

Distribution and status of significant freshwater fishes of Pakistan

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ABSTRACT

Present paper deals with the fish fauna of special importance with regard to endemism, IUCN status, commercial importance and the rarity of species. A total of 86 species have been identified as the fish fauna of special concern. Out of the total, 34 species have been categorised as endemic in the country, 11 species have special IUCN status, 31 species are commercially important while 8 species are identified as very rare in Pakistan. IUCN status of major component of freshwater fish species of Pakistan and mainly that of the endemic fauna has not yet been determined. Population of some of the economically important species is declining due to overexploitation, pollution and habitat fragmentation and therefore needs some conservation measures for its sustainable use. Major causes of high endemic component of the fish fauna in the river systems of the country have also been highlighted.

Introduction

Pakistan, and associated parts of Kashmir, is the land of geological and geographic diversity. The Indus Plain constitutes the eastern parts and the folds of mountains occupy the western and northern parts of the country, with valleys and plateaus of varying sizes falling between these mountain folds. The altitudes range between the coastlines in the south and the world highest mountain peaks (K-2, 8,611m above sea line and Nanga Parbat 8,126 m) in the north, holding many of the world's largest glaciated highland valleys. The gradual change in the altitude provides a natural slope to the area. Subtropical location of the country and its falling in the western-most reaches of the summer monsoons provides a gradual variation in temperature and precipitation. The southern and western parts of the country receive very low precipitation and have high summer temperatures, creating hot deserts with undulating sand dunes. The northeastern parts receiving high precipitation and low temperatures, where the glaciers and snow capped peaks dominate.

The general physiographic variation is equally reflected in hydrographical features of the country. Pakistan has substantially large natural inland water resources in the form of rivers and their tributaries, network of canals and natural and man-made lakes. Based upon pattern of the flow of its rivers and streams, Pakistan can be divided into three major drainage systems: the Indus drainage, Balochistan coastal drainage and landlocked drainage. Indus drainage is the largest river system of the country, consisting of the main Indus River and all its associated rivers and streams in Gilgit-Baltistan, Khyber Pakhtunkhwa, Punjab, northern and eastern Balochistan and Sindh. The Balochistan coastal drainage system consists of a number of relatively small and shallow rivers, namely Hub, Porali, Hingol, Basol and Dasht. All these rivers emerge from southwestern hills and independently fall into the Arabian Sea. The landlocked drainage is constituted by a number of small and shallow landlocked rivers and streams of central and western Balochistan. The Pishin River, Lora River and Shirin Aab end up in the Hamun-i-Lora and Rekhshan River, Mashkel stream and Tahlab River drain into Hamun-i-Mashkel. The available geologic, geographic, ecological and hydrographic variations has attributed to a diverse fish fauna of the country. The variation in fish fauna can also be attributed to the fact that the areas under Pakistan constitutes a transient zone between the Oriental, Palearctic and Ethiopian zoogeographical regions and

fish fauna of Pakistan is influenced with all these geographical entities (Mirza, 1994).

The fish fauna of water bodies located in the areas under Pakistan is known through a number of comparatively recent studies conducted at different places and times (Mirza, 1975, 1978, 1980, 1990, 2003, Rafique and Qureshi, 1997; Rafique, 2000; Rafique, 2001; Rafique *et al.*, 2003). These studies are useful in providing baseline information on species distribution and diversity in different areas, yet are deficient in many ways as none of these studies exclusively encompass the species of special importance and their conservation status. Present study has been initiated to cover the most important aspect of commercial as well as conservation aspect of the fish fauna of Pakistan.

