastructure were devolved to district service as under.

Functional Items	Existing	Devolved to District level
II. RESOURCES		
- Rivers, major tributaries, reservoirs, barrages and water logged areas.	103	103
- Natural water bodies which have no links with rivers etc.	14	
- Canals	32	32
- Lakes.	10	
- Small Dams (private/public)	405	
- Fish seed rearing units.	36	36
- Government fish farm.	28	
- Extension services to Private Fish Farms.	5750	
- Hatcheries & Training	14	14
- Research & Training.	3	3

Total Functional items	**Devolved to District level**
6395	6207

The staff was distributed as under:-

Category	**Total**	**Devolved to Districts**
Officer BS-17 & above	120	20
Staff BS-1 to 16	1705	258

II.2.c. INTERNATIONAL CONVENTIONS

2.c.a. Climate Change Convention (CCC)

Objectives

Stabilize the climate; prevent dangerous anthropogenic interference with the climate. Achieve a level within a time frame sufficient to allow ecosystems to adapt naturally to climate change. Ensure that food production is not threatened. Enable economic development to proceed in a sustainable manner.

Country Signation and Ratification

Pakistan participated in the United Nations Conference on Environment and Development in 1992 and chaired the group of 77, signed the United Nations Framework Convention on Climate Change (UNFCCC) on June 13, 1992 and ratified this convention on June 1, 1994. The UNFCC took effect on May 31, 1994 and entered into force in Pakistan on August 30, 1994.

Obligations

- Develop national inventories of anthropogenic emission by sources and removal by sinks;
- Take measures to mitigate climate change by addressing anthropogenic emissions;
- Promote sustainable management, and promote and co-operate in the conservation and enhancement of sinks and reservoirs of all greenhouse gases including biomass, forests, and oceans as well as other terrestrial, coastal and marine ecosystem;
- Co-operate in preparing for adaptation to the impacts of climate change;

- Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions.

Implementation Mechanism

1. In accordance with Article IV, Paragraph I, each party shall communicate to the conference of the parties, the following elements of information through the secretariat:
   - A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit;
   - A general description of steps taken or envisaged by the party to implement the convention;
   - Any other information that the party considers relevant to the implementation of the objective of the convention and suitable for inclusion in its communication, including, if feasible, material relevant for circulation of global emission trends.
2. Developing countries/parties may, voluntarily, propose projects or financing including specific technologies, materials, equipment, techniques or practices needed to implement such projects, along with, if possible, estimate of greenhouse gases, as well as estimate of consequent benefits.

2.c.b. Biosphere Reserve under UNESCO MAB programme

Objectives

To promote the protection, restoration and wise use of natural resources. To understand the ecological and cultural heritage in perpetuity through the management and development of human activities.

Country signation and ratification
Pakistan became a party in 1977.
Implementation Mechanism

Planning and Control Functions

1. Port Qasim and Karachi Development authority;
2. Coastal Development authority;
3. Sindh Forest Department;
4. Sindh Board of Revenue;
5. Sindh Environmental Protection Agency;
6. Maritime Security Agency;
7. Pakistan Navy.

Natural Resource Management Functions

1. Sindh Forest and Fisheries Departments;
2. Resource users from coastal communities

Research and Environmental Monitoring Functions

1. Marine Fisheries Department;
2. National Institute of Oceanography;
3. Zoological Survey Department;
4. Karachi and NED University;
5. Jamshoro University, Hyderabad;
6. Sindh Environmental Protection Agency;

Coastal Community Development Functions

1. Coastal Development Authority;
2. Municipal & Development Authority;
3. Community Based Organizations

Environmental Awareness Functions

1. Environmental NGOs
2. Schools, Colleges and Universities;
3. Media.

2.c.c. World Heritage Convention (WHC)

Objectives

The objective of the World Heritage Convention (WHC) is the identification, protection, conservation, preservation and transmission of cultural and natural heritage of outstanding universal value to future generations. The WHC recognizes world heritage in two sectors i.e., cultural heritage and natural heritage. The natural category comprises physical and biological formations or groups of such formations, which are of outstanding universal value from aesthetic or scientific point of view.

Country Signation and Ratification

The WHC currently has 114 party countries; Pakistan became a signatory in 1976.

- Identify, protect, conserve, present and pass on heritage to future generations in a good state
- The effective and active measures to discharge responsibility;
- Adopt a general policy on heritage protection;
- Take educational measures to promote the protection of heritage properties;
- Allocate more resources and improve services;
- Encourage scientific studies and research on heritage properties;
- Foster the establishment of national centers;
- Discourage action endangering heritage properties.
- To assist stake parties to the WHC in protecting heritage properties, a fund has been established for the purpose of:
  - Identification, protection, conservation, presentation or rehabilitation of heritage;
  - Studies, experts, training of staff, equipment;
  - Soft loans and non-repayable subsidies;
  - Addressing calamities and disasters (on priority basis);
  - National commitment is valued positively but considered essential for assistance on a large scale.

2.c.d. The Convention on Biological Diversity (CBD)

Objectives

In November 1988, an adhoc working group of experts on biological diversity was formulated by UNDP to explore the need for a convention on biological diversity. This working group of technical and legal experts sat together in May 1989 to discuss an international legal instrument for conservation and sustainable resource use. Based on this working group, an Inter Governmental Negotiating Committee was formulated in February 1991. In May 1992, a

conference was held in Nairobi to discuss and later adopt the agreed text of the Convention of Biological Diversity. This was opened for signature till June 4, 1993. There are 42 articles and two annexes in this convention inspired by the World Community's growing commitment to sustainable development. CBD reconciles the intrinsic value of biological diversity and its ecological, genetic, social, economic, scientific, educational, recreational and aesthetic values and components.

Country Signation and Ratification

By June 4, 1993, 168 countries had signed this convention. It entered into force on December 29, 1993. Pakistan became a party to it on June 5, 1992, and became the 14th Signatory.

Obligations

- International Co-operation;
- Develop national strategies, plans, programmes for conservation;
- Identification and monitoring of biodiversity;
- In-situ and ex-situ conservation;
- Integrate conservation and development;
- Incentive measures for conservation;
- Research and training;
- Public education and awareness;
- Access to and transfer of technology;
- Exchange of information;
- Financial resources.

Implementation Mechanism

The following national and international organizations deal with the convention

International

1. World Bank
2. United Nations Development Programme (UNDP)
3. Global Environment Facility (GEF)

Government

1. Ministry of Environment
    - National Conservation Strategy (NCS) Unit
    - National Council for the Conservation of Wildlife (NCCW)
    - Pakistan Forest Institute (PFI)
    - Zoological Survey Department (ZSD)
2. Academic and Research Institutions
3. Provincial Forest Departments
4. Provincial Wildlife Departments
5. Environment Protection Departments (EPDs)

Chapter III

FINANCIAL
AND
ADMINISTRATIVE

III.1. DELEGATION OF FINANCIAL POWERS (2006)

Sr.#	Name of powers	To whom delegated	Extent
1.	Power to fix rates for disposal of fish	Director of Fisheries	Full powers to determine rates at which fish caught on Government account may be sold.
Note:-	The Director of Fisheries will ensure that rates so fixed are not below the market rates.		
2.	To sanction expenditure on the purchase of fish seed, manure, fishing implements and breed fish, etc.	i) Director General Fisheries ii) Deputy Director Fisheries iii) Asstt. Director Fisheries	Full Powers Rs.10,000 in a year. Rs. 5,000 in a year.
3.	To sanction expenditure on purchase of chemicals, equipment and apparatus required at Research Stations, Hatcheries, Nurseries and Training Centres.	Director General Fisheries	Full powers
4.	To sanction dismantling and selling unserviceable buildings, tanks and other civil works constructed out of department funds under minor head “works”.	i) Director General Fisheries ii) Deputy Director Fisheries iii) Asstt. Director Fisheries	RS.20,000/- Rs.10,000/- Rs. 5,000/-
5.	To accept tenders of fishing on share basis from government farms and other public waters reserved for departmental operations.	Director General Fisheries	Full powers
6.	Lease of land for grazing of cattle or cultivation of fruit trees in fisheries project areas.	Director General Fisheries	Full powers by open auction or tenders for one year
7.	Sale of trees and other products in fisheries projects areas.	Director General Fisheries	Full powers by open auction or tenders for one year
8.	To approve highest bid of fishing leases in open auction.	i) Director General Fisheries ii) Deputy Director Fisheries iii) Asstt. Director Fisheries	Full powers Rs.50,000/- Rs.10,000/- Full powers subject to condition that the highest bid is more than 10% of the last auction or average bid of last 3 years, whichever is more.

9.	To auction fishing rights.	Director General Fisheries	Full powers subject to condition that open auction is held by the Auctioning Authority i.e. Assistant Director Fisheries under the Auction Committees as under:-

DISTRICT AUCTION COMMITTEE

Assistant Director of Fisheries of the District	Chairman Auctioning Authority
Assistant Warden of Fisheries of the respective district.	Member
Any other Assistant Director of Fisheries of the adjoining district.	Member

DIVISIONAL AUCTION COMMITTEE

Deputy Director Fisheries of the respective division.	Chairman
Assistant Director Fisheries of the respective district.	Auctioning Authority & Member
Assistant Director Fisheries of adjoining district.	Member

PROVINCIAL AUCTION COMMITTEE

Any Deputy Director	Nominated as Chairman by the Director General
Assistant Director Fisheries of the respective District.	Auctioning Authority and Member
Any Assistant Director Fisheries of the Directorate.	Member

III.2. NOTIFICATION – DELEGATION OF POWERS OF TRANSFERRING AUTHORITY

GOVERNMENT OF THE PUNJAB
FORESTRY, WILDLIFE, FISHERIES
AND TOURISM DEPARTMENT

Dated Lahore, the 15th August, 1989

NOTIFICATION

No. E&A (F&W)9-6/88… In exercise of the powers conferred upon him under Section 23 of the Punjab Civil Servants Act, 1974, the Governor of the Punjab is pleased to delegate the powers of Transferring Authority to the Officers mentioned in Column No.3 in respect of officers/officials specified against the post of such persons in Column No.2 of the attached schedule.

(S. K. KHANZADA)
SECRETARY

No. & Date Even

A copy is forwarded for information and necessary action to:-

1. The Superintendent, Government Printing Press, Lahore for publication in the official gazette.
2. The Accountant General, Punjab, Lahore.
3. The Director General Fisheries, Punjab, Lahore.
4. All Deputy Secretary/Under Secretaries/Section Officers, Forestry, Wildlife, Fisheries and Tourism Department, Government of the Punjab, Lahore.
5. The Section Officer (R-III), Services, General Administration and Information Department, Government of the Punjab, Lahore.
6. All Directors of Fisheries, Punjab, Lahore.

SECTION OFFICER (GENERAL)

SCHEDULE

S.No.	NAME OF THE POST	TRANSFERRING AUTHORITY
1.	**2.**	**3.**
1.	Director General Fisheries	Government
2.	Director Fisheries	Government
3.	Deputy Director Fisheries	Director General Fisheries
4.	Principal Chemist	
5.	Senior Economist	
6.	Assistant Director Fisheries/Zoologist	i) Director General Fisheries throughout the Punjab. ii) Director Fisheries concerned within his jurisdiction.
7.	Assistant Director Fisheries (Chemistry)	
8.	Senior Chemist	
9.	Botanist	
10.	Economist/Evaluation Officer/ Statistical Officer/Research Officer	
11.	Budget & Accounts Officer	
12.	Chemist	
13.	Administrative Officer	
14.	Librarian	
15.	Research Investigator/Statistical Investigator	
16.	Superintendent	

MINISTERIAL AND TECHNICAL SUBORDINATE STAFF (Headquarter as well as Field)		
1.	Senior Scale Stenographer	i) Director General Fisheries throughout the Punjab. ii) Director Fisheries concerned within his jurisdiction. iii) Deputy Director Fisheries within his jurisdiction
2.	Stenographer	
3.	Assistant	
4.	Assistant Warden Fisheries/Fisheries Research Assistant/ Fisheries Development Assistant	
5.	Overseer/Sub-Engineer	
6.	Foreman	
7.	Draftsman	
8.	Statistical Assistant	
9.	Publicity Assistant	
10.	Photographer	
11.	Mechanic (A. C. & Refrigeration)	
12.	Mechanic (Auto)	
13.	Electrician	
14.	Photo Artist/Artist-cum-Photographer	
15.	Library Assistant	
16.	Senior Clerk	
17.	Mason	
18.	Fisheries Supervisor/Field Assistant	
19.	Junior Clerk	
20.	Computer	
21.	Tracer	
22.	Laboratory Supervisor	
23.	Laboratory Assistant	
24.	Driver/Tracer	
25.	Pellet Machine Operator	
26.	Tubewell Mechanic/Lift Pump Mechanic/operator	
27.	Head Fisheries Watcher	
28.	Daftri	
29.	Publicity Assistant	
30.	Laboratory Attendant	
31.	Fisheries Watcher	
32.	Naib Qasid/Chowkidar/Mali/Sweeper/Beldar /Cleaner/Fisherman/Boatman- cum-Fisherman, Boatman-cum-Beldar /Fisherman-cum-Beldar.	

1.	**2.**	**3.**
1.	Assistant Warden Fisheries/Fisheries Research Assistant/Fisheries Development Assistant	Assistant Director Fisheries within his jurisdiction
2.	Fisheries Supervisor	
3.	Field Assistant	
4.	Head Fisheries Watcher	
5.	Tubewell Mechanic/Lift Pump Mechanic/Operator.	
6.	Fisheries Watcher	
7.	Beldar/Fisherman/Boatman/Boatman-cum-Beldar/Fisherman-cum-Beldar	

III.3. NOTIFICATION – AMENDMENT IN THE PUNJAB (CIVIL SERVICE) DELEGATION OF POWERS, RULES, 1983.

GOVERNMENT OF THE PUNJAB
FINANCE DEPARTMENT

NOTIFICATION

No.FDSR-1-7-1/82-1. In exercise of the powers conferred on him under Section 23 the Punjab Civil Servants Act, 1974, the Governor of the Punjab is pleased to direct that in the Punjab (Civil Services) Delegation of Powers Rules, 1983, the following amendment shall be made, namely:-

AMENDMENT

In Appendix-A for Rule 3, the following clauses (ii) against Sr. No.19 shall be added:-

Sr. No.	POSTS	SANCTIONING AUTHORITY
i)	Officers holding Posts of: a) Administrative Secretaries including A.C.S Chairman P&D Board & Chairman Governor's Inspection Team. b) Senior Member/Members, Board of Revenue, Punjab. c) Heads of Attached Departments. d) Heads of Autonomous Bodies. e) District Coordination Officers. f) Deputy Inspectors General of Police. g) Senior Superintendents of Police/ Superintendents of Police in the Districts.	Chief Minister/Governor
ii)	Officers of Bs-18 & above belonging to APUG (SG/DMG/PSP) ex-PCS, ex-PSS and PP Cadres. Such delegation of powers will, however, exclude the officers working against post mentioned at Sr. No. (i) above.	Chief Secretary
iii)	Officers of Bs-17, belonging to DMG, ex-PCS & ex-PSS.	Additional Chief Secretary
iv)	Bs-17 and above officers belonging to the Department concerned.	Administrative Secretary concerned

GOVERNMENT OF THE PUNJAB
FORESTRY, WILDLIFE, FISHERIES
AND TOURISM DEPARTMENT

No.E&A(F&W)10-12/98…. Dated Lahore, the 6th December, 2001.

A copy is forwarded for information and necessary action/future compliance to:-

1. All the CCF's in the Province of Punjab.
2. The Director General Fisheries, Punjab.
3. The Director General, Wildlife & Parks.
4. The Managing Director, TDCP, Lahore.
5. The Director (B&A), Forests, 24-Cooper Road, Lahore.
6. All the Uss/Sos/STOs, in the FWF&T Department.

(CH. MUHAMMAD ANWAR)
UNDER SECRETARY (GENERAL)

No. 3(9)E-1/18392-95 Dated 24-12-2001

Copy to:-
All Director Fisheries in the Punjab for information and necessary action.

(MUHAMMAD IQBAL BHATTI)
DEPUTY DIRECTOR (ADMN)
HEADQUARTER, LAHORE

III.4. JOB DESCRIPTION

HOW TO CONSERVE FISH AND PROMOTE FISHERIES DUTIES AND ROLE OF OFFICERS/OFFICIALS

Name of the Post	BS	Job Description
Director General Fisheries	20	**Responsibilities:** 1. To assist the Secretary, Government of the Punjab, FWF&T Department being Chief Technical Advisor on Fish and Fisheries in the Province. 2. To ensure Management of Fisheries on scientific lines. 3. To keep financial discipline in the Department. 4. To maintain professional liaison with national and international organizations in connection with promotion/ conservation of Fisheries/Aquaculture. 5. To plan development projects on Fisheries. 6. To prepare the budget of Fisheries Department. **Duties:** 1. To under take tour at least 8-10 days in a month. 2. Visit one, nursery unit/Govt. fish farm/private fish farm and hatcheries in each tour. 3. Visit development project at least once in a month. 4. To carry out inspection of Hatchery/District/ Project offices on monthly basis. 5. To arrange for the auctioning of fishing rights of public water areas lying in the province. 6. Inspection of subordinate offices once in a month. 7. To direct and supervise the natural stock replenishment in tapped/untapped water areas conservation of Fisheries in the province. 8. To supervise the execution of development projects. 9. To supervise research into hydro biological nutrition requirement physio chemical, factors, bio diversity, pollution effect and other fields connected fisheries management. 10. To supervise the strict enforcement of the Punjab Fisheries Act 2001 and rules etc. 11. To coordinate experts in fish/fisheries for exchange of technical knowledge and expertise. 12. To maintain professional liaison with National and International Fisheries Conservation Agencies. 13. To supervise the work of subordinate staff by spot inspection and through data collection monthly report etc.

POWERS:

a) Financial

To exercise Financial powers prescribed for the Head of attached department as well as officer of Category-I under the Delegation of Financial Powers Rules, 1990.

b) Administrative

i) To exercise powers as delegated under Fisheries Department (Delegation of Powers) Rules 1980 as well as under provision of General clauses.

ii) To exercise the powers as delegated under the provision of Punjab Fisheries Ordinances, 1961 and Punjab Fisheries Rules, 1965.

Name of the Post	BS	Job Description
Director Fisheries (Extension)	19	**Responsibilities** 1. To plan the development of fish and fisheries. 2. To assist the Director General Fisheries in conservational and extension activities. 3. Administrative, coordination, development and extension work of Fisheries resources in public as well as private sector. 4. Arrange for the auctioning of public water areas in the province. 5. To achieve the stipulated targets i.e. revenue, fish seed stocking, licencing and etc. **Duties** 1. To under take touring at least for 5-7 days in a month. 2. To carry out inspection of two natural water bodies every month. 3. To prepare the development projects for promotion of fish and fisheries in their respective field. 4. To plan research into the natural water resources, enhancement per acre field through application of organic/inorganic manure. 5. Management and supervision of all operational activities. 6. Dissemination of technical know how through all communicational skills. 7. Transfer of technology, preparation of feasibility reports for the establishment of fish culture units. 8. To arrange for the auctioning of fishing rights of public water area in the province. **Powers** **a) Financial** To exercise financial powers as prescribed under "Delegation of Financial Powers 1990" **b) Administrative** i) To exercise powers delegated under the provisin of Fisheries Department (Delegation of Powers) Rules 1980 as well as the provisions of general clauses. ii) To exercise powers as delegated under the provisions of Punjab Fisheries Ordinance, 1961 and Punjab Fisheries Rules, 1965. iii) Transferring authority in respect of officers/officials BS-1 to BS-17 in all cadres in their respective jurisdiction.

