

RESERVOIR FISHERIES

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INTRODUCTION

A **reservoir** may be defined as: a natural or artificial place where water is collected and stored for use, especially for supplying a community, irrigating land, furnishing power etc. It may also be defined as a large multipurpose body of surrounding water, created by the effects of the human beings. It is formed by constructing a dam in the route of water so that the part of the river or stream lying immediately behind it changes into an artificial lake, now called **Reservoir**. Thus, the reservoir is a place where the flowing water of river changes into the stagnant water of lake and the ecology of lake, yet the reservoir is different from lakes for it is subject to much fluctuations of water and being drained by the river behind.

INTRODUCTION

Because of neither being a river nor a lake, the reservoir has its own ecological and physicochemical properties influencing the life of fishes in different ways. Unfortunately there is not detail known regarding fisheries and its development in the country.

Upper Beaches

Water level

DAM

RESERVOIR

out let for Epilimnion XI

out let for sub surface water X

out let for Hypolimnion lower beaches XII

Fig: A DAM ON RESERVOIR

Classification of Reservoirs

- The reservoirs are classified based on the water spread area and water holding capacity.
- The reservoirs are classified into Large (> 5000 hectares), Medium (1001-5000 hectares) and Small (< 1000 hectares)
- There are 56 large reservoirs having a water area of 1140268 hectares, 180 medium reservoirs having a water area of 527541 hectares and 19134 small reservoirs having a water area of 1485557 hectares.

Merits and Demerits of Reservoir Fisheries

- There are some of the merits and demerits of reservoir with respect to the establishment of commercial fisheries.
- Because the flowing water of river changes into the stagnant water , the migratory fishes wiped off leading to disturbed ecosystem.
- The benthic riverine fauna is replaced by lacustrine plankton.
- As the water get stagnant , the running water fish species become fewer in number or totally exterminated.
- The Indian major carps , breeding in running water do not spawn except the migratory fishes which spawn near the mouth of river or at the tail end of water body.
- Slow water fish species and those adapted to thrive well in oxygen depleted water predominate.
- Reservoir differs from the natural lakes in many of its ecological parameters.

Merits and Demerits of Reservoir Fisheries

- Thermal stratification is not marked so well like lake, because of the release of water from upper (epilimnion) , middle ((sub-surface water) or lower layer (hypolimnion) of reservoir.
- Water level is subject to great fluctuations, depending upon the requirement , such as for power generation, irrigation and for drinking purpose etc.
- The physicochemical conditions of water differ depending upon the river which feeds them and sedimentation.
- Changes on morpho-ecological conditions of river occur, both above and below the site of them.

Merits and Demerits of Reservoir Fisheries

- Other changes such as inundation of spawning groups , change in turbidity and silting pattern occur that adversely affect spawning of many important fish species.
- However , it may be pointed out that the effects of dams on fisheries are not always deleterious, although it should be noted that fish culture in reservoir is different from that of the lake in the matters of selection of fishes for rearing , period of water supply discharge , peculiarities in fishing and methods of intensification.

DISTRIBUTION OF RESERVOIRS

- There are at present , about 975 man made reservoirs covering an area of about 65 million hectares in the country. Many more are under construction. [Table 1](#) shows some principal reservoirs and their area .
- It is evident that the fish production in reservoir is generally low, being only 5 to 10 kg \ha as against the potential which is about 100 kg\ha.
- Studies conducted by [Central Inland Capture Fisheries Research Institute \(CICFRI\) , Barrackpore](#), over 2 decades in a number of small reservoirs , situated in different agroclimatic zones of the county have clearly demonstrated that [a fish yield upto 100-200 kg\ha can be achieved from small reservoirs by adopting extensive aquaculture techniques, if managed scientifically](#). In case of reservoirs created by damming activity, the [natural estimated average fish production may range from 6-7 kg\ha](#)

Table 1.

