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# Odisha-WorldFish Project Final Report

July 2016 to March 2022

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## About WorldFish

**WorldFish** is a nonprofit research and innovation institution that creates, advances and translates scientific research on aquatic food systems into scalable solutions with transformational impact on human well-being and the environment. Our research data, evidence and insights shape better practices, policies and investment decisions for sustainable development in low- and middle-income countries. We have a global presence across 20 countries in Asia, Africa and the Pacific with 460 staff of 30 nationalities deployed where the greatest sustainable development challenges can be addressed through holistic aquatic food systems solutions.

Our research and innovation work spans climate change, food security and nutrition, sustainable fisheries and aquaculture, the blue economy and ocean governance, One Health, genetics and AgriTech, and it integrates evidence and perspectives on gender, youth and social inclusion. Our approach empowers people for change over the long term: research excellence and engagement with national and international partners are at the heart of our efforts to set new agendas, build capacities and support better decision-making on the critical issues of our times.

WorldFish is part of OneCGIAR, the world's largest agricultural innovation network.

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# 1. Introduction

The Memorandum of Agreement (MoA) for technical collaboration between the Fisheries and Animal Resources Development Department (FARD), Government of Odisha and The WorldFish, Malaysia was signed on 28th June 2016. The project commenced on 1st July 2016 and ended on 31st March 2022. The overall objective of the MoA is to technically support the FARD Department to implement the Odisha State Fisheries Policy-2015 and to achieve “sustainable aquaculture and fisheries sector in Odisha State, India, creating employment, stimulating inward investment and contributing to State goals for reducing malnutrition among vulnerable and marginalized communities, particularly women and children”. Under the MoA, the FARD Department and WorldFish have agreed to collaborate in undertaking the following potential areas of research and development.

- Increasing the productivity of aquaculture operations through improvements in quality fish seed, technology, and farming systems.
- Improving the environment for private investment and supporting growth of the SME sector in aquaculture value chain.
- Increasing impacts of fish and aquaculture on human nutrition in the State.
- Improving the planning and management of inland aquatic resources for aquaculture and fisheries, with due reference to maintaining or improving social and ecological resilience of natural resources and the people dependent on these resources.
- Improving overall public and private capacity for management of aquaculture and fisheries sector growth.

The project was implemented in three stages:

- Inception Phase: 1st July 2016 – 31st March 2017 (9 months)
- Implementation Phase 1: 1st April 2017 – 31st March 2019 (2 Years)
- Implementation Phase 2: 1st April 2019 – 31st March 2022 (3 Years)

Inception phase activities and baseline studies were completed during the Inception Phase of the project (1st July 2016 – 31st March 2017) and a detailed **inception report** summarizing all the findings was formally submitted to FARD on 31<sup>st</sup> March 2017.

**A draft action plan for Phase1 (April 2017 – March 2019)** developed based on a series of consultations held and field assessment activities undertaken during the inception phase was submitted to FARD on 12th April 2017. This draft action plan/work plan provided details of all activities to be taken up for key technical interventions during phase I of the project in 4 pilot districts. The draft action plan for phase I was presented at the **Phase I planning workshop on 17th April 2017** for review and feedback from the officials of the Directorate of Fisheries including the officers of 4 priority districts selected for phase 1. The work plan for 4 pilot districts was also presented, discussed, and approved at the **Steering Committee Meeting chaired by the Commissioner-cum-Secretary held on 18th April 2017**. Subsequently, the Phase I action plan was reviewed jointly by the Commissioner-cum-Secretary and the WorldFish Director of Program Delivery in the month of August 2017 and as per suggestion of the

Commissioner-cum-Secretary it was decided to expand the scope of the project to cover 11 districts. **The revised final Action Plan** covering 11 districts and incorporating all the feedback and suggestions received from the Commissioner-cum-Secretary, FARD Department and Director of Fisheries was formally submitted on 26th Sept 2017. The revised Action Plan for **Phase 1 was approved by the Government on 14th Nov 2017 (vide L. No. 1320/FARD)**. The activities under Action Plan for Year 1 (2017-18) of Phase 1 were completed on 31st March 2018 and the **Annual Report for Year 1 of Phase 1** and the Financial Report were submitted to the Government on 23rd April 2018. A review meeting on progress made during Year 1 (2017- 18) of the Phase 1 of the Odisha-WorldFish Project was held on 09.07.2018 under the Chairmanship of the Commissioner-cum-Secretary and in the presence of Director of Fisheries and project staff. Subsequently, on 19.07.2018 the Project **Steering Committee Meeting** was held in the presence of senior officials from WorldFish, Malaysia and chaired by the Commissioner-cum-Secretary. Subsequently, the Annual Report for Y1 of Phase 1 of the Odisha-WorldFish project was approved by the Government.

The **Action Plan for Year 2 (2018-19) of Phase 1** covering all 30 districts of Odisha and incorporating all the feedback and suggestions received from the Commissioner-cum-Secretary, FARD Department and Director of Fisheries was formally submitted to the Government through the Directorate of Fisheries (vide L. No. 11481 of Directorate of Fisheries dt 17.09.2018). It was approved by the Government on **26.09.2018 (vide L. No.12182/FARD)**. The core project interventions, which started in 4 pilot districts during the inception phase (July 2016-March 2017) expanded to cover 11 districts in Y1 (2017- 2018) and further expanded to cover 30 districts in Y2 (2018-2019).

The **Annual Report for Year 2 of Phase 1 (April 2018-March 2019)** summarizing all the component-wise activities undertaken from 1st April 2018 to 31st March 2019 in 30 districts, methodologies and approaches followed and the results accomplished under Phase 1 (April 2017-March 2019) of the Odisha-WorldFish project was submitted to the FARD Department through the Directorate of Fisheries on 29.04.2019. This was presented in the 2nd Annual steering committee meeting held on 13.12.2019 at the FARD conference hall in the State Secretariat (Loka Seva Bhavan) under the chairmanship of the Commissioner-cum-Secretary to Government at FARD Department. The **Annual Report for Year 2 of Phase 1 (April 2018-March 2019)** was approved by the Government on **09.01.2020 (vide L. No.431/FARD)**.

The **Action Plan for Year 1 of Phase 2 (2019-2020)** covering all 30 districts of Odisha and incorporating all the feedback and suggestions received from the steering committee chaired by the Commissioner-cum-Secretary, F&ARD Department was approved by the Government on **09.01.2020 (vide L. No.431/FARD)**.