Name of the Post	BS	Job Description
Director Fisheries (R&T)	19	**Responsibilities** 1. To assist Director General Fisheries regarding the affairs of Research & Training. 2. To maintain close coordination between Research & Training disciplines. 3. Supervision and evaluation of ongoing research activities at the institute. 4. To produce better result through the application of latest technical and scientific approaches in fish and Fisheries. 5. Keep close liaison with national and International Organizations and Institutes about the recent advances in research and Training methods. **Duties** 1. To maintain discipline and harmony among the different research divisions. 2. Supervision and coordination of Research and Training programme at the Institute. 3. To arrange/organize training workshops, seminars, symposia on different aspects of fish and fisheries. 4. Dissemination of modern aquaculture technology through comprehensive programmes in private as well as public sector. 5. To cope with the disease problems probably erupted in private and public sector. 6. To arrange research experimentation on periodical basis. 7. Provision of Administrative logistic and training facilities/requirement. 8. Preparation of concept papers for research projects. 9. To facilitate the ambitious fish culturists/masses and students from other colleges and universities. 10. Periodical studies on endangering problem i.e. pulif relative diseases, organisms etc. **Powers** **a) Financial** To exercise financial powers delegated under the provisions of delegation of financial powers 1990. **b) Administrative** i) To exercise powers delegated under the provision of Fisheries Department (Delegation of Powers) 1980. ii) Under the provision of Punjab Fisheries Ordinance 1961 and Rules, 1965.

Name of the Post	BS	Job Description
Director Fisheries (HM)	19	**Responsibilities** 1. To assist Director General Fisheries in Hatchery Management affairs in the province. 2. Administrative/Technical supervision and coordination in fish seed production programme at the hatcheries/ brood stock Farm. 3. Nursing ponds as per targets. 4. To procure and produce genetically improved brood stock at the hatchery. 5. Efficient and administrative control over the management of hatcheries. **Duties** 1. To under take at least 2-3 tours of hatcheries in a month. 2. Test netting of ponds to asses the brood stock and fish seed. 3. Annual stock taking (consumable & non consumable) verification. 4. Annual administrative and technical inspection of at least 3 hatcheries. 5. Provision of quality fish seed to private as well as public sector. 6. Replenishment of natural water bodies through periodical fish seed stocking. 7. Raising of brood stock, to ensure the adequate numbers of fish seed of culturable species. 8. Efficient management and maintenance of hatcheries/ brood farms installations to take proper case of machinery and equipments etc. 9. Guidance to private sector on designing the hatcheries in private sector, dissemination of technical knowledge of fish seed production, nursing and rearing etc. 10. Administrative and miscellaneous matters relating to staff working at hatcheries. 11. Adoption of modern techniques on hypophysation practice. **Powers** **a) Financial** To exercise financial powers under the "Delegation of Financial Powers 1990" **b) Administrative** i) To exercise powers delegated under the provision of Fisheries Department (Delegation of Powers) Rules 1980 as well as the provisions under general clauses. ii) Punjab Fisheries Ordinance, 1961 and Punjab Fisheries Rules, 1965.

Name of the Post	BS	Job Description
Director Fisheries (Aqua)	19	**Responsibilities** 1. To assist the Director General Fisheries on technical aspects regarding promotion of fish culture. 2. Management and supervision of aquaculture projects i.e. nursery Units and training centers. 3. Production of quality fish seed through modern hypophysation techniques. **Duties** 1. Administrative and technical supervision and coordination amongst the aquaculture units. 2. Introduction of modern technical/ scientific approaches for the enhancement of fish production. 3. To conduct visits of aquaculture unit to monitor or evaluate their performance and functioning. 4. Promotion of aquaculture practices especially in private sector. 5. Extend maximum cooperation to exchange the expertise and know how among other wings of department. 6. Ensure the genetically stock improvement. 7. Introduction of new exotic species for better crop. **Powers** **a) Financial** To exercise financial powers as prescribed under "Delegation of Financial Powers 1990" **b) Administrative** To exercise powers as delegated under the provisions of Fisheries Department (Delegation of Powers) Rules 1980 as well as the provisions of general clauses.

Name of the Post	BS	Job Description
Deputy Director Fisheries (Admn)	18	**Responsibilities** 1. To assist the Director General Fisheries regarding all administrative matters. 2. To keep liaison with all Directorate of Fisheries for proper compliance on policies and administrative affairs. 3. To maintain proper record of staff strength, vacancy position and service records etc. **Duties** 1. To respond all administrative matters in accordance with law and regulation. 2. Preparation of service record of gazetted & non gazetted staff. 3. Disposal of day to day matters relating to disciplinary, pension, leave and gratuity cases. 4. Supervision on the attendance and disposal of work by subordinate staff. 5. Supervision of store and vehicles. Maintenance of building, furniture and fixture. 6. Maintenance and preparation of old record files. 7. Preparation of proposed amendment in rules and regulations. 8. To conduct DPC etc.

Name of the Post	BS	Job Description
Deputy Director Fisheries (P&D)	18	**Responsibilities** 1. To supervise the budget preparation and financial periodicals. 2. Reconcile the department's income/receipt and expenditure reports. 3. To conduct, DAC/PAC to settle the audit paras. 4. Coordination in development schemes with the respective officers, preparation and achievements of targets for income, fish seed and stocking etc. **Duties** 1. Preparation of working paper on various technical aspects of department's activities. 2. Coordination of fish farming, seed production, distribution, research training programme and management of resources and collection of data etc. 3. Coordination with P&D department, Finance department and other planning and research institution for future planning and implementation of ongoing development projects.

Name of the Post	BS	Job Description
Deputy Director Fisheries (District)	18	**Responsibilities** 1. Conservation and management of natural fisheries resources in respective district/projects. 2. Enforcement of fisheries enactment. 3. Development of extension work of the fisheries resources in respective districts/projects. 4. Development of sport fishing. **Duties** 1. Statistical work on fish and fisheries. 2. Preparation of proposals regarding planning and development projects for different areas / regions / projects. 3. Administrative matters of the officials under his jurisdiction. 4. Coordination of development works in various districts and with other nation building departments. 5. Management and Judicious exploitation of existing resources for increasing fish production. 6. To conduct auctions for the fishing rights of public water areas. 7. Stock replenishment through stocking of major and chinese carp. **Powers** **a. Financial** To exercise financial powers prescribed under the Delegation of Financial Powers Rules, 1990. **b. Administrative** i) To exercise power as delegated under Fisheries Department (Delegation of Power Rules, 1980 as well as under Provision of General clauses. ii) To exercise the power as delegated under the provision of Punjab Fisheries Ordinance 1961 and Rules, 1965.

Name of the Post	BS	Job Description
Deputy Director Fisheries (Training)	18	**Responsibilities** 1. Conduct, supervise and coordinate the various training programmes/courses on various aspects of fish and fisheries at Fisheries Training Institute for the technical staff and fish farmers. 2. To deliver lecturers to the trainees on various disciplines of fisheries science. **Duties** 1. Organize mass motivation programme for promotion of fisheries through various information media. 2. To organize practical training workshops, seminars, symposia on fisheries and aquaculture. 3. Coordination of extension programme with the District Officers including publication of literature for the guidance of technical staff and farmer. 4. Liaison with Agriculture University Faisalabad and other institutes for the improvement of training programmes in fisheries Science. 5. Training of professional staff for the promotion of fish culture and to motivate the public through publicity.

Name of the Post	BS	Job Description
Deputy Director Fisheries (Hatchery)	18	**Responsibilities** 1. To supervise and coordinate the work of breeding, rearing of fish seed of economic value under natural, semi natural and controlled conditions. 2. Management and supervision of the operation of hatching, rearing, fattening and other tanks and installations so as to regulate their functions on scientific lines. 3. Distribution and supply of fish seed to fish culture units in public and private sectors. **Duties** 1. Technical guidance to field staff on fish culture. 2. Research work on problems related to seed production techniques and technical guidance to public on designing of hatcheries. 3. To maintain liaison with research Institute's staff and Aquaculture Development Project for promotion of fish culture practices. 4. To cater the large scale requirement of fish seed of culturable species, to meet the development requirements of the resources in public and private sector. **Powers** **a. Financial** To exercise financial powers prescribed under the Delegation of Financial Powers Rules, 1990. **b. Administrative** i) To exercise power as delegated under Fisheries Department (Delegation of Power Rules, 1980 as well as under Provision of General clauses. ii) To exercise the power as delegated under the provision of Punjab Fisheries Rules, 1965. iii) Appointing and punishing to officials BS-1 to BS-5 in their respective jurisdiction.

Name of the Post	**BS**	**Job Description**
Senior Economist	18	**Duties** 1. Progress monitoring, evaluation, appraisal and feed back of project management. 2. Preparation of reports and working papers etc. 3. Management, co-ordination and scrutiny of statistical data on Fish and Fisheries. 4. Streamline of evaluation and monitoring efforts through co-ordination and arranging facilities of the personnel working in the department.

Name of the Post	BS	Job Description
Principal Chemist	18	**Responsibilities** 1. Monitoring of physico chemical parameters of soil and water suitability as related to Fisheries and Aquaculture. 2. Hydrology of ponds, especially water quality criteria for fish culture. 3. Changes in water chemistry through fertilization of ponds on hatching of fish eggs, rearing of fry/fingerlings and raising adult fishes. 4. Effect of water pollution on fauna flora and chemical means for control of macro vegetation and alagal bloom 5. Study of primary productivity effect of fluctuation sin biotic and abiotic factors on the physico-chemical characteristics of soil sediments. 6. Technical and advisory assistance to the fish farmers on the related fields. **Duties** 1. Technical guidance to field staff on fish culture. 2. Research work on problems related to seed production techniques and technical guidance to public on designing of hatcheries. 3. To maintain liaison with research Institute's staff and Aquaculture Development Project for promotion of fish culture practices. 4. To cater to the large scale requirement of fish seed of culturable species to meet the development requirements of the resources in public and private sector.

Name of the Post	BS	Job Description
Senior Chemist	17	**Responsibilities** 1. Bio-chemical and Physio-chemical aspects of fish seed production and rearing and fish culture at the fish seed Hatchery. 2. Soil and water analysis, study of various weeds in water in relation to temperature, soil densities and other interacting, environmental factors. 3. Determination of water quality criteria for fish culture. **Duties** 1. Analysis of feed for fry and fingerlings. 2. Preparation of suitable artificial feed for fish seed. 3. To boost up fish production of the province by finding solution of problems which hamper the rapid development of fisheries resources.

Name of the Post	BS	Job Description
Assistant Director Fisheries (District)	17	**Responsibilities** 1. Conservation and management of natural fisheries resources in respective District/Projects. 2. Enforcement of Fisheries enactment. 3. Development extension work of the Fisheries resources in respective Districts/Projects. 4. Development of sport fishing. **Duties** 1. Statistical work on fish and fisheries. 2. Preparation of proposals regarding Planning of Development project for different areas/regions/ projects. 3. Administrative matters of the working staff under him. 4. Coordination of development in various districts with other nation building departments. 5. Management and judicious exploitation of existing resources for increasing fish production. 6. To conduct/auction for the fishing rights of public water areas. 7. Stock replenishment through stocking of M. carp and Chinese carp. **Powers** **a) Financial** To exercise financial powers prescribed under the Delegation of Financial powers rules 1990. **b) Administrative** i) To exercise power as delegated under Fisheries Department (Delegation of Power Rules 1980 as well as under Provision of General Clauses). ii) To exercise the power as delegated under the provision of Punjab Fisheries Ordinance 1961 and Punjab Fisheries Rules, 1965. iii) Appointing and punishing authority in respect of official BS-1 to BS-3 in their respective jurisdiction.

Name of the Post	BS	Job Description
Assistant Director Fisheries (Publicity)	17	**Responsibilities** 1. To organize publicity work on various aspects of Fisheries and departmental activities, through various other publicity media. 2. To organize exhibitions on the occasion of important national functions such as Awami Mela etc. **Duties** 1. To assist the Zoologist, Fisheries Training Institute in the preparation of leaflets, posters etc. for motivating the public on fish culture. 2. Motivation for fish culture to inculcate public interest in fish farming.

Name of the Post	BS	Job Description
Assistant Director Fisheries (Training)	17	**Responsibilities** 1. To deliver lectures to the trainees at the Fisheries Training Centre on various biological and cultural aspects of Fish and Fisheries. 2. Demonstration work in the Laboratory. **Duties** 1. Management of Aquaria, Library and Laboratory equipment of the Fisheries Training Centre. 2. To assist the Zoologist in technical and administrative functions of the Fisheries Training Centre. 3. Welfare activities of trainees. 4. To provide training on Fish Culture to the newly trainees and to the newly recruited staff, inservice employees and general public. **Powers** **a) Financial** To exercise financial powers prescribed under the Delegation of Financial Powers Rules, 1990. **b) Administrative** i) To exercise power as delegated under Fisheries Department (Delegation of power Rules 1980 as well as under provision of General clauses. ii) To exercise the power as delegated under the provision of Punjab Fisheries Ordinance 1961 and Punjab Fisheries Rules, 1965 iii) Appointing and punishing authority in respect of officials BS-1 to BS-3.

Name of the Post	BS	Job Description
Zoologist	17	**Responsibilities** 1. To organize training courses for preservice and inservice personnel of Department. 2. Vocational training to fish farmers, employees of other nation building departments on fish farming. **Duties** 1. Publicity of departmental policies and achievements through leaflets, radio, T.V. programme and audio visual media. 2. Dissemination of technical advice on fish culture to public. 3. Management of boarding and joining of trainees. 4. Training of professional staff for the promotion of fish culture and to motivate the public through publicity.

Name of the Post	BS	Job Description
Budget & Accounts Officer	17	**Duties** 1. Preparation of budget estimates of permanent and non-development expenditure. 2. Co-ordination of development and non-development budget including its distribution, expenditure and income cases etc. 3. Drawing and disbursing officer for office of the Director General of Fisheries, Punjab, Lahore. 4. Internal audit of offices subordinate to Director General Fisheries, Punjab, and correspondence on miscellaneous accounts matters with various organizations. 5. Reconciliation of income and expenditure statements, WAPDA, Suigas. 6. Preparation of working paper for DAC and PAC meeting and settle the audit paras etc.

Name of the Post	BS	Job Description
Evaluation Officer	17	**Responsibilities** 1. Monitoring and Evaluation work of development non-development projects of the department, identification of bottlenecks in their implementation and to devise suitable ways and means for the achievement of stipulated targets. 2. Consolidation and submission of various progress reports to Government and others regarding development/non-development projects. **Duties** 1. Spot inspection of various projects for monitoring and evaluation purposes. 2. To assist the Director General Fisheries and Senior Economist in monitoring and evaluation of various development and non-development projects. 3. Processing of auction papers etc. 4. Assistance in legislation and court matters.

Name of the Post	**BS**	**Job Description**
Economist	17	**Duties** 1. To supervise the work of Research officers/Statistical officer as well as establishment and administration. 2. Analysis of financial and economical aspects of short, medium and long term plans. 3. Determination of economically viable strategies/ programmes on the basis of feasibility studies of projects. 4. Appraisal of projects through different analytical techniques viz; sensitivity, analysis, benefit cost ratio, net present worth, IRP tests of projects etc., from financial as well as economical aspects. 5. Identification of bottlenecks and measures/strategies for smooth implementation of development projects. 6. Scrutiny of statistical data by an application of applied operational research aspects. 7. Processing of auction papers at headquarter level. 8. Liaison with P&D and Finance Department and other related institutions for monitoring and evaluation of reports.

Name of the Post	**BS**	**Job Description**
Research Officer	17	**Duties** 1. Liaison with P&D department and other related institutions for monitoring and evaluation. 2. Monitoring and evaluation of the reports, received from the field and its consolidation/submission to the concerned agencies. 3. Identification of constraints, problems in the implementation of the projects and initiate timely recommendations/suggestion for remedial measures/ solutions thereof.

Name of the Post	BS	Job Description
Statistical Officer	17	**Responsibilities** 1. Collection/coordination of statistical data on fish catches marketing, fishery resources and other economic aspects of fish and fisheries, fishing tackles and gears. 2. Formulation of suitable projects to regulate and improve fish marketing and other socio-economic aspects of fish industry/fishermen community. **Duties** 1. Coordination of work regarding grant of credit facilities to fish farmers/fishermen from various government agencies for establishment of fish farms and purchase of fishing implements etc. 2. Collection of data for preparing projects for fish marketing provision of facilities for fishermen and people and supply of fresh fish on reasonable rate at the government fish shop.

Name of the Post	**BS**	**Job Description**
Administrative Officer	17	**Responsibilities** 1. To assist the Deputy Director Fisheries (Administration) regarding correspondence on all basic service matters of gazetted/non-gazetted staff and other administrative issues. 2. Maintenance of office building and premises. **Duties** 1. Vigilance and coordination of work of ministerial staff attached with different sections at headquarter level. 2. Maintenance of vehicles and other government store articles/items at Headquarter, Lahore. 3. Preparation of periodical reports on administrative and miscellaneous matters for submission to government and other organizations.

Name of the Post	BS	Job Description
Chemist	16	**Responsibilities** 1. Physio-chemical studies of fresh and saline water under various ecological condition. 2. Study on pollution of streams and rivers by sewage and industrial effluents and other allied problems. 3. Soil and water analysis under various limnological conditions. **Duties** 1. To boost up fish production of the Province through research. 2. Analysis of water and soil samples in the laboratory as well as on spot. 3. Disease diagnosis etc.

Name of the Post	BS	Job Description
Librarian	16	**Duties** 1. Organization and administration of Library affairs. 2. Classification of Books. 3. Cataloging of Books. 4. Circulation. 5. Maintenance of record. 6. Up keeping of latest research references. 7. Liaison with other institutional libraries. 8. Arrangement of latest scientific and technical books on fish and fisheries.

Name of the Post	BS	Job Description
Overseer	11	**Responsibilities** 1. Survey of site. 2. Preparation of lay-out. 3. Preparation of rough cost estimates. 4. Finalization of detailed estimates. 5. Supervision, guidance and execution of departmental works according to estimates and plans. **Duties** 1. Technical guidance to farmers for construction of fish farms etc.
Photo-Artist/ Artist-cum-Photographer	11	**Responsibilities** 1. Taking of photographs of various fisheries resources, exhibition, tournament and other ceremonial functions regarding fish and fisheries. 2. Processing and enlargement of photographs. 3. Maintenance of dark room and ptohographic equipment. 4. Arranging slogans titles for folders, charts, placards, calendars and other publicity material. **Duties** 1. Decoration and art work in fisheries stalls at exhibitions. 2. Preparation of micro photographs & scientific diagrams.
Publicity Assistant	11	**Responsibilities** 1. Preparation of pamphlets, hand books, booklets on fish and fisheries for printing and their distribution. 2. Writing of general articles on fisheries in newspapers, magazines and journals. 3. Preparation and telecast of Radio talks on fisheries. 4. Arrangement of fisheries stalls at various melas/ exhibitions of the province. 5. To deliver talks for the mass motivation of rural population towards fish culture. 6. To travel with the publicity van with audio visual aids. **Duties** 1. To organize angling tournaments for the publicity and promotion of sport fishing in the province. 2. To help in the preparation of slides and films on fish and fisheries. 3. To operate the audio visual aids.

Name of the Post	BS	Job Description
Assistant Warden Fisheries/ Fisheries Research Assistant/ Fisheries Development Assistant	11	**Responsibilities** 1. Survey of fishery resources. 2. Collection of statistical data on fish and fisheries. 3. Recovery of lease money. 4. Introduction of improved fishing gears and tackles. 5. Research on various problems of fish and fisheries. 6. Propaganda and publicity for mass motivation through audio-visual. **Duties** 1. Coordination of work in his jurisdiction with other nation building departments.
Draftsman	10	**Responsibilities** 1. Preparation of final sketches and designs on the basis of rough sketches prepared by departmental Overseer. 2. Preparation of designs of fish ponds, nurseries, hatcheries tanks, water reservoirs, channels, moghas etc. **Duties** 1. Preparation of detailed estimates. 2. Preparation of drawings and maps of site plans etc.
Electrician (M.T)	7	**Responsibilities** 1. Responsible for the maintenance and minor repairs of all electrical fittings and batteries in the vehicles, battery charging and also maintenance of other allied appliances. 2. Guidance to the drivers for proper handling of the electrical fittings, batteries in the vehicles. **Duties** 1. Proper maintenance of electrical fittings/ batteries of vehicle.
Laboratory Cum Farm Supervisor.	6	**Responsibilities** 1. Management of fish stock/equipment maintained in the pond complex and Laboratory attached with the hatchery. 2. To assist the superiors in the execution and co-ordination of technical work regarding production, rearing and nursing of fish seed. **Duties** 1. General supervisory function of installations/roads/ tracks etc. of the hatchery and water regulation arrangements of the tanks. 2. Production and rearing of fish seed and its supply to the fish farmer, so as to produce large quantity of fish seed annually under semi-natural and controlled conditions and its distribution for development programme launched under various schemes.