Results

The freshwater fish fauna of Pakistan is represented by a minimum of 193 fish species. These species belong to class Actinopterygii, sub-class Teleostei, 3 cohorts, 6 superorders, 13 orders, 30 families and 86 genera (Rafique, 2007; Rafique and Mian, 2012). This diversity also includes the exotic species introduced in wild or fish farming system of Pakistan during the recent past. Among the total fish fauna of Pakistan, 86 species (8 exotic and 78 indigenous) have been identified as "species of special importance" (Table 1) on the basis of endemism, IUCN status, economic importance and rarity. Among the indigenous species of special importance, 43 species have been identified as endemic to Pakistan and Kashmir. The IUCN conservation status of none of the endemic fish fauna, however, has yet been determined except one species, *Glyptothorax kashmirensis*, which is declared as 'Critically Endangered'. Among the rest 35 indigenous fish species of special importance, one species (*Tor putitora*) is declared Endangered, 6 species (*Ompok bimaculatus*, *Ompok pabda*, *Wallago attu*, *Ailia coila*, *Chitala chitala*, *Bagarius bagarius*) Near Threatened, one species (*Schizothorax plagiostomus*) Vulnerable, 12 species Least Concern while IUCN status of 7 species has not been determined. Rest of the indigenous species viz., *Danio rerio*, *Megarasbora elonga*, *Schizopygopsis stoliczkai*, *Triplophysa stoliczkai*, *Nandus nandus*, *Badis badis*, *Monopterus cuchia*, and *Macrognathus aral* are very rare in Pakistan.

Among the species of special importance in Pakistan, at least 31 species are economically important. Major component of the

economically important species belong to warm water fish fauna and are found in the Indus Plain while 8 species *Oncorhynchus mykiss*, *Salmo trutta fario*, *Schizothorax plagiostomus*, *Diptychus maculatus*, *Ptychobarbus conirostris*, *Racoma labiata*, and *Schizopyge esocinus* are distributed in cold waters of Himalayas,

Hindukush and Karakoram. Some of the indigenous commercially important species like *Labeo rohita*, *Cirrhinus mrigala* and *Gibelion catla* are being exploited in aquaculture while all the commercially important exotic species are part of fish aquaculture in Pakistan.

Table 1: Species of special importance found in Pakistan

Sr. No.	Species	Common Names	Distribution	Distributional status	IUCN Status	Maximum Length (cm)	Maximum weight (kg)	Commercial value
1	<i>Salmophasia punjabensis</i> (Day, 1872)	Punjab razorbelly minnow	KP, Punjab, Sindh	Endemic	Not evaluated	-	-	-
2	<i>Barilius naseeri</i> (Mirza, Rafique and Awan, 1986)	Naseeri baril	Punjab	Endemic	Not evaluated	-	-	-
3	<i>Barilius Pakistanicus</i> (Mirza and Sadiq, 1978)	Pakistani baril	AJK, Balochistan, KP, Punjab, Sindh	Endemic	Not evaluated	-	-	-
4	<i>Labeo caeruleus</i> (Day, 1877)	Blue rahu	Balochistan, Punjab, Sindh	Endemic	Not evaluated	-	-	-
5	<i>Labeo nigripinnis</i> (Day, 1877)	Days' labeo	Sindh Hills	Endemic	Not evaluated	-	-	-
6	<i>Labeo gedrosicus</i> (Zugmayer, 1912)	Balochistan labeo	Balochistan	Endemic	Not evaluated	-	-	-
7	<i>Labeo macmahoni</i> (Zugmayer, 1912)	Macmahons' labeo	Balochistan	Endemic	Not evaluated	-	-	-
8	<i>Naziritor zhobensis</i> (Mirza, 1967)	Zhob mahasheer	Balochistan, KP	Endemic	Not evaluated	-	-	-
9	<i>Puntius punjabensis</i> (Day, 1871)	Punjab barb	Balochistan, KP, Punjab, Sindh	Endemic	Not evaluated	-	-	-
10	<i>Puntius waageni</i> (Day, 1872)	Salt Range barb	Punjab	Endemic	Not evaluated	-	-	-
11	<i>Garra wanae</i> (Regan, 1914)	Wana garra	South Waziristan	Endemic	Not evaluated	-	-	-
12	<i>Botia javedi</i> , (Mirza and Syed, 1995)	Javeds' loach	KP	Endemic	Not evaluated	-	-	-
13	<i>Schistura afasciata</i> (Mirza and Banareescu, 1981)	Havelian loach	KP	Endemic	Not evaluated	-	-	-
14	<i>Schistura alepidota</i> (Mirza and Banareescu, 1981)	Swat loach	AJK, KP, Punjab	Endemic	Not evaluated	-	-	-
15	<i>Schistura anambarensis</i> (Mirza and Banareescu, 1970)	Anambar loach	Balochistan	Endemic	Not evaluated	-	-	-
16	<i>Schistura arifi</i> (Mirza and Banareescu, 1981)	Arifs' loach	Balochistan	Endemic	Not evaluated	-	-	-
17	<i>Schistura baluchiorum</i> (Zugmayer, 1912)	Panjgur loach	Balochistan	Endemic	Not evaluated	-	-	-
18	<i>Schistura curtistigma</i> (Mirza and Nalbant, 1981)	Kurram loach	Kurram Agency	Endemic	Not evaluated	-	-	-
19	<i>Schistura fascimaculata</i> (Mirza and Nalbant, 1981)	Hangu loach	KP	Endemic	Not evaluated	-	-	-
20	<i>Schistura harnaiensis</i> (Mirza and Nalbant, 1969)	Harnai loach	Balochistan	Endemic	Not evaluated	-	-	-
21	<i>Schistura kessleri</i> (Gunther, 1889)	Pishin loach	Balochistan	Endemic	Not evaluated	-	-	-
22	<i>Schistura lepidocaulis</i> (Mirza and Nalbant, 1981)	Parachinar loach	KP, Punjab	Endemic	Not evaluated	-	-	-
23	<i>Schistura kohatensis</i> (Mirza and Banareescu, 1981)	Kohat loach	KP	Endemic	Not evaluated	-	-	-
24	<i>Schistura machensis</i> (Mirza and Nalbant, 1970)	Mach loach	Balochistan	Endemic	Not evaluated	-	-	-
25	<i>Schistura macrolepis</i> (Mirza and Banareescu, 1981)	Dera loach	KP	Endemic	Not evaluated	-	-	-