The **Annual Report for Year 1 of Phase 2 (1<sup>st</sup> April 2019 – 31<sup>st</sup> March 2020)** summarizing all the component-wise technical activities undertaken from 1st April 2019 to 31st March 2020 in 30 districts, methodologies and approaches followed and the results accomplished under Phase 2 (April 2019-March 2020) of the Odisha-WorldFish project was submitted to the FARD Department through the Directorate of Fisheries on 26.04.2020. This report was presented in the 3<sup>rd</sup> annual steering committee meeting chaired by the Commissioner-cum-Secretary, FARD Department on 06.05.2020. And it was approved by the Government vide Letter No. 5404/ FARD dated 16.05.2020.

The **Work Plan for Year 2 of Phase 2 (2020-2021)** covering all 30 districts of Odisha and incorporating all the feedback and suggestions received from the 3<sup>rd</sup> steering committee meeting chaired by the Commissioner-cum-Secretary, FARD Department on 06.05.2020. And it was approved by the Government vide Letter No. 5404/ FARD dated 16.05.2020.

The **Annual Report for Year 2 of Phase 2** (1<sup>st</sup> April 2020 – 31<sup>st</sup> March 2021) consisting the details of all the component-wise technical activities undertaken during the financial year 2020-2021 (from 1<sup>st</sup> April 2020 to 31<sup>st</sup> March 2021) in 30 districts, methodologies and approaches followed and the results accomplished under the Odisha-WorldFish project was submitted to the FARD Department and was approved in the 4<sup>th</sup> steering committee meeting chaired by the Commissioner-cum-Secretary, FARD Department on 19.05.2021.

The **Work Plan for Year 3 of Phase 2 (2021-2022)** covering all 30 districts of Odisha and incorporating all the feedback and suggestions received from the 4<sup>th</sup> steering committee meeting chaired by the Commissioner-cum-Secretary, FARD Department on 19.05.2021. And it was approved by the Government vide Letter No. 7705/FARD Dtd: 29.06.2021.

The **Annual Report for Year 3 of Phase 2** (1<sup>st</sup> April 2021 – 31<sup>st</sup> March 2022) consisting the details of all the component-wise technical activities undertaken during the financial year 2021-2022 (from 1<sup>st</sup> April 2021 to 31<sup>st</sup> March 2022) in 30 districts, methodologies and approaches followed and the results accomplished under the Odisha-WorldFish project was submitted to the FARD department on 27.04.2022 and was approved in the 5<sup>th</sup> steering committee meeting chaired by the Principal Secretary, FARD Department on 19.05.2022 (vide Directorate of Fisheries, Odisha, Letter No. 8035 Dtd: 02.06.2022).

This **Final Report** of the project summarises all the activities carried out during the entire project duration from 1<sup>st</sup> July 2016 to 31<sup>st</sup> March 2022 in support of work specified in Article I & II and Annexure 2 of the Memorandum of Agreement for technical collaboration between the FARD Department, Government of Odisha and WorldFish.



## 2. Major outputs and outcomes of technical collaboration between FARD Department and WorldFish

During the last 5 years and 9 months (1<sup>st</sup> July 2016 to 31<sup>st</sup> March 2022), the state of Odisha has experienced tremendous acceleration of growth in fisheries sector and its impact on SDGs including nutrition gains, job creation, increase in farmer incomes, women's empowerment etc. Several policies and schemes were launched targeting wide spectrum of beneficiaries including farmers, fisher folks, primary fishermen cooperative societies, women self-help groups, hatchery operators, entrepreneurs, private companies etc. Overall, the fish production has increased from baseline 5.21 Lakh metric tons in 2015-16 to 9.91 Lakh metric tons in 2021-22 with an annual average growth rate of about 12%. Some noteworthy and specific outputs, outcomes and impacts from the last 5 years of technical collaboration include:

1. Support was provided to over 9,229 women SHGs in all 30 districts of the state for taking up nutrition-sensitive fish farming in Gram Panchayat tanks with long-term leasing policy. This was a convergence program between Departments of FARD, Mission Shakti and Panchayati Raj & Drinking Water. This has helped to empower more than 92,000 women members of SHGs under Mission Shakti by increasing their incomes through sale of big size carps and through consumption of small-sized mohurali (mola) in their households. On average the Women SHGs are making a net annual income of Rs. 1.54 Lakhs/Ha from fish farming in GP tanks.
2. For the first time in India, the Government of Odisha has rolled out an investor friendly "single window clearance", socially equitable and environmentally sound policy for taking up of cage culture in reservoirs by farmers / private entrepreneurs / companies in collaboration with PFCS/SHGs. By March 2022, in total, 101 sub-zones have been allotted to 96 entrepreneurs for taking up cage culture on "lease-install-operate" basis in Hirakud reservoir. Already, the entrepreneurs have installed 213 nos. of cages (69 circular cages in 23 sub-zones and 144 rectangular cages in 6 sub-zones). Reservoir cage culture has a huge potential to add 1.25 Lakh tons of fish to the state fish basket.
3. Efficiency and effectiveness was brought in under implementation of the program on reservoir fingerling stocking and fish production enhancement in all 138 reservoirs of the state, with community-based approach (co-management) and strict implementation of SOPs. This has empowered the local fishermen through increased fish catches from reservoirs, increased household incomes, and improved nutrition. Also, a Reservoir Atlas was prepared in support of the reservoir fisheries resources management.
4. For achieving self-sufficiency in fish seed production, "Master Plan for Fish Seed Production" was prepared. Early breeding of Indian Major Carps has been successfully introduced and 4 nos. of Government/OPDC hatcheries have been upgraded in to Mega Hatcheries. Also, 49 nos. of private hatcheries have been supported for early breeding and seed quality improvement through introduction of genetically improved varieties such as Jayanti Rohu, Improved Catla and Amur Common Carp.