Name of the Post	BS	Job Description
Fisheries Supervisor.	6	**Responsibilities** 1. To survey Fisheries Resources. 2. To conduct salvage and conservation work. 3. To apply Fisheries Ordinance and Rules made there under. 4. To assist the seniors in production, management and exploitation of fisheries resources. **Duties** 1. To maintain fish seed stock and its supply/stocking. 2. To provide technical guidance to fish farmer. 3. Co-ordination of work in his jurisdiction with nation building Department. 4. Proper management, conservation and development of fisheries resources.
Computer	5	**Responsibilities** To provide necessary assistance to the staff working in the cell in handling of calculator, maintenance of record and type work. **Duties** To provide necessary assistance to the staff working in the cell.
Tracer	5	**Responsibilities** 1. Tracing of maps, drawing of charts. 2. Fero printing. 3. Preparation of charts and sketches. **Duties** 1. Enlargement and education of drawing with pentograph. 2. To assist draftsman in technical work. 3. Technical drawing.
Laboratory Assistant	5	**Responsibilities** 1. Maintenance and handling of laboratory store. 2. Recording of scientific data for research work. 3. Collection of samples for research work. **Duties** 1. Minor repair of laboratory instruments. 2. To provide assistance to research work.
Driver	4/6	**Responsibilities** 1. Operation and maintenance of vehicle. 2. Maintenance of the log book and P.O.L record. **Duties** 1. Transportation of fish seed in the province. 2. Other logistic duties.

Name of the Post	BS	Job Description
Head Fisheries Watcher	3	**Responsibilities** 1. To supervise work of Fisheries Watcher and other Class IV establishment under him. 2. To guide progressive farmers for construction of fish farms. 3. To collect and transport fish seed to nursery/private/ government fish farms. **Duties** 1. To assist the superiors in other activities regarding fish and fisheries. 2. Assists the superior in the proper management, conservation and development of fisheries resources.
Tube-well Mechanic/Lift Pump Mechanic	3	**Responsibilities** 1. Maintenance and operation of tube-well/lift Pump. 2. Minor repair of tube-well/lift pump. **Duties** 1. Maintenance of record of P.O.L and repair. 2. To ensure adequate supply of water to fish nurseries and fish farms.
Daftri	2	**Responsibilities** 1. Maintenance and upkeep of office files. 2. Handling of duplicating machine. **Duties** 1. To maintain office articles in neat and tidy order. 2. To maintain and upkeep office record and handling of duplicating machine.
Publicity Attendant	1	**Responsibilities** 1. Installation of stall in exhibitions. 2. Handling and fixing audio-visual equipment. 3. Organization of publicity material including, hand books leaflets, booklets, forms etc. to the public in mela/ exhibitions and other functions. **Duties** Promotion of fish culture through publicity media.

Name of the Post	BS	Job Description
Fisheries Watcher	1	**Responsibilities** 1. Performs watch and ward functions under Fisheries Ordinance, 1961. 2. Assistance to the supervisors. 3. Surveying Fisheries Resources. 4. Salvaging young fish of culturable species. 5. Locating spawning grounds & fish seed collection centers. **Duties** 1. Collection of fish seed and stocking of private/ government fish farms. 2. Development of extension work. 3. Proper management, conservation and development of fisheries resources.
Laboratory Attendant	1	**Responsibilities** 1. Handling of laboratory equipment. 2. Cleaning and maintenance of laboratory articles. 3. Maintenance of aquaria. **Duties** 1. Preparation of fish food for experiments. 2. Collection of samples and routine data etc. 3. To provide assistance to research work.
Beldar/Boatman/ Fisherman	1	**Responsibilities** 1. Maintenance of minor repair of nurseries, tanks, hatcheries, farms, attached plots and landscaping. 2. Removal of aquatic weeds and collection of fish seeds. 3. Catching and transport of fish. **Duties** 1. Maintenance and operation of boats. 2. Collection of research material. 3. To provide necessary labour for different projects.

Chapter IV

FISH AND FISHERIES

IV. FISH AND FISHERIES

IV.1. FRESHWATER FISHERIES

IV.1.a. OPEN WATERS

1.a.i. River Fisheries

In rivers, different species of fish (both cat & carp fish) breed to the natural waters. There is a great struggle for existence. The fishes have to find their food by effort and yet keep away from the enemies. During the floods, in the months of June and July, the carp fishes like Rohu, Mrigal and Thaila ascend the streams and streamlets and lay eggs in shallow waters from where they return to the rivers. In the shallow pools the young ones emerge within 24 hours and grow to fry and fingerling stage. With the next flood, after a month or so, they ascend to the streams and find their way to rivers. They become adult in their third year and repeat the process of egg laying.

The river fishery has the following characteristics:

i) There is a great variation of depth, width and speed of water.
ii) There is a great range of temperature.
iii) Life is hard to live against the enemies.
iv) Food has to be searched.
v) Breeding places have to be found.
vi) Natural obstructions have to be surmounted.
vii) The fish has to face the water-current perpetually.

1.a.ii. Canal Fisheries

The life of fish is more difficult in the canals as compared to the life of fish in rivers. In fact any fish that enters the canal is doomed to perish. This is because at least twice in a year closure of canals take place. The whole water from the canals is almost drained off. Most of the fishes therefore die. A few fishes are caught and sold. Others are eaten away by fish enemies. Some are saved by the Fisheries Department. However, a very small number survive in some waters that remain in the deeper places. There are no fish ladders provided in the canals. The fish therefore, cannot go back into the river.

1.a.iii. Lake Fisheries

In Pakistan, the lake fishery is of recent origin. The really big lake is the Mangala Lake (District Jhelum) reputed for Mahashair (*Tor macrolepis)* and common carp (*Cyprinus carpio*). This lake is full of water weeds. Apart from principal carp fish, the lakes have the big Wallago's in large numbers as well as some Channa fish (Murrel).

Excluding the above lakes, are the small dams of various areas varying from 100 to 1,000 acres. They have been stocked with carp fry which gave good results.

The lake fishery is characterized with:-

i) Greater depth.
ii) Greater expanse of water.
iii) The main reservoir is quiet but at the farther end there is main river-current entering into lake.
iv) The depth, temperature and food provide different habitats for fish.
v) It takes quite a long time for a lake to provide necessary environments to fish life, usually a decade.

1.a.iv. Small Dams

Over the past 38 years the Small Dams Organization of the Irrigation and Power Department of the Government of the Punjab has constructed a number of small dams in the Province to provide irrigation to agricultural lands. At present there are 32 dams in operation. All small dams are located in District Jhelum, Attock, Rawalpindi, Chakwal and Islamabad. Detail of Small Dams is as under:-

Rawalpindi District

1. Dhok Sunday Mar
2. Jaawa
3. Misriot
4. Nirali
5. Doungi
6. Khasala

Jhelum District

1. Garat
2. Jamargal
3. Tainpura I+II

Islamabad

1. Rawal
2. Simli.

Attock District

1. Mierwal
2. Jabbi
3. Shakardara
4. Sipiala
5. Bango
6. Ratti Kassi
7. Kanjoor
8. Channibor
9. Qibla-Bandi
10. Shahpur

Chakwal District

1. Bughtal
2. Nikka
3. Dhok Qutab Din
4. Kot Raja
5. Pira Fatehal
6. Garabh
7. Dhurnal
8. Khokher Zer
9. Walana
10. Surla

At present fisheries management in the Small Dam reservoirs in Punjab province is under the control of the Department of Fisheries and has been decentralized to District Officers. The major management functions carried out by the Department of Fisheries in Small Dam reservoirs is stocking of fish fry and issuing of permits for harvesting.

Fish stocks and fisheries in Small Dams are dominated by a number of indigenous and exotic species, mentioned below:-

COMMON NAME	**SCIENTIFIC NAME**
Calbans	Labeo calbasu
Grass Carp	*Ctenopharyngodon idella*
Gulfam	*Cyprinus carpio*
Mahashair	*Tor macrolepis*
Mori or Mrigal	*Cirrhinus mrigala*
Rohu	*Labeo rohita*
Silver Carp	*Hypophthalmichthys molitrix*
Thaila	*Catla catla*

IV.2. FARM PRODUCTION - AQUACULTURE

IV.2.a. Establishment of Fish Farm-Guidelines

Following parameters are considered while determining the suitability of the site for fish culture.

i. Site Selection

Special consideration should be given to the location. It should be located in an area that is not subject to frequent flooding and should have enough elevation, so that farm can be drained out in case of any emergency, should have suitable texture, enough water supply, availability of required inputs, have market road access even during the rainy season.

ii. Soil sampling

To determine suitability of the site for fish culture, soil samples should be taken from the proposed site. They should be from surface and from slightly below the depth that will represent bottom of the pond, i.e. if three feet of soil was anticipated to be excavated, the soil samples should be taken from between three and four feet depth.

A soil sample is taken by drilling a soil auger into the desired depth. The soil in the head of the auger is then placed in a plastic bag and taken to the departmental laboratory for analysis. The bag should be labeled with the farm name, the location and the depth at which the soil sample was taken.

iii. Water Quality

In most areas of the Punjab province water source is either from a tubewell or irrigation canal. The quality of the tubewell water should be analyzed. For this purpose a sample should be taken preferably in a sealed bottle and sent to the Department of Fisheries Laboratory for the testing of total alkalinity, hardness, pH, nitrogen, total dissolved solids alongwith other required parameters.

iv. Farm Designing

A production pond/grow-out pond should be one acre to 2.5 acre area with the length – breadth ratio of 2:1 whereas the size of nursery pond should be at least ½ acre and nursery area should be $1/8^{th}$ of the total production area of fish farming project.

Each production and nursery pond should have an independent inflow as well as outflow water structures to regulate the water level in the pond.

v. Manuring / Fertilization

In a new pond bottom should be manured prior to water filling with 5,000 to 6,000 Kgs organic manure per acre. Cowdung or poultry waste is the most desirable manure. Similar quantity is required to be added periodically in subsequent stages to maintain productivity of the pond through out the growth period i.e. from March to October.

In addition, fertilizers are also applied during the growth period on fortnightly basis to maintain the productivity of the farm.

Different fertilizers require different application procedures. Manures should be evenly spread in the pond whereas fertilizers should be dissolved in the water and then spread on the surface of pond water in a uniform way.

vi. Stocking Densities

Criteria for the stocking of a fish farm

- Stocking be managed according to the carrying capacity.
- Stocking be executed according to the required ultimate weight of individual fish (at the time of harvest) and the optimum space/room required/kg fish.
- Stocking of fish seed be arranged taking into consideration its potential growth rate under different aquaculture management systems.

Recommended Species with Percentage of stocking

Name of the Fish Species	Relative Ratio
Indigenous	
Thaila (*Catla catla*)	10-20 %
Rohu (*Labeo rohita*)	30-35 %
Mrigal (*Cirrhinus mrigala*)	10-15 %
Exotic	
Grass Carp (*Ctenopharyngodon idella*)	15-20 %
Silver Carp (*Hypophthalmichthys molitrix*)	15-20 %

IV.2.b. Farm Management Calendar

Month	Grow-out Pond	Nursing Pond
January	Dry pond	Maintain water at required level
February	Dry pond to cracking	Maintain water at required level
March	Plough the pond bottom until smooth	Maintain water at required level
	Spread organic manure evenly on bottom	Prepare for harvest of advanced fingerlings
	Fill the pond with water	
	Add inorganic fertilizers (dissolve, disperse evenly.)	
April	Transfer advanced fingerlings from the nursery pond to the grow-out pond	
	Maintain water at required level	Drain, dry pond
	Apply fertilizers at the required level	
May	Maintain water at required level	Dry bottom to cracking
	Apply fertilizers at the required level	Plough the pond
	Monitor growth on monthly basis	
June	Maintain water at required level	Plough the pond until the bed is smooth
	Apply fertilizers at the required level	Spread organic manure evenly on bottom
	Monitor growth	Fill the pond with water
		Add inorganic fertilizer dissolved and dispersed evenly
		Maintain water at required level
		Stock with fingerlings of Silver, Grass Carps
July	Maintain water at required level	Maintain water at required level
	Apply fertilizers at the required level	Apply fertilizers at the required level
	Monitor growth	Monitor growth
		Stock with fry of Rohu, Mori, Thaila

August	Maintain water at required level Apply fertilizers at the required level Monitor growth	Maintain water at required level Apply fertilizers at the required level Monitor growth
September	Maintain water at required level Apply fertilizers at the required level Monitor growth	Maintain water at required level Apply fertilizers at the required level Monitor growth
October	Maintain water at required level Apply fertilizers at the required level Monitor growth	Maintain water at required level Apply fertilizers at the required level Monitor growth
November	Maintain water at required level Initial harvest of fish by net, to market	Maintain water at required level
December	Harvest by draining entire pond for marketing Drain, dry pond	Maintain water at required level

IV.3. FISH BREEDING TECHNIQUES

IV.3.i. Pre-Breeding

Brood Fish Care

Sr. #	Particulars	Remarks
i)	**Stocking**	
	Brood fish should be raised and maintained with the stocking rate of 400 to 500 kg/acre. It is preferable to stock 400 kg fish/acre. Different species of fish should be kept in different ponds.	Availability of quality brood stock has a pivotal role in the successful operation of a hatchery. As such healthy stock should be selected and greater attention be focused towards maintenance of proper hydro-biological condition to ensure sustained growth.
ii)	**Fertilization**	
	Bed manuring of the brood stock ponds be carried out with 4,000-5,000 kg per acre organic manure (cowdung) prior to water filling and such ponds be periodically fertilized to maintain productivity to desirable extent with 1000-1500 kg organic manure & 8 kg Inorganic fertilizer per acre per fortnight, subject to qualitative and quantitative fluctuations of plankton level.	Preferably when the water temperature ranges between 25-32°C. At the time of shifting of brood fish treatment with sodium chloride or $KMNO_4$ (Potassium permanganate) be given.
iii)	**Supplementary Feeding**	
	Supplementary feeding of brood stock should be done with Rice polish, Maize glutin and Mollasses in the ratio of 7:2:1 at the rate of 2-3% body	

weight of stocked fish per day.

Note: Brood stock of grass carp be fed with green fodder (Shatala, Barseen, etc.) daily as per the requirement of fish.

IV.3.ii. Breeding

i) Selection of Brood Fish

Brood fish selected at the time of induced spawning should be healthy and fully ripe.

It is to ensure breeding without fail and improve efficiency in breeding results.

ii) Sex Ratio

Male	:	Female
1	:	1

iii) Hormone Dosage (Ovaprim)

Fish Species	Total dosage ml/kg for male	Total dosage ml/kg for female	In case of proper maturity of brood stock preferred doze should be 0 – 6 ml/kg for male & 0.1 ml/kg for female.
i) *Ctenopharyngodon idella* (Grass carp)	0.6 – 0.7	0.1 to 0.2	Fertilization is executed only through stripping after 10-12 hours of hormone injection.
ii) *Aristichthys nobilis* (Big head)	0.6 – 0.7	0.1 to 0.2	-do-
iii) *Hypophthalmichthys molitrix* (Silver carp)	0.6 – 0.7	0.1 to 0.2	-do-
iv) *Catla catla* (Thaila)	0.5	0.1	-do-
v) *Labeo rohita* (Rohu)	0.3 – 0.4	0.1	-do-
vi) *Cirrhinus mrigala* (Mori)	0.3 – 0.4	0.1	-do-

IV.3.iii. <u>Post Breeding</u>

<u>Incubation</u>

i) Circular tank

a) Quantity of eggs — 8,00,000 to 10,00,000 lac eggs in a tank of 5 cft dia

b) Water Supply — The supply of water in circular tank be arranged between 22-25 litres per minute.

c) Screen — Screen at the central exit pipe should be of preferably bolton cloth or nylon cloth and the number of mesh be 4,200 or slightly above per sq. inch.

ii) Mc Donald Jar (Glass Jar)

a) Water Supply

Water supply to each Mc Donald Jar should be regulated with 1- 1.5 litres per minute.

b) Quantity of eggs

15,000 – 20,000 eggs / Jar

Nursing of Hatchling

Feeding of Yolk fry be avoided.

Following is duration period for nursing of hatchlings till these become first feeding larvae/fry.

Hours	Water Temperature
72 – 80	27 – 28°C
80 - 96	25 – 27°C

Fry is ready for rearing when air bladder is formed and yolk sac is nearing absorption.

Preparation of Fry Ponds

i) The pond should be sun dried before the breeding schedule is commenced.

To ensure dis-infection of pond soil.

ii) The pond should be fertilized with organic manure (cowdung) @ 4000 -– 5000 kg/acre subject to qualitative & quantitative fluctuations of plankton level.

Dry manure is preferable. The fertilization should be executed the day fertilized eggs are obtained.

iii) Fill the pond with water to a depth of 1.5 to 2.00 feet and maintain it.

Addition of water should be managed just after the pond is fertilized.

iv) Observe the production of micro fauna after 48 hours of fertilization.

At a temperature of 25 –32°C, after 48 hours of fertilization, protozoans and rotifers start appearing. After 72 hours the first food (protozoans and rotifers) are produced fairly abundant.

v) Add insecticide, @ 0.5 – 1 ppm. In case dry pond is not available, net out the stock from the fry receiving pond as far as possible, reduce the water to minimum possible level. Assure extermination by Rotenon or any other recommended insecticide @ 1ppm. Manure/ prepare the pond as per doze referred in (ii & iii)) above. Add insecticide.

Only insecticide of mild toxicity, preferably of organophosphate group be used. Check toxicity of the insecticide after 48 hours of its addition prior to release of stock. Survival of fry in a sample of water collected from treated pond upto 4 hours will give satisfactory results.

Stocking of Fry

i) **Rate of Stocking**

4,00,000 fry/acre

ii) At the time of stocking of fry, care should be taken to ensure acclimatization of fry with pond water temperature.

To avoid temperature shock to fry.

iii) Start raising water level of pond by 2" to 3" per day till it reaches the depth of 3 feet after the stocking of fry.

iv) Start feeding fry with artificial feed after 10 – 14 days of stocking of fry.

v) Feed ingredients may be rice polish + Maize glutin (30%) in fine powdered form with the ratio of protein 8:1 respectively @ 5% of total weight of fry/day.

vi) Start fertilization of the pond with 1000 – 1500 kg cowdung & 8 kg inorganic fertilizer, subject to qualitative & quantitative fluctuation of plankton level.

IV.4. DISEASES OF FISH AND THEIR CONTROL / PREDATORS

The tremendous growth in fish farming activity in Punjab has highlighted various issues of fish husbandry including fish diseases and their control. The problems of fish diseases are related to stocking density, level of aquaculture technology applied and inputs going into the fish ponds.

In fish farms the fishes are densely stocked and thus are more susceptible to different diseases. Uncontrolled and unregulated transport of fish and poor farm management is also considered as cause of spread of disease. Disease causes mortality, poor growth, loss of fecundity and minimize production.

All culturable fish species, *Labeo rohita, Cirrhinus mrigala, Catla catla, Hypophthalmichthys molitrix and Ctenopharyngodon idella* are affected by bacterial, fungal and parasitic diseases and infections. Moreover, poor water quality in fish ponds also put fish under stress which can lead to fish mortality. In ponds fishes are also under stress of predation by some predators at the early age.