Some Important Reservoirs In India

State	Reservoir	River	Area (ha)
Uttaranchal	Sardasagar Dam	Chuksanda	7,304
U.P.	Matitala	Betwa	20,720
Punjab	Beas Dam	Beas	26,418
Assam	Umrong	Brahmaputra system	974
Meghalaya	Barapani	Umiam	500
Tripura	Gumti	Barak river system	4,500
Jharkhand	Tilaiya	Barakar	6,475
M.P.	Tawa	Tawa	29,534
Orissa	Hirakund	Mahanadi	74,592

Table 1.

Some Important Reservoirs In India

State	Riservoirs	River	Area(ha)
A.P.	Wyra	Krishna System	1,626
„	Nagarjunsagar	„	28,474
Maharashtra	Sivajisagar	Koyna	12,100
„	Darwa	Darwa	3,367
Karnataka	Tungabhadra	Tungabhadra	37,814
„	Krishnarajasagar	Cauvery	15,343
Tamilnadu	Bhavanisagar	Bhavani	7,862
Kerala	Periyar Barrage	Periyar	606
„	Neyyar dam	Neyyar	9,000

Table 2. Some Principal Reservoir and Their Dominant Fish Species

(A) Ganga River System

(i) **River Reservoir** – Banga

(ii) **Altitude**- Upper reaches of Rihand (U.P.) and Matatila (U P)

(iii) **Fishes**: *Tor tor*, *T. putitora*, *T. mosal*, *Acrossocheilus hexagonolepis*, *Schizothorax* sps, *Labeo dero*, *Pangusia*, *Bagarius bagarius*

(A) Ganga River System

(i) **River Reservoir** – Banga

(ii) **Altitude**- Middle and lower section of river. Dam- Gandhi Sagar(M.P.), Kangabate (W.B.), Mayurrakshi (Jharkhand)

(iii) **Fishes**: *Catla catla*, *Labeo rohita*, *L. calbasu*, *L. bata*, *L. gonius*, *Cirrhinus mrigala*, *Puntius sarana*, *Wallago attu*, *Silonia silondia*, *Pangasius pangasius*, *Rita rita*, *Mystus aor*, *M. seengala*, *M. cavasius*, *Clupisoma garua*, *Eutropiichthys vacha*, *Ompok bimaculatus*

Table 2. Some Principal Reservoir and Their Dominant Fish Species

(B) East Coast River System

(i) **River Reservoir** – Mahanadi

(ii) **Altitude**- Hirakund (Orissa)

(iii) **Fishes**: similar to Ganga river .In addition to it *Labeo fimbriatus*,
Rita chrysea

(B) East Coast River System

(i) **River Reservoir** – Godavari

(ii) **Altitude**- Part of river between Dolaiswarin and Dummagudem

(iii) **Fishes**: *Catla catla*, *L. rohita*, *L. calbasu* , *L. fimbriatus* *Cirrhinus*
mrigala, *C.horai* *Silonia childreni*, *Pangasius pangasius*, *M.*
seenghala, *M.oar*, *Bagarius bagarius*, **Prawns**- *Macrobrachium*
malcolmsonii

Table 2. Some Principal Reservoir and Their Dominant Fish Species

(B) East Coast River System

(i) **River Reservoir** – Krishna

(ii) **Altitude**- Tungabhadra(Mysore), Nagar Junasagar (A.P.) , Nijam Sagar(A.P.)

(iii) **Fishes**: *L. fimbriatus*, *L. calbasu*, *L. bata*, *L. baga*, *L. boggut*, *Puntius sarana*, *P. kotus*, *P. pulchellus*, *Tor khudree*, *Cirrhinus reba*, *M. seenghala*, *M. cavasius*, *M. aor*, *Osteobramia vigorsii*, *W. attu*, *Channa punctatus* , *Eutropiichthys gongura*, *Ompok bimaculatus*, *Bagarius bagarius*

B) East Coast River System

(i) **River Reservoir** – Cauveri

(ii) **Altitude**- Krishnaraja Sagar(Mysore) , Bhawani Sagar and Poondi (Tamilnadu)