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26	<i>Schistura microlabra</i> (Mirza and Nalbant, 1981)	Khyber loach	KP	Endemic	Not evaluated	-	-	-
27	<i>Schistura nalbanti</i> (Banareescu and Mirza, 1972)	Rawlakot loach	AJK, KP, Punjab	Endemic	Not evaluated	-	-	-
28	<i>Schistura pakistanica</i> (Mirza and Banareescu, 1969)	Zhob loach	Balochistan	Endemic	Not evaluated	-	-	-
29	<i>Schistura parashari</i> (Hora, 1933)	Pakhtunkhwa loach	KP, Punjab	Endemic	Not evaluated	-	-	-
30	<i>Schistura shadiwalensis</i> (Mirza and Nalbant, 1981)	Chenab loach	Punjab	Endemic	Not evaluated	-	-	-
31	<i>Triplophysa hazaraensis</i> (Omer and Mirza, 1975)	Hazara Loach	KP	Endemic	Not evaluated	-	-	-
32	<i>Triplophysa kashmirensis</i> (Hora, 1922)	Verinag triplophysaloach	AJK	Endemic	Not evaluated	-	-	-
33	<i>Triplophysa naziri</i> (Ahmad and Mirza, 1963)	Nazir triplophysaloach	KP	Endemic	Not evaluated	-	-	-
34	<i>Triplophysa yasinensis</i> (Alcock, 1898)	Yasin triplophysaloach	Gilgit-Baltistan	Endemic	Not evaluated	-	-	-
35	<i>Batasio pakistanicus</i> (Mirza and Jan, 1989)	Pakistan's batasio	Punjab	Endemic	Not evaluated	-	-	-
36	<i>Mystus horai</i> (Jayaram, 1955)	Horas' mystus	Punjab	Endemic	Not evaluated	-	-	-
37	<i>Gagata pakistanica</i> (Mirza, Perveen and Javed, 1999)	Pakistani gagata	KP, Punjab	Endemic	Not evaluated	-	-	-
38	<i>Glyptothorax naziri</i> (Mirza and Naik, 1969)	Naziri catfish	AJK, Balochistan, KP, Punjab	Endemic	Not evaluated	-	-	-
39	<i>Glyptothorax punjabensis</i> (Mirza and Kashmiri, 1971)	Punjab catfish	AJK, Balochistan, KP, Punjab	Endemic	Not evaluated	-	-	-
40	<i>Glyptothorax stocki</i> (Mirza and Nijssen, 1978)	Bhed catfish	AJK, KP, Punjab	Endemic	Not evaluated	-	-	-
41	<i>Nangra robusta</i> (Mirza and Awan, 1973)	Kalabagh nangra	Punjab	Endemic	Not evaluated	-	-	-
42	<i>Ompok Sindhensis</i> (Day, 1877)	Sindh catfish	Sindh	Endemic	Not evaluated	-	-	-
43	<i>Glyptothorax kashmirensis</i> (Hora, 1923)	Kashmir catfish	AJK	Endemic	Critically Endangered	-	-	-
44	<i>Tor putitora</i> (Hamilton, 1822)	Golden mahasheer	AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Endangered	275	54	Very high
45	<i>Ompok bimaculatus</i> (Bloch, 1794)	Butter catfish	KP, Punjab, Sindh	Indigenous	Near Threatened	-	-	-
46	<i>Ompok pabda</i> (Hamilton, 1822)	Pabdah catfish	AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Near Threatened	-	-	-
47	<i>Wallago attu</i> (Bloch and Schneider, 1801)	Freshwater shark	AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Near Threatened	-	-	Very high
48	<i>Ailia coila</i> (Hamilton, 1822)	Gangetic ailia	Punjab, Sindh	Indigenous	Near Threatened	-	-	-
49	<i>Chitala chitala</i> (Hamilton, 1822)	Humped featherback	Punjab, Sindh	Indigenous	Near Threatened	120	10.5	High
50	<i>Bagarius bagarius</i> (Hamilton, 1822)	Gangetic goonch	Punjab, Sindh	Indigenous	Near Threatened	200	110	High
51	<i>Oreochromis mossambicus</i> (Peters, 1852)	Mozambique tilapia	AJK, Balochistan, KP, Punjab, Sindh	Exotic	Near Threatened	35	1.10	High