Some commonly occurring fish diseases, predators and their control is given as under:-

Abdominal Dropsy

This is the most common and important bacterial disease of cultured carps. Bacteria infect fish through water, physical contact and contaminated feed. The diseased fish has sunken eyes, contains watery fluid mixed with blood in abdominal cavity and belly becomes swollen. This disease is treated with the use of antibiotic i.e. oxytetracycline or terramycine in feed for 5- 10 days @ 60 mg/kg fish weight.

Fin Rot

This is also a bacterial disease of cultured carps. The edges of fins of diseased fish become darker in colour and split up. The caudal fin become reddish and is eventually eroded. This disease is also treatable with antibiotic chloromycetin bath @ 60 mg/l for 5 minutes for six days and copper sulphate bath @ 50 mg/l for 1 minute.

Lernaeasis

This is an ectoparasitic infection in fish. The parasite *Lernaea* sp. penetrate into the skin of fish and cause wounds, which lead to secondary infection. Infected fish become week and their scales fall down. This parasite infects all parts of the body of the fish. Lernaeasis is treated with chemicals such as dipterex @ 0.2 – 0.5 mg/litre in pond and thunder @ 0.25 ppm in pond.

Saprolegniasis

This is a fungal infection commonly found in our fishes. The spores of fungus saprolegnia invade wounded fish. The fungal hyphae penetrate into fish musculature and damage fish flesh. At the point of attachment fungus appear as cotton wool. Saprolegniasis can be treated by giving Malachite green bath to infected fish @ 1 mg/litre solution for 1 hour.

Anoxia

Depletion of oxygen in fish pond is called anoxia. This condition may be due to rise in water temperature in pond, over-stocking of fish seed and other biological factors. In anoxia condition, fish comes on the surface of water, stops feeding and shows restlessness. The Anoxia condition in pond can be improved by addition of fresh water and agitating pond water.

Fish Predators

In fish farms there are some predators which prey on fish from fry to adult stage. These predators include water insects, amphibians, reptiles, birds, carnivorous fish and even mammals.

Harmful insects include, water beetle, water bugs, water scorpion etc. These attack fish eggs and fry. These insects can be controlled by improvement in nursery ponds management.

Frogs and toads also prey on fish fry and fish. The best way to control them is by destroying the breeding grounds of these amphibians.

Tortoises and snakes also eat fish. These can be controlled by netting them out of pond and destroying them.

Aquatic birds like king fisher, fishing eagle, heron and others prey on small and big fish. These birds can be controlled by shooting and keeping away.

The presence of carnivorous fish in pond also affects fish production and growth. These fish prey on farmed fish. Carnivorous fish include *Mystus* sp., *Wallago* sp. *Channa* sp. etc. These fish may enter the farm through canal water or by stocking unidentified fish seed from natural waters. These unwanted fish can be eradicated by use of rotenone and even installing fine screens at water inlet.

Water rats and otter eat small fish, eggs, fry and even big fish. These animals also destroy fish feed. These predators can be controlled by fixing fences around the ponds and catching them in traps.

IV.5FISH HARVEST
IV.5.I: Types of Nets

CAST NETS

BEHRKO	It is conical in shape, provided with pockets iron, lead sinkers at base used for catching fish in Rawalpindi & Multan areas.
DOBAJU	It is conical in shape, provided with pockets, iron & lead sinkers at base, used for catching small fish in Multan areas.
JARI	It is conical in shape, provided with pockets, iron & lead sinkers at base. It is used for catching small fish in Hyderabad, Quetta, Multan areas.
OCHHALWAN JAL	It is conical in shape, provided with pockets, iron & lead sinkers at base. It is used for catching fish in Manchar Lake District Dadu, Hyderabad areas.
PALKU	It is conical in shape, provided with sockets, iron, lead sinkers at base used for catching fish in Rawalpindi & Multan areas.
RAKHA	It is conical in shape, provided with sockets, iron, lead sinkers at base used for catching fish in Rawalpindi & Multan areas.
SORU	It is conical in shape, provided with pockets, iron, lead sinkers at base used for catching fish in Rawalpindi & Multan areas.
SOTWAN	It is conical in shape, provided with pockets and lead, iron sinkers at base used for catching smaller fish in Lahore, Peshawar, Multan, Rawalpindi & Sargodha areas.
VEHERN	It is conical in shape, provided with sockets, iron, lead sinkers at base used for catching fish in Rawalpindi & Multan areas.

DRAG AND SIENE NETS

BHAN	It is the biggest known net used for catching Palla in River Indus in the Hyderabad areas, made of Cotton/Nylon operated by 12-15 persons from boats, dragged towards bank exploiting fish. No pockets, float of pan & sinkers of iron and lead.
GHAWA	It is made of cotton, provided with pockets, has floats of gourd, lead/iron sinkers. It is operated by 10-12 persons. The rope at head end is tied to a pole or held by two fishermen on the bank. The net is carried in a boat & laid in water then pulled slowly towards the bank from where it was operated trapping the fishes moving in that area, mainly used in catching palla fish from river Indus in Hyderabad areas.
KARRA	It is made of cotton or Nylon, operated by 4-10 persons used on the Balochistan Coast.
MAHAJAL (Patti (Bhiga), Toofanjal (Kadh), Chhatta (Kurga)	It is made of cotton or hemp, rectangular with pockets, floats of weed at head end & iron sinkers at lower end, used in stagnant waters, operated by 4-10 persons in Peshawar, Rawalpindi, Sargodha and Gujrat Districts.
PATTA	It is made of cotton, rectangular in form and is used in stagnant waters in Quetta & Kalat areas.
UCH	It is made of cotton or nylon provided with floats operated by 4 to 10 persons. It is used on Balochistan Coast.

DIP NETS

KURLI This net has cone type shape, made of cotton, used in Manchar Lake.

KHURLI This net is conical in shape, made of cotton used in Hyderabad district.

DRIFT OR GILL NETS

NARA It is made of cotton or nylon, has floats of reeds but no sinkers, operated by 4-10 persons used in stagnant waters in Hyderabad & Khair pur areas. When laid in water, it sinks lying between 1 ft to 6 ft below water surface, used for catching all fish types.

OJHANI It is made of nylon and provided with earthen floats at head ropes and iron / lead sinkers at ground ropes. It is operated by 3-5 persons. It is used for catching palla fish in river Indus.

FIXED NETS

ADOA OR PATHARO It is a rectangular cotton net without floats. The sinkers with pockets are at the lower end. It is operated by fishermen in 2 or more boats who move by beating their copper utensils, rocking their boats from side to side and splashing water with bamboos thereby trapping fish in stagnant waters especially in big lakes of Hyderabad areas.

CHADAR JAL It is rectangular net, used in shallow pond waters spread in the center of pond with its corners tied with poles which are fixed into soil. It is operated by four or more persons from the corners of pond who lift the net immediately after trapping the fish.

KHANDI It is a rectangular cotton net without floats and sinkers. It is fixed with long bamboos with a gap of 6-8 feet. Its head end is flushed with water & lower end is fixed in mud.

NARA Its lower part has sinkers, floating with floats attached to the upper rope fixed at one of the poles & fish are driven towards the nets.

NILOTU OR PAND It is made of cotton with floats of reeds but no sinkers, fixed by 3-5 persons across a stream during night, used in gilling fish in Rawalpindi, Sargodha, Hyderabad areas.

NURAH It is a rectangular Aak fibers net operated by single person in district Sargodha and Gujrat.

PATTI It is a rectangular cotton or nylon net without floats, with sinkers of burnt clay. It is fixed with bamboos or wooden stakes used in stagnant waters operated by 2-4 persons.

SEHAR It is a rectangular cotton gill net provided with floats of reeds & sinkers of burnt clay fixed at the bottom by wooden pegs provided at lower end of net. It is operated by two persons in stagnant waters in Hyderabad region.

SOONIMAR PATTI It is a rectangular cotton net, provided with float of pan & burnt clay sinkers. Its lower end is fixed to the bottom by two wooden pegs. The floats & sinkers keep the net in vertical position. It is used for catching the fish crossing it from either side in shallow stagnant waters in Hyderabad areas.

THORIAR It is a rectangular cotton net provided with floats but no sinkers. It is operated by 20-30 persons who drive the fish towards this fixed net by splashing water with bamboos & also by causing commotion in water by rocking their boats. Another net is fixed attached to the free arm of this fixed net for the exploitation of fish, in stagnant shallow waters.

HAND NETS

DHANGLA It is bag type net operated by two persons in shallow waters in Sheikhupura, Gujranwala, Sialkot districts.

KALERA It is a bag like net with a wooden frame having a short strong handle operated by a single person used for catching palla from river Indus in district Thatta.

KOCHHRI Bag nets circular in shape, made of cotton supported by bamboo handle used in Multan division.

SAGGAN Circular or triangular in form, used in Multan division.

SAND OR SAMBOI Triangular purse net made of nylon supported by a wooden frame, used for catching palla fish in river Indus in Hyderabad district.

RODS & LINES

BANSI It is a fishing rod made of bamboo with or without a pulley and a line made of cotton or nylon, with one barbed hook fixed to the line, with a float of reed or light wood.

CHABB OR CHIPLI It is a type of rod & line used by children with one barbed hook & a float of reed.

DOR/LANG/ WHANG It is a long line made of cotton or nylon cord, snoods with barbed hooks at their ends which are attached to the line, at suitable intervals. Two ends of line are tied to the boats and hooks are baited and left overnight in water and are hauled in the morning.

DORI It is a handline comprising a strong cotton or nylon cord provided with 1 to 3 barbed hooks and with a float of reed or piece of light wood.

SPEARS

BHALLA OR TIRI It is composed of a blade with 4-5 barbed points attached to a bamboo or wooden shaft thrown either from boat or bank with great force at the fish. The blade plunges into the body of fish, spear is lifted out of water and fish removed.

CHATTO: It consists of a blade with two barbed points attached to a wooden shaft or a bamboo used for killing tortoises in Mancher Lake. The hunter by creating vibrations in the water causes the prey to come on the surface. As the prey comes above, he plunges the spear in its soft parts & lifts it out of water.

IV.5ii. Fish Marketing

Fresh fish is traded throughout Punjab. Retail markets are established in almost all the cities and towns of the province. Wholesale and distribution markets are limited to the cities and big towns. Marketing of the fish continues throughout the year except June, July and August. Lahore, Rawalpindi, Gujranwala, Faisalabad, Multan, Kasur and Sahiwal are the major fish markets in the Punjab. Each district and tehsil headquarter also serves as a fish market.

The perishable nature of fish, lack of appropriate transport facilities, day to day fluctuation of fish catch, functioning of un-regulated markets, non-availability of adequate storage facilities and limited taste for fish are the factors which have complicated the marketing system of fish.

Fish Marketing Channel

A route followed by a commodity in the marketing operation from the producer to the consumer is called marketing channel. The marketing of fish in Punjab is carried out through indirect channel. Fish is generally brought in the markets direct from rivers as well as from fish farms in private sector. Some quantity of fish is directly auctioned to retailers (consumers) whereas the surplus quantity is marketed to the wholesalers.

Marketing Intermediaries

Marketing intermediaries include all the individuals or firms who handle the fish after it leaves the producers untill it reaches the consumers. They are of two types. One who assumes business risk, invests capital and accepts the title of goods i.e. contractor, private fish farmer, middleman and retailer. The others who bear no risk and do not accept the ownership but sell their services i.e., fishermen, commission agents and jobbers.

a) Contractors

The contractors perform a key role in the marketing of fish. They take the contracts or lease of fishing rights of public water areas from the Fisheries Department. They manage the catching of fish and supply to markets.

b) Private Fish Farms

They produce the fish in their farms and supply the same to the market.

c) Wholesalers

They buy and sell the huge quantity of fish. They operate their business in assembly. To attract sellers, they extend shortterm loans to both producers and contractors on the pledge that loanees would sell the fish to them.

d) Retailers

They buy the fish in small lots and sell to ultimate consumers. Fish retailing is mostly done through shopkeepers. However, a number of hawkers and venders sell fish by sitting at footpaths or wandering on bicycles.

Fish Supply to Markets

The fish after harvesting/catching is degutted, graded, packed and transported to the market as detailed below:-

a) Fish Catching

The contractor and private fish farmers engage the fishermen on contract basis to catch the fish from public water areas and private fish farms. The fishermen generally operate in a group and wages are paid in accordance with the quantity of fish caught either in shape of cash or kind.

b) Degutting

Degutting is the process performed after catching the fish. An incision is given to the fish to remove the gills and intestines. It increases the storage life of the fish.

c) Grading

The fish population is heterogeneous. It varies in respect of species as well as the degree of freshness. The rates vary by species and weight.

d) Packing

Fish is mostly packed with ice for handling and transportation. It is commonly packed in baskets and jute sacks/bags.

e) Transportation

Fish is a perishable commodity. Efficient transportation plays a vital role in the marketing of fish. Transportation is done by men, pack animals, motor vehicles and railways.

IV.6. ORNAMENTAL FISHERIES

Ornamental fish culture is an old practice, which is being carried out in almost all parts of the world. There are a number of types and varieties of ornamental fishes with specific characteristics for display and exhibition.

IV.6.i. Aquarium Fish Production

The majority of aquarium fishes are egg-laying species, with eggs being expelled by the female and fertilized by the male during spawning. Within this category, the egg-laying species commonly found in aquaria can be divided into five groups according to spawning habits namely egg-scatter's, egg-buriers, egg-depositors, mouth- breeders and nest builders.

Egg-scatter's have little or no parental care. These fishes simply scatter their eggs into the water e.g. Barbs, and gold fish

Egg-carriers. These fishes make an attempt to care for their eggs, even those that never see their offspring e.g. killi fish.

Egg-depositors. These fishes select their own breeding partner, then choose and clean spawning site. The chosen site may be out in the open, on a plant leaf or upturned flowerpot. They forcibly keep other fish away from the surrounding area by chasing them away. The eggs are deposited on the plant leaves, on the tank side or in the depression in the gravel e.g., angel fish (*Pterophyllum scalare)* and tilapia (*Oreochromis niloticus*) are *mouth-breeders* that carry their eggs in their mouth until they hatch e.g. cichlid are *nest builder* some fishes that construct nests in which their fertilized eggs are laid and guided until hatching occurs e.g., Gouramis and some sun fishes.

Life-bearer fishes differs from egg lying because the eggs develop inside the female fish, not outside. The male's anal fin-the gonopodium–is modified, so he can introduce sperm into the female.

There are two types of life-bearer fishes one is called viviparous and other is ovoviviparous. In the former the eggs are nourished through the female's blood stream and in the later the eggs are nourished by the yolk-sac.

IV.6.ii. Aquarium Fishes

A number of types of ornamental fishes are being raised according to the demands in government and private sector. The prominent among these fishes are Gold fish, Guppies, Mollies, Angel fishes, Zebra fishes, etc.

The goldfish (*Carassius auratus)* has been reared as an ornamental fish for centuries, and is still raised in great numbers, as an ornamental fish. It is widely available from commercial sources in size from one to five inches. The fish will spawn when it reaches a length from four to five inches.

The goldfish has been selectively bred for variation in finnage, color, and telescoping of eyes. It tolerates handling, eats dried foods, and is attractive in appearance.

The zebra fish (*Brachydanio rerio)*, is a favourite ornamental variety and is widely available in market. The zebra grows and reproduces readily in captivity. It can be maintained on dried foods and is small enough, about 1.5 inches that only the most limited facilities are required for its rearing. Like most "tropicals" the zebra fish should be maintained at a temperature of 75º to 80º F.

To spawn this species, one should place several males and females in a cage of nylon marquisette suspended in water tank. Water depth in the tank should be only three or four inches. The cage should be suspended approximately one inch above the bottom of the tank. When the fish spawn, the eggs fall through the netting and escape being eaten. Zebras fish may also be spawned over gravel, but a large tank is required.

Bullheads (*Ictalurus spp.)* can be held in aquaria and fed on meats or meals. They respond negatively to light and are probably more suitable as experimental fish when kept in subdued light. In small ponds bullheads tend to become very numerous, and by seining one may frequently obtain large numbers of uniform size.

Guppy (*lebistes reticulates*), re-produces rapidly, and since it is not too inclined to eat its young, no special precautions are needed to ensure their survival. It has a short life cycle. Numerous colors and finnage mutations of the guppy have been preserved by hobbyists.

The platy (*platypoecilus maculatus*) and swordtail (*Xiphophorus helleri*) are quite similar to the guppy in size, color variations and environmental requirements but do not reproduce and survive as successfully as guppies.

Chapter V

EFFECT OF WATER POLLUTION ON FISH ECOLOGY

V. EFFECT OF WATER POLLUTION ON FISH ECOLOGY

V.1. REDUCED FISH PRODUCTION FROM NATURAL WATERS.

There are many causes of reduced fish production from natural waters. Amongst these, aquatic pollution is the main cause. Aquatic pollution takes place by the effluents from Industries, sewage wastes from big cities and use of pesticides and insecticides. Among other factors construction of Barrages, etc on the rivers; Global warming, heated effluents from power generating plants/nuclear plants, drought, change the entire ecology of natural waters and reduce fish production.

V.2. AQUATIC POLLUTION/POLLUTING ELEMENTS

In Pakistan rapid industrialization and urbanization has resulted in increased discharge of various types of effluents into natural waters. Besides due to ever increasing use of insecticides and pesticides, the part of these chemicals get their way into natural waters. All this has an adverse effect on aquatic environment and on fish.

The major source of surface water in Pakistan is the Indus river and its major tributaries, the Kabul, Jehlum, Chenab, Ravi & Sutlej. Fishing in these waters is widely spread in all the provinces/regions. These Rivers and Canals are also the chief breeding areas and the principal fish producers. However, these major sources of surface waters have lost their purity due to pollution. Pollutants can be grouped mainly into:-

i. Industrial effluents
ii. Domestic sewage
iii. Agricultural chemicals

V.2.a. <u>Industrial effluents</u>

i. Acids, mainly inorganic and some organic from Acid manufacturing, chemical industry, steel industry cause the pH<6.0
ii. Alkalis from Food Industry, Chemical Industries, Textile Manufacture cause the pH>9.0
iii. Antibiotics from pharmaceutical Industry.
iv. Chromium, lead, zinc, copper, etc., from metal processing for example electroplating, anoding, tanneries, are toxic to fish as they precipitate and clog the gills of fish.
v. Detergents from textile manufacture, detergent manufacture, laundries, food industry, etc. These cause respiratory distress by destroying the gill surfaces.
vi. Insecticides like D.D.T., Parathion, Dieldrin, Malathion, etc. from Agricultural spray, disturb the action of central nervous system of fishes.
vii. Ammonia from cloth manufacture, fertilizer manufacture, rubber industry, upsets water balance level by increasing permeability.
viii. Cyanides from coke manufacture, metal plating, etc., inactivate the enzyme system related to the uptake of oxygen.

With the increasing industrialization and manufacturing of new products with new & varied processes industrial pollution has increased both in qualitative & quantitative terms. The industries are situated in big cities and their effluents, treated or untreated find their way into surface waters.

V.2.b. Sewage

Domestic sewage from big cities is another important source of biological pollution. The huge organic load exerts heavy oxygen demand on the receiving stream. Lahore is the second biggest city of Pakistan and its sewage is being discharged into river Ravi without treatment in such a quantity that at low flow hardly 1:1 dilution is available. Similarly, River Chenab receives sewage water from Faisalabad & Multan cities. Same is the case with other rivers and streams.
Sewage has a high bio-chemical oxygen demand which deprives the water of its dissolved oxygen. In the absence of dissolved oxygen, an aerobic bacteria produce toxic gases as methane, hydrogen sulphide, ammonia and phosphene etc., resulting in fish kills.

V.2.c. Agricultural Chemicals etc.

