ମତ୍ସ୍ୟ ନିର୍ଦ୍ଦେଶାଳୟ, ଓଡ଼ିଶା, କଟକ

DIRECTORATE OF FISHERIES, ODISHA, CUTTACK

Ph.: (0671) 2414061, Fax:-(0671) 2410521, E-mail: **director.odifish@gmail.com**

Letter No. : _____/ **Date:** _____

EoI No.-8046 /IE-XII-RF-17/19, Date- 15/07/2020

For taking up reservoir cage culture in Hirakud Reservoir, Odisha by PFCS/private entrepreneurs /companies on Lease-Install-Operate basis

The Director of Fisheries, Odisha, Cuttack invites sealed Expression of Interest (EoI) for taking up reservoir cage culture in Hirakud Reservoir, Odisha by PFCS / private entrepreneurs /companies on Lease-Install-Operate basis. Applicants are advised to go through the EoI document carefully before filling up the application form. Filled up application shall be submitted along with required documents and fees on or before **Dt-31.08.2020 by 17.00 hrs**. The details of criteria, submission requirement, objective, scope of work etc is available in the websites of Directorate of Fisheries, Odisha, Cuttack at https://odishafisheries.nic.in, www.fishfedodisha.com and F& ARD Department at www.fardodisha.gov.in.

Sealed envelope containing EoI application along with all relevant documents should be submitted to the below address, **mentioning "EoI for taking up reservoir cage culture in Hirakud reservoir, Odisha by PFCS /private entrepreneurs /companies on Lease-Install-Operate basis"** on the top of the envelope.

The Director of Fisheries, Odisha reserves the right to alter the date of opening of the EOI and also to reject any all the EOI's without assigning any reason whatsoever.

15-07-2020

DIRECTOR

The Director of Fisheries, Odisha, Cuttack
Directorate of Fisheries, Odisha
Near Dry Dock Jobra,
Cuttack-753007
Telephone-0671-2414061, Email- director.odifsih@gmail.com

Memo No- 8047 **/Date-** 15.7.2020

Copy along with soft copy of the advertisement forwarded to the Dy. Director (Advertisement), I & PR Department Bhubaneswar with a request to publish the EOI in two reputed Odia Daily & and two National English Daily.

15/07/2020

DIRECTOR

Memo No- 8048 **/Date-** 15.7.20

Copy along with soft copy of the EOI & EoI document forwarded to the Addl. Secretary to Govt., F & ARD Department, Bhubaneswar for favour of kind information of the Commissioner-cum- Secretary to Govt., F& ARD Department with a request to publish the EOI document in website of F& ARD Department.

15/7/2020

Addl. DIRECTOR (Tech)

Memo No- 8049 **/Date-** 15.7.20

Copy the EOI submittedto the PS to APC-Cum-ACS, Odisha for favour of kind information of the APC-Cum-ACS, Odisha.

15/7/2020

Addl. DIRECTOR (Tech)

Memo No- 8050 **/Date-** 15.7.20

Copy along with soft copy of the EOI & EoI document forwarded MD, FISHFED for information and necessary action.

15/7/2020

Addl. DIRECTOR (Tech)

Memo No- 8051 **/Date-** 15.7.20

Copy of the EOI &EoI document forwarded all Zonal Deputy Directors for information and necessary action.

15/7/2020

Addl. DIRECTOR (Tech)

Memo No- 8058 **/Date-** 15.7.20

Copy along with soft copy of the EOI &EoI document forwarded to I/C Computer Cell, Directorate of Fisheries, Odisha, Cuttack with a request to publish the EOI document in website of the Directorate.

15/7/2020

Addl. DIRECTOR (Tech)

EXPRESSION OFINTEREST DOCUMENT

For taking up reservoir cage culture in Hirakud Reservoir, Odisha by private PFCS/Fish Farmers/Entrepreneurs /Companies on Lease-Install-Operate basis

ମତ୍ସ୍ୟ ନିର୍ଦ୍ଦେଶାଳୟ, ଓଡିଶା, କଟକ
Directorate of Fisheries, Odisha, Cuttack
Ph : 0671-2414061, Fax : 0671-2410521
Email : director.odifish@gmail.com// director@orissafisheries.com
website-www.odishafisheries.com

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Part I: Request for "Expression of Interest"

1. Introduction

The Government of Odisha through the Directorate of Fisheries, Odisha, Department of Fisheries and Animal Resources invites sealed Expression of Interest (EoI) for taking up reservoir cage culture in Hirakud Reservoir, Odisha from interested and eligible PFCS/Fish Farmers/private entrepreneurs/companies on Lease-Install-Operate Basis.

2. Details of EoI

Sl. No.	Subject	Particulars
1	Project Title	EoI for taking up reservoir cage culture in Hirakud Reservoir, Odisha from interested and eligible PFCS/ Fish Farmers / private entrepreneurs/ Companies on Lease-Install-Operate Basis.
2	Implementing Agency	Directorate of Fisheries, Odisha Dry-dock, Jobra, Cuttack – 753 007
3	Implementing Department	Fisheries and ARD Department, Government of Odisha, Bhubaneswar, India
4	Contact Person	Sri. SashikantaAcharya, Deputy Director of Fisheries (Reservoir), Directorate of Fisheries, Odisha, Cuttack. Mob. No: 9437232717
5	Validity of Proposal	Technical DPR and Financial proposals to be valid up to 1 year
6	e-mail	director.odifish@gmail.com
7	Website	https://odishafisheries.nic.in/ ; http://fardodisha.gov.in/ ; http://www.fishfedodisha.com/

3. Tentative calendar of events

The following table gives details of important milestones and timelines for completion of bidding process and activities

Last date for the submission of EoI	31.08.2020 by 5 PM
Last date for receiving of Pre-bid Queries	12.08.2020 up to 5 pm
Date of Pre-bid meeting at Directorate of Fisheries, Odisha, Dry-dock, Jobra, Cuttack – 753 007	13.08.2020 at 11.30 AM
Date of Issue of Pre-bid Clarifications in Department website: https://odishafisheries.nic.in/ ; http://fardodisha.gov.in/	14.08.2020
Opening of the Technical Proposal and Financial Proposal	03.09.2020, 4 PM
Proposed date for signing of agreements	To be intimated

Office Address	Directorate of Fisheries, Odisha Dry-dock, Jobra, Cuttack – 753 007

4. Availability of the EoI document

EoI document can also be downloaded from website address as given above: https://odishafisheries.nic.in/ ; http://fardodisha.gov.in/ andhttp://www.fishfedodisha.com/. The participants are expected to examine all instructions, forms, terms, project requirements and other details as in the EoI document. Failure to furnish complete information as mentioned in the EoI document or submission of a proposal not substantially responsive to the EoI documents in every respect will be at the bidders risk and may result in rejection of the proposal.

5. EoI Processing Fees (Non- Refundable)

A processing fee for Rs. 1,000/- (Rupees one thousand only) in the form of Demand Draft drawn in favour of "Director of Fisheries, Odisha", and payable at Cuttack, Odisha has to be submitted along with the proposal. Proposals received without or with inadequate processing fee shall be liable to get rejected. The Applicant shall submit the Fee separately for each location in case of applying for multiple locations.

6. Venue and deadline for submission of EoI

EoI in its complete form in all respects as specified above shall be submitted to the Directorate of Fisheries, Cuttack, Odisha as specified in Para -2 above. Director of Fisheries, Odisha, Cuttack in exceptional circumstances and at his/her discretion, can extend the deadline for submission of the proposals by issuing an addendum to be made available on the website, in which case all rights and obligations of the Director of Fisheries and the bidders previously submitted to the original deadline will thereafter be subject to the deadline as extended.

Part II: Scope of the Proposal

1. Introduction

Demand and consumption of freshwater fish such as Indian Major Carps and other varieties is ever increasing in Odisha. During 2018-19, Odisha produced about 5.08 lakh metric tonnes of freshwater fish. However, the state is still importing nearly 40,000 metric tonnes of fish per annum from neighbouring states to meet the existing demand. With an aim of self-sufficiency and increased fish production in the state, as envisioned in the Odisha State Fisheries Policy 2015, Fisheries & ARD Department, Government of Odisha has been successfully promoting fish production in the state through various schemes.

Freshwater aquaculture in Odisha is by and large pond-based. However, there are limitations for growth in pond-based aquaculture, considering the ever increasing and often conflicting cross-sectoral demands for water and land; increasing land prices; huge capital investment required to dig the new ponds and maintain the related infrastructure. Due to requirement of such high capital investment, the state is experiencing a slow growth in addition of new fish tanks. However, Odisha has 138 reservoirs with water spread area of nearly 1.4 lakh hectares, which are under-utilised from fish production perspective. Therefore, it can be used for optimal fish production by adopting advanced fish farming technologies such as cage culture.

In view of this, it is felt necessary to promote cage culture in the medium and large reservoirs (reservoirs having mean water spread area - MWSA 1,000 ha or more at Full Reservoir Level– FRL and with an average depth of 10 m) as per the national guidelines for cage culture in inland open water bodies (National Fisheries Development Board - NFDB, GoI, 2016) and as per the sub-clause no. 1.2 (iv) of the State Reservoir Fishery Policy, Odisha-2012. Utilizing a modest fraction (1%) of their surface area, large and medium reservoirs can contribute a substantial quantity of fish to the total inland fish production basket.

Cage Culture is an emerging technology for intensive production of fish and has a huge potential for increasing the fish production of the state. It is often considered as the future of Indian Fisheries. In recent years, efforts are being made to promote cage culture in the reservoirs of Odisha with following objectives:

1) To augment fish production from reservoirs in a responsible manner, without affecting the livelihood of the traditional/local fishing communities;
2) To achieve self-sufficiency in the fish demand of the state;
3) To increase per capita fish protein availability in the state;
4) To enhance the income and livelihood security of the fishers depending on reservoirs;
5) To Promote entrepreneurship in aqua culture and to create job opportunities;
6) To ensure that the growth of aquaculture is:
    a. Inclusive and sustainable,
    b. In harmony with principles of ecological integrity and natural resource

conservation, and

c. Not in conflict with the genuine interests of other users of the water and land resources.

2. Cage Culture

Cage is an enclosed space to rear fish in water that maintains free exchange of water with the surrounding water body. The cages are generally enclosed on all sides with net walls, except for leaving an opening at the top for feeding and handling the stock. They can be positioned at the bottom, middle or surface of the water column, but floating cages are very popular and easy to manage. In this document, cage means floating cage at the surface of water body.