5. Technical support was provided for horizontal expansion of freshwater aquaculture through Mo Pokhari Yojana and PMMSY under which more than 6689 Ha of new fish ponds have been excavated over last 3 years.
6. For increasing the farmer profits and resilience to climate change, crop diversification has been successfully promoted through set up of a state-of-the-art GIFT tilapia hatchery at Government fish seed farm, Kausalyaganga; introduction of Amur carp seed production in 11 nos. of Government hatcheries, and establishment of 4 nos. of GIFT tilapia hatcheries by the private sector. Also, farm level best practices for GIFT tilapia production has been demonstrated in over 250 acres of farms and farmers were provided with market linkage support.
7. Nutrition-sensitive carp-mola polyculture has been widely promoted in various types of water bodies (Gram Panchayat tanks, private tanks, and agriculture farm ponds) for nutritional gains, especially among vulnerable and tribal communities in the state. Government has brought out suitable schemes for promotion of polyculture fish farming system in 10,000 agriculture farm ponds on an annual basis.
8. Intensive aquaculture through biofloc and polyliner technology has been introduced in freshwater and brackish water sector and more than 1838 farmers/ entrepreneurs/ youth have been trained to take up this activity with installation of 7080 biofloc tanks in 30 districts of the state.
9. Fish based nutrition has been included in state nutrition policy “SOPAN-2025” under the Women and Child Development Department. A pilot on inclusion of fish based product has been successfully conducted in 50 nos. of Anganwadi centers covering 1200 children (3-6 year group) and 800 Pregnant and Lactating mothers in Kaptipada block of Mayurbhanj District. A plan for scaling this activity is under preparation under the guidance of WCD and FARD Department.
10. Hygienic solar drying of marine fish using low-cost polyhouse technology of ICAR (CIFT) has been introduced among women SHGs in coastal villages and promoted as a convergence program among Departments of FARD, MSME and Mission Shakti.
11. Under the CGIAR program on “CCAFS” (climate change, agriculture and food security), the FARD Department was supported to capacitate the fish farmers across Odisha to manage climate risks through identification of suitable climate change mitigation practices and their dissemination through various channels including Ama Krushi platform, All India Radio, Door Darshan, Reliance Foundation etc.
12. Support was provided for effective implementation of fishing ban in olive ridley turtle nesting sites (3 river mouths and Bhitarkanika marine wildlife sanctuary) along Odisha coast through integration of GIS based mapping technology in Fisher Friend Mobile Application of the Department and GPS navigation systems of the fishing vessels.
13. Impact assessment study of Odisha-WorldFish Project was conducted for understanding ground level impacts achieved in fisheries and aquaculture sector as a result of the technical collaboration between FARD Department and WorldFish during 2016-2022.

14. Odisha Fisheries Master Plan-2030 has been prepared for holistic and sustainable development of fisheries sector over next 10 years. This included Fish Value Chain study and Foresight Analysis of the sector.



### 3. Odisha-WorldFish Project Impact Assessment Study

This impact assessment study seeks to assess WorldFish contribution in developing aquaculture and fisheries in the State of Odisha through five years of collaboration with Odisha's F&ARD. A special attention is given to five impact areas previously agreed upon between Odisha's Government and WorldFish (F&ARD and WorldFish 2016).

- Increasing the productivity of aquaculture operations through improvements in quality fish seed, technology, and farming systems.
- Improving the environment for private investment and supporting growth of the SME sector in aquaculture growth and value chain.
- Improving market access for Odisha aquaculture products, increasing impacts of fish on human nutrition in the State.
- Improving the planning and management of existing resources (particularly coastal areas, and inland wetlands) for aquaculture and fisheries, with due reference to maintaining or improving social and ecological resilience of natural resources and the people dependent on these resources.
- Improving overall public and private capacity for management of aquaculture and fisheries sector growth

#### 3.1 Highlights of the impact assessment study

- The collaboration between F&ARD and WorldFish has contributed to an extensive dissemination of better aquaculture management practices, improved feed and feeding practices, and increased the access to quality fish fingerlings. These interventions have contributed to higher fish productivity, poverty alleviation, and strengthened the overall household resilience to external shocks. On average, beneficiaries doubled their fish production compared to control groups and increased their income from aquaculture activities by up to 48%.
- Through an increased fish productivity and diversity, household nutrition has been improved. Beneficiaries of the investments produce more fish species than their control groups across the different types of intervention. They also consume up to 80% more fish throughout the year (measured in kg/AE/year) compared to their control groups.
- Innovations in fish production and aquatic food systems can strengthen all four pillars of food security. Food seasonality shortages are reduced thanks to aquaculture's stable availability of fish during food crops off-season. Households experienced less food insecurity throughout the year having access (food availability pillar) to a nutritious aquatic food (i.e., fish) (food utilization pillar) when they need them the most (food stability pillar).

Moreover, savings from fish trade provides households the mean to purchase additional food items (e.g., fruits, vegetables) (food access pillar).

- Partnerships and collaboration between and within actors have been bolstered in the last five years. Interdepartmental collaboration between government offices has increase (e.g., F&ARD, WCD, Mission Shakti). Evidence of new interactions emerging among government officials, private sector, and the community looks promising. However, more needs to be done to incentivize private investment in the sector including soft (e.g. single window system for new business creation, ICT) and hard measures (e.g., roads, markets).
- Access to quality research and information has significantly improved over the years. Interdepartmental collaboration has increased and met with high satisfaction levels contributing to effective resources management and the design of intervention based on robust evidence. However, continuous monitoring and evaluation systems needs to be further improved to ensure proper implementation of new policies. Tracking the challenges and barriers faced by the private sector, households, and SME actors throughout the interventions' implementation mitigates unintended consequences and reinforces stakeholders' commitment.
- The quality and accessibility of trainings across the entire fish production chain has been improved. Through gender transformative approaches, all members of the households have increased their technical skills and implemented pond better management practices that reduces post-harvest loses and add value to final fish products.
- Household's limited economic capacity and the lack of access to financing systems represents the main entry barrier to fish farming. Moreover, the absence of policies seeking to protect farmers' investment (e.g., regulating fish market prices) has been cited as a concern to engage in aquaculture. Other challenges faced by farmers compounding to their reservation to engage in aquaculture includes access to quality seeds, climate uncertainties, and unclear understanding of the economic benefits from aquaculture.
- Lessons learned in the last five years helped us identify new intervention opportunities and how to scale up successful programs. Women's integration in aquaculture have yield promising progress and expanding the support of WSHG in GP tank aquaculture will carry the current production growth achieved. However, while substantial progress has been made in the fish production through an increased access to capacity building and interdepartmental collaboration, there is an opportunity to expand the scope of the programs to include post-harvest innovations (e.g., packaging, smoking fish, go to market), access to services (e.g., credits, community groups), and Information and Communication Technologies (ICT) to disseminate information (e.g., market prices, business opportunities).