The entry of insecticides, pesticides and other chemicals used in agricultural sprays, mosquito and other insects control also find their way into surface waters and cause pollution. Similarly, oils from garages, workshops, etc., when enter a stream, cut off the surface of water from the air, causing dissolved oxygen depletion.

V.3. EXTENT OF POLLUTION

The pollution due to the above mentioned causes has resulted in the decline of natural fisheries. River Ravi, River Soan, Deg Nullah, Rohi Nullah, Pulkhu Nullah, Seepage drains of Faisalabad, etc., are some of the many affected sites. Water pollution has resulted in great damage to aquatic fauna and flora. Fish mortalities have often been reported in rivers, canals streams, etc., due to aquatic pollution.

IMPORTANT WATER QUALITY PARAMETERS SUITABLE FOR WARM WATER FISH

	Parameter	Suitable Range	Optimum Range
1.	Temperature	10-35 ºC	20-30 ºC
2.	pH	6.5 – 9.0	7.0 – 8.00
3.	Light penetration	15-45 cms	20-30 cms
	a. Dissolved oxygen	3.00 ppm & above	5.0 ppm & above
	b. Free carbon dioxide	0–20 ppm	3–10 ppm
	c. Total alkalinity	20–600 ppm	75–400 ppm
	d. Total dissolved solids	20–3000 ppm	100-1500 ppm

Toxic gases as ammonia, hydrogen sulfide, toxic metals as Chromium, Zinc, Lead, Nickle, etc., cyanides, grease, oil Tar should almost be absent.

Working Standards for effluents discharging into Fishing Streams

(Where 1:8 dilution of River, Canal water, etc., is available)

S.No.	Parameter	Standard
1.	Temperature	32 ºC
2.	pH value (Acidity/Basicity)	6.0 – 9.0
3.	Biochemical oxygen demand at 20ºC (BOD)	20 mg/l : 5 day
4.	Chemical oxygen demand	Not > 730 mg/l
5.	Total suspended solids	30 mg/l
6.	Total dissolved solids	3500 mg/l
7.	Cr & other toxic metals either singly or in combination	Not more than 0.5 ppm

8.	Pesticides, herbicides, fungicides and insecticides	Not more than 0.15 mg/l
9.	Sulfides as HS	Not more than 0.1 mg/l
10.	Chlorine	Should be absent
11.	Cyanides (as HCN)	Not more than 0.1 ppm
12.	Oil and Greases.	Nil

V.4. HOW TO CONTROL POLLUTION

a. In Ponds

In ponds, pollution is usually due to lack of sufficient dissolved oxygen which results from:-

i) Over stocking
ii) Over manuring
iii) Increased use of feed.

Overstocking causes consumption of oxygen by fish, thus lowering oxygen of the pond. Use of high dozes of organic manure, use of excessive feed resulting in putrefaction of unconsumed feed exert high biochemical oxygen demand on the pond. The DO deficiency causes asphyxiation and mortality of fish.
It is imperative, therefore, that to prevent pollution in ponds, following points should be given due consideration:

1- Stocking of fish should be done as per recommended stocking rate & fish species.
2- Fertilizers and manures be used in recommended dozes only.
3- Feeding be done in recommended doses with proper techniques.
4- Hygienic conditions be maintained during fish farming activities.

b. In Natural Waters

1- Prevention is better than cure. Preventive measures are much cheaper and more effective than remedial measures. The industries must treat the effluents of their respective industries as per standards laid down by the E.P.D and Fisheries Department. The industrialist may feel the cost of pre-treatment as a burden, but as a rule, "The polluter must pay the cost"; The polluter should bear it.
2- The agencies involved in pollution control must have qualified managers/staff to check at the site of entry of effluents into the natural waters to ensure if proper treatments of effluents have been done. For this purpose availability of adequate lab equipment/facilities is a must.
3- Municipalities & corporations must install proper checks & treatments of wastes, before throwing these into natural waters.
4- Proper mass motivation by awareness campaign is also needed.

V.5. CLIMATIC IMPACTS

Climate has a profound effect on fish and fisheries and allied ecological factors. Every aquatic organism including fish species have adapted themselves to conditions which favour their optimum living conditions. Any change in climatic conditions, will favour some organisms and at the same time disfavour the other organisms and species for example warming of a certain stream will favour the establishment of organisms that require warmer conditions and disfavour the species that require low temperatures. Organic load will reduce the dissolved oxygen concentration and will favour fish species that can live at reduced dissolved oxygen concentrations. Similarly, changes

in salinity will favour species that are best adapted to the changed salinity and will disfavour the species that are not suited to that change.

V.6. CHANGES IN RIVER/CANAL ECOLOGY

The pollution process causes elimination of less resistant organisms/ population leaving more resistant species. Process of eutrophication, turns a system, once of economical value and good looking into a system which is uneconomical and bad looking. Where pollution load is present round the year, most of the organisms including fish break down. Where pollution load is present at certain periods of the year, fishes and organisms with only a short span of life can survive and these include fishes of low economical value.

V.7. EFFECTS OF POLLUTION ON BIOLOGY OF FISHES

Due to pollution some effects on the biology of fishes may be observed as indicated below:-

a) **Migration:** Sub lethal doses of pollutants may cause migration of fishes to less polluted zone.
b) **Behaviour:** Chemo receptors of fishes required for search of food may be interfered with by pollutants.
c) **Incidence of disease:** These may increase the chances of disease attacks.
d) **Life cycle:** Interruption at any stage in life cycle can occur.
e) **Physiological processes:** Pollutants may interfere with respiration and other enzymatic processes, affect central nervous system of fishes, interfere in the hatching of eggs, mar photosynthesis in planktonic algae and interfere with digestion in fishes, etc.
f) **Genetic effects:** Pollutants may cause long ranging genetic effects eg; radioactivity can cause mutations; oils & other organic compounds may cause both carcinogenic and mutagenic effects on fishes and other aquatic organisms.

Chapter VI

FISH SPECIES

AND

AQUATIC VEGETATION

VI.1. TAXONOMY AND DISTRIBUTION OF FISHES

VI.1.a. FISH, STATUS IN HUMAN DIET-IMPORTANCE

The food value of fish has been recognized all over the world. Proteins have a key role in human diet for proper growth and other vital activities. Fish is regarded as an excellent source of protein for human diet. As compared to other sources of animal protein, the fish provides highly digestible protein which has also much growth promoting value for humans. Recent studies have proved that fish proteins are superior to that of milk, beef and egg albumen regarding digestibility which is in the order of 96% for fish. These proteins comprise all the essential amino acids in required concentration in human diet namely, lysine, arginine, histidine, leucine, isoleucine, valine, threonine, methionine, phenylalanine and tryptophane. This makes the biological value of fish much higher. Fish, therefore, is also an effective supplementary diet for people whose diet is principally of plant origin that is deficient in lysine and methionine.

In addition to about 20% proteins fish also contains phosphorus, iron, calcium, iodine, vitamin A, vitamin D, vitamin B/vitamin B_2 and niacin for supplementation of human diet. Flesh of fish is white and has a food value of 300 to 600 calories in one pound of fish. Fish is also highly nutritious as child food and is easily digested by infants. In short, the nutritional value of fish is higher than that of beef, lamb, sheep and poultry. Above all, it cooks easily, possesses an agreeable taste and flavour and is easily digestible. In recent studies, it has also been recorded that fish meat in the human diet reduces the risks of heart problems by reducing the formation of cholesterol as it possesses highly unsaturated fatty acids in it.

VI.1.b. FISH TAXONOMIC STATUS

Pakistan is bestowed with immense aquatic resources both marine and freshwater. The marine fauna is not discussed here and focus is made on freshwater fauna only. The freshwater fisheries resources include rivers, canals, lakes, streams, huge reservoirs emerging by construction of dams and barrages.

Fish is the most abundant and successful of all vertebrates encountered in water. The reason probably is that about $3/4^{th}$ of the globe (Earth) is ocean and the remaining $1/4^{th}$ also includes rivers, canals, drains, lakes, pools and rapids. According to an estimate more than 20,000 fish species are recorded in the world. However, the number of freshwater fish species recorded so far in Pakistan is 186.

The animals are classified on the basis of similarities and differences amongst them that form the basis of relationships between them. Animals most closely associated are placed in similar groups.

The fish (an exclusively aquatic organism) belongs to the Phylum Chordata of the Kingdom Animalia. They are placed in Sub Phylum Vertebrata which comprises two Super Classes Agnatha (jawless vertebrates) and Gnathostomata (jawed vertebrates) which is further subdivided into six classes namely Class Elasmobranchiomorphii (cartilaginous fishes), Teleostomi (bony fishes), Amphibia, Reptilia, Aves and Mammalia.

All the freshwater fish species found in Pakistan belong to the Class Teleostomi.

The classification of these species alongwith diagnostic features is as follows:

Kingdom: Animalia
Phylum: Chordata
Sub-Phylum: Vertebrata
Super Class: Gnathostomata (jawed vertebrates)
Class: Teleostomi (bony fishes)
Sub-Class: Actinopterygii (ray finned fishes)
Infra Class: Teleostei

The animals are named following the International Code of Zoological Nomenclature. According to the provisions of this code the generic name and names of all the preceding levels must begin with capital alphabets whereas the specific and sub specific names must always commence with small alphabets.

The freshwater fish fauna of Pakistan belongs to the following 9 orders and 20 families.

	Order	**Family**
1.	Clupeiformes	Clupeidae (palla, palri)
2.	Osteoglossiformes	Notopteridae (featherbacks)
3.	Salmoniformes	Salmonidae (trouts, salmon, white fishes & graylings)
4.	Cypriniformes	Cyprinidae (minnows & carps) Bagaridae (bagrid catfishes) Siluridae (Eurasian catfishes) Schilbeidae (schilbeid catfishes) Heteropneustidae (stinging catfishes)
5.	Beloniformes	Belonidae (needle fishes)
6.	Cyprinodontiformes	Cyprinodontidae (killi fishes) Poeciliidae (livebearers)
7.	Perciformes	Centropomidae (snooks) Nandidae (leaf fishes) Cichlidae (cichlids) Gobiidae (gobies) Channidae (snakeheads) Anabantidae (climbing perches)
8.	Mastacembeliformes	Mastacembelidae (mastacembelid eels)
9.	Synbranchiformes	Amphipnoidae (cuchia)

The details of species belonging to each family may be seen at page 129.

VI.1.c. FISH, ECOLOGICAL STATUS

The abundance and distribution of fishes in the waters of the earth are the products of interaction among fishes and their chemical, physical and biological surroundings. The study of relationships between an organism and its environment is the subject matter of ecology. All the communities in these habitats are continually changing.

In order to support/sustain any ecosystem the energy and nutrients are the basic requirements. In aquatic ecosystems the main source of energy is the light, only a fraction of which in aquatic ecosystems appears in the form of fish flesh as this energy is first harnessed by aquatic plants (producers) through photosynthesis that is followed by consumers i.e., animals including fishes. The key nutrients namely Carbon, Nitrogen and Phosphorus available for synthesis into protoplasm in the hydrosphere are circulated in biogeochemical cycles.

The environment of fishes is composed of many factors in addition to nutrients that may limit populations or influence geographic distribution. Any of these

factors may be limiting when it is present in quantities which are either too little or too large.

Aquatic organisms including fishes, may be classified ecologically in several different ways. According to environmental tolerances, they may be grouped as either narrowly or broadly tolerant. The corresponding expression is prefixed respectively either by "Steno" (narrow) or "Eury" (broad). For temperature the classification is thus stenothermal or eurythermal, for salinity it is stenohaline or euryhaline, etc. Fishes may also be categorized on the basis of location in aquatic ecosystems i.e., benthic (bottom dwellers or ground fishes), pelagic (free swimming) or planktonic (depending on currents for their movements as do the larval young of many species). In lakes and ponds, littoral zone fishes are those of the inshore waters where light penetrates to the bottom and rooted green plants are often present. Limnetic zone fishes are those of offshore waters free of rooted plants, and extend downward to the light compensation level where illumination is inadequate for sustained life of phytoplankton, and profundal zone fishes are those in the darkened waters beneath the light compensation level. The foregoing categorizations illustrate stratification of communities in ecosystems. However, the species composition of the zone may be expected to vary geographically. In the flowing waters, the readiest division of the habitat and its occupants is into two rather subjective zones pools and riffles. The current of the riffles is generally fast enough to move sand and silt which is then deposited in pools and backwaters. The environmental forces that affect the lives of fishes are many, complex and interrelated in their effects e.g., temperature, light, current, dissolved oxygen, food, social factors, population density, population structure, succession, etc.

Freshwater occupied by fishes occurs both on the surface of the earth and in the subterranean waters of caves and underground stream channels.

The fresh surface waters of the earth are broadly separable into two groups of environments, standing or lentic and flowing or lotic. The lentic habitats include those of natural lakes and ponds along with many impoundments constructed by man. The lotic environment is that of river and streams. To these may be added the special conditions found in (a) springs, which may be sources of either lakes or streams, and (b) estuaries and heads of large impoundments where the lotic conditions of streams grade into lentic.

The Punjab Province has been bestowed with huge water resources wherein both types of ecosystems exist in the form of lotic and lentic waters. The total area of the lotic systems is 29,63,700ha. The major rivers of Pakistan are Indus, Ravi, Jhelum, Chenab and Sutlej that traverse huge distances. The running waters display typical characteristics with regard to temperature, turbidity, silting patterns, etc. The lentic waters are represented by natural lakes, man-made reservoirs, small dams, water-logged areas, ponds, etc.

On the basis of various regions the fishes in Pakistan have been grouped into 5 ichthyographic regions

1.a.i. Northern Mountainous Region

This region comprises the northern mountainous areas of Pakistan and Kashmir above 1,500m altitude. It includes the northern areas (Gilgit, Diamer and Skardu), upper parts of Chitral, Swat and Kaghan valleys. The fish fauna is predominantly high Asian (Central Asian) and mainly comprises the snow trouts (*Schizothoracinae)*, loaches *(Noemacheilus)*, and catfish genus of *Glyptosternum*.

Some south Asian forms belonging to genera *Labeo, Tor, Puntius, Garra, Ompok, Botia* and *Glyptothorax* have also been described.

1.a.ii. Yaghistan Region

This region was previously named as the north-western mountainous region. It is renamed as the Yaghistan region after the old tribal name of this area. This area is between 1000-1500m altitude. It is bordered by the Koh Sufaid range in the north, the Suleman range in the east, the Marri-Bugti hills in the south and the central Brohui range in the south-west. In the north-west, it extends upto Afghanistan areas drained by the rivers Kurram, Tochi, Gomal and their tributaries. The fish fauna is a mixture of south Asian, high Asian and west Asian forms but south Asian form predominates.

1.a.iii. AbaSeen Region

This includes the southern parts of the Malakand division, the vale of Peshawar, sub-mountainous Hazara, adjoining parts of the Punjab and Kashmir, north of the Safaid Koh and Kala Chitta ranges. It extends into south-eastern part of Afghanistan drained by the river Kabul and its tributaries. The fish fauna of this area is predominantly south Asian but some high Asian forms are, also found.

1.a.iv. Mehran Region

It was previously named as the Indus plain region. It comprises the Indus plain, adjoining hills i.e., Kohat hills, the Salt range and Potwar plateau in the north and Sind - Baluchistan hills in the south-west. The fauna of this region is south Asian except a few west Asian forms. Rarely, genus *Schizothorax* may also be found.

1.a.v. Gedrosian Region

This region comprises Baluchistan plateau, west of central Brohui and Hala ranges. The northern part of this range is drained by the rivers of Lora and Mashkel, which end into salt lakes of Hamun-i-Mashkel respectively. The southern part of the range is drained by the rivers Hingol, Dasht and their tributaries, which fall into Arabian Sea. The fish fauna is a mixture of west Asian (Lora drain) and south Asian form (rest).

Presently life in many of these regions is threatened due to human activities that have resulted in elevated pollution levels resulting from indiscriminate discharge of untreated industrial effluents and city sewage into these natural water bodies. This situation is further worsened due to drought that has caused lowering of ground water and sub soil water levels. This also has contributed to the higher concentration of pollutants in the aquatic environment. The construction of dams and barrages across major rivers aimed for irrigation and hydropower generation have also destroyed the fish habitat and breeding grounds. These structures have also hampered the migration of fish.

VI.2. FISH SPECIES AND AQUATIC VEGETATION

In addition to the knowledge about potential fishery resources it is essential that the fishery officers should have the knowledge of the fish-fauna and should be able to identify the early stages of the important culturable species of fishes. Unless they possess the requisite knowledge all efforts made may go in vain, or may even prove destructive. The scientific names of all the important freshwater species of fish fauna in Punjab Pakistan

with their local names are given. The scientific names will help the officers to study the literature on different species of fish published in India and elsewhere and the local names to help them to correctly identify them. Armed with this knowledge the officers will be able to stock the impoundments with right types of fish in correct proportion.

VI.2. FISHES OF PUNJAB

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME
Bagridae	***Sperata Sarwari***	Singhari
	Batasio pakistanicus	Batasio
	Mystus bleekeri	Bleekri
	Mystus cavasius	Teengara
	Mystus horai	Horaki Keengar
	Mystus vittatus	Keengar
	Mystus tengara	Teengara
	Rita rita	Khagga
Chondiae	***Parambasis baculis***	Baculis shisha
	Chanda nama	Nama shisha
	Parambasis ranga	Ranga shisha
Channidae	***Channa gachua***	Dauli
	Channa marulius	Saul
	Channa punctatus	Daula
	Channa striatus	Sauli
Cobitidae	***Botia birdi***	Botia
	Botia lohachata	Botia
	Lepidocephaleus guntea	Kanda Tori
	Acanthocobitis botia	Botia
	Nema chailus corica	Sundli
	Schistura alepidota	Schistura
	Schisturoa horai	Schistura
	Schistura lepidocaulis	Schistura
Cyprinidae	***Amblypharyngodon mola***	Makni
	Aspidoparia morar	Aam Chilwa
	Systomus sarana	Khurni
	Barilius bendelisis	Patha Chilwa

Cyprinidae	***Amblypharyngodon mola***	Amblypharyngodon mola
	Barbodes sarana	Khurni
	Barilius bendelisis	Patha Chilwa
	Barilius naseeri	Naseeri Chilwa
	Barilius pakistanicus	Pakistani Chilwa
	Barilius vagra & Barilius modestus	Lahori Chilwa
	Danio rerio	Zebra Machli
	Carassius auratus	Sunehri machli
	Gibelion catla	Theila
	Cirrhinus mrigala	Mori
	Cirrhinus reba	Sunni
	Chela cachius	Cachius Biddah Morriah
	Chela caubuca	Laubuca Biddah
	Barilius modestus	Chilwa
	Devario devario	Patha Makhni
	Rasbora daniconius	Charl Machhli
	Labeo angra	Buttar
	Lebeo bata	Bata Machhli
	Labeo caerleus	Neeli rohie
	Labeo diplostomus	Giddah
	Puntius terio	Terio popra
	Puntius ticto	Ticto popra
	Puntius waagenii	Waagenic popra
	Systomus sarana	Khirni
	Crossocheilus diplocheilus	Dogra Machhli
	Garra gotyla	Patherchat Machhli
	Ctenopharyngodon idella	Grass carp
	Hypophihal michthys	Nobilis Big head carp
	Cyprinion watsoni	Watsoni sabzag
	Cyprinus carpio	Gulfam
	Esomus danricus	Soomara Machli
	Hypopthalmichthys molitrix	Silver carp
	Labeo boga	Bhangan
	Labeo boggut	Bhangana
	Labeo calbasu	Kalbans
	Labeo dero	Pahari rohu
	Labeo dyocheilus pakistanicus	Torki
	Labeo gonius	Sareeha
	Labeo rohita	Rohu
	Osteobrama cotio	Paliro