Cages are of many shapes (circular, square or rectangular). Circular cages are with a cylindrical net, supported by circle-shaped support floating frames and rectangular/square cages are with a cube-shaped net supported by square/rectangle-shaped floating frames. Both circular and rectangular cages are equally good from production point of view and their choice is mainly based on other considerations such as species of farmed fish, endurance (against turbulence), cost, availability of materials, convenience in assembling and transporting the components.

Circular cages of 16 m diameter are considered more suitable for choppy waters with wave- and wind-driven turbulence for culture of IMC. Size of a rectangular modular cage for fish culture in reservoirs can vary, but often multiple units are installed as a battery of cages with catwalks for easy access to the fish stock and floating huts. However, from operational and planning purposes, a cage with the dimensions: 6m (length) x 4m (width) x 4m (height) is considered as a standard unit and a battery comprises 6, 12 or 24 such cages, as per requirement. The cages in a battery are arranged in caterpillar design for better exchange of water thereby facilitating relatively high dissolved oxygen.

Durable and stable cage materials are essential for achieving better results. A cage comprises hard frames as support and nylon nettings as cage body. It is desirable to have environment friendly, HACCP (Hazard Analysis and Critical Control Points) protocol compliant, rust-free materials for cage fabrication. Commonly used materials for cage frames are bamboos, mild steel (MS), galvanized iron (GI), poly-vinyl chloride (PVC) and virgin-grade HDPE (High Density Polyethylene) (for runner-based & pontoon-based frames). The bamboo based frames are not recommended for commercial cage fish farming due to their poor longevity and strength to withstand turbulence. Knotless nylon nets are recommended for cage fabrication. The net mesh size recommended for rearing fry of *Pangasianodonhypophthalmus*is 10 to 12 mm and that for fingerling to marketable size is 20 to 30 mm. (In case of IMC, the mesh size should be 5 mm for fry and 10 mm for fingerling). Protective net may be put above the cage to avoid crop loss due to predation by birds.

Separate cages are needed for nursery rearing and grow-outs. Normally, 30% of the cages in a battery are earmarked for *in situ* rearing of fingerlings (stocking materials); the rest being grow-out cages. Special care is needed on mooring/anchoring of the cage structure to avoid displacement or damage to the structure. Anchoring needs to be done diagonally opposite at the four corners of the cage structure by providing heavy sinkers such as anchors or black stones having a dimension of 0.5 m x 1.0 m (not less than 40 kg in weight) tied with strong nylon rope.

3. Depth of the Reservoir and Water Quality

Depth of the reservoir at cage culture zone is an important criterion for selecting the cage culture site. The cage culture zone needs a water depth of at least 10 meters round the year. A clearance of 6 meters will be always needed from the cage bottom to the floor of the water body. The cage culture zones under this EoI are selected based on above primary criterion.

As the cage culture operations will tend to increase nutrient load, BOD and COD in the water bodies, the selected cage culture entrepreneur / company has to pre-assess the water quality of the zone. Excessive nutrient load from cage culture inputs, especially feeds can create eutrophic conditions with disastrous consequences to the ecosystem. The cage culture entrepreneur / company needs to be self-ensured that the water body is either oligotrophic (low nutrient content) or mesotrophic (moderate nutrient content) before starting the cage culture.

It will be mandatory for the cage culture operators to collect data on the trophic status in and around the cages as well as the areas away from the cages periodically (on quarterly basis) and should be reported to the Directorate of Fisheries to assess any implications caused due to nutrient loading. Studies on other chemical and physical parameters of water and sediments should also be undertaken as per the future perceptive risk.

It will be mandatory for the cage culture operators to record the water quality parameters such as Dissolved Oxygen, pH, CO_2, total alkalinity, total phosphorous and total nitrogen inside and outside the cages from the day-one of its operation in a Government prescribed format, keeping in view the need for long-term environmental health of the water body.

As per the approved guidelines for taking up cage culture in reservoirs by private entrepreneurs and companies in partnership with PFCS and SHGs in Odisha, FISHFEDOdisha is mandated to conduct an Environment Impact Assessment (EIA). EIA shall be carried out by FishFed as per the “Government of India guidelines for cage culture in inland open water bodies” by hiring the services of the ICAR research Institutes or local Universities.

4. Cage Maintenance

Anti-corrosive paint should be applied to GI/MS cages to prevent rusting and to increase the durability. Cage should be cleaned at 15-days interval to avoid net clogging. After shifting the stock to another cage, each cage is taken out, sun-dried and cleaned thoroughly by scrubbing/ water-jet wash to remove debris and fowling organisms. *In situ* cleaning using water jets is not advised as it will dislodge the pathogenic organisms throwing them into cages to infect the fish. Additional *hapa*s/nets may be maintained for this purpose or to meet other emergency situation. The physico-chemical parameters of water should be recorded regularly as a part of water quality monitoring.

5. Species to be cultured

At the moment economically viable cage culture is practiced in inland water bodies of Odisha and other states of India by growing the exotic pangasius (Sutchi Catfish), *Pangasianodonhypophthalmus*. Culture of another exotic species *viz.,* GIFT tilapia, a genetically improved strain of *Oreochromisniloticus*has been allowed subject to certain conditions such as: only all-male seed, sourced from authorized agencies can be used. Culture of Indian Major Carps(Catla&Rohu) in circular cages has been demonstrated successfully by Department of Fisheries & ARD, Odisha in Hirakud reservoir.

Considering the consistent demand for species of high economic and nutritive value, coupled with the local preference, the following indigenous species can also be farmed by entrepreneurs / companies in the cages: *Labeobata, Osteobramabelangeri*(*pengba*), *Ompokbimaculatus*(*pabda*), *Anabas testudineus (koi)*, *Puntiussarana*, *Latescalcarifer (bhetki)*, *Chanoschanos (*milk fish*)*, *Etroplussuratensis*, *Chitalachitala*(featherback)*,* Murrels (*Channastriata, C. marulius*), *Wallagoattu*and freshwater giant prawn (*Macrobrachiumrosenbergii*). Apart from *Pangasianodonhypophthalmus* and GIFT Tilapia, all other exotic species (including illegally introduced fishes) are strictly prohibited for cage culture.

The following special of fresh water fishes are allowed to be culture in reserviour cages:

Sl. No.	Scientific name	Common name (English)	Common name (Odia)
1	*Catlacatla*	Catla	Bhakura
2	*Labeorohita*	Rohu	Ruhi
3	*Cirrhinusmrigala*	Mrigal	Mirkali
4	*Labeobata*	Bata	Bata
5	*Cyprinuscarpio*	Common Carp / Amur	BilatiRuhi

		common carp	
6	*Pangasianodonhypophthalmus*	Pangasius (Sutchi Catfish)	Jalanga
7	*Oreochromisniloticus*	Mono-sex GIFT tilapia	China Kau
8	*Osteobramabelangeri*	Manipur osteobrama	*Pengha*
9	*Ompokbimaculatus*	Butter catfish	*Pabda*
10	*Anabas testudineus*	Climbing perch	Kau
11	*Puntiussarana*	Olive barb	Putia-kerundi
12	*Latescalcarifer*	Asian Seabass / Barramundi	*Bhetki*
13	*Chanoschanos*	Milk fish	Sebakhoinga
14	*Etroplussuratensis*	Pearl spot	Cundahle
15	*Chitalachitala*	Featherback	Chital
16	*Channastriata& C. marulius*	Murrels / snakeheads	Sola
17	*Wallagoattu*	Wallago	Ballai / Boabe
18	*Macrobrachiumrosenbergii*	Giant freshwater prawn	Nayichingudi

The lessee should to specify the name of the fish species that he/she intends to culture in the cages in the DPR while submission of the EoI. During the lease period, if he/she wants to change to any other species than mentioned in the DPR, then he/she should get due approval from the Directorate of Fisheries for the same.

6. Fish Health Monitoring

As fish health monitoring involves maintaining hygienic and healthy culture environments, it is important to source seed and feed from authorized and genuine agencies that follow high standards. Usage of suitable quality feed, maintenance of optimum stocking densities, adoption of preventive measures such as prophylactic treatment before stocking, regular monitoring of stock and periodic cleaning of cages will avoid outbreak of diseases and stock loss. As far as possible, use of antibiotics and chemical should be avoided. However, in the event of it becoming necessary under exceptional circumstances, the use should be judicious and *it must be clearly understood that only approved drugs/chemicals, permitted by Government regulatory authorities (See Table IX) at standard doses shall be used.* In case

of severe infection, the fish should be removed from the cages and buried/incinerated/ bleached. Health of the fishes stocked in cages must be monitored at monthly interval and proper treatment measures must be adopted in case of disease outbreak, (if any). Standard doses of chemicals like $KMnO_4$ and formalin can be used for dip treatment. In case of bacterial disease, oxytetracycline (OTC) and its derivatives can be administered through feed or other modes. These are the only antibiotics allowed for fish culture in cages. A record on incidence of fish disease and control measures adopted including medicines used should be maintained. In case of disease outbreak, the State Fisheries Department or National Institutes (one of the eight fisheries research Institutes under ICAR (other Central Government labs like NABL accredited aquaculture lab of RGCA) or any laboratory belonging to the State governments can be approached.

7. Safety Measures

Cage culture involves working in a risky environment and therefore, all security measures should be taken to avoid injury and loss of life while installing cages and working in cages to manage the stock (rearing the fishes). Adequate number of lifebuoys/ other life-saving equipment should be provided at the cages and in vessels used for approaching (managing) the cages. Similarly, the workers should wear life-jackets all the time while working in water and cages. Emergency life-saving kits and first-aid boxes should be provided at the cages/boats/floating huts or field camps. The international conventions related to 'safety at sea' and procedures prescribed in the FAO-Code of Conduct for Responsible Fisheries (FAO-CCRF) will be the guiding principles for safety measures (http://www.fao.org/docrep /005/v9878e/v9878e00.HTM). The cage stock needs to be protected from poaching/ trespassing by keeping efficient watch and ward.