## Impact pathways, progress and outcome of the Odisha-WorldFish project.

Objective	Impact pathways	Section	Progress	Outcome
<b>Increase fish productivity</b> 	Household characteristics	1.1		✓
	Improved pond management practices	1.2		
	Increased fish production	1.3		
	Availability of quality seeds	1.4		
	Equitable access to quality inputs and resources	1.5		
<b>Improve household nutrition</b> 	Improving household income	2.1		✓
	Increasing fish variety production	2.2		
	Stable access to nutritious aquatic food systems	2.3		
	Increasing consumption of higher variety of nutritious fish	2.4		
	Increasing household dietary diversity	2.5		
<b>Improve PPP cooperation</b> 	Increase private investment	3.1		!
	Partnership and collaboration	3.2		
	Increase availability of training and workshops	3.3		
	Developing an effective climate for private investment	3.4		
<b>Strengthen resource management</b> 	Increase data availability and aquatic food system research	4.1		✓
	Strengthen inter-governmental collaboration	4.2		
	Monitor and Evaluation	4.3		
<b>Increase capacity building</b> 	Growing stakeholder collaboration	5.1		✓
	Improve access to extension services	5.2		
	Increase access to technical trainings	5.3		

\*Note:  low level progress;  medium level progress;  high level progress

### 3.2 Outcome summary

#### Increase fish productivity:

- Beneficiaries of the project display consistently a lower intensity in the Multidimensional Poverty Index (MPI), indicating an improved access to multiple basic resources (e.g. drinking water, sanitation, cooking fuel) when compared to their controls.
- Aquaculture innovations - pond better management practices (e.g. improved feed and feeding practices; use of improved fingerlings; pond preparation and maintenance) have been extensively disseminated across Odisha's fishery sector with high adoption rate among intervention beneficiaries.
- Overall, beneficiary households have significantly higher fish productivity across the different types of intervention, harvesting 114% more fish on average (measured in kg /year) compared to control groups.
- High quality seeds have been made more accessible throughout Odisha in the last five years including improved strains such as GIFT.
- Significant progress has been made integrating women in aquaculture throughout the entire value chain, reaching 60,000 WSHG beneficiaries. However, more needs to be done to empower men and women in the fishery sector. Institutional and social barriers need to be addressed and capacity building activities need to be scale up.

### **Improve household nutrition:**

- While not conclusive across all programs, engagement in fish production increases household income while reducing expenditures related to food purchases. Beneficiaries showed up to 48% more income from aquaculture compared to their control groups
- Intervention beneficiaries produce significantly higher variety of fish species than their respective control groups across all programs introduced in the last five years.
- Aquatic food systems contribute to food stability in Odisha. Fish production complement households food security during food crops off-season reducing the variability of food availability throughout the year.
- Food availability and utilization is better among intervention beneficiaries. The total quantity of fish consumed at household level as well as the variety of species consumed are higher among WorldFish beneficiaries (up to 80% more fish consumed, measured in kg/AE/year).
- Dietary diversity has been improved across most program beneficiaries since 2016, having access to multiple food groups (e.g. pulses, vegetables, fruits).

### **Improve Public-Private-Partnerships:**

- More needs to be done to increase private investment and expand the role of private actors. Ongoing efforts to develop Odisha's fishery sector relies on govt. officials and development agencies (i.e. WorldFish).
- Experts in Odisha's Fishery development agrees there has been significant progress developing partnership and collaboration "between" and "within" actors in the last 5 years.
- Capacity building have been bolstered at multiple levels (i.e. individual, intra, and inter organizational level). Moreover, evidence shows a growing demand from the community to expand and increase farmer's technical capacity.
- Promoting private investment in the fishery sector will require maintaining current soft infrastructure measures (e.g. capacity building, networking) combined with hard infrastructure development (e.g. roads, cold storage supply chain).

### **Strengthen resource management:**

- Access to quality research has significantly improved over the last 5 years. This knowledge contributed to evidence-based decision-making process for resource allocation and interventions design.
- Inter-departmental collaborations between government offices (e.g., Departments of F&ARD, WCD, Mission Shakti) have significantly improved boosting programs outcomes by capitalizing on intervention synergies while reducing unintended consequences.
- Monitoring and evaluation has been improved and formalized, however more needs to be done to ensure that policies are implemented effectively at ground level.

### Increase capacity building:

- New partnerships and collaborations across a myriad of actors (e.g. private sector, NGOs, community groups) has been developed in the last years to strengthen household livelihoods, food nutrition, aquatic food system productivity.
- Access to extension services progress has been achieved across two fronts including higher coverage of trained officers at community level and inclusive access across gender and socioeconomics.
- Access to technical trainings pertaining to aquatic fish production systems has significantly increased among WorldFish intervention beneficiaries across all household members. Key opportunities for future intervention involved access to ICT, improve access to credit.



## 4. Odisha Fisheries Master Plan – 2030: For further Acceleration of the Fisheries Sector Development in Odisha

The technical collaboration between FARD Department, Government of Odisha and WorldFish during 2016-2022 has brought several benefits to the State and assisted it to achieve its vision and objectives under the Odisha Fisheries Policy-2015, especially under inland fisheries sector, and thus contributed for the sustainable development goals (SDGs) of the State. Odisha has gigantic potential for development under fisheries sector. Therefore, the momentum generated so far over last 5 years needs further acceleration through various policies & programs of the Government, infusion of latest technologies and global best practices, and also active participation and investment by fishers, farmers, entrepreneurs, women, youth, SHGs, cooperatives, private sector companies along the fishery value chain. In this regard, FARD Department with the technical support from WorldFish has prepared “Odisha Fisheries Master Plan – 2030”.

The Vision of the Master Plan is sustainably increased fish production to meet domestic demand, improve the nutrition of domestic consumers and promote exports of high-value fish species in order to increase the incomes of fishers and fish farmers, SHGs, PFCS and other stakeholders, create new job opportunities for local entrepreneurs, youth and women. This goal will be achieved by (1) significantly increasing aquaculture productivity through increasing the availability of ponds, the application of best management practices, improvements in infrastructure, and increased availability of high-quality inputs to support inland and brackishwater aquaculture and improved access to markets; and (2) the adoption of sustainable management practices for wild fisheries resources, as well as improving product handling, processing and marketing of marine fish products.

The anticipated outputs from the Master Plan are expected to result in:

- An increase in domestic annual fish production from 873,000 MT in 2020-21 to 20,28,392 MT by 2030-31, inland freshwater aquaculture & fisheries production accounting for 13,85,144 MT (68%), brackishwater aquaculture & fisheries production, 3,50,680 MT (17%) and marine fish production, 2,92,568 MT (15%) (Table 1).
- A projected increase in employment from 19,76,906 to 25,33,938 (+28%), with an increase in employment in inland aquaculture from 4,05,786 to 8,20,818 and in brackishwater aquaculture from 71,120 to 2,13,120 persons. Marine fisheries employment currently accounts for 15,00,000 persons.
- The total annual sale value of all fishery product would reach INR 82,447 Crores in 2030-31. The annual contribution from the Fisheries sector to State Gross Value Added by 2030-31, if all activities are implemented successfully, would be INR 26,091 Cr (**Error! Reference source not found.**). It was INR 10,815.75 crores in 2020-21.
- An increase in seafood export (sale value) from INR 3,108 Cr in 2020-21 to INR 20,884 Cr by 2030-31.