	Puntius chola	Kola popra
	Puntius conchonius	Gulabi barb
	Puntius gelius	Gelius popra
	Puntius punjabensis	Punjabi popra
	Puntius sophore	Sophore popra
	Racoma labiata	Chun
	Salmophasia bacaila	Choti Chal
	Salmophasia punjabensis	Punjabi Chal
	Securicula gora	Bari Chal
	Macrotepis putitora	Mahseer
Mastacembelidae	***Mastacembelus armatus***	Bam
	Mastacembelus pancalus	Grooj
Nandidae	***Nandus nandus***	Patta
Neomacheilidae	***Schistura curtistigma***	Shistura
	Schistura prashari	Shistura
	Schistura punjabensis	Shistura
	Schistura shadiwalensis	Shistura
	Schistura nalbanti	Shistura
Notopteridae	***Gudusia chapra***	Palli
	Notopterus chitala	Cheetal Pari
	Notopterus notopterus	But Pari
Osphranomidae	***Colisa fasciata***	Bari kanghi
	Colisa lalia	Choti kanghi
	Oreochromis mossambica	Tilapia
Salmonidae	***Oncorhynchus mykiss***	Rainbow Trout
Schilbeidae	***Eutropiichthys vacha***	Jhalli
	Pseudeutropius atherinoides	Chaali
	Clupisoma garua	Bachwa
	Clupisoma naziri	Aahi
Siluridae	***Heteropneustes fossilis***	Singhi
	Ompok bimaculatus	Pafta
Siluridae	***Wallago attu***	Mullee
Sisoridae	***Bagarius bagarius***	Goonch, Fauji Khagga
	Gagata cenia	Gageeta
	Glyptothorax cavia	Kani tingara
	Glyptothorax stocki	Stocki pahari Khagga
	Nangra nangra	Nangra
	Nangra robusta	Nangra
Synbranchidae	***Monopterus cuchia***	Cuchia
Xenentodontidae	***Aplocheilus panchax***	Lal jheengra
	Xenentodon cancila	Kaan

VI.3. AQUATIC VEGETATION

	LOCAL NAME	SCIENTIFIC NAME
1.	Alligator weed	Alternanther asessilis
2.	Bladder wort	*Utricularia flexuosa*
3.	Common contail	*Ceratophyllum demersum*
4.	Common reed	*Phragmites communis*
5.	Curly leaf pond weed	*Potamogeton crispus*
6.	Duck weed	*Lemna paucicostata*
7.	Eel grass (cock screw)	*Vallisneria spiralis*
8.	Eurasian water milfoil	*Myriophyllum spicatum*
9.	Gulbakauli (water Hyacinth)	*Eichhornia crassipes*
10.	Horned pond weed	*Zannichellia palustris*
11.	Hydrilla	*Hydrilla verticillata*
12.	Kanwal or Lotus	*Nelumbium nelumbo*
13.	Naiad	*Najas graminea*
14.	Pan (cat tail)	*Typha angustata*
15.	Water chestnut (Singhara)	*Trapa bispinosa*
16.	Water lettuce	Pistia *stratiotes*
17.	Water lily (Nilofar)	*Nymphaea lotus*

VI.4. PLANKTON

The plankton community is a mixed group of tiny plants and animals floating, drifting or feebly swimming in the water mass. The freshwater plankton lacks many elements that are abundant in the sea, where nearly every phylum is represented.

The individual plant, animal or bacterium in the plankton community is called a plankton. The plant plankton comprise the phytoplankton and the animal plankton are the zooplankton.

The plankton play a prominent role in providing the fishes with food. Nearly all marine life or even freshwater animals are ultimately dependent upon planktonic life for existence. They have been the subject of many studies on adaptations for flotation. Oil droplets, gas bubbles, gelatinous envelopes and water filled and saccoid bodies are adaptations for reducing weight or specific gravity. Horns, spines, setae and elongated stick like bodies are some of the structures that increase total surface area and resistance to sinking.

They have been classified on the basis of their sizes. The commonly encountered plankton in freshwaters of Punjab are Scenedesmus, Daphnia, Sphaerocystis, diatoms, flagellates, Dinobryon, Hydrodictyon, Peridinium, Volvox, Nitella, etc.

VI.5. COMMONLY FOUND FISHES

VI.5.i. CARNIVOROUS FISHES

5.1.a. *Channa marulius* (Saul)

This belongs to snakehead group of freshwater fishes inhabiting large lakes and rivers. It prefers deep stretches of water with sandy or rocky bottom. It is locally called as Saul and is highly valued for its flesh

Geographical Distribution
This fish is commonly found in Pakistan, Nepal, Bangladesh, Burma, Thailand, China, Kampuchea and Sri Lanka.

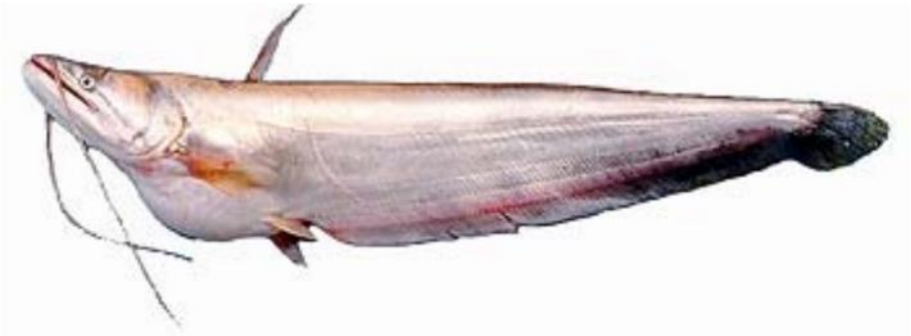
Distinguishing Characters
A large fish, body elongate and sub-cylindrical, head and mouth large, lower jaw with 7-18 canines, dorsal fin extends from head to the caudal region, caudal fin rounded. Plate like scales on the head. Pectoral fins about half head length. 56-70 scales on lateral line. Since these fishes inhabit a variety of environments, their color differs accordingly. Usually above lateral line reddish with 5 or 6 dark oval blotches on flanks; below lateral line between blotches pale yellow, distinct white spots scattered on body. Juveniles with an orange band running from eye to middle of caudal fin

Feeding
It usually feeds on fishes, frogs, snails and other small aquatic animals. As such, it takes live bait well, particularly frog.

Breeding
Its spawning period extends from April to June. During this period the pairs of this fish form floating nests. The eggs are yellowish red with 2mm dia. Nests are guarded both by male & female. Eggs are hatched within 30- 54 hours and the fry remains guarded by the parents for about six weeks. It attains length of more than 120 cm.

Prospects in Aquaculture
In view of its popularity for taste and compactness of flesh, the Department of Fisheries Punjab is considering this fish for aquaculture after conducting detailed studies on its biology and adaption to controlled conditions.

5.i.b. *Wallago attu* (Mullee)



It is a freshwater river and Lake Fish found in Indus Plains and adjoining hilly areas in Pakistan. Moreover it is common in India, Nepal, Bangladesh, Burma, Thailand, Vietnam, Kampuchea, the Malay Peninsula, Sumatra and Java. Its local name is Mullee.

Distinguishing Characters

Body elongate and compressed, snout round, mouth wide, its gape extends posteriorly beyond eyes. Two broad bands of conical teeth. Barbells two pairs; Maxillary pair long, extends beyond origin of anal fin, the mandibular pair much shorter. Dorsal fin short inserted slightly in advance of pelvic fins. Pectoral spine weak. Caudal fin deeply forked, its upper lobe longer. Skin is scaleless. Color of body is silvery or sometimes olive.

Feeding

It is extremely carnivorous and feeds on all types of aquatic animals as well as on dead bodies. As such, it is also called "Freshwater Shark".

Breeding

It breeds during July and August. The eggs are yellowish with a diameter ranging from 1.2 -1.5 mm. It grows to about 2m and weighs more than 40 kg.

Prospects in Aquaculture

Although it is included in the game fishes of Pakistan, its taste and meat is not liked very much due to its feeding on dead bodies. Moreover, due to its carnivorous habits and low market value it is not used in aquaculture practices.

5.i.c. *Sperata sarwari* (Singharee)

It is a common giant catfish of freshwater rivers, lakes, channels and reservoirs. It is locally called as "Singharee", "Seengh" and " Singhara".

Geographical Distribution
It is a well-known fish of Indo-Pak Subcontinent. Moreover, in Pakistan, this fish has been reported in the rivers, streams and also stagnant waters.

Distinguishing Characters
Body stout and compressed Snout broad and specthulate. Mouth subterminal, barbels four pairs which extend posteriorly to pelvic fin. Dorsal spine weakly serrated on its posterior edge; adipose fin base short about as long as rayed dorsal fin base. Scaleless skin. It is brownish gray on back, silvery on flanks and belly.

Feeding
It feeds on different aquatic animals including crustaceans, molluscs, frogs and small fishes.

Breeding
It breeds during May, June & July and attains a length of more than one m. This fish is very much liked for its flesh (with nominal intramuscular bones), taste and sport. It comes easily both on dead and live baits.

Prospects in Aquaculture
Although it is a carnivorous fish yet keeping in view its other qualities pertaining to its popularity for taste, flesh, easy dressing and filleting, the Department of Fisheries, Punjab is considering it for its monoculture. As such, the detailed biological studies along with its artificial/induced breeding are included in the future plan.

5.i.d. *Rita rita* (Khagga)

It is one of the famous catfishes of freshwater esteemed as a food and game fish. *Rita rita* is locally called as "Khagga" and "Tirkanda". The anglers enjoy the way this fish plays during angling.

Geographical Distribution
This fish inhabits freshwaters of most of the South Asian countries including Pakistan, India, Nepal, Bangladesh and Burma. In Pakistan, it is common in Indus plain and most of the freshwater streams, nallahs and ponds.

Distinguishing Characters
Body is elongate. Head somewhat depressed. Mouth transverse, provided with small teeth arranged in bands. Barbels three pairs. Dorsal and pectoral spines are stout and strong. Body is scaleless. Lateral line straight. The color is greenish brown on the back and on flanks, dull white on abdomen.

Feeding
It mostly feeds on insects, young fishes, mollusks and also on carrion. It comes very easily on live baits like worms and small fishes as well as other baits.

Breeding
This fish attains maturity at 380mm stage. It breeds during May to September with peak during July to August. It attains a maximum length of one meter or even more but commonly it is found in small sizes.

Prospects in Aquaculture
Rita rita is a meaty and stout fish and is very much esteemed as food. As such, some preliminary studies on its culture have also been undertaken. However, due to small size, slow growth and carnivorous habit it is not used in fish culture practices.

5.i.d.*Notopterus spp.* (Pari)

This fish belongs to family Notopteridae. The fish of this family predominantly inhabit tropical freshwaters and brackish water. These fish have diverse body form and size. Genus Notopterus is represented by two species namely, *N. notopterus* and *N. chitala* in Pakistan. These fishes are often seen at the surface, splashing and exposing their silvery flanks*. N. chitala* attains a maximum length up to 122cm, whereas *N. notopterus* is a small fish and attains a maximum length of 60cm. Presence of 15-silvery bars on back and a hump in *N. chitala* can easily distinguish it from *N. notopterus*

Geographical Distribution
These fishes inhabit particularly larger rivers and flood plains. These are also found in stagnant backwaters. Three genera are found in tropical Africa and East Asia, whereas one namely Notopterus in India and Pakistan, Bangladesh, Burma, Thailand, Malaya and Indonesia.

Distinguishing Characters
A very long anal fin which begins just behind the head and extends along the under surface of the body to tip of the caudal fin. Caudal fin confluent with anal fin. On the dorsal side in the center is a small slender dorsal fin from which the fish derives the name " Feather-back." Pelvic fins rudimentary, scales small, lateral line complete. These fishes are dull on the back and silvery on the sides.

Feeding
It feeds on live foods, aquatic insects, snails and surface swimming fishes. It mostly feeds during night time, therefore, it is also called nocturnal predator.

Breeding
During the rainy season, the sexually mature specimens migrate to flooded swamps. The eggs are laid on aquatic plants, fallen trees and branches in the water. They are guarded by the male who fans the spawn to keep them aerated. After production of fry they return to the main streams along with their fry.

Prospects in Aquaculture
Although it is regarded as a good game fish yet due to its carnivorous habits, slow growth and presence of a large number of intra-muscular bones in its flesh, it is not used as a culturable species of fish for aquaculture practices.

5.i.e.*Bagarius bagarius* (Fauji Khagga)

This fish belongs to family Sisoridal. It is an exclusively Asian family of bottom dwelling catfishes. Most with more or less thickened leathery skins. The genus *Bagarius* of this family has head and body covered by heavily keratinised skin superficially differentiated into un-calciferous plaques or tubercles. *Bagarius bagarius* is the well known member of this genus found in Pakistan. It is locally called "Fauji Khagga" or "Gonch".

Geographical distribution

These fishes are mainly inhabitant of rapid and rocky pools. *Bagarius bagarius* is found in Punjab, Sind, N.W.F.P in Pakistan and other Asian countries including India, Nepal, Bangladesh, Burma, Thailand, Malaysia and Indonesia.

Distinguishing characters

The body of this fish is rather elongate, head depressed. Mouth is inferior and crescentic, barbels four pairs. Dorsal fin inserted near to adipose fin than to snout tip. Pelvic fins inserted anterior to a ventral line through base of last dorsal fin ray. Abdominal vertebrae 17 to 20. Body is green or olivaceous to rich green tan or brown, with darkly pigmented bands or blotches. Caudal fin light yellowish grey; paired fins with black spots.

Feeding

B. bagarius is a strongly carnivorous and voracious fish. It preys on a variety of fishes and other live food. It also feeds on carrion.

Breeding

Its breeding season starts prior to the commencement of the monsoon rains.

Prospectus in aquaculture

This is one of the largest Asian catfish and so far the largest member of sisoridae.

It grows to 120 kg in weight and 2 m in length. The flesh is not much relished being very stiff and fibrous. This fish is also called freshwater shark because of its strong voracious and carnivorous feeding habits. Due to these demerits it has not been included in the list of culturable species of fishes.

VI.5.ii. HERBIVOROUS FISHES

5.ii.a. *Labeo calbasu* (Kalbans)

Geographical Distribution
This fish is commonly found in Pakistan, India, Nepal, Bangladesh, Burma, Thailand, China and Sri Lanka.

Morphological Characters
Its body is deep and well built. The mouth is narrow, depressed and obtuse in frontal region. Four barbels are present along the sides of the mouth. Lips are thick and fringed. Colour of the body greyish, dusky and darkish. The eyes are reddish in color. There are pores on upper lip and snout.

Feeding
It feeds on decayed or bottom vegetation like other culturable species. The fry usually feed on unicellular algae and zooplankton. The adult fish also feeds on molluscs.

Breeding
Its spawning period extends from April to late July. The pattern of breeding is similar to that of rohu and thaila. In captivity, it can not be bred except through induced spawning. Pairing occur during the period of spawning. The spawning temperature is 20-26^{o}C. Fecundity rate is about 70,000 eggs/kg body weight.

Prospects in Aquaculture
It is very delicious fish. Its growth rate is poor compared to other culturable species, due to this reason it is not preferred to culture. However, Department of Fisheries has launched a project to study the breeding habits and its adaptation in prevailing culture system.

5.ii.b. *Labeo gonius* (Sariha)

Geographical Distribution
This fish is commonly found in Pakistan, India, Nepal, Bangladesh, Burma, Thailand and China.

Morphological Characters
It is similar to rohu and kalbans. The number and size of scales are more than rohu and kalbans. The body is deep and well built. The mouth is narrow, depressed and obtuse in frontal region. Four barbels along the sides of the mouth. Lips are thick and fringed. Colour of the body greyish, dusky and darkish.

Feeding
It is an omnivorous fish and eat plankton (both zoo & phytoplankton), insects and crustaceans. The fry usually feed on unicellular algae and zooplankton.

Breeding
Its spawning period extends from April to late July. The pattern of breeding is similar to that of rohu and thaila. In captivity, it can not be bred except through induced spawning. Pairing occur during the period of spawning. There is external fertilization and no parental care. The spawning temperature is 20-26 °C. Fecundity rate is about 70,000 eggs/kg body weight.

Prospects in Aquaculture
It is very delicious fish. Its growth rate is poor compared to other culturable species, due to this reason it is not preferred to culture.

5.ii.c. *Labeo dero* (Pahari Rohu)

Geographical Distribution
Pakistan, India, Nepal, Bangladesh, Burma, Thailand, China and Sri Lanka.

Morphological Characters
Its body well built and sub-cylindrical. Its head is small and 20 % of the whole body. The depth of body is deep and equal to the length of head. The dorsal side of the snout has deep groove. Many small pits are present on snout. There is no lobe on lateral side of snout. The mouth is big and inferior. The lower lip bears a number of dorsal papillae. The lower jaw bears a horny layer. Only two small maxillary barbels are present on the sides of the mouth. The eyes are located in the posterior half of the head. The diameter of the eye is 25 % of head length. The dorsal fin originate between snout and base of tail. The dorsal fin is somewhat elevated than the head and bears 13 rays. The pectoral and pelvic fins are small and carry 18 and 09 rays respectively. Anal fin is also small and has 8 rays. The caudal fin is forked and is longer than head.
On lateral line, there are 41-43 scales. Colour of the dorsal side is brownish while rest of the body is silvery. On each scale, there is conspicuous red line. The eyes are reddish in colour. There are pores on upper lip and snout.

Feeding
Basically it is herbivorous fish and eat planktons and insects. It is the substitute of rohu in mountaineous area.

Breeding
It spawns during July to August. The pattern of breeding is similar to that of rohu and thaila. The temperature required for spawning is 20-26 ^{o}C. Fecundity rate is about 50,000 eggs/kg body weight.

Prospects in Aquaculture
Its growth rate is poor compared to other culturable species. Therefore, it is not commonly cultured in central and southern Punjab.

5.ii.d. *Labeo dyocheilus pakistanicus* (Torki)

Geographical Distribution
Pakistan & India

Morphological Characters
It is similar to pahari rohu, however it differs from pahari rohu in having lobes on each side of snout. Snout has no groove on dorsal side as is present in case of Pahari rohu. Only two small maxillary barbells are present on the sides of the mouth.

Feeding
It is herbivorous fish and its feeding behavior is similar to other carps. It is the substitute of rohu in mountaineous area.

Breeding
It spawns during July to August. The pattern of breeding is similar to that of rohu and thaila. The temperature required for reproduction is 20-26 ^{o}C. Fecundity rate is about 50,000 eggs/kg body weight.

Prospects in Aquaculture
Its growth rate is poor as compared to other culturable species. It is not commonly cultured in central and southern Punjab.

5.ii.e. *Cirrhinus reba* (Sunni)

Geographical Distribution
This fish is commonly found in Pakistan, India, Russia, Nepal, Bangladesh, Burma, Thailand and China.

Morphological Characters
It is similar to mrigal, but differ in color and size. Its body is stout and head is small. Mouth opens on ventral side. Its lips are thin there are two rostral barbels around the mouth. Dorsal fins contain 11-12 rays. Caudal fin is forked. The scales are hexagonal and are 35-37 on the lateral line. Its colour is silvery and the margin of scales are bluish. Eyes are golden.

Feeding
It is mainly herbivorous fish and usually feeds on small insects and crustaceans.

Breeding
Its spawning period extends from April to late July. Breeding start during rainy season in nature. The optimal temperature for spawning is 17-27 ^{o}C. Fecundity rate is about 80,000 eggs/kg body weight.

Prospects in Aquaculture
It attains maximum length of 60 cm. It contains a number of intramuscular bones. As such, it has low market value and is not included in the culture system. Its growth rate is very slow.

5.ii.f. *Tilapia mossambicus*

Tilapia is a hardy fish belonging to Cichlidae family. The fish is endemic to Africa but during the last five decades they have been introduced to many parts of the world. Tilapia is being successfully cultured in many countries both in fresh and saline waters. Tilapia are grouped on the basis of their feeding/ breeding habits and anatomical differences under the following genera:

i) Tilapia
ii) Sarotherodon
iii) Oreochromis

These fishes are now well known in Indo-Pak due to their hardy nature and prolific breeding in open ponds.