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52	<i>Schizothorax plagiostomus</i> (Heckel, 1838)	Himalayan snow trout	AJK, Gilgit-Baltistan, KP, Northern Punjab, Northern Balochistan	Indigenous	Vulnerable	60	2.5	High
53	<i>Cyprinus carpio</i> (Linnaeus, 1758)	Common carp	AJK, Balochistan, KP, Punjab, Sindh	Exotic	Vulnerable	110	40	High
54	<i>Tenulosa ilisha</i> (Hamilton, 1822)	Hilsa Shad	Sindh, Balochistan	Indigenous	Not evaluated	60	2.5	Very High
55	<i>Oncorhynchus mykiss</i> (Walbaum, 1792)	Rainbow trout	AJK, Gilgit-Baltistan, KP	Exotic	Not evaluated	120	25	Very High
56	<i>Salmo trutta fario</i> (Linnaeus, 1758)	Brown trout	AJK, Gilgit-Baltistan, KP	Exotic	Least Concern	100	20	Very High
57	<i>Cirrhinus mrigala</i> (Hamilton, 1822)	Mrigal	Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	100	12.7	Very High
58	<i>Gibelion catla</i> (Hamilton, 1822)	Catla	AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	182	36.6	Very High
59	<i>Labeo dyocheilus pakistanicus</i> (Mirza and Awan, 1976)	Thicklip labeo	AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	90	5	High
60	<i>Labeo calbasu</i> (Hamilton, 1822)	Orangefin labeo	KP, Punjab, Sindh	Indigenous	Least Concern	90	4	High
61	<i>Labeo gonius</i> (Hamilton, 1822)	Kuria labeo	Punjab, Sindh	Indigenous	Least Concern	70	2.5	High
62	<i>Labeo rohita</i> (Hamilton, 1822)	Rahu	AJK, Balochistan, Punjab, Sindh	Indigenous	Least Concern	200	45	Very High
63	<i>Diptychus maculatus</i> (Steindachner, 1866)	Scaly osman	AJK, Gilgit-Baltistan	Indigenous	Not evaluated	50	3	High
64	<i>Ptychobarbus conirostris</i> (Steindachner, 1866)	Indus snowtrout	Gilgit-Baltistan	Indigenous	Not evaluated	30	1	High
65	<i>Racoma labiata</i> (McClelland and Griffith, 1842)	Kunar snowtrout	AJK, KP, Gilgit-Baltistan, Northern Punjab, Northern Balochistan	Indigenous	Not evaluated	30	1.5	High
66	<i>Schizopyge esocinus</i> (Heckel, 1838)	Chirruh snowtrout	AJK, KP, Gilgit-Baltistan, Northern Punjab	Indigenous	Not evaluated	47	2	High
67	<i>Carassius auratus</i> (Linnaeus, 1758)	Goldfish	AJK, KP, Balochistan, Punjab, Sindh	Exotic	Not evaluated	-	-	High
68	<i>Ctenopharyngodon idellus</i> (Valenciennes, 1844)	Grass carp	KP, Punjab, Sindh	Exotic	Not evaluated	150	45	Very High
69	<i>Aristichthys nobilis</i> (Richardson, 1844)	Bighead carp	KP, Punjab, Sindh	Exotic	Not evaluated	146	40	Very High
70	<i>Hypophthalmichthys molitrix</i> (Valenciennes, 1844)	Silver carp	KP, Punjab, Sindh	Exotic	Not evaluated	105	50	Very High
71	<i>Sperata seenghala</i> (Sykes, 1839)		AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	150	10	Very High
72	<i>Rita rita</i> (Hamilton, 1822)	Rita catfish	Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	50	2	Very High
73	<i>Clupisoma garua</i> (Hamilton, 1822)	Garua bachcha	AJK, Punjab, Sindh	Indigenous	Least Concern	60	1	Very High
74	<i>Clupisoma naziri</i> (Mirza and Awan, 1973)	Naziri bachcha	AJK, KP, Punjab	Indigenous	Not evaluated	60	1	Very High
75	<i>Clarias batrachus</i> (Linnaeus, 1758)	Walking Catfish	Restricted areas of Punjab	Indigenous	Least Concern	47	1.2	High
76	<i>Channa marulius</i> (Hamilton, 1822)	Great snakehead	Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	180	30	Very High