Sl. No.	Fish Production Systems	2020-21 Total Fish Production (Metric Tons)	2030-31 Total Fish Production (Metric Tons)
<b>A</b>	<b>Inland Aquaculture &amp; Fisheries</b>		
1	Freshwater FinFish & Scampi Aquaculture in Tanks, Ponds & MIPs	5,07,886	10,20,369
2	Freshwater Vannamei shrimp Aquaculture in Private Tanks in non-CAA zone	-	1,20,000
3	Biofloc Fish Production	-	40,000
4	Reservoir Cage Culture Production	-	1,24,275
5	Fish Production from reservoirs, lakes, swamps, rivers, canals	67,150	80,500
	<b>Total Inland Fish Production</b>	<b>5,75,036</b>	<b>13,85,144</b>
<b>B</b>	<b>Brackishwater Aquaculture &amp; Fisheries</b>		
1	Brackishwater Shrimp aquaculture	97,125	2,86,680
2	Brackishwater finfish aquaculture	-	17,000
3	Brackishwater Mud Crab aquaculture	-	11,000
4	Chilika lake and Estuarine fish production	28,396	36,000
	<b>Total Brackishwater fish production</b>	<b>1,25,521</b>	<b>3,50,680</b>
<b>C</b>	<b>Marine Fish Production</b>	<b>1,72,468</b>	<b>2,92,568</b>
<b>D</b>	<b>TOTAL FISH PRODUCTION</b>	<b>8,73,025</b>	<b>20,28,392</b>

Sl. No.	Source	Total Annual Production in 2030-31 (MT)	Total Annual Sale Value in 2030-31 (INR in Crore)	Total Annual contribution to State GVA in 2030-31 (INR in Crore)
1	Inland freshwater aquaculture	13,04,644	37,927.01	12,847.84
2	Brackishwater aquaculture	314,680	15,989.37	4,861.52
3	Marine fisheries	292,568	8,775.00	2,729.00
4	Fish Production from reservoirs, lakes, swamps, rivers, canals (Capture)	80,500	805.00	379.00
5	Chilika lake and Estuarine fish production (Capture)	36,000	1.260	241.00
6	Mariculture			
	Seaweed	2,160	2.16	0.59
	Mussels	8,000	6.40	2.10
	Sea Bass	140	2.65	1.29
7	Ornamental fish	1,225 (units)	54.00	16.20
8	Processing	3,39,004	20,884.00	5,012.00
	<b>TOTAL</b>		<b>82,447.00</b>	<b>26,091.00</b>

In addition to growth in production, growth in GVA would be responsive to:

- A reduction of post-harvest losses from the reported 20-25% to about 10%.
- An increase in consumption from 16.24 kg per capita in 2019-20 by 10% per annum, with the expectation of reaching 22 kg per capita by 2030-31.
- Improved access by producers to markets and a strengthening of the reliability of prices.
- Increase in the sale value of Odisha's seafood export to INR 20,000 Cr.

The Master Plan sets out a number of core objectives in support of the aquaculture and fisheries program. These focus on:

- Attaining self-sufficiency in Odisha's fish production to support domestic consumption;
- Contributing to food, nutrition and livelihood security of the people of Odisha state;
- Ensuring continuous growth in farmers and fishers incomes;
- Adhering to a balanced approach to marine fisheries management based on a sound ecological, economic and precautionary principles;
- Establishing an efficient value-chain through the creation of aqua hubs and organizing a secure marketing /supply chain system for fish and fishery products so as to protect the producers' and consumers' interests;
- Promoting marine and freshwater fish production for sales in other Indian states and adjacent countries;
- Promoting exports and foreign exchange earnings for international markets;
- Strengthening infrastructure facilities to support aquaculture, marine and inland lake fishery fisher folk clusters;
- Facilitating access to credit;
- Promoting public-private partnership and community participation for developing, managing, conserving and sharing the fishery resources; and
- Strengthening the human resource capacity to support the extension and development of aquaculture and fishery systems.

### ***Investment required over 10 years for implementing the Master Plan***

The total investment required for the implementation of the master plan over 10 years is INR 34,081 Cr. This includes investments required by Government through beneficiary and non-beneficiary oriented programs and private sector investment by farmers, fishers, entrepreneurs, trader, exporters, SHGs, PFCS, companies etc. The investment required in inland fisheries is INR 16,978 Cr (49.2%), brackishwater fisheries is INR 8,871 Cr (26%), Marine fisheries INR 4,575 Cr (13.4%), inland waterways and salt water estuaries is INR 708 Cr (2%), fish post-harvest handling, processing and value addition infrastructure is INR 1,510 Cr (4.4%), support to promoting fish consumption and nutrition INR 1,109 Cr (3.3%), and support to strengthening governance is INR 268 Cr (0.8%).

## 5. Way forward: Steps taken by WorldFish to continue its support to Odisha

To achieve greater and wider developmental impacts through fisheries sector, FARD Department plans to meticulously and aggressively implement the action plan under the “Odisha Fisheries Master Plan – 2030”, which has been prepared taking in to account the Odisha Fisheries Policy-2015, State Agriculture Policy SAMRUDDHI-2020 and national fisheries policy & program. In support of implementation of this Master Plan, the FARD Department has sought to continue the technical collaboration program with WorldFish for another 5 years duration from 2022 to 2027. In response, WorldFish in consultation with FARD Department has prepared a new proposal for Phase II of technical collaboration with 5-year action plan (2022 to 2027). The proposed action plan aligns to the priorities of the FARD Department, multiple OneCGIAR impact areas and to all three impact areas of the WorldFish 2030 research and innovation strategy. This proposal was submitted to the FARD Department on 19<sup>th</sup> March 2022.

In the meantime, during the transition period, WorldFish is committed to support the FARD Department, Government of Odisha and Fisheries sector of Odisha through its below mentioned two new and externally funded projects to scale the CGIAR technologies, systems and tools for holistic development of aquatic food systems in the state for greater impacts contributing to state level transformation.

1. OneCGIAR Resilient Aquatic Food Systems initiative (2022-2024).
2. “Taking nutrition-sensitive Carp-SIS polyculture technology to scale” funded by the German Corporation for International Cooperation (GIZ) (2021-2023).