(iii) **Fishes**: *Labeo fimbriatus*, *L. calbasu*, *L. potail* , *L. porcellus*, *L. rohita*, *Catla catla*, *Cirrhinus mrigala*, *C. reba*, *Cyprinus carpio*, *Puntius sarana*, *P. micropogon*, *Tor khudree* , *Wallago attu*, *Pangasius pangasius*

Table 2. Some Principal Reservoir and Their Dominant Fish Species

(C) West Coast River System

- (i) **River Reservoir** – Different tributaries of West Coast System
- (ii) **Fishes:** *Labeo rohita*, *L. calbasu*, *L. gonius*, *L. bata*, *L. fimbriatus*, *L. dyocheilus*, *Catla catla*, *Cirrhinus mrigala*, *Tor tor*, *T. khudree*, *Puntius sarana*, *Bagarius bagarius*, *Wallago attu*, *Mystus seenghala*, *M. aor*, *Clupisoma garua*, *Rita sps.*

FISHERIES OF RESERVOIR

- Many fishes suit to ecological conditions of reservoir and thrive well, while several other have adapted to changed conditions and adjusted to live in reservoirs. Among the major carps the *Labeo rohita* is incapable of adjusting to reservoir but a hybrid of Catla and Rohu , has been found to thrive well in the reservoirs.
- Various weed fishes and crap minnows such as *Parambassis ranga*, *Osteobrama cotio* and *Gadusia chapra* are well suited for reservoir fish but they have to struggle with the major carps for food.

FISHERIES OF RESERVOIR

- The reservoirs of U.P. , M.P. being connected to Ganga river system have a natural stock of major carps, but looking to the large volume of water to reservoir , they are stocked regularly by the carp fingerlings. Similarly, the other reservoirs are also either stocked with or are under experimental conditions.
- Reservoirs located at high altitudes includes the cold water fishes grow well and breed in confined water. The various species include *Tor tor*, *Labeo dero*, *L. gonius*, *Cyprinus carpio*, *Tinca tinca* and *Cavassius sps.*
- The fishing of mahaseer in reservoir in lower reaches could not come up to commercial level, as the fish could not adjusted to changed hydrobiological conditions of the reservoir.
- Fishing of *Hilsa* in the East Coast river system declined significantly as a result of construction of barrage hindering the migration of fishes.

Suggested Measures for Commercial Fisheries

The productivity of reservoir as against its potential is very low at present. For an efficient management of reservoirs culminating into commercial fisheries of the country following measures are suggested:

- The bottom of reservoir should be cleared from the obstructions such as aquatic vegetation, weeds and other submerged objects like stones, plant stems and debris finding access through inflowing water of river.
- The fish farms when constructed near the reservoir facilitates restocking of reservoir.
- Stocking with fingerlings of commercial fishes should be done on regular basis to sustain yield on an economically sound basis.
- Population of predatory fishes such as the *Mystus sps.*, *Channa sps.*, *W. attu* etc. should be effectively controlled for building up a population of commercial fishes feeding on lower food chains.

Suggested Measures for Commercial Fisheries

- Predatory animals such as amphibians , reptiles, birds and mammals should be removed from water.
- Steps to identify the breeding behaviors and the conservation of spawning grounds of stocked fishes , as also the prevention of fishing during spawning period should be ascertained.
- Overfishing and fishing of small sized fishes be prevented.
- Steps to modernize fishing gears (those used, including drag net, surface and bottom gill nets) should be properly thought of undertaken.
- Effective measures should be taken to prevent pollution of water caused by both the riverine and the local surfaces.

Reservoir Management

For judicious exploitation of fishery resources various rules and regulations under the **Indian Fisheries Act** should be effectively enforced lying more emphasis on allowed limits of mesh-size, limits of size of fish to be caught , declaration of closed fishing season from June to September (to allow unhampered migrations and breeding) declaring certain areas as sanctuaries, protection from heavy pollution load from the industries etc.

Thanks

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FOR OUR FUTURE**