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77	<i>Mastacembelus armatus</i> (Lacepede, 1800)	Zig-zag eel	AJK, Balochistan, KP, Punjab, Sindh	Indigenous	Least Concern	90	0.5	High
78	<i>Danio rerio</i> (Hamilton, 1822)	Zebra fish	Once in KP, Punjab, Sindh	Indigenous	Least Concern/ Very rare	-	-	-
79	<i>Megarasbora elonga</i> (Hamilton, 1822)	Bengala barb	Once in KP, Punjab, Sindh	Indigenous	Least Concern/ Very rare	-	-	-
80	<i>Schizopygopsis stoliczkai</i> (Steindachner, 1866)	Ladakh snowtrout	Upper Indus	Indigenous	Not evaluated/ Very rare	-	-	-
81	<i>Triplophysa stoliczkai</i> (Steindachner, 1866)	Stoliczka triplophysaloach	Deosai plateau	Indigenous	Not evaluated/ Very rare	-	-	-
82	<i>Sisor rabdophorus</i> (Hamilton, 1822)	Whiptail Catfish	Once in Punjab and Sindh	Indigenous	Least Concern/ Very rare	-	-	-
83	<i>Nandus nandus</i> (Hamilton, 1822)	Gangetic leaf fish	Once in Punjab and Sindh	Indigenous	Least Concern/ Very rare	-	-	-
84	<i>Badis badis</i> (Hamilton, 1822)	Chameleon fish	Once in Punjab and Sindh	Indigenous	Least Concern/ Very rare	-	-	-
85	<i>Monopterusuchia</i> (Hamilton, 1822)	Gangetic mud eel	Once in Punjab and Sindh	Indigenous	Least Concern/ Very rare	-	-	-
86	<i>Macrogathus aral</i> (Bloch and Schneider, 1801)	One-stripe spiny eel	Once in Punjab and Sindh	Indigenous	Not evaluated/ Very rare	-	-	-

Discussion

The freshwater fish fauna has a high proportion of endemics. Major component of the endemic species belong to three genera (*Triplophysa*, *Schistura* and *Glyptothorax*). Fish species in these genera are not very agile or migratory in nature and mostly confined to their respective river systems. Moreover, these species are mainly cold water fauna and confined in headwater hilly streams and rivers and isolated from other such populations by the warm water stretches in between them. This natural isolation of different populations due to ecological barriers provides a fair chance of adaptations and evolution. The species of these taxa seem to have evolved after the creation of present day hydrography of the region, in response to orogeny of Himalayas and Tibetan Plateau. After the uplift of Himalayas and the Tibetan Plateau, the ancestors of these groups of fishes had to face the harder conditions of glacier-fed cold waters and the torrential rivers. The fishes of genera *Triplophysa* and *Schistura* reduced their body size and became thin and rounded to be able to hide in crevices and underneath the stones to save themselves from slipping away in the fast moving water, while those of *Glyptothorax* fishes developed different thoracic suckers in the abdominal region. Thus, anchorage to substratum was the prime factor for the survival of this group of fishes. These fishes have, therefore, developed numerous types of adhesive devices in response to water velocity and nature of river bed (Jayaram, 1982).