## 6. List of key documents prepared under the project

### 6.1 Odisha-WorldFish Project Annual Reports submitted to the FARD Department

Sl. No.	Report	Date of submission	Date of approval
1	Inception Phase Report	31.03.2017	
2	Annual Report for Year 1 of Phase 1 (April 2017-March 2018)	23.04.2018	19.07.2018
3	Annual Report for Year 2 of Phase 1 ((1 April 2018 to 31 March 2019)	29.04.2019	09.01.2020
4	Annual Report for Year 1 of Phase 2 (1 April 2019 to 31 March 2020)	26.04.2020	16.05.2020
5	Annual Report for Year 2 of Phase 2 (1 April 2020 to 31 March 2021)	29.04.2021	19.05.2021
6	Annual Report for Year 3 of Phase 2 (1 April 2021 to 31 March 2022)	27.04.2022	02.06.2022 <i>vide Directorate of Fisheries, Odisha Letter No. 8035</i>

### 6.2 Work plans and various proposals prepared and submitted to FARD Department

Documents	Submitted to	Date of Submission	Date of approval
<b>Inception Phase (1<sup>st</sup> July 2016 – 31<sup>st</sup> March 2017)</b>			
Technical and operational plan for GIFT hatchery and multiplication center (in support of availing permission to set up the GIFT tilapia hatchery in Kausalyaganga, Odisha)	Fisheries Development Commissioner, DAHDF, Ministry of Agriculture and Farmers Welfare, GOI, New Delhi	21.04.2017	19.02.2018
<b>Phase 1: 1st April 2017 – 31st March 2018</b>			
Odisha-WorldFish Project Annual Action Plan for Phase 1 (April 2017-March 2018)	FARD Dept.	26.09.2017	14.11.2017 vide L. No. 1320/FARD
a. Modalities for promotion of carp mola production in ponds, tanks and MIPs			
b. Modalities for carp intensification			
c. GIFT Tilapia Farm Demonstration			
d. Reservoir fish production and productivity enhancement			
e. GIS and spatial planning for inland fisheries resources management			
f. Block level aqua farmers service centre			
Various Proposals under RKVY			

a. GIFT Multiplication centre and Hatchery			
b. Promotion of Carp Advanced Fingerlings and farm BMPs			
c. Block level Aqua Farmers Service Centre (90)			
d. GIFT Farming and Market Promotion			
e. GIS Modelling for inland aquaculture potential			
f. Reservoir Fish production enhancement			
g. Carp-mola polyculture			
<b>Phase 1: 1st April 2018 – 31st March 2019</b>			
Odisha-WorldFish Project Action Plan for 2018-19 (Year 2 of the Phase 1)		06.09.2018	26.09.2018 vide L. No. 12182/FARD
a. Modalities for implementation of carp intensification in GP tanks managed by Women SHGs			
b. Modalities for implementation of reservoir fish production and productivity enhancement through fish fingerling stocking and co-management			
c. Modalities of implementation for production of Indian major carps in circular HDPE cages in reservoir			
d. Modalities of implementation for GIFT tilapia farm demonstration			
e. Modalities of implementation for establishment of multiplication centre and hatchery units for producing GIFT fry in Odisha			
f. Modalities of implementation for establishment of GIS and spatial planning cell for management of Inland fisheries resources in Odisha			
Input support to Women SHGs for Pisciculture in Gram Panchayat Tanks under RKVY during 2018-19	Mission Shakti		
Training and on-farm extension support Women SHGs for Pisciculture in Gram Panchayat Tanks under RKVY during 2018-19 and 2019-20	Mission Shakti		
<b>Phase 2: 1st April 2019 – 31st March 2020</b>			
Odisha WorldFish Project Work Plan for 2019-20 (Year 1 of the Phase 2)	FARD	10.06.2019 (1 <sup>st</sup> version) 19.12.2019 (2 <sup>nd</sup> version)	09.01.2020 (vide L. No.431/FARD).
a. Modalities of implementation for Fish Farming (Carp Intensification and Mola polyculture) in GP Tanks by Women SHGs			
b. Modalities of Implementation for Reservoir fish production enhancement: Pen nurseries for			

captive production of IMC fingerlings for reservoir stocking			
c. Modalities of implementation for Upgradation of government fish hatcheries for early production of IMC seeds			
d. Modalities of implementation for establishment of multiplication center and hatchery unit for producing Genetically Improved Farmed Tilapia (GIFT) fry in Odisha			
e. Modalities of implementation for establishment of PMU in Directorate of Fisheries with GIS based MIS			
f. RKVY Project proposal for upgradation of 4 nos. of Government fish hatcheries for year-round seed production of Indian Major Carps (IMC) in Odisha			
g. Standard Operating Procedure (SOP) for raising the IMC brood stock for early spawning and seed production during April-May 2020			
h. Hatchery-wise operational cost estimate for raising the IMC brood stock for early spawning and seed production in 4 Government Hatcheries			
i. Detailed project report (DPR) for upgradation of hatcheries for early breeding and year-round seed supply of Indian Major Carps			
j. Master Plan for fish seed production in Odisha,			
k. Guidelines for fish hatchery accreditation and seed certification			
l. Guidelines for physical audit-cum-monitoring of government hatcheries and seed farms.			
m. Guidelines for establishment of block-level private seed grower network			
n. Operational guideline for Amur common carp brood stock management and seed production			
o. Reservoir-wise Action Plan & Implementation guideline			
p. Action plan for “circular cage culture of Indian Major Carps in Hirakud reservoir			
q. Action plan for implementation of commercially viable cage culture practices in rectangular cages in Odisha			
r. “Expression of Interest for taking up the reservoir cage culture by private entrepreneurs / companies on		11.03.2020	