8. Market, Harvesting and Post-Harvest Management

The feeding should be stopped 2 days prior to harvesting. If antibiotics were used during the culture period, sufficient withdrawal period may be given before harvest. It is advisable that the harvesting of stock may be done in phased manner like larger fish first, especially to avoid glut in the market, to avoid low price for the harvested fish and get a better market price. Records of harvest should be maintained at the site. Cage culture is a high-intensive culture practice that could result in harvest of large quantities of fish at a time. Growth of this segment of fish production without a planned link to a whole value chain approach, could result in marketing problems and post-harvest losses. It is essential to have a post-harvest and marketing strategy before launching cage culture ventures on a large-scale. The large-scale cage production centres should either have their own facilities or have linkages for:

- Proper harvesting gadgets
- Fish holding and storage
- Live fish transport

- Post-harvest processing centres like fillet plants
- Market chain including E-markets.

In any case, it is advisable for all cage units (including small units) to have a small ice-making device at each cage site for preservation of the harvest before being transported for storage or to the market. There should be at least one insulated van at site for transportation of fish. Efforts may also be made to create live/preserved fish sale outlets at strategically important points in nearby cites for better return.

9. Environmental Precautions and Assessment

Cage culture is a relatively new area of fish production in Odisha and India and its environmental impacts are not fully understood. Unregulated growth in cage culture without addressing environmental concerns have resulted in disastrous consequences to ecosystems. As per the national guidelines for cage culture in inland open water bodies in India, the following measures will be adopted:

i. An Environmental Impact Assessment (EIA) will be conducted by FishFedOdisha through ICAR institution / University or through a competent agency as per the requirement under the above national guidelines.

ii. Fisheries and ARD Department, Odisha has already demarcated, listed and notified water bodies that are suitable for cage culture using GIS platform.

iii. It is mandatory for the cage culture entrepreneurs / companies to record the water quality parameters such as Dissolved Oxygen, pH, CO_2, Total Alkalinity, total phosphorous, total nitrogen inside and outside the cages from the day-one of the operation, keeping in view the need for long-term environmental impact. Any increase in nutrients level away from the cage area will be taken as a warning.

iv. It is be mandatory for the cage culture entrepreneurs / companies to collect data on the trophic status in and around the cages as well as the areas away from the cages, periodically and report to the Directorate of Fisheries to assess the impacts in terms of nutrient loading. Studies on other chemical and physical quality parameters of water and sediments also shall be undertaken up by the entrepreneurs / companies as per the risk perception as suggested by competent authority (ICAR institution / University / Nationally accredited environment monitoring laboratory) and upon insistence by the Directorate of Fisheries.

Part III: Terms of EoI and Pre-qualification Criteria

1. Guiding Principle

1.1 Submission of DPR and evaluation

Interested private entrepreneurs /companies shall submit Detailed Project Report (DPR) and formulate implementable cage culture project in the selected reservoir. Department of Fisheries& ARD, Government of Odisha will have no role in facilitating the land for the need based ancillary units proposed for the project. The party may adopt innovative or already proven technologies of cage culture/farming with the approval of the Department with their own technical specifications and design. Feasibility studies, time line of the project, implementation strategy, and detailed cost estimates, quotations, technical, financial, economic aspects and anticipated output and outcome of the project etc. are needed to be furnished in the DPR. Private entrepreneur /company need to submit the DPR as per the (Format-4) along with application. Submitted applications will be scrutinized by empowered committee as approved by Directorate of Fisheries and shortlisted applicants will be sent for approval to the Govt.

1.2 Financial Arrangement

The selected party shall have the onus of implementing the proposed project from their own financial arrangement. The Directorate of Fisheries will only have the facilitative role in the leasing out designated spaces (zones and sub-zones) to install cage and carry out culture and any ancillary activities.

1.3 Implementation Module

The Directorate of Fisheries provides (leases) the zones and sub-zones for cage culture. Lease is based on water surface area of cages installed in sub-zone. Number of cages and number of batteries may be decided by the lessee as per his/her business DPR.

- PFCS / Fish Farmers / Entrepreneurs/Companies may come up with their own design, components, and innovative technologies. DPR shall be submitted to Directorate of Fisheries along with the application. Application and DPR will be evaluated by the empowered committee
- The PFCS / Fish Farmers / Entrepreneurs/Companies shall adhere to the timeline stipulated by the committee for implementation of the project.
- On completion, teams from Directorate of Fisheries will inspect, assess and recommend any corrective measures required prior to the start of the project.

2. Terms & Conditions

2.1 Application Terms

1. The cage culture application is on Lease-Install-Operate Basis.
2. Implementation model is specified as above (item 4) is subject to change as per the evaluation of DPR submitted by the applicant.
3. EoI Application processing non-refundable fee of Rs. 1,000 shall be paid through any nationalized bank through Demand Draft (DD) in the name of Director of Fisheries, Odisha and Demand Draft should be enclosed with application.
4. Applications without processing fee and incomplete applications will be summarily rejected.

2.2 Selection Procedure

1. Selection committee constituted by Directorate of Fisheries, Cuttack, will evaluate the applications and technical DPRs submitted by the applicants and shortlist them.
2. Shortlisted applicants will be invited to make a detailed presentation before the committee for further evaluation before finalizing the selection of entrepreneurs.
3. Financial bid is the sole criteria for final selection. H1 bid will be selected for leasing the sub-zones in reservoir to private entrepreneur / company for cage culture.
4. The decision of the committee members will be final in the selection process.

2.3 Eligibility Conditions

1. The Individual/ Fish farmer/ Primary Fisheries Cooperative Society/ Entrepreneur/ Company registered in India.
2. In case ofCompany,they should have valid PAN, Registration certificates for GST and Income Tax Return for last three financial years i.e., 2016-17, 2017-18 and 2018-19.
3. Even though applicants satisfy the above requirements, they are subject to be disqualified if they have made untrue or false representation in the form, statement and attachments required in the EOI.

2.4 Documents To Be Submitted:-

1. The bidder has to submit EoI Processing Fee a non-refundable fee of Rs 1000.00 (Rupees One Thousand) only
2. Valid Registration Certificate for Firm/ Memorandum or Article of Association or Constitution of company

3. Copy of PAN Card
4. GST Registration Certificate. (as per ITB 5.8)
5. A Declaration that they have not been blacklisted/banned by any Government Agencies /Govt. Department /Quasi Govt. Dept /PSU /Board / Council or similar organization. If any Government Agencies/ Govt. Department /Quasi Govt. Dept/ PSU/ Board/ Council or similar organization has banned the bidder and later on lifted the ban, the fact must be clearly stated.
6. A technical proposal (DPR) is to be submitted based on the Proforma placed in the Format-5.
7. Submission of the sealed EOI (with sign & seal of bidder/authorized representative on all the pages of EOI and all other submitted documents).

EOI not submitted within time will not be accepted. The decision of the Tender Committee shall be final and no enquiry or application for review shall be entertained.

The office of the undersigned reserved the right to modify the terms and conditions partially or wholly or cancel the EOI without assigning any reason thereof.

2.5 Reservoir Lease Terms

1. In total, 100 sub-zones located in 5cage culture zones of Hirakud reservoir in Odisha have been identified for leasing to PFCS/ Fish Farmers / Private Entrepreneurs / companies. The detailed zonation maps are placed in **Appendix-1**.

2. Each sub-zone has a cage surface area of 600 m^2 and can accommodate a maximum of 24 nos. of rectangular cages of 6 m length x 4 m width x 4 m depth dimension or 3 nos. of circular cages of 16 m diameter.

3. Each applicant can submit the EoI for a minimum of one sub-zone and without any upper limits.

4. The lessee of each sub-zone is allowed to have a maximum of 2 nos. of floating sheds (of each 5 m X 5 m floor area), 2 floating rafts or boats for transportation of people and cage culture inputs from reservoir bank to the cage culture zone.

5. Maximum allowed fish biomass in the cage is 30 kg/m^3 of water. This means, in rectangular cages of 6 m length x 4 m width x 4 m depth dimension the maximum allowed biomass is 2880 Kg/cage (or round off to 3000 Kg/cage). According to this biomass, lessee can adjust the stocking density of fish (number of fish) and crop duration.

6. The cage culture sub-zone shall be leased to the selected PFCS / Fish Farmer / private entrepreneur /company to take up culture of fishes in cages for a period of **5 years** and may be extendable to a further maximum period of **5 years** with approval of Director of Fisheries.

7. The floor price for lease amount is Rs 30,000/- per sub-zone per annum (or Rs. 50/- per m^2 of cage surface area per annum) for the 1st year. For the remaining years, lease amount shall be increased annually by 5 percent of the lease amount of

previous year.

8. Subleasing of the leased area is strictly prohibited.

9. Successful applicant shall pay the first year lease amount along with the signing of the agreement. Lease amount of the remaining years shall be paid in the beginning of the corresponding year and shall obtain renewal order from Directorate of Fisheries.

10. Directorate of Fisheries shall have the power to cancel the lease if the proposed activities cause any violation of lease agreement or due to changes in Government Regulations with respect to reservoir management or any other environmental concerns or public interest activities in the location.

11. The Leased site shall be utilized for fish culture in cages only. It shall not be used for any other commercial purposes like tourism or sports fisheries etc. In such case, lease will be cancelled.

12. The dumping, throwing of any type of wastages, dead fish or their viscera into the reservoir which pollutes the quality of water shall not be allowed.

13. In case, any disease incidence is noticed in cages, all precautions should be taken to prevent and control it and the dead fish shall be disposed safely burying/ burning them at a far-away place from the reservoir so that disease does not spread to the other cages or fishes in the reservoir.

14. The species of fishes permitted by the Director of Fisheries, Government of Odisha only shall be reared in cages. If any illegal varieties or culture of banned varieties is noticed in the cages, lease shall be cancelled with immediate effect and shall attract legal measures from the concerned Department.

15. The lessee should to specify the name of the fish species that he/she intends to culture in the cages in the DPR while submission of the EoI. During the lease period, if he/she wants to change to any other species than mentioned in the DPR, then he/she should get due approval from the Directorate of Fisheries for the same.

16. The lessee shall stock only the high-health fish seeds (fingerlings) which are screened for Government of India notified fish pathogens. Health certificate of each batch of fish seed shall be maintained in the farm record by the lessee.

17. Directorate of Fisheries shall not pay any compensation for any loss/damages caused due to any natural calamity or any other causes. The lessee alone will be responsible for any damage/loss incurred.

18. Fish culture shall be taken up within 6 months after obtaining the unit on lease, otherwise lease will be cancelled.

19. Marketing of the fish produced from cage culture project is the sole responsibility of Lessee.

20. Lessee shall provide information in stipulated format to Directorate of Fisheries

regarding, seed stocking, fish catch & marketing details of each crop.