Geographical Distribution
They are found in Java, Malaysia, Philippines, Thailand, Sri lanka, Pakistan, India, Vietnam, Zair, Madagascar, Mozambique, Zimbabve, Tanzania, & Uganda and other African countries. Since 1985 it is abundantly cultured in Pakistan, particularly in extreme climatic conditions. Tilapias were introduced in Pakistan due to their quality of growing equally well in saline and in brackish waters. Tilapia is presently growing well in Lal Sohanrah Bahawalpur, & Kallar Kahar lake Chakwal.

Marphological Characters
There are about 77 species of Tilapia in the world in which 20-25 are most important. They all have oblong body shapes with long dorsal fins, which have 23-31 fin rays. The nose has one nostril on each side. Head is upwardly concave.

Their colour ranges from olive grey to blackish brown and bright golden. Its size varies from 10 to 40cm.

Feeding

Tilapias are omnivorous fishes. Various species of Tilapia feed on variety of natural food items e.g., *S. galilaeus* are mainly herbivores, *S. mosambicus* & *T. rendalli* are phytoplankton eater where as *S. alcalicus* mostly feeds on dead phytoplankton deposits.

Breeding

They become sexually mature at an age of just 2-3 months. They breed in standing waters. In Pakistan Tilapia breeds three to four times a year. Their optimum temperature range is between 20-30 ^{o}C. They produce several hundred sticky eggs and breed the eggs and larvae in their mouth. These fishes breed frequently in the pond resulting in over population, which can be prevented through use of suitable systems.

Prospects in Aquaculture

Now-a days UNDP, A.D.B and several other agencies are taking interest in cultivation of Tilapia due to its euryhaline nature which enable them to survive even in 30,000 ppm salinity & water-logged environment. In Pakistan every year 1.601 acres of land becomes useless either due to salinity or water logging. These areas can be used for Tilapia farming because of their hardy nature. As such, the detailed scientific studies and surveys are being made by the Department of Fisheries Punjab to undertake successful culturing of this fish in the said areas.

Although Tilapia has been introduced to many brackish natural water bodies but its prospects in Pakistani polyculture system are minimum. Efforts are made to restrict the species to few natural habitats.

Experiments for mono-sex culture through sex reversal and other techniques are underway to exploit aquaculture potential of the species.

VI.5.iii. CULTURABLE FISHES

5.iii.a. *Labeo rohita* (Rohu)

Geographical Distribution

This fish is commonly found in Pakistan, India, Nepal, Bangladesh, Burma, Thailand, China, Kampuchea and Sri Lanka.

Morphological Characters

Its body is deep and dorsal profile is more concave than abdomen. Snout is obtuse and compressed, projecting beyond the jaws. Lips are thick and fringed with distinct inner fold. Generally one pair of small maxillary barbels is present and sometimes a second rostral pair is present. Lateral line scales are 40-42. Color of the body is bluish or brownish along the back and silvery on the sides and beneath. Usually a red mark is present on each scale.

Feeding

Rohu is an omnivore fish and usually takes increasing quantities of decayed vegetation matter including higher plants, which might form more than half the bulk of its food. The fry usually feed on unicellular algae and zooplankton.

Breeding

Its spawning period extends from April to late July. In captivity, it can not be bred except through induced spawning. Pairing occur during the period of spawning. There is external fertilization and no parental care. The spawning temperature is 20-26^{o}C. Fecundity rate is about 100,000 eggs per kilogram body weight.

Prospects in Aquaculture

It is very popular and considered an excellent food. Due to high demand and price in the market, it is commonly cultured in the province of Punjab along with other species.

5.iii.b. Catla *catla* (Thaila)

Geographical Distribution
Pakistan, India, Nepal, Bangladesh, Burma, Thailand, China, Kampuchea and Sri Lanka.

Morphological Characters
It possesses elongated body, curved on ventral and dorsal sides. There is pair of small barbels on upper jaw. Mouth is small. Body is scaled except mouth and head. Red spot on each scale. Dorsal side of body is bluish and silvery on the side.

Feeding
It is surface-feeder. Adult usually feeds on phytoplankton, zooplankton, small insects and crustacean. During fingerling stage, it feeds mostly on crustaceans and algae.

Breeding
Its spawning period extends from April to late July. In captivity, it can not be bred except through induced spawning. Pairing occur during the period of spawning. There is external fertilization and no parental care. The temperature required for reproduction is 20-26 ^{o}C. Fecundity rate is about 100,000 eggs per kg body weight. Eggs are hatched within 8-12 hours.

Prospects in Aquaculture
Due to reasonable price in the market, it is commonly cultured in the province of Punjab along with other species.

5.iii.c. *Cirrhinus mrigala* (Mrigal)

Geographical Distribution
This fish is commonly found in Pakistan, India, Russia, Nepal, Bangladesh, Burma, Thailand, China, Kampuchea and Sri Lanka.

Morphological Characters
A large fish, body oblong and moderately compressed. Width of head equal to length behind the eyes which is located in the anterior half of the head. One pair of barbels present. Scales of moderate size; lateral line scales 40 to 45. caudal fin deeply forked. Colour of the body is silvery, dark grey along the back, sometimes coppery. Pectoral, ventral and anal fins are tinged with black. Eyes are golden.

Feeding
It is bottom-feeder. It is usually feeds on phytoplankton, zooplankton and other small insects. It can be angled well with live and artificial bait.

Breeding
Its spawning period extends from April to late July. In captivity, it can be bred through induced spawning. Pairing occur during the period of spawning. Fertilization external and without parental care. The optimal temperature for reproduction is 20-26 ^{o}C. Fecundity rate is about 100,000 eggs/kg body weight. Eggs are hatched within 12-18 hours.

Prospects in Aquaculture
Due to reasonable price in the market, it is commonly cultured in the province of Punjab along with other species.

5.iii.d. *Cyprinus carpio (*Common carp)

Geographical Distribution
This fish is inhabitant of China and Russia, transplanted in the middle ages to Europe and south east Asia.

Morphological Characters
Body oblong, moderately compressed. Protractile mouth with smooth simple lips. Three rows of teeth in throat. Two pairs of barbels, one pair is sometimes rudimentary. Long dorsal fin with last simple ray ossified and serrated behind. Origin of dorsal fin opposite to that of ventral. Height of body, development of fins and scales, color of body and size subject to great variation.

Feeding
It is an omnivorous fish. It is mud-strainer feeds on phytoplankton, zooplankton and other small insects. It collects food by taking bottom mud into the mouth, filtering out digestible particles and rejecting the rest. It can be angled well with live and artificial bait.

Breeding
Its spawning period extends from February to April. In captivity, it can be bred easily. Pairing occur during the period of spawning. Fertilization is external and exhibits no parental care. Reproduction temperature above 20 ^{o}C. Fecundity rate is about 100,000 eggs/kg body weight. Eggs are hatched within 72 hours.

Prospects in Aquaculture
In view of its popularity for taste, it is often cultured with other species.

5.iii.e. *Ctenopharyngodon idella* (Grass carp)

Geographical Distribution
It is native of south, central and northern China and Russia, transplanted in Europe south Asia, south east Asia and Africa.

Morphological Characters
This fish has elongated and moderately compressed body, broad head with short and rounded snout. Upper jaw is slightly longer than the lower. Barbels are absent. There are two rows of compressed, comb-like teeth in throat. Scales on the body are of moderate size. The fish is dark grey above and silvery on the belly.

Feeding
It is a herbivorous and highly voracious fish. The adults have distinct preference for vegetable food such as leaves of tree, green fodder, weeds and other aquatic plants.

Breeding
Its spawning period extends from April to late July. In captivity, it can not be bred except through induced spawning. Pairing occur during the period of spawning. There is external fertilization and without parental care. The breeding temperature is 20-26 ^{o}C. Fecundity rate is about 100,000 eggs per kg body weight. Eggs are hatched within 12-18 hours.

Prospects in Aquaculture
Due to high price in the market, it is commonly cultured in the province of Punjab along with other species under prevailing polyculture system.

5.iii.f. *Hypophthalmichthys molitrix* (Silver carp)

Geographical Distribution
It is native of south, central and northern China and Russia, transplanted in Europe, south Asia, south east Asia and Africa.

Morphological Characters
This fish has elongated and moderately compressed body. Head is short and rounded snout. Upper jaw is slightly longer than the lower. Barbels are absent. Caudal is forked and lateral line is curved. Scales on the body are of moderate size. The colour of the body is silvery and fins are slightly blackish.

Feeding
It is a herbivorous fish. The adult has distinct preference for vegetable food such as plankton, leaves of tree, and crustaceans.

Breeding
Its spawning period extends from April to late July. In captivity, it can not be bred except through induced spawning. The breeding temperature is 20-26 ^{o}C. Fecundity rate is about 100,000 eggs per kg body weight. Eggs are hatched within 12-18 hours.

Prospects in Aquaculture
Due to fast growth, it is commonly cultured in the province of Punjab along with other species under prevailing polyculture system.

Chapter VII

ANNEXURES

VII.i. GLOSSARY OF COMMONLY USED TERMS IN FISHERIES

Acclimatization	The adaptation of fishes to a new environment or habitat or to different climatic conditions.
Air Bladder (Swim bladder).	An internal, inflatable gas bladder that enables a fish to regulate its buoyancy.
Algal Bloom	A high density or rapid increase in abundance of algae.
Alkalinity	The power of a mineral solution to neutralize hydrogen ions; usually expressed as equivalent of calcium carbonate.
Anal	Pertaining to the anus or vent.
Anterior	In front of; toward the head end.
Anus	The external posterior opening of the alimentary tract; the vent.
Aquaculture	Culture or husbandry of aquatic organisms.
Asphyxia	Suffocation caused by too little oxygen or too much carbon dioxide in the blood.
Barbell	An elongated fleshy projection, usually of the lips.
Blank Egg	An unfertilized egg.
Brackish Water	A mixture of fresh and seawater; or water with total salt concentration between 0.05% and 3.0%.
Brood Stock	Adult fish retained for spawning.
Buccal Cavity	Mouth cavity.
Carnivorous	Feeding or preying on animals.
Cartilage	A substance more flexible than bone but serving the same purpose.
Caudal Fin	The tail fin of fish.
Compressed	Applied to fish, flattened from side to side, as in the case of a sunfish. *See* Depressed.
Conditioned Response	Behaviour that is the result of experience or training.
Cold Water Species	Generally, fish that spawn in temperatures between 40^{o} and 60^{o}F.
Cytoplasm	The contents of a cell, exclusive of the nucleus.
Dechlorination	Removal of the residual hypochlorite or chloramine from water to allow its use in fish culture.
Dissolved Oxygen	The amount of elemental oxygen, O_2, in solution under existing atmospheric pressure and temperature.
Dorsal Fin	The fin on the back or dorsal side, in front of the adipose fin if the latter is present.
Energy	Capacity to do work.

Environment	The sum total of the external conditions that affect growth and development of an organism.
Enzyme	A protein that catalyzes biochemical reactions in living organisms.
Epizootic	A disease attacking many animals in a population at the same time; widely diffused and rapidly spreading.
Esophagus.	The gullet; a muscular, membranous tube between the pharynx and the stomach.
Extensive Culture	Rearing of fish in ponds with low water exchange and at low densities; the fish utilize primarily natural foods.
Fauna	The animals inhabiting any region, taken collectively.
Fecundity	Number of eggs in a female spawner
Fingerling	Young fish measuring approximately from 2.5 to 13 cm in total length. Sometimes split into early and late or advanced fingerling stages.
Flagellum	Whip-like locomotary organelle of single celled organisms (usually free-living)
(plural: Flagella)	cells.
Flush	A short bath in which the flow of water is not stopped, but a high concentration of chemical is added at the inlet and passed through the system as pulse.
Fork Length	The distance from the tip of the snout to the fork of the caudal fin.
Formalin	Solution of approximately 37% by weight of formaldehyde gas in water. Effective in the control of external parasites and fungal infections on fish and eggs. Also used as a tissue fixative.
Fresh Water	Water containing less than 0.05% total dissolved salts by weight.
Gametes	Sexual cells: eggs and sperm.
Genus	A unit of scientific classification that includes one or several closely related species.
Geographic Distribution	The geographic area in which a condition or organism is known to occur.
Grading of Fish	Sorting of fish by size, usually by some mechanical device.
Habitat	Those plants, animals, and physical components of the environment that constitute the natural food, physical-chemical conditions, and cover requirements of an organism.
Histology	Microscopic study of cells, tissues, and organs.

Homing	Return of fish to their stream or lake of origin to spawn.
Hybrid	Progeny resulting from a cross between parents that are genetically unlike.
Inferior Mouth	Mouth on the under side of the head, opening downward.
Intensive Culture	Rearing of fish at densities greater than can be supported in the natural environment; utilizes high water flow or exchange rates and requires the feeding of formulated feeds.
Lesion	Any visible alteration in the normal structure of organs, tissues, or cells.
Leucocyte	A white blood corpuscle.
Mandible	Lower jaw.
Microbe	Microorganism, such as a virus, bacterium, fungus, or protozoan.
Milt	Sperm-bearing fluid.
Morphology	The science of the form and structure of animals and plants.
Mucus	A viscid or slimy substance secreted by the mucous glands of fish.
Mycosis	Any disease caused by an infectious fungus.
Nematoda	A diverse phylum of roundworms, many of which are plant or animal parasites.
Operculum	A bony flap-like protective gill covering.
Oviparous	Producing eggs that are fertilized, develop, and hatch outside the female body.
Ovulate	Process of producing mature eggs capable of being fertilized.
Part Per Billion (ppb)	A concentration at which one unit is contained in a total of a billion units. Equivalent to one microgram per kilogram (1μg/kg) or one nanoliter per liter (1nl/liter).
Pectoral Fins	The anterior and ventrally located fins whose principle function is locomotor maneuvering.
Pelvic Fins	Paired fins corresponding to the posterior limbs of the higher vertebrates (sometimes called ventral fins), located below or behind the pectoral fins.
pH	An expression of the acid-base relationship designated as the logarithm of the reciprocal of the hydrogen-ion activity; the value of 7.0 expresses neutral solutions; values decreasing below 7.0 represent increasing acidity; those increasing above 7.0 represent increasingly basic solutions.

Phytoplankton	Minute plants suspended in water with little or no capability for controlling their position in the water mass; frequently referred to as algae.
Planting of Fish	The act of releasing fish from a hatchery into a specific lake or river. Synonyms: stocking.
Prophylactic	Activity or agent that prevents the occurrence of disease.
Protozoa	The phylum of mostly microscopic animals made up of a single cell or a group of more or less identical cells and living chiefly in water; includes many parasitic forms.
Ranching	Type of aquaculture involving the release of juvenile aquatic animals into marine waters to grow in natural foods to harvestable size.
Ray	A supporting rod for a fin. There are two kinds: hard (spines) and soft rays.
Roe	The eggs of fishes.
Sac Fry	A fish with an external yolk sac.
Secchi Disk	A circular metal plate with the upper surface divided into four quadrants, two painted white and two painted black. It is lowered into the water on a graduated line, and the depth at which it disappears is noted as the limit of visibility.
Sediment	Settleable solids that form bottom deposits.
Sedimentation Pond	A wastewater treatment facility in which Settling Basin settleable solids are removed from the hatchery effluent.
Selective Breeding	Selection of mates in a breeding program to produce offspring possessing certain defined characteristics.
Shocking (Eggs)	Act of mechanically agitating eggs, which ruptures the perivitelline membranes and turns infertile eggs white.
Snout	The portion of the head in front of the eyes. The snout is measured from its most anterior tip to the anterior margin of the eye socket.
Spent	Spawned out.
Stock	Group of fish that shares a common environment and gene pool.
Swim-up	Term used to describe fry when they begin active swimming in search of food
Syndrome	A group of signs that together characterize a disease.
Turbidity	Presence of suspended or colloidal matter or planktonic organisms that reduces light penetration of water.
Turbulence	Agitation of liquids by currents, jetting actions, winds, or stirring forces.

Vent	The external posterior opening of the alimentary canal; the anus.
Ventral Fins	Pelvic fins.
Virulence	The relative capacity of a pathogen to produce disease.
Warm water Species	Generally fish that spawn at temperatures above 60°F. The chief cultured warmwater species are basses, sunfish, catfish, and minnows. *See* Coldwater Species; Coolwater Species.
Water Hardening	Process by which an egg absorbs water that accumulates in the perivitelline space.
Weir	A structure for measuring water flow.
Zooplankton	Minute animals in water, chiefly rotifers and crustaceans, that depend upon water movement to carry them about, having only weak capabilities for movement. They are important prey for young fish.
Zygote	Cell formed by the union of two gametes, and the individual developing from this cell.

VII.2. LIST OF WATER AREAS FOR LEASE

1. Multan	1. River Chenab, tehsil Multan
	2. River Sutlej, tehsil Lodhran
	3. River Chenab & Sutlej, tehsil Shuja Abad
	4. River Chenab & Sutlej, tehsil Jalalpur Pirwala
	5. Ailampur Shujabad Canal Sub Division
	6. Rashida Canal
2. Vehari	1. Pond Area Head Islam
	2. River Sutlej, tehsil Vehari
	3. River Sutlej, tehsil Mailsi
	4. River Khushk Bias, tehsil Vehari
	5. P.I. Link Canal, District Vehari
	6. Khadar Branch Canal, tehsil Vehari
	7. Damky Canal, tehsil Vehari
	8. Mailsi Sidhnai Link Canal, Distt: Vehari
	9. Pak Pattan Canal
3. Khanewal	1. River Ravi & Chanab, tehsil Kabirwala
	2. River Ravi, tehsil Mianchannu
	3. Sidhnai Canal, tehsil Kabirwala
	4. Sidhnai Mailsi Link Canal, tehsil Mianchannu
	5. Nikasu, tehsil Kabirwala
	6. Lower Bari Doab Canal, tehsil & Distt. Khanewal
4. Sahiwal	1. River Ravi, tehsil Sahiwal
	2. River Ravi, tehsil Chichawatni
	3. River Khushak Biass Pull Bunga Hayat to Pul Trikhni
	4. River Khushak Biass Pull Trikhni to Pull Kanadan
	5. Lower Bari Doab Canal RD 112 to 417
	6. Lower Bari Doab Canal RD 417 to 540
	7. Escape Channel, tehsil Chichawatni
	8. Cheri Syphan, District Sahiwal
	9. Sahiwal Pakpattan Canal
	10. 12/L Head to Tail tehsil Chichawatni.
	11. 5/L Head to Tail (New water area)
	12. 9/L Head to Tail
5. Pak Pattan	1. River Sutlej, tehsil Pakpattan
	2. Pakpattan Canal RD 112 to 220
	3. Khadar Branch RD 0 to 130.
	4. Khadar Branch Rd 130 to Tail.
	5. Pakpattan Canal RD 220 to 340.
6. D.G. Khan	1. River Sind, tehsil Dera Ghazi Khan.
	2. River Sind, tehsil Taunsa.
	3. Dera Ghazi Khan Canal.
	4. Dhangano Sub-Division.
	5. Dera Sub-Division.
7. Layyah	1. River Sind, tehsil Layyah.
	2. River Sind, tehsil Karor.
	3. Dholewala Canal Unit.