lease-install-operate basis” prepared by the project and submitted to the F&ARD Department on 11.03.2020 through the Directorate of Fisheries for approval			
s. Guidelines for taking up cage culture in reservoirs by PFCS, Private Entrepreneurs and Private Companies in partnership with PFCS / SHG”			07.03.2020
<b>Phase 2: 1st April 2020 – 31st March 2021</b>			
Odisha WorldFish Project Work Plan for 2020-21 (Year 2 of the Phase 2)	FARD	11.05.2020	16.05.2020 vide Letter No. 5404/ FARD dated
a. Guideline for Fish farming in GP tanks managed by Women SHGs			
b. Training calendar for the beneficiaries under scheme for training and exposure visit during 2020-21			
c. SOP and timeline chart of activities for IMC broodstock raising and early spawning in Odisha (during March-May) in Government hatcheries			
d. Operational guideline for upgradation of hatcheries for early breeding and year-round seed supply of IMC in Government fish hatcheries in Odisha			
e. Support to FED for preparation of Detailed Project Report (DPR) for upgradation of 4 nos. of Government/OPDC fish farm viz., Kausalyaganga (Bhubaneswar), Saramanga (Bhadrak Dist.), Bhanjanagar (Ganjam Dist.), Chipilima farm (Sambalpur Dist.)			
f. Promotion of early breeding and year-round seed production in Private Fish Hatcheries” under RKVY / OIIPCRA / State Plan during 2020-21 and 2021-22			
g. Guidelines for Accreditation of Fish hatcheries and Seed certification system in Odisha			
h. Proposal for “Establishment of new private IMC hatchery” under PMMSY			
i. Action plan & implementation guideline for reservoir fingerling stocking during 2020-21			
j. DPR for establishing common infrastructure in Hirakud reservoir in support of cage culture development			
k. Proposal on Scheme for Establishment of GIFT Tilapia Hatchery			
l. Preparation of Expression of Interest for taking up the GIFT hatchery by	FARD	18.07.2020	

private entrepreneurs / companies with subsidy on capital investment”			
m. Guidelines for “GIFT tilapia farm demonstration”			
n. Comprehensive skill development plan in Fisheries Sector			
o. Preparation of Detailed Project Proposal for funding under Pradhan Mantri Matsya Sampada Yojana (PMMSY)	(29 different proposals prepared and submitted to FARD)		
p. Technical support to the Department in planning its State Fisheries Budget for 2020-21 and 2021-22			
q. Proposal for financial assistance to support the Aquaculture Production Component of the World Bank assisted Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA) under the Irrigation and Water Resources Department, Government of Odisha.			
r. Livelihood promotion of Tribals through fisheries activities”			
s. PM Formalization of Micro Food Processing Enterprises Scheme on Fishery Products for Balasore, Bhadrak, Khurda, Ganjam & Kalahandi Districts			
t. Establish Common Incubation Centre for Value Added Fishery Products” at College of Fisheries, Rangeilunda, Odisha University of Agriculture and Technology			
u. Preparation of nomination form to the Ministry of Fisheries, GoI, for Best State Award 2020			
v. Compliance report to the Honourable Orissa High Court on “Olive Ridley Turtle Conservation in Odisha: Initiatives and Status”			
w. Draft guideline for establishment of brackishwater Aqua Park for leasing out to private entrepreneurs to take up brackishwater aquaculture.			
x. scheme guidelines for “Intensive fish production through biofloc and polyliner technology”			
<b>Phase 2: 1st April 2021 – 31st March 2022</b>			
Odisha WorldFish Project Work Plan for 2021-22 (Year 3 of the Phase 2)	FARD	17.05.2021	29.06.2021 <i>vide Letter No. 7705/FARD</i>
a. Project proposal on Input to women self-help groups for pisciculture in gram panchayat tanks under state plan during the year 2020-21 to 2023-24			
b. Guidelines of Machha chasa pain nua pokhari khola yojana (Matsya			

Pokhari Yojana - MPY) for the year 2021-22			
c. Promotion of early breeding and year-round seed production in private fish hatcheries" under State Plan / OIIPCRA during 2020- 21 and 2021-22.			
d. Input support to fish farmers / entrepreneurs / WSHGs for fish fry and fingerling production in nurseries & rearing tanks.			
e. Scheme guideline for promotion of IMC early breeding in private fish hatcheries			
f. Scheme proposal on Input Assistance to Fish Seed Growers			
g. Promotion of intensive aquaculture: introduction of bio-floc and polylining technology in fisheries".			
h. Intensive fish farming by bio-floc culture system at Chiplima Fish Farm, Sambalpur			
i. Intensive fish farming by biofloc culture system for Jharpada jail, Bhubaneswar			
j. Intensive fish farming by bio-floc culture system at Kausalyaganga, Bhubaneswar.			
k. MKUY - Model project report on reservoir cage culture			
l. Proposal for Establishment of Fish Market Complexes in Bhubaneswar, Odisha			
m. Guidelines for farming SPF <i>Litopenaeus vannamei</i> in inland waters of Odisha			
n. Project Proposal on upgradation of Arzipalli Fish Landing Centre into a World-Class "Eco Fishing Harbour" in Odisha			
o. Proposal on dredging of existing brackishwater tidal channels for enhancing brackishwater aquaculture.			
p. Preparation of an operational guidelines for establishment of special purpose vehicle (SPV) in IDCO for brackish water aqua park			
q. Preparation of guidelines for establishing the brackish water aqua park in coastal areas of Odisha through IDCO for taking up commercial brackishwater aquaculture			
r. Preparation of Detailed Project Proposal for funding under Pradhan Mantri Matsya Sampada Yojana (PMMSY)	2021-22 & 2022-23		

a. Annual action plans for 4 years (2021-22 to 2024-25) under World Bank assisted OIIPCRA project. And OIIPCRA scheme implementation guidelines			
b. Livelihood promotion of Tribals through fisheries activities” under OMBADC			
c. DPR for preparation of hygienic dried fish using polyhouse solar dryer and hybrid solar dryer			

### 6.3 Details of various IEC materials produced under the project

SL. No.	Year	Name	Type of publication	Language	No of copies published
1	2017-18	Carp-Mola Polyculture	Manual	English	1000
2	2017-18	Manual for Training of Trainers on Carp-Mola Polyculture	Manual	English	50
3	2017-18	Manual for Training of Trainers on Carp-Mola Polyculture (Revised version)	Manual	English	1000
4	2017-18	BMP on Carp Intensification and GIFT demonstration	Manual	English	100
5	2017-18	Pond Monitoring Book	Record book	English	1000
6	2017-18	Posters and wall hangings (7 Nos)	Posters	English	
7	2017-18	GIFT Market promotion posters (2 Nos)	Posters	English	
8	2018-19	Training Manual on Fish Culture in GP tanks by WSHGs	Manual	English	2000
9	2018-19	Training manual on reservoir fisheries management, pen nurseries and cage culture	Manual	English	300
10	2018-19	11 steps for successful Pisciculture	Poster	Odia & English	1000
11	2018-19	Fish disease management	Poster	English	500
12	2018-19	Odisha-WorldFish Project Activities	Poster	English	13
13	2018-19	WorldFish Project Activities	Leaflet	Odia	5000
14	2018-19	Various fisheries and aquaculture activities of the Directorate of Fisheries	Leaflet	Odia	10000