21. Any issues regarding implementation of the scheme shall be sorted out by mutual discussion. In case of any irreconcilable differences, this decision of the Secretary, Department of Fisheries and Animal Resources Development shall be final and lessee shall abide by it.

22. Further disputes, if any arising out of the project will be settled within the jurisdiction of Law in the state court Cuttack only.

23. Officials of Department of Fisheries and ARD, Govt. of Odisha shall have the access to the unit whenever required.

24. Director of Fisheries, Government of Odisha and the Department of Fisheries & ARD shall have right to cancel the lease if any of above Terms of References found to be violated by the lessee.

25. Permission for cage culture will not be granted in the reservoir area coming under reserve forest, Wild life zone, national parks where public entrance is prohibited under any Government Notifications or Law.

26. Successful applicant shall execute an agreement on Rs.200/- judicial stamp paper with Directorate of Fisheries stating that he / she will abide by the above said terms and conditions.

27. The lessee shall not interfere or come in the way of other activities implemented in the reservoir. State Government is in no way liable for the damages / compensation / relief claimed by the individual/agency/firm/company to whom permission to install cages in the water body leased out is given.

28. The Lessee is liable for payment of compensation to the reservoir fishermen in the event of indulgence in activities inimical to the interests of the reservoir fishermen.

29. The Lessee shall abide by the Terms & Conditions stipulated periodically by the State Government. The lease amount & security deposit shall be forfeited in case the lessee decides to discontinue the lease before completion of lease period.

30. Department of Fisheries and ARD has all the rights to modify any portion of EoI or withdraw or cancel the entire process at any stage during the process of implementation of the project.

Compliance to existing Govt. Notifications and Guidelines

1. The lessee shall abide by/comply the guidelines/Terms & conditions/Clauses of the following Govt. notifications.

2. While implementing the project, the First Party / lessee will abide by the terms and conditions stipulated by the Govt. of Odisha.

3. Guidelines for taking up cage culture in reservoirs by private entrepreneurs /

companies in partnership with Primary Fishermen Cooperative Societies and Self Help Groups in Odisha.

4. The Specifications/directives issued by the Director of Fisheries, Govt. of Odisha.
5. The guidelines published by NFDB on the Guidelines for Cage culture in open inland water bodies of India on behalf of DADF, Govt. of India

Sd/-

DIRECTOR

Format-1: Applicant's Expression of Interest

To,

The Director of Fisheries,
Directorate of Fisheries, Odisha
Cuttack

Sub: Submission of Expression of Interest (EoI) for taking up cage culture in Hirakud Reservoir, Odisha by Primary Fisheries Cooperative Society / Fish Farmers / Private Entrepreneurs / Companies on Lease-Install-Operate basis.

Dear Sir/Madam

In response to the Invitation for Expressions of Interest (EoI) published on……for the above purpose, I/ we would like to express interest to the above proposed task. As instructed, we are herewith submitting the following documents in sealed envelopes for needful:

a) Application as per Format-2 with relevant documents

b) Declaration of the Applicant: Format-3.

c) Undertaking not having Blacklisted: Format-4

d) Detailed Project Report (DPR) Format-5

e) Financial Bid Format: format-6 (Separate Envelope)

Sincerely Yours,

Signature of the applicant

[Full name of applicant]

Date:

Encl.: As above.

Format-2: Application for taking up cage culture in reservoir

Sl. No	Particulars to be submitted by the applicant	Information furnished by the applicant
(1)	(2)	(3)
1	Name and address of the company/ entrepreneur (IN BLOCK LETTERS):	
2	Address for communication: Telephone: Fax: Mobile: E-mail:	
3	*Details of the where cage culture activity is proposed to be taken up:*	
	Name of the Reservoir:	
	Number of sub-zones that you are interested to take on lease basis	
	Specify the sub-zone ID numbers interested to take up under the lease (sub-zone ID numbers may be obtained from the Zonation Maps at **Appendix 1**)	
	Details of the proposed construction works of cage farms. (Design details/engineering works to be submitted):	
	Number of cage units as per the indicated model above:	
	Dimensions of each cage:	
	Maximum fish holding capacity in each cage:	
	Details of other structures including floats, anchors, watch towers, light-buoys:	
	Details of boats for transporting men and material to and fro:	
4	On-site facilities for the cage farm: Details of the area where the on-shore facility is proposed to be taken up:	
	Ownership (whether free hold or open lease):	
	If on lease, details and duration of lease:	
5	Details of the proposed construction works of on-shore facility. (Design details/engineering works to be certified and approved by the Competent Authority):	

	Fish Species and source of fry:	
	Details of the holding facility for the seed (fry to fingerling):	
	Details of feed to be used for fry:	
	Storage facility for feed (for rearing and seed cultured fish):	
	Frozen / Chilled storage facility for harvested fish (if any):	
	Details of mechanized/motorized crafts for transporting men and material to and fro:	
	On-site laboratory for monitoring water quality parameters and disease diagnosis in the cage farm site (if any):	
6	Whether the assistance for the cage culture has been sought under any other scheme of the Central/State Government? If so, please provide the details:	
7	Whether the Company/Firm is in default of payment to any financial institution/State Government for loan/assistance availed earlier. If yes, please provide the details and the reasons for default:	
8	Estimates regarding input cost:	
	Fish Species to be cage cultured:	
	Stocking density (please specify the stage of stocking – fry/fingerling) – numbers per cubic meter of cage:	
	Cost of seed (Rs. per thousand):	
	Source of procurement:	
	Transportation cost (Rs. per thousand):	
	Details of feed to be used, its quantity and cost:	
	Source of procurement of feed:	
	Transportation cost of feed from on-shore facility to the cage culture site:	
	Number of culture cycles per year:	
	Salaries/wages:	
	Harvesting cost:	
	Operational cost for the on-shore facility:	
9	Details regarding economics of operation:	
10	Whether any financial tie up has been made for availing Bank loan, if so please provide the details:	

11	Expected date of operation of the farm and tentative schedule of activities:	
12	Marketing tie-up (Provide details):	
13	Source and number of labor employed for construction as well as day-to-day culture operations (man days per year):	
14	Enclose solvency certificate of Rs……lakhs from the bank as a proof of financial capacity to invest for developing floating cages: Enclose applicants details of business turnover in the field of fisheries or fisheries related sector:	
15	Details of Application Fee: Amount, Demand Draft number, Date, Bank name.	

Declaration of Applicant:

This is to certify that, I/ we …….. son/ daughter of ……..hereby declare that the information furnished above is true to my knowledge and belief and all relevant documents are enclosed.

Date:

Place: Signature:

Format-3: Declaration by the Authorized Signatory of the entrepreneur / company

I /We son /daughter /wife of …….. residing at…… …… hereby declare that the information furnished above is true to the best of my/ our knowledge and belief. I am/ we are fully aware that, if any information furnished by me/ us are found to be fabricated or there is any kind of deviation/ violation of the conditions laid out by the Directorate of Fisheries, any action as deemed fit may be taken against me/ us.

Date:

Place: Signature of the applicant (s)

PS: Please enclose details in additional pages if required

Format-4 Undertaking regarding not Blacklisted:-

I/we/ M/s ……

(the names and addresses of the registered office) have not been blacklisted by Central Government/ State Government/ PS/ Supreme Court/ High Court of any State/ District Court of any State from participating in any Projects.

We further confirm that we are aware that, our Application for the captioned project would be liable for rejection in case any material misrepresentation is made or discovered at any stage of Bidding Process or thereafter during the agreement period and the amount paid (including performance security deposit) shall stand forfeited without any further intimation.

Dated ……. this the… day of 2020

Name of Applicant…….

Signature of the Authorized Person…….

Name of the Authorized Person……

Format- 5: Detailed Project Report (DPR) Format

S. No.	Contents	Points to be covered
1	Project Title:	-
2	Introduction & Rationale:	Background information, need, justification
3	Specific Objectives:	Objectives pertaining to the component
4	Site Details:	
	Specify the sub-zone ID numbers interested to take up under the lease (sub-zone ID numbers may be obtained from the Zonation Maps at **Appendix 1**)	
5	Implementation Strategy:	
6	Components Abstract:	Salient features of the component, activities
7	Project Feasibility:	Resource, Production, Marketing and Consumption
8	Time line of the Project:	
9	Financial Arrangements/ Lease Agreements/ Linkages/ Marketing tie ups etc.	
10	Technical Details	Design, layout, specifications, inputs, SOP, Better Management Practices (BMP), etc.
11	Details about adoption of any new technology/innovation in methodology etc.	
12	Details of technical: (collaborations/ national or international consultancy if any)	
13	Financial Details:	Unit cost (Capital & Recurring cost); Profitability
14	Economic Analysis:	Internal rate of return (IRR), Cost Benefit Ratio, Net Present Value (NPV),

		Sensitivity Analysis
15	Output and Outcome:	Production, Employment and Revenue Generation
16	Anticipated Impact:	Economic, Social and Environmental impact
17	Conclusions:	-
18	Annexures/supporting documents	To attach

Format 6:

Financial Proposal

(Separate sealed Envelope to be submitted)

For Taking up reservoir cage culture in Hirakud reservoir in Odisha by Primary Fisheries Cooperative Society / Fish Farmers / Private entrepreneurs / Companies on Lease-Install-Operate basis.