8. Rajanpur	1. River Sind, tehsil Rojhan
	2. River Sind, tehsil Rajanpur
	3. River Sind, tehsil Jampur
	4. Qadra Sub-Division Canal 0 to 40
	5. Qadra Sub-Division 40 to Tail
	6. Jampur Sub-Division
	7. Dajal Branch
	8. Talai Sub-Division 0 to 55
	9. Talai Sub-Division 55 to Tail
	10. Sem Nallah Manke
	11. Duba Peomar
9. Muzaffargarh	1. Pond Area Head Taunsa Barrage.
	2. River Sindh, tehsil Kot Addu.
	3. River Sindh, tehsil Ali Pur.
	4. River Chenab, tehsil Ali Pur Jatoi
	5. River Chenab, tehsil Muzaffargarh.
	6. River Sindh, tehsil Jatoi.
	7. Pond Area Head Punjnad.
	8. River Sind, tehsil Shah Jamal.
	9. T.P. Link Canal 0 to 192.
	10. Chatha Khander Canal.
	11. Muzaffargarh Canal.
	12. Rangpur Telri Canal.
	13. Abasia Punjnad Canal.
	14. Sindhri Drain.
	15. Ghatoo Supply Channel.
	16. Jatoi Sub-Division.
	17. Kot Addu Main Drain.
	18. Shaher Sultan-Sub Division.
	19. Dhand Nikka.
	20. D.G.Canal 0 to 22.
	21. Ghazi Ghat Drain (Old and New)
10. Bahawalpur	1. River Sutlej, tehsil Bahawalpur.
	2. River Sutlej, tehsil Hasilpur.
	3. River Chenab & Sutlej, Tehsil Ahmad Pur Sharqia.
	4. Bahawal Canal RD 0 to 210.
	5. Qaim Canal.
	6. Mailsi Bahawal Link Canal.
	7. Ahmed Pur Branch Canal.
	8. I.R. Desert Branch RD 0 to 78.
	9. I.R. Desert Branch RD 78 to Tail.
	10. Abassia Canal.
	11. Punjnad Canal RD 11 to 81.
11. Bahawalnagar	1. River Sutlej, tehsil Minchinabad
	2. River Sutlej, tehsil Bahawalnagar
	3. River Sutlej, tehsil Chishtian.
	4. River Ghaghar, tehsil Fortabbas.
	5. Sadiqia Canal, tehsil Minchinabad

	6.	Hakra Canal.
	7.	Malikwah Canal.
	8.	Fordwah Canal RD 6 to 71.
	9.	Fordwah Canal RD 71 to 125.
	10.	Fordwah Canal RD 125 to 245.
	11.	Fordwah Canal RD 245 to Tail.
	12.	Sadiqia Feeder, tehsil Minchinabad.
	13.	Diffah Border Area.
	14.	Saim Nullah Fordwah.
	15.	Awami Canal.
	16.	Maclod Ganj Canal.
	17.	Budh Awanwali.
	18.	Saim Nullah Chishtian
	19.	Kali Budhi Sem Nullah
	20.	Dubha Hafizwala Punj Kosi.
	21.	Out fall Drain tehsil Fort Abbas.
12. R. Y. Khan	1.	River Sind, tehsil Sadiqabad.
	2.	River Sind and Chenab, tehsil Liaqat Pur
	3.	River Sind, tehsil Khanpur.
	4.	River Sind, tehsil R.Y.Khan.
	5.	Machka Circle No.1.
	6.	Machka Circle No.2.
	7.	Panjnad Canal RD 81 to 286.
	8.	R.Y. Khan Branch Canal.
	9.	Sadiq Branch Canal.
	10.	Purana Dalas.
	11.	Dalas Branch Canal.
	12.	Minchan Branch Canal.
	13.	Abassia Canal.
	14.	Daigi Escape.
	15.	Malkani Escape.
	16.	Sidowali Drain.
	17.	Malkani Drain.
	18.	Dhand Malkani
	19.	Sadiq Feeder to Head Chitaa Behtaa
13. Faisalabad	1.	River Ravi, tehsil Samundri.
	2.	Rakh Branch Canal.
	3.	Dijkot Drain.
	4.	Buchiana Escape.
	5.	Marh Chiniot.
	6.	Gogera Branch Canal.
	7.	Syphon Kot Khuda Yar.
	8.	Jhang Branch Canal.
	9.	Awagat Branch.
14. Jhang	1.	River Chenab, tehsil Jhang Up Stream
	2.	River Jhelum, tehsil Jhang.
	3.	River Chaneb Down Stream Jhang
	4.	River Chenab, tehsil Shorkot.

5. River Chenab, tehsil Chiniot
6. Jheel Malkana RD 0 to 15 Pond Area Trimmu Headworks
7. Jheel Korawala RD 0 to 15
8. T.S. Link Canal R.D 0 to 145
9. Haveli Mainline Canal RD 0 to 145.
10. Rangpur Canal.
11. Lower Jhelum Canal Rd 0 to 145
12. Badowana Minor, tehsil Shorkot.
13. Khairwala Drain.
14. Raniwah Drain.
15. New Sobagha Drain.
16. New Ahmedwala Drain.
17. Gujana Bhajwana Fish Farm
18. Rangpur Jheel No.4,5,8.

15. T.T.Singh

1. River Ravi Up Stream, upto Shahbal Shah Bund, tehsil Kamalia
2. River Ravi Down Stream, Headworks Sidhnai, tehsil Kamalia.
3. T.S. Link Canal RD 146 to 216
4. Haveli Main Line Canal RD 146 to 216
5. Old Condom Canal tehsil Kamalia.
6. Nikasoo.
7. River Ravi Down Stream, Shahbale Shah Bund to Sindhnai
8. Sem/Drain up Stream 95 Pul Teh.Kamalia Distt.T.T. Singh

16. Sargodha

1. River Jhelum, District Sargodha.
2. River Chenab, District Sargodha.
3. F.S.Drain Up Hindewali.
4. F.S.Drain Down Hindewali.
5. Budhi Drain RD 0-100
6. Budhi Drain RD 100-160.
7. Budhi Drain RD 160-206.
8. Raniwah Drain RD 60-121.
9. Raniwah Drain RD 121-182
10. Mona Drain RD 17-122.
11. Mona Drain RD 122-202.
12. Mona Drain RD 202-271.
13. Mona Drain RD 271-296
14. Mona Drain RD 296-328.
15. Sulki Escape.
16. New Bhera Action Drain.
17. Bucha Drain.
18. Gondal Minor
19. Shahpur Branch Canal.
20. Lower Jhelum Canal.
21. Sahiwal Sial Sharif Drain.
22. Jahanabad Drain.
23. Kalra Bhakar
24. New Budhi Drain.
25. Hudda Drain.

	26.	Talibwala Dhand.
17. Khushab	1.	River Jhelum, tehsil Khushab.
	2.	Dip Area Khushab.
	3.	Thal Canal Mahajar Branch.
	4.	Joharabad Drain.
	5.	Ganda Nallah Khushab
	6.	Chashma Jhelum Link Canal.
	7.	Punj Sem Nallah
18. Mianwali	1.	River Sind, tehsil Isa Khel.
	2.	River Sind Down Stream, tehsil Mianwali
	3.	River Sind Upstream, Tehsil Mianwali
	4.	Chashma Jhelum Link Canal.
	5.	Thal Canal Mohajar Branch
19. Bhakkar	1.	River Sind Upstream, Pul Darya Khan
	2.	River Sind Down Stream, Pul Darya Khan
	3.	Khaddi Nallah
	4.	Thal Canal
20. Jhelum	1.	River Jhelum, tehsil Jhelum
	2.	River Jhelum, tehsil Pind Dadan Khan
21. Attock	1.	River Indus, tehsil Attock & Jand
	2.	Nallah Jhablot tehsil Hassanabdal.
	3.	Sukkh Nullah
	4.	Shahpur Dam
22. Chakwal	1.	River Swan, tehsil Chakwal
	2.	River Swan, tehsil Talagang
	3.	Gandhala Nala, tehsil Choa Saiden Shah
22. Lahore	1.	Head Balloki Pond Area Pul Kotoana Qadirabad Link Canal including Chan Dhand No.9 Dhand Lanchanwali, Dhand Zakheera Except Dhand Laloo khichi Dhand No.7 Naka Pakkiwala, tehsil Pattoki Distt:Kasur.
	2.	BRB Canal, District Lahore including Dhands Ravi Syphon Area.
23. Sheikhupura	1.	Ravi Bordar Area including Dhands,Tehsil Ferozewala District Sheikhupura
	2.	Toor Asil to Chatti Jatri, tehsil Nankana.
	3.	Q.B Link Cananl to Pul Khai, tehsil Sheikhupura.
	4.	Ranawali Dhand, tehsil Nankana.
	5.	Tor Upper Chenab Canal except Tora Batarian.
	6.	Nawan Kot Dhand, tehsil Nankana.
	7.	Marla Ravi Link, tehsil Ferozewala.
	8.	Bahari Pur Dhand, tehsil Nankana.
	9.	Upper Chenab Canal.
	10.	B.R.B. Canal Burji 151 to 204.
	11.	B.R.B. Canal Burji 143 to 150.
	12.	Ganesh Pur Dhand, tehsil Nankana.
	13.	Dhand Nanu Dogar Nolan
	14.	Deg Diversation, tehsil Ferozewala.
	15.	Dhand Waran Jattan Nawan Kot.

	16.	Dhand Dhaney Wali Tehsil Ferozwala.
24. Kasur	1.	River Sutlej Up Stream Rohi Nullah Kasur, Tor Rajokey and Katora Canal Except first portion Tehsil & District Kasur.
	2.	River Sutlej Down Stream from Head Ganda Singhwala to Indo Pak Burji 218/4 limit, Tehsil Kasur.
	3.	River Sutlej Teh: Chunian from Indo Pak Burji 218/4 to limit, Teh: Chunian Distt: Kasur.
	4.	River Ravi Down Stream from Head Balloki Tehsil Pattoki, Nankana Distt: Kasur/Sheikhupura.
	5.	Balloki Sulemanki Link Canal Teh: Pattoki/Chunian.
	6.	Lower Bari Doab Canal (Halaywali)
	7.	Rajba Gidpur, Teshil Chunian.
	8.	Rohi Nullah, Tehsil Chunian Distt: Kasur.
	9.	B.R.B Cananl Jhall Nathowali including Demu Nullah.
	10.	Depalpur Canal
	11.	Rohi Nullah Jaman.
	12.	Upper Bari Doab Canal(Mustafabadwali), Teh. Chunian
	13.	Dingi Kore Sial, Tehsil Chunian Distt: Kasur
	14.	Tor Sheikhpur Nau tehsil & district Kasur.
	15.	Dhand Laloo Khichi, Tehsil Chunian
	16.	Naka Rakkiwala, Tehsil Chunian
25. Okara	1.	River Sutlej Up Stream, Teh. Depalpur.
	2.	River Sutlej Down Stream, Tehsil Depalpur.
	3.	Pond Area Head Sullemanki.
	4.	River Ravi, Tehsil Okara.
	5.	Lower Bari Doab Canal Okara.
	6.	Sem Nullah Kamma Islampura.
	7.	Pak Pattan Canal R.D 0 to 52.
	8.	Pak Pattan Canal R.D 52 to 112.
	9.	Khushak Bias, Teshil Okara.
	10.	Khushak Bias, Tehsil Depalpur.
	11.	Ford Wah Canal R.D to 0 to 6.
	12.	Saddiquia Canal R.D 0 to 6
	13.	B.S Link Canal Pull Out Fall including Khada
	14.	Khanwah Canal, Tehsil Dapalpur.
	15.	Lower Sohag Canal R.D 0 to 78.
	16.	Lower Sohag Canal R.D 78 to Tail.
	17.	Gogera Branch Canal Okara.
26. Gujranwala/ Hafizabad	1.	Qadirabad Pond Area except reserved Area Tehsil Wazirabad Distt: G/Wala.
	2.	Lower Chenab Canal, Teshil Wazirabad/Hafizabad.
	3.	Upper Chenab Canal from Nandipur to end of District Gujranwala.
	4.	River Chenab Down Stream except reserved Area from Qadirabad Barrage to Talibwala Pattan Tehsil Hafizabad.
	5.	Qadirabad Balloki Link Canal, Tehsil Hafizabad.
	6.	Ahmedpur Wag Drain, Tehsil Hafizabad.
	7.	Jhang Branch Canal, Tehsil Hafizabad.

27. Sialkot/ Narowal

1. River Chenab Down Stream except reserved area from Head Marala to end of District Sialkot.
2. Upper Chenab Canal from Head Marala to Head Bombanwala including syphons.
3. M.R Link Canal Head Marala to Kotli Bawa Faqir Chand including syphons.
4. M.R Link Canal Kotli Bawa Faqir Chand to limit Sialkot including syphon.
5. Rayyah Branch Canal including syphons from Head Bombiwala to end of District Sialkot.
6. Dum Plot No.2 Head Marala.
7. River Ravi Teh:Shakkar Garh with attached Dhands except Karalanwali Dhand and 500 yard border area Teh:Shakkar Garh Distt: Narowal
8. River Ravi,Teh:Narowal including Dhand except 500 yard Tehsil & Distt: Narowal
9. Dhand Dauood Bhanian, Teh. & Distt. Narowal.
10. Nullah Odge,Teh. Shakkar Garh from Chenyal Bodley to Ganwal Taudyal, Distt. Narowal.
11. M.R Link Canal R.D 237 to end limit Narowal
12. Dhand Kakeki & Karalanwali,Teh. & Distt.Narowal.

28. Gujrat

1. River Chenab, Tehsil Gujrat
2. Bhimbar Nullah, Tehsil & District Gujrat
3. Upper Jhelum Canal
4. B.R.K Drain Teh: Kharian Disttrict Gujrat.
5. Qadirabad Dhand Tehsil Phalia
6. River Chanab, Tehsil Phalia
7. Pond Area Rasool Barrage, Tehsil & District Mandi Baha-Ud-Din
8. Rasool Qadirabad Link Canal, Tehsil Phalia
9. Lower Jhelum Canal Distt: Mandi Baha-Ud-Din
10. Budhi Sem Nullah, Teh. Phalia Distt. Mandi Baha-Ud-Din
11. Jhoulpur Bangla Canal, Tehsil Mailkwal
12. Bhabra Sem Nullah Tehsil Phalia District Mandi Baha-ud-Din
13. Halki Sem Nullah, Tehsil Phalia
14. Qadirabad Sem Nullah, Tehsil Malikwal
15. Power Supply Channel, Tehsil Mandi Baha-Ud-Din
16. Sugar Mill Sem Nullah,Teh & Distt. Mandi Baha-Ud-Din
17. Chot Drain with Mona Drain, Tehsil Phalia
18. Miana Gondal Sem Nullah, Tehsil Malikwal
19. Herya Escape Channel, Tehsil Malikwal
20. Herya Sem Nullah, Tehsil Mailkwal
21. River Jhelum,Distt.Mandi Baha-Ud-Din.
22. Malikwal Drain
23. Khokhra Branch Canal Mandi Baha-Ud-Din
24. Jholpur Bangla Escape Channel
25. Govt. Fish Farm Head Rasool Distt. Mandi Baha-ud-Din
26. River Jhelum Tehsil Sarai Alam Gir

VII.3. MAIN ANGLING SPOTS

Name of Water Area	Location	Available Fish
Rohi Nullah, Chunian	Teshil Chunian Kasur	Rohu, Mori, Thaila, Mullee, Singhari
Ravi Down Stream Head Balloki	Tehsil Chunian Kasur	Rohu, Mori, Thaila, Mullee, Singhari
Dhand Mohalanwal	Near Village Chung Multan Road, Lahore	Rohu, Mori, Thaila, Mullee
Dhand No.5, 6, 7, & 8	Head Balloki Tehsil Chunian, Kasur	Rohu, Mori, Thaila, Mullee, Singhari, Khagga
Hiran Minar	6 km from Sheikhupura	Rohu, Mori Silver Carp, Gulfam
Khanki Barrage	On Rasul Nagar Road, 48 km from Gujranwala	Rohu, Mori, Singhari,.
Qadirabad Head Works	53 km from Gujranwala	Rohu, Mori, Singhari, Soul, Gulfam
Junction of River Chenab & Manawar Tavi	27 km from Sialkot	Rohu, Mori, Mahseer, Singhari
Marala Barrage	River Chenab at Marala Barrage, 24 km from Sialkot	Rohu, Mori, Mullee, Mahseer, Singhari
Government Fish Farm Himatpura	Agriculture University, Faisalabad	Rohu, Mori, Silver Carp, Thaila, Gulfam.
Trimmu Head Works	22 km from Jhang on Bhakkar Road	Rohu, Mori, Thaila, Mullee, Khagga, Kalbans, Soul
Reserve Area Chashma	38 km from Main Wali on D. I. Khan Road	Rohu, Mori, Gulfam
Palkhoo Reserve Area	2 km from Wazirabad Gujrat Road	Rohu, Mori, Soul, Mullee, Singhari
Old Sidhnai Head Works	9 km from Abdul Hakim District Khanewal	Rohu, Mori, Khagga
Pallah Head Works	River Suttlej Near Vehari	Rohu, Mori
Punjnad Head Works	17 km from Alipur District Muzaffargarh	Rohu, Mori
Taunsa Barrage	9 km from Kot Addu on D. G. Khan Road	Rohu, Mori, Gulfam, Mullee,
Dhand Sheroo	25 km from D. G. Khan near village Imam Jhakkar Shah	Rohu, Thaila, Mullee
Sulemanki Head Works	56 km from Okara	Rohu, Thaila, Mullee, Mori, Gulfam

VII.4. PROVINCIAL ASSEMBLY OF THE PUNJAB

NOTIFICATION

9 February 1999

No. Legis-2(36)/98/116. The Punjab Fisheries (Amendment) Bill 1999, having been passed by the Provincial Assembly of the Punjab on 1 February 1999 and assented to by the Governor of the Punjab on 4 February 1999, is hereby published as an Act of the Provincial Assembley of the Punjab.

THE PUNJAB FISHERIES (AMENDMENT) ACT 1999

ACT IV OF 1999

[First published, after giving received the assent of the Governor of the Punjab, in the Guzette of the Punjab (Extraordinary) dated 9 February 1999].

An
Act

Further to amend the Punjab Fisheries Ordinance, 1961 (XXX of 1961).

Preamble.— whereas it is expedient further to amend the Punjab Fisheries Ordinanace, 1961 (XXX of 1961) in the manner hereinafter appearing;

It is hereby enacted as follows:—

1. SHORT tilte and commencement.— (1) This Act may be called the Punjab Fisheries (Amendment) Act 1999.

(2) It shall come into force at once.

2. Amendment of section 17 of Ordinance XXX of 1961.— In the said Ordinance, in the Second 17, for the words "three months", "five hundred" and "one hundred", the words "two years", "ten thousand" and "three thousand" shall respectively be substituted.

3. Amendment of Second Schedule of Ordinance XXX 1961.— In the said Ordinance, in the Second Schedule**.—**

(i) against Serial Numbers 1,2,3 and 4, for the words " twenty-five", the words "five thousand" shall be substitiuted; and

(ii) against Serial Numbers 5, 6 and 7, for the words " twenty-five", words "one thousand" shall be substituted; .

4. Repeal.— The Punjab Fisheries (Amendment) Ordinance, 1998 (XXXVI of 1998) is hereby repealed.

VII.5. GOVERNMENT OF WEST PAKISTAN AGRICULTURE DEPARTMENT

NOTIFICATION
THE 6TH JUNE, 1962

No. 5(177)-s.o. (Marketing)/62—In exercise of the powers conferred on him by sub-section (1)of Section 3 of the West Pakistan Fisheries Ordinance, 1961, (West Pakistan Ordinance No. XXX of 1961), the Governor of the West Pakistan is pleased to Appoint th following officers to be Inspectors of Fisheries for the purpose fo the said ordinance with in the local limits of their repective jurisdiction:—

(1) Director [General] of Fisheries.
(2) Deputy Director of Fisheries
(3) Extra Assistant Director Fisheries.
(4) Fisheries Development officers.
(5) Fisheries Survey Officers.
(6) Fisheries Chemist.
(7) Fisheries Senior Chemist.
(8) Fisheries Zoologist
(9) Fisheries Development Assistants.
(10) Fisheries Research Assistants.
(11) Assistant Warden Fisheries
(12) Fisheries Supervisors

By order of the Governor of the West Pakistan

Secretary to Government West, Pakistan,
Agriculture Department

Inserted Director "[General]" vide gazeteer notification No.Legis13-61/ 2004 dated 13-11-2003