Owing to dispersal limitation, the endemic fish species have relatively localised distributions and are restricted in localised areas (Rosenfeld, 2002). If IUCN conservation status of the endemic fish fauna is determined, most of the species will be determined critically endangered or threatened with extinction due to restricted range of distribution, declining of their population and narrowing chances of their reproductive success. High levels of human pressure, overexploitation of resources, habitat loss and degradation of breeding grounds has lead to unrecorded extinction

of the restricted range species (Magurran, 2009). Only assessed endemic species, *Glyptothorax kashmirensis*, on the basis of IUCN criteria has been declared Critically Endangered. It is found in Jhelum River drainage. The river is currently being dammed at several locations. This will impact this fast flowing river species due to habitat loss. A predicted decline of more than 80% over the next five to ten years is expected due to the above severe, irreversible threats (IUCN, 2011). A comprehensive strategy, therefore, needs to be evolved for conservation of this extinction prone group of fishes. Major component of endemic fish fauna of Pakistan is restricted to mountainous and sub-mountainous areas. This area, being the main centre of damming and blocking of rivers and streams, may be ecologically altered to such an extent that could eventually lead to extinction of this important component of freshwater biodiversity (Regnier *et al.*, 2009).

The commercially important fishes are a vital component in the livelihoods of people of Pakistan. A total of 31 economically important fish species in the water bodies of Pakistan is apparently good number. It provides high quality protein, essential nutrients and minerals that are often difficult to obtain from other food sources. It is also used for recreation rather than for food production, another avenue to economic development and growth. Population of many commercially important species is declining due to various anthropogenic factors. As a result of severe population decline, the species, *Tor putitora* has been declared Critically Endangered. It is under severe threat from overfishing, loss of habitat and decline in quality of habitat resulting in loss of breeding grounds. In addition, with several dams planned for construction in the future in the Himalayan region, they could have a more drastic effect on its populations blocking their migrations and affecting their breeding. It is estimated that population of the species has already declined by more than 50% in the past and if the current trends continue, the population may decline even up to 80% in the future (IUCN, 2011).

The species, *Ompok pabda*, *Wallago attu*, *Ailia coila*, *Chitala chitala*, *Bagarius bagarius* and *Oreochromis mossambicus* have been declared Near Threatened (IUCN, 2011). This status is given mainly as a result of overexploitation in case of *Ompok pabda*, *Wallago attu*, *Ailia coila*. Significant decline of population due to pollution and overharvesting has occurred in case of *Chitala chitala*. The population of *Bagarius bagarius* has declined due to heavy harvesting of species as food fish and for ornamental trade and as sport. A rapid decline in the population of species *Oreochromis mossambicus* is expected due to its hybridisation with closely related and rapidly spreading *Oreochromis niloticus*.

In response to the above impacts on inland fisheries, special enhancement programmes need to be initiated for sustainable use of fisheries resources. One common form of enhancement is the stocking of natural water bodies with the fish seed produced in fish hatcheries. Thus, fishery production can be maintained not by natural recruitment but by the release of hatchery-raised individuals. Similarly, bringing more indigenous species in aquaculture net will boost the fish production in the country. The potential candidates being the *Tenulosa ilisha*, *Chitala chitala*, *Labeo calbasu*, *Labeo dyocheilus*, *Wallago attu*, *Sperata seenghala*, *Rita rita*, *Clupisoma garua*, *Clarias batrachus*, *Channa marulius* and the cold water schizothoracid snow carps.

Population of some of the species is declining due to habitat loss and degradation, water abstraction, drainage of wetlands, dam construction, pollution and eutrophication. These factors have caused substantial declines and/or changes in inland fish species. Consequently distributional ranges of some of the species have shrunk tremendously over the last three decades and are restricted to localised areas. The species *Danio rerio*, *Megarasbora elonga*, *Rita rita*, *Nandus nandus*, *Badis badis*, *Monopterus cuchia*, and *Macrogathus aral* have been severely affected by the environmental deterioration and habitat loss. Once quite common in river systems of Pakistan are now at the verge of extinction and hardly encountered in their natural habitats.

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