Location: Pls mention location:

Sl. No.	**Zone ID number**	**Sub-zone ID number**	**Price to be quoted by the Bidder (**The floor price for lease amount is Rs 30,000 per sub-zone per annum (or Rs. 50 per m^2 of cage surface area per annum) for the 1st year.) **(inRs.)**
1			
2			
3			
4*			

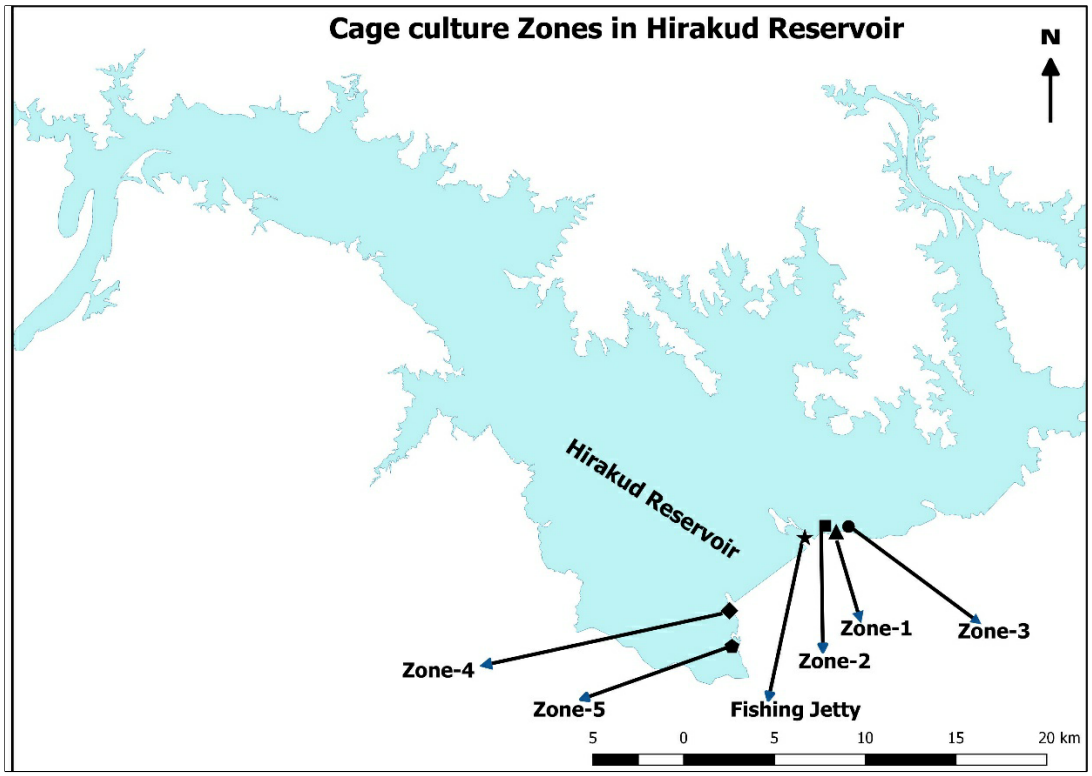
***Please add more rows if the lessee is interested for leasing more sub-zones.**

- Rates are exclusive of all taxes
- Floor Price shall be increased by 5% annually on compounded basis.
- The bidder shall quote their price above the above mentioned floor price
- The interested bidder shall propose their price location-wise separately as per the format.

Seal & Signature of the Bidder

Date

Cage Culture Zones in Hirakud Reservoir

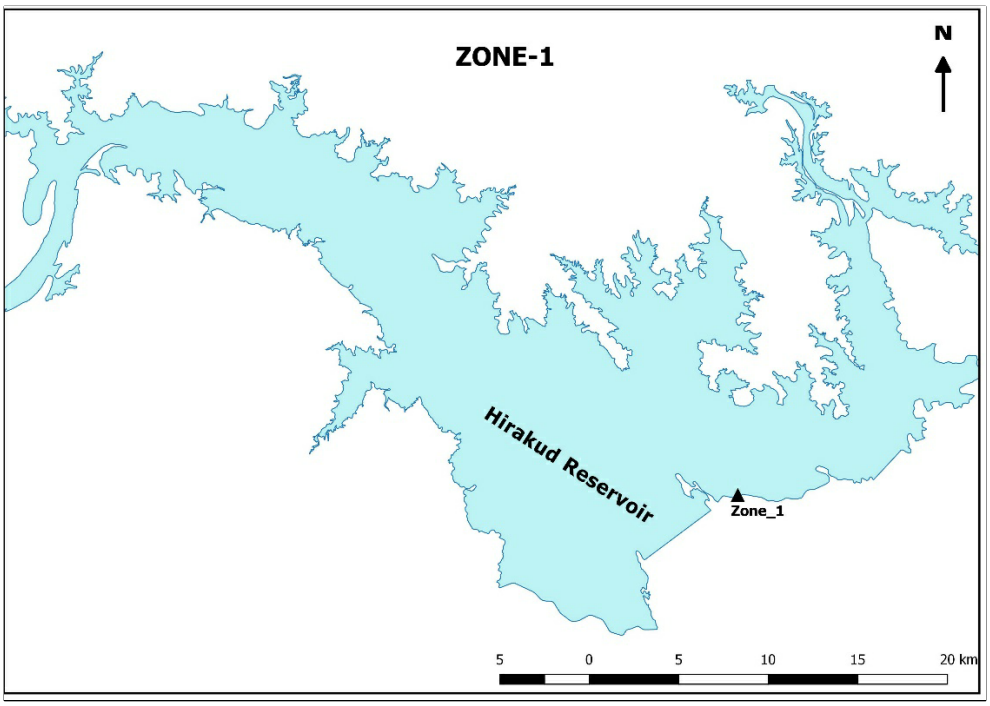


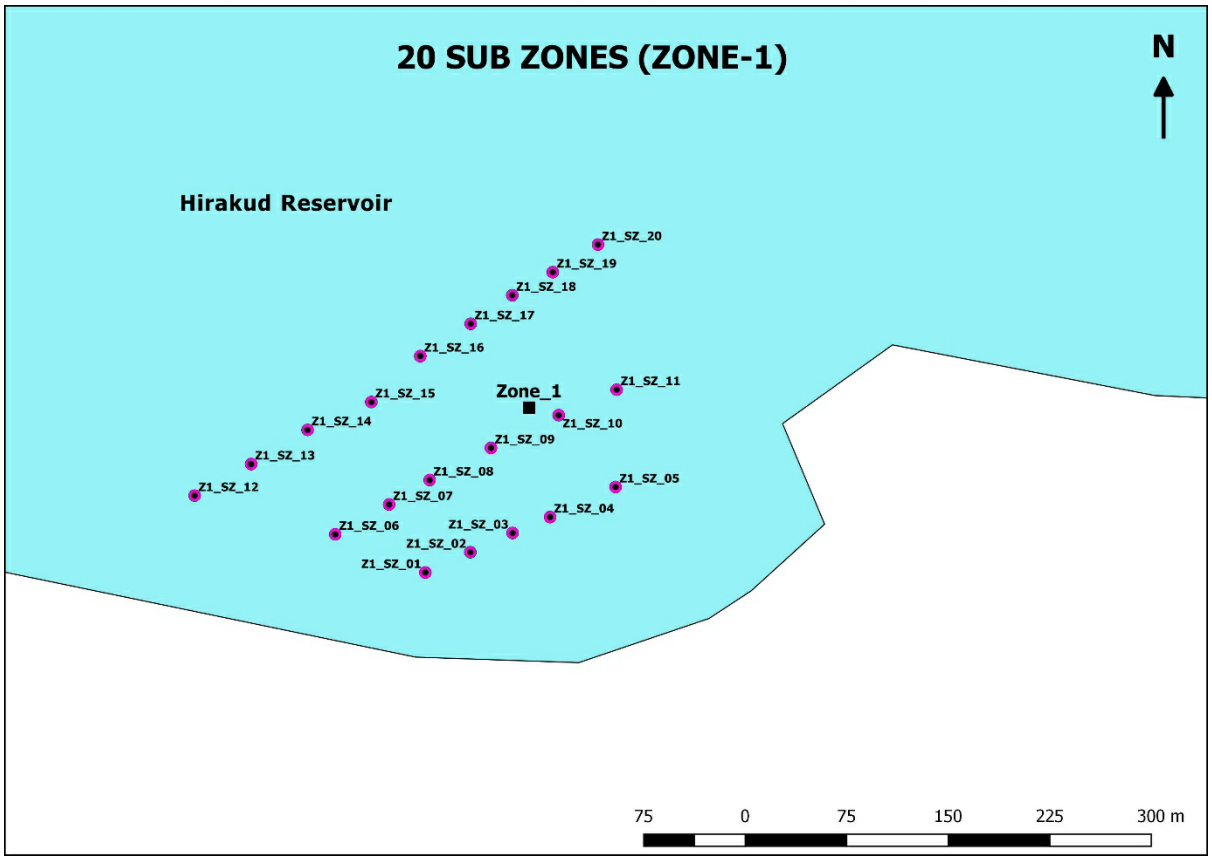
GPS Coordinates of Major Zones and Fishing Jetty in Hirakud Reservoir			
Sl. No.	Zone ID No.	Longitude	Latitude
1.	Zone-1	83°54'5.26"E	21°33'4.69"N
2.	Zone-2	83°53'47.17"E	21°33'16.34"N
3.	Zone-3	83°54'27.15"E	21°33'14.80"N
4.	Zone-4	83°50'54.95"E	21°30'45.50"N
5.	Zone-5	83°51'1.33"E	21°29'38.71"N
6.	Fishing jetty	83°53'9.35"E	21°32'54.39"N

Water Quality Parameters in Different Zones (As per the survey during 20 May – 3 June 2020)					
Parameters	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5
Dissolved Oxygen (mg/l)	7.06	7.58	7.22	8.01	8.07
Temperature (˚C)	35.16	35.58	32.96	32.13	33.25
pH	7.7	8.3	7.7	8.3	8.3
Ammonia (mg/l)	Nil	Nil	Nil	Nil	Nil
Total Alkalinity (ppm)	90	120	100	80	90

Total Hardness (ppm)	100	130	120	110	110
Transparency (cm)	60	50	45	48	55
Average Depth (m)	10	10	10	12	11

Sub-Zones under Zone-1



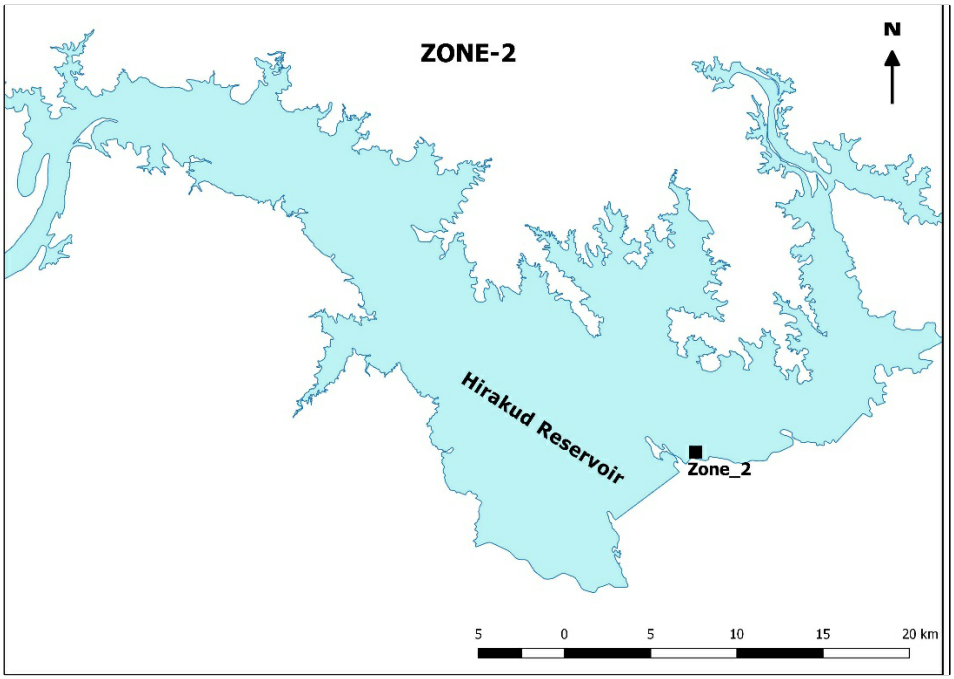


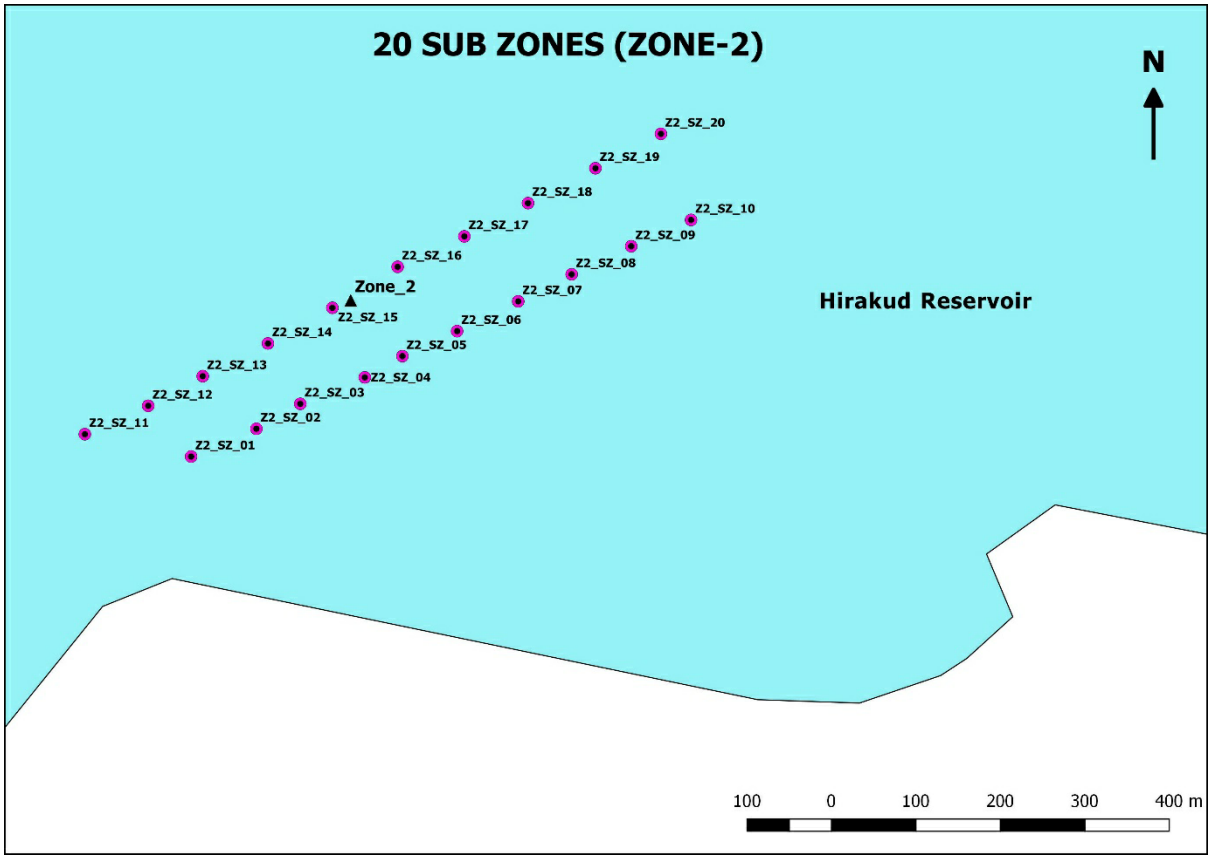
GPS Coordinates of Sub-Zones in Zone 1			
Sl. No.	Sub-Zone ID No.	Longitude	Latitude
1	Z1_SZ_01	21°33'1.42"N	83°54'2.61"E
2	Z1_SZ_02	21°33'1.94"N	83°54'3.77"E
3	Z1-SZ_03	21°33'2.43"N	83°54'4.85"E
4	Z1_SZ_04	21°33'2.84"N	83°54'5.82"E
5	Z1_SZ_05	21°33'3.62"N	83°54'7.50"E
6	Z1_SZ_06	21°33'2.40"N	83°54'0.30"E
7	Z1_SZ_07	21°33'3.17"N	83°54'1.68"E
8	Z1_SZ_08	21°33'3.79"N	83°54'2.72"E
9	Z1_SZ_09	21°33'4.62"N	83°54'4.30"E
10	Z1_SZ_10	21°33'5.46"N	83°54'6.04"E
11	Z1_SZ_11	21°33'6.12"N	83°54'7.53"E
12	Z1_SZ_12	21°33'3.40"N	83°53'56.69"E
13	Z1_SZ_13	21°33'4.21"N	83°53'58.14"E
14	Z1_SZ_14	21°33'5.08"N	83°53'59.59"E
15	Z1_SZ_15	21°33'5.80"N	83°54'1.23"E
16	Z1_SZ_16	21°33'6.98"N	83°54'2.48"E
17	Z1_SZ_17	21°33'7.81"N	83°54'3.78"E
18	Z1_SZ_18	21°33'8.54"N	83°54'4.85"E
19	Z1_SZ_19	21°33'9.13"N	83°54'5.89"E
20	Z1_SZ_20	21°33'9.84"N	83°54'7.05"E

Features of Zone-1:

Zone-1 is located on the left side of the main dam spillage and just 5 km away from the Hirakud Township. All selected sub-zones under Zone-1 have easy and direct access to the main town road. Zone-1 comes under Mahamadpur PFCS in which presently has one rectangular cage battery (28 cages) and one set of circular cages (2 cages). Current (dry season) average water depth of zone is 10 m.

Sub-Zones under Zone-2



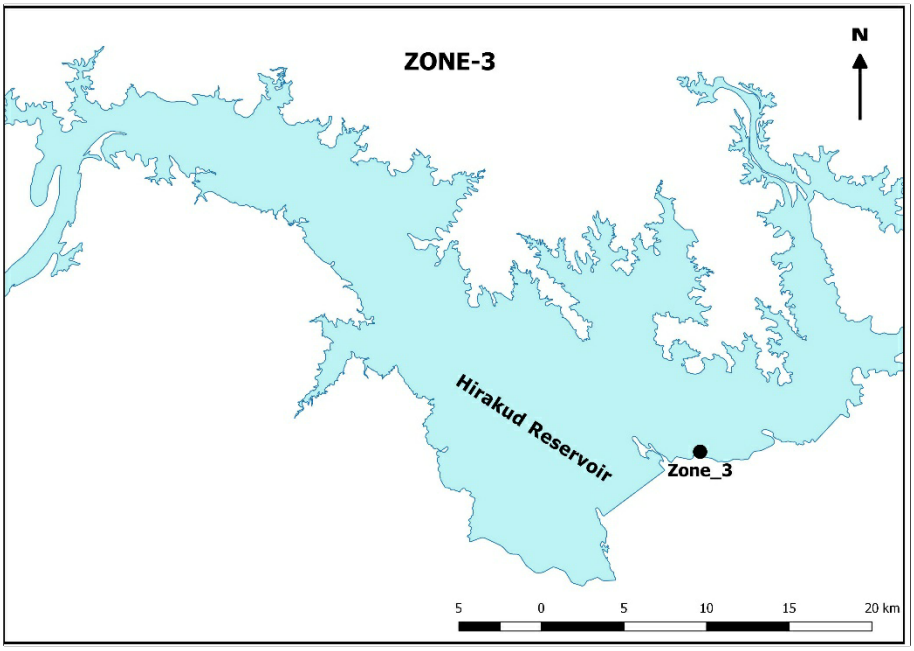


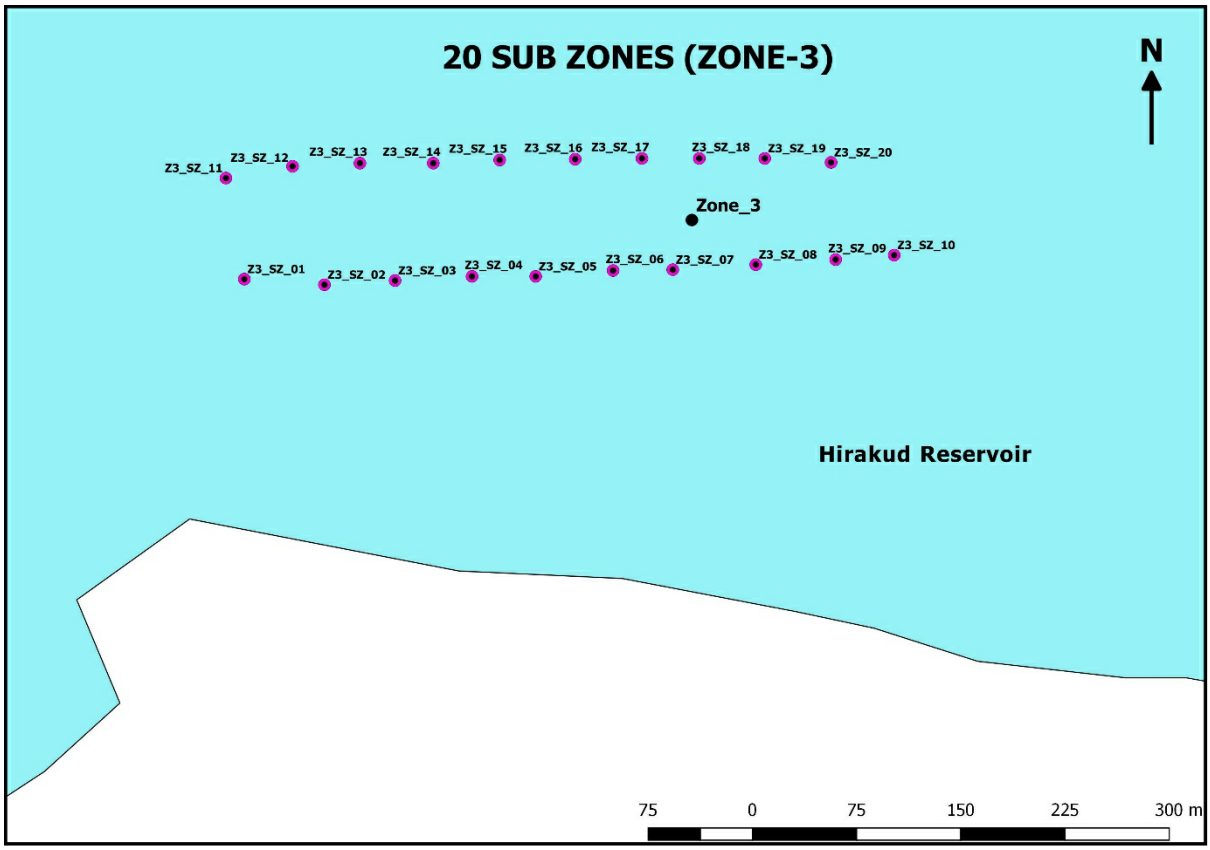
GPS Coordinates of Sub-Zones of Zone-2			
Sl. No.	Subzone ID No.	Longitude	Latitude
1	Z2_SZ_01	21°33'9.26"N	83°53'39.04"E
2	Z2_SZ_02	21°33'10.40"N	83°53'41.73"E
3	Z2-SZ_03	21°33'11.43"N	83°53'43.54"E
4	Z2_SZ_04	21°33'12.52"N	83°53'46.19"E
5	Z2_SZ_05	21°33'13.39"N	83°53'47.74"E
6	Z2_SZ_06	21°33'14.42"N	83°53'49.99"E
7	Z2_SZ_07	21°33'15.65"N	83°53'52.51"E
8	Z2_SZ_08	21°33'16.76"N	83°53'54.71"E
9	Z2_SZ_09	21°33'17.92"N	83°53'57.16"E
10	Z2_SZ_10	21°33'19.00"N	83°53'59.62"E
11	Z2_SZ_11	21°33'10.18"N	83°53'34.67"E
12	Z2_SZ_12	21°33'11.35"N	83°53'37.28"E
13	Z2_SZ_13	21°33'12.57"N	83°53'39.52"E
14	Z2_SZ_14	21°33'13.92"N	83°53'42.21"E
15	Z2_SZ_15	21°33'15.38"N	83°53'44.86"E
16	Z2_SZ_16	21°33'17.07"N	83°53'47.55"E
17	Z2_SZ_17	21°33'18.32"N	83°53'50.29"E
18	Z2_SZ_18	21°33'19.69"N	83°53'52.91"E
19	Z2_SZ_19	21°33'21.13"N	83°53'55.69"E
20	Z2_SZ_20	21°33'22.55"N	83°53'58.38"E

Features of Zone-2:

Zone-2 is more than 800 m away from Zone-1. Total water spread area of this zone is 16.35 Ha (approx.) and average water depth is 10 m (dry season). Zone-2 comes under Mahamadpur PFCS.

Sub-Zones under Zone-3



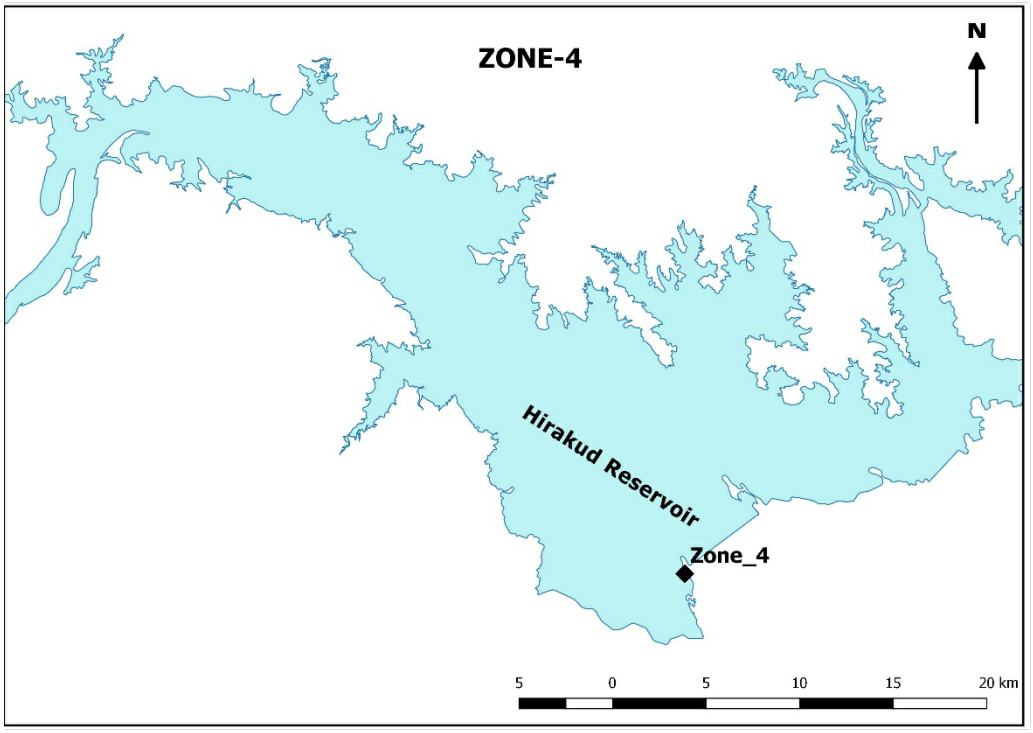


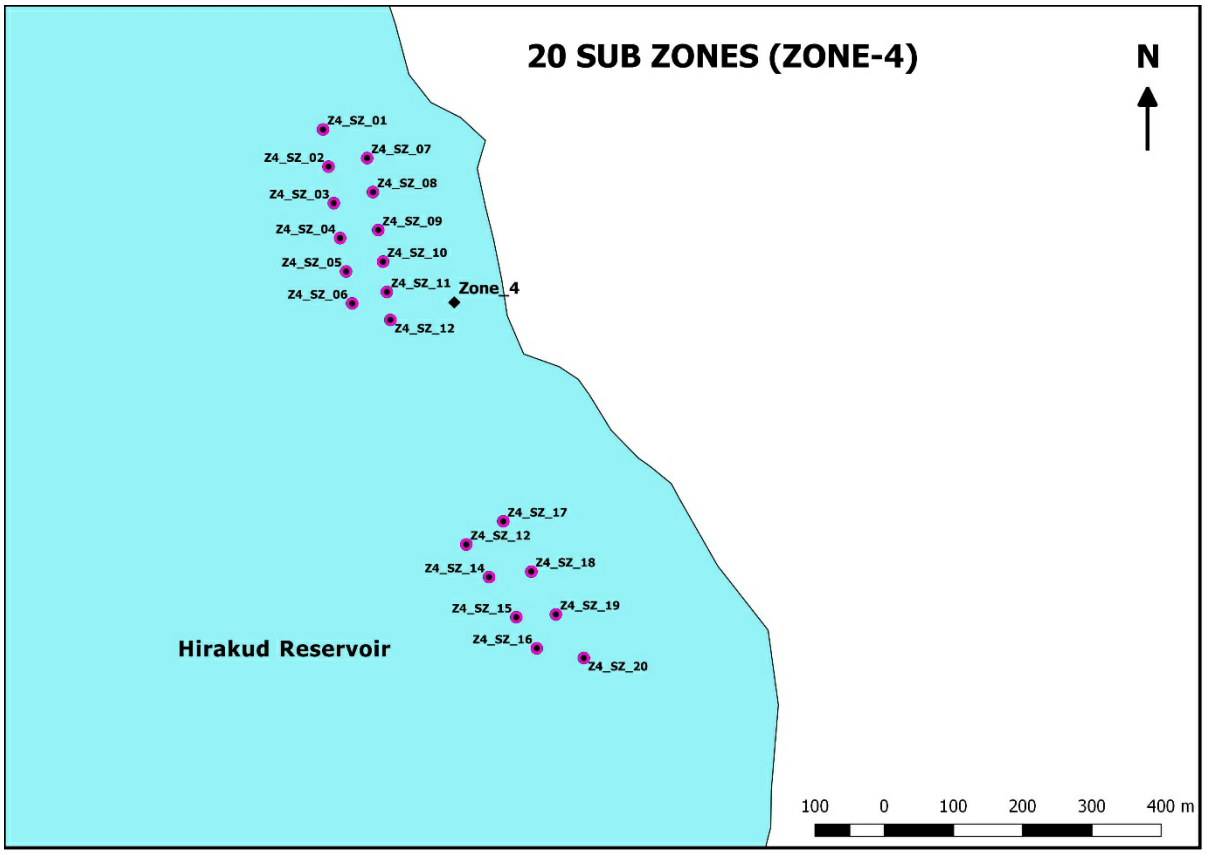
GPS Coordinates of Sub-Zones of Zone-3			
Sl. No.	Subzone ID No.	Longitude	Latitude
1	Z3_SZ_01	21°33'13.27"N	83°54'15.98"E
2	Z3_SZ_02	21°33'13.13"N	83°54'17.98"E
3	Z3-SZ_03	21°33'13.23"N	83°54'19.75"E
4	Z3_SZ_04	21°33'13.34"N	83°54'21.67"E
5	Z3_SZ_05	21°33'13.34"N	83°54'23.26"E
6	Z3_SZ_06	21°33'13.49"N	83°54'25.20"E
7	Z3_SZ_07	21°33'13.51"N	83°54'26.69"E
8	Z3_SZ_08	21°33'13.63"N	83°54'28.77"E
9	Z3_SZ_09	21°33'13.76"N	83°54'30.77"E
10	Z3_SZ_10	21°33'13.87"N	83°54'32.23"E
11	Z3_SZ_11	21°33'15.80"N	83°54'15.52"E
12	Z3_SZ_12	21°33'16.09"N	83°54'17.18"E
13	Z3_SZ_13	21°33'16.17"N	83°54'18.87"E
14	Z3_SZ_14	21°33'16.17"N	83°54'20.70"E
15	Z3_SZ_15	21°33'16.25"N	83°54'22.37"E
16	Z3_SZ_16	21°33'16.27"N	83°54'24.25"E
17	Z3_SZ_17	21°33'16.29"N	83°54'25.92"E
18	Z3_SZ_18	21°33'16.29"N	83°54'27.36"E
19	Z3_SZ_19	21°33'16.29"N	83°54'28.99"E
20	Z3_SZ_20	21°33'16.19"N	83°54'30.65"E

Features of Zone-3:

Zone-3 is more than 800 m away from Zone-1 and 1000 m away from Zone-2. Total water spread area of this zone is 6.05 ha (approx.) and average water depth is 10 m (dry season). Zone-3 comes under Mahamadpur PFCS.

Sub-Zones under Zone-4



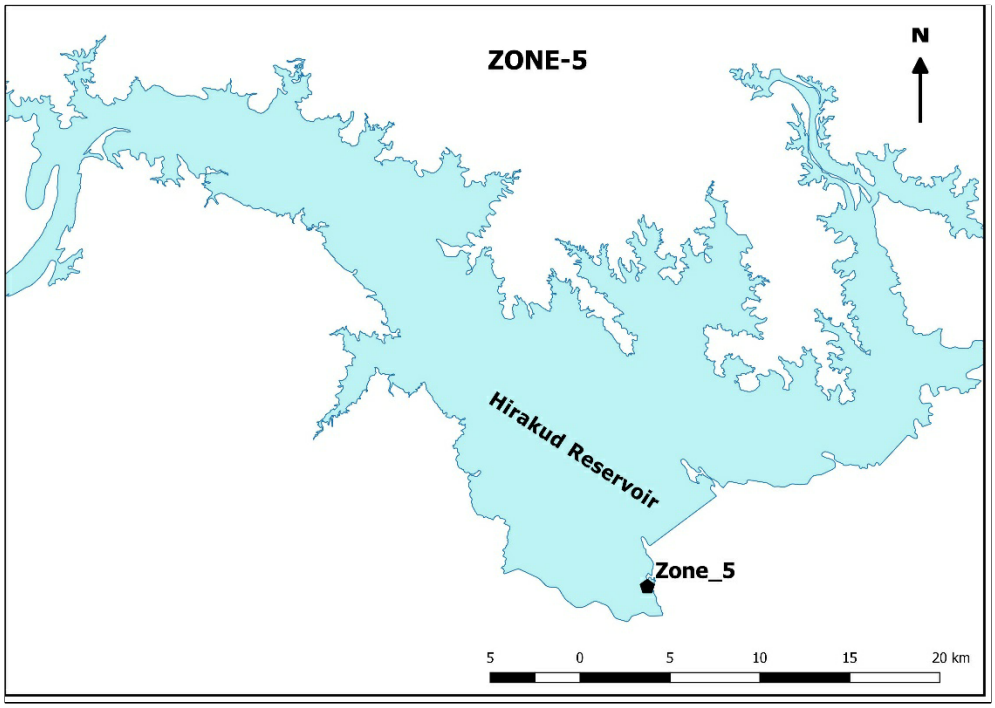


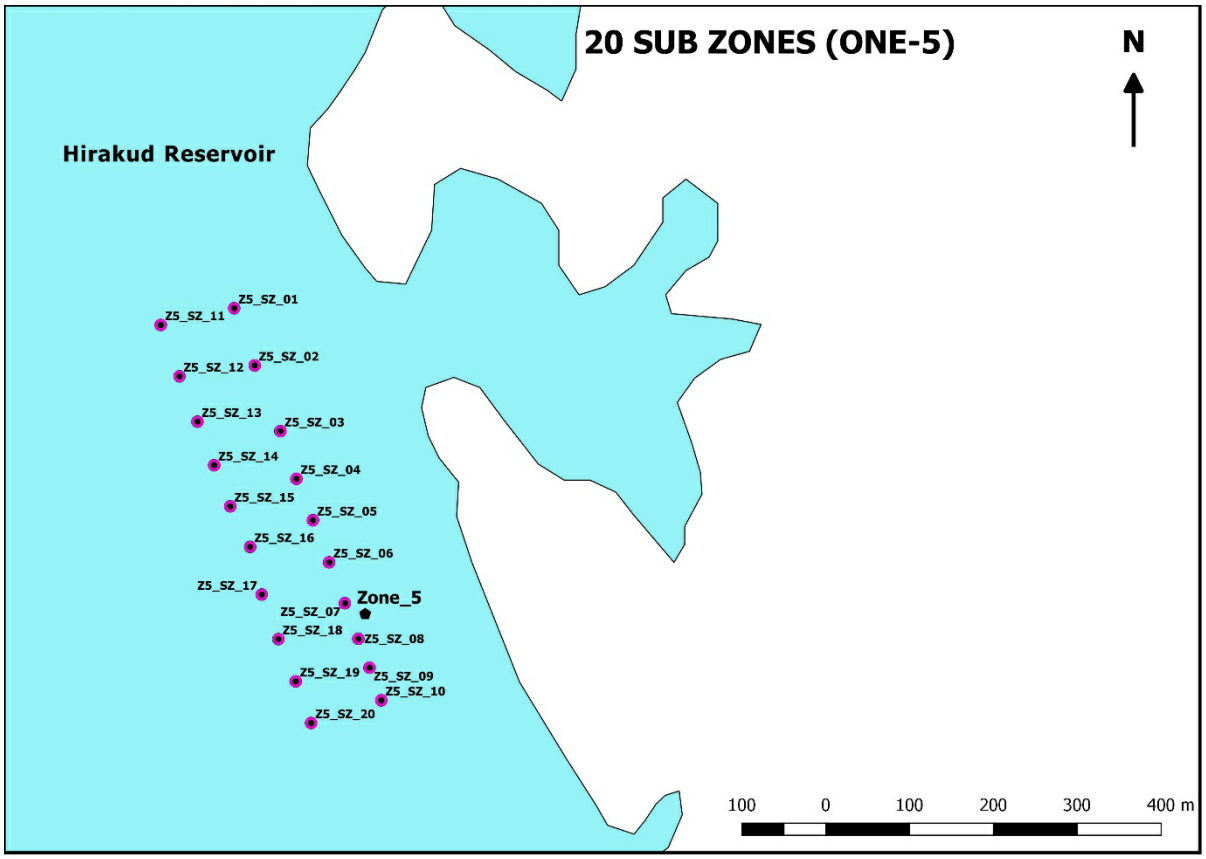
GPS Coordinates of Sub-Zones of Zone-4			
Sl. No.	Subzone ID No.	Longitude	Latitude
1	Z4_SZ_01	21°30'53.41"N	83°50'48.50"E
2	Z4_SZ_02	21°30'51.55"N	83°50'48.78"E
3	Z4-SZ_03	21°30'49.71"N	83°50'49.04"E
4	Z4_SZ_04	21°30'47.96"N	83°50'49.36"E
5	Z4_SZ_05	21°30'46.28"N	83°50'49.66"E
6	Z4_SZ_06	21°30'44.68"N	83°50'49.96"E
7	Z4_SZ_07	21°30'51.98"N	83°50'50.72"E
8	Z4_SZ_08	21°30'50.27"N	83°50'51.01"E
9	Z4_SZ_09	21°30'48.36"N	83°50'51.27"E
10	Z4_SZ_10	21°30'46.78"N	83°50'51.52"E
11	Z4_SZ_11	21°30'45.25"N	83°50'51.71"E
12	Z4_SZ_12	21°30'43.85"N	83°50'51.88"E
13	Z4_SZ_13	21°30'32.57"N	83°50'55.69"E
14	Z4_SZ_14	21°30'30.94"N	83°50'56.83"E
15	Z4_SZ_15	21°30'28.92"N	83°50'58.20"E
16	Z4_SZ_16	21°30'27.36"N	83°50'59.23"E
17	Z4_SZ_17	21°30'33.74"N	83°50'57.55"E
18	Z4_SZ_18	21°30'31.22"N	83°50'58.96"E
19	Z4_SZ_19	21°30'29.07"N	83°51'0.19"E
20	Z4_SZ_20	21°30'26.88"N	83°51'1.59"E

Features of Zone-4:

Zone-4 is more than 10 km away from Zone-1, 2 & 3. Total water spread area of this zone is 11.47 ha (approx.) and average water depth is 12 m (dry season). Zone-4 comes under Mahanadi PFCS.

Sub-Zones under Zone-5





GPS Coordinates of Sub-Zones of Zone-5			
Sl. No.	Subzone ID No.	Longitude	Latitude
1	Z5_SZ_01	21°29'53.45"N	83°50'54.15"E
2	Z5_SZ_02	21°29'51.08"N	83°50'55.00"E
3	Z5-SZ_03	21°29'48.36"N	83°50'56.06"E
4	Z5_SZ_04	21°29'46.38"N	83°50'56.73"E
5	Z5_SZ_05	21°29'44.67"N	83°50'57.42"E
6	Z5_SZ_06	21°29'42.92"N	83°50'58.09"E
7	Z5_SZ_07	21°29'41.23"N	83°50'58.74"E
8	Z5_SZ_08	21°29'39.76"N	83°50'59.30"E
9	Z5_SZ_09	21°29'38.56"N	83°50'59.76"E
10	Z5_SZ_10	21°29'37.21"N	83°51'0.25"E
11	Z5_SZ_11	21°29'52.75"N	83°50'51.11"E
12	Z5_SZ_12	21°29'50.63"N	83°50'51.88"E
13	Z5_SZ_13	21°29'48.75"N	83°50'52.63"E
14	Z5_SZ_14	21°29'46.94"N	83°50'53.32"E
15	Z5_SZ_15	21°29'45.24"N	83°50'53.99"E
16	Z5_SZ_16	21°29'43.56"N	83°50'54.81"E
17	Z5_SZ_17	21°29'41.59"N	83°50'55.29"E
18	Z5_SZ_18	21°29'39.74"N	83°50'55.98"E
19	Z5_SZ_19	21°29'37.99"N	83°50'56.70"E
20	Z5_SZ_20	21°29'36.27"N	83°50'57.34"E

Features of Zone-5:

Zone-5 is more than 1 km away from Zone-4. Total water spread area of this zone is 7.47 ha (approx.) and average water depth is 11 m (dry season). Zone-5 comes under Mahanadi PFCS.