15	2018-19	Scheme on "Fish farming in GP tanks by WSHGs	Leaflet	Odia	10000
16	2018-19	Carp Mola polyculture	Video documentary	English & Odia	
17	2018-19	Carp Intensification	Video documentary	English & Odia	
18	2018-19	GIFT tilapia farming	Video documentary	English & Odia	
19	2018-19	Circular Cage for Intensive IMC farming	Video documentary	English & Odia	
20	2018-19	Cage Culture of fishes in Reservoirs	Video documentary	English & Odia	
21	2019-20	Input to WSHGs for Pisciculture in GP tanks	Manual	Odia	9000
22	2019-20	Better Management Practices in Fish farming for training of WSHGs	Brochure	Odia	20000
23	2019-20	Tilapia Major Clinical Signs	Poster	Odia	500
24	2019-20	Fish and its importance	Poster	Odia	2000
25	2019-20	Pond Book for Back yard tanks, GP & other tanks	Book	Odia	2000
26	2019-20	Increase of Production and Management of Reservoirs in Odisha (Jointly published with FISHFED)	Leaflet	Odia	500
27	2019-20	Jeevan Dhara" A compendium of success stories in Fisheries Sector	Book	Odia & English	1000
28	2020-21	Fish farming for start-up entrepreneurs and farmers	Manual	Odia	
29	2020-21	BMPs for GIFT farming in Odisha	Manual	English	
30	2020-21	BMPs for Amur Carp farming in Odisha	Manual	English	
31	2020-21	Matsya Pokhari Yojana (MPY)	Manual	English	
32	2020-21	Pen culture in reservoir	Manual	English	
33	2020-21	Carp Fry and Fingerling Production	Manual	English	
34	2020-21	Better Management Practices of Cage Culture in India	Manual	English	
35	2020-21	Intensive Fish Farming using Bio-floc Technology	Manual	English	500
36	2020-21	Reservoir Fisheries production enhancement and Management	Manual	Odia	500
37	2020-21	Magur Culture	Manual	English	
38	2020-21	Matsya Pokhari Yojana	Leaflet	Odia	5000

39	2020-21	Input Assistance to WSHGs for Scientific Pisciculture in GP tanks	Leaflet	Odia	5000
40	2020-21	Poly lining in ponds for Prawn Culture	Leaflet	Odia	5000
41	2020-21	Bio floc Technology	Leaflet	Odia	10000
42	2020-21	Assistance to marine fishermen during fishing ban period	Leaflet	Odia	5000
43	2020-21	Popularization of Fisheries equipment	Leaflet	Odia	5000
44	2020-21	Revolving fund for PFCS for reactivation	Leaflet	Odia	5000
45	2020-21	Brackish Water Development through Prawn culture	Leaflet	Odia	5000
46	2020-21	GIFT farm Demonstration	Leaflet	Odia	5000
47	2020-21	Early Breeding of IMC	Leaflet	Odia	5000
48	2020-21	Cage Culture in Reservoirs	Leaflet	Odia	5000
49	2020-21	Fish farming: A Road to Economic upliftment of Farmers	Leaflet	English	5000
50	2020-21	Odisha Fisheries Fact sheet (2019-20)	Poster	English	
51	2020-21	Seven Numbers of Video Clips on use of fish and hygiene during COVID 19 were designed and prepared for the Department	Video documentary	Odia	
52	2020-21	Five Numbers of Radio Jingles on use of fish and hygiene during COVID 19 were designed and prepared for the Department	Video documentary	Odia	
53	2020-21	Sasakta Nari	Video documentary	Odia	
54	2020-21	Cage Culture	Video documentary	Odia	
55	2020-21	Fisheries Activities in Odisha for Fish Farmers Day	Video documentary	English	
56	2020-21	Launching of 5T Initiatives, Inauguration documentary for the programme of Chief Minister, Odisha	Video documentary	Odia & English	
57	2021-22	Hygienic preparation of Dried fish" using polyhouse solar tunnel dryer	Manual	Odia	1000
58	2021-22	Preparation of boneless Rohu and soft bone rohu, Odisha India	Manual	English	
59	2021-22	Boneless Rohu and value-added products	Manual	Odia	1000

60	2021-22	Odisha Fisheries Development Schemes (For World Fisheries Day)	Book	Odia	1000
61	2021-22	Odisha Fisheries Profile (For World Fisheries Day)	Book	Odia	1000
62	2021-22	Handbook on Year-round seed production of IMC through Early Breeding in Odisha	Book	Odia	1000
63	2021-22	Bio floc Fish Farming	Manual	Odia	2000
64	2021-22	“Fisheries and Animal Products” prepared for Odisha Agri Conclave-October 2021	Catalogue	English	1000
65	2021-22	Matsya Pokhari Yojana (MPY)	Leaflet	Odia	2000
66	2021-22	Input assistance to WSHG for practicing pisciculture in GP Tanks	Leaflet	Odia	2000
67	2021-22	Popularization of Fisheries equipment	Leaflet	Odia	2000
68	2021-22	Early breeding programme in Pvt Fish farm	Leaflet	Odia	2000
69	2021-22	Bio floc fish farming	Leaflet	Odia	2000
70	2021-22	Motorisation of Traditional Craft (Marine)	Leaflet	Odia	2000
71	2021-22	Brackish Water Development through Prawn Culture	Leaflet	Odia	2000
72	2021-22	Assistance to marine fishermen for Boat, Net and Engine	Leaflet	Odia	2000
73	2021-22	Fish farming in Farm Pond	Leaflet	Odia	2000
74	2021-22	River Ranching programme in Mahanadi River	Leaflet	Odia	2000
75	2021-22	Farmer Friendly Mobile Application for Olive Ridley Turtle conservation (FFMA)	Leaflet	Odia	1000
76	2021-22	Poster on Coastal Security.	Leaflet	Odia	2000
77	2021-22	Fact Sheet of Odisha Fisheries	Poster	English	10
78	2021-22	Cage culture in Hirakud reservoir	Video/radio jingles	Odia	
79	2021-22	Bio floc fish farming	Video/radio jingles	Odia	
80	2021-22	Farmer Friendly Mobile Application for Olive ridley conservation (FFMA)	Video/radio jingles	Odia	
81	2021-22	Fisheries development on Odisha in last 20 years	Video/radio jingles	English	
82	2021-22	Fish and Fisheries products of Odisha	Video/radio jingles	English	

83	2021-22	Input assistance to WSHG for practicing pisciculture in GP Tanks (30 videos)	Video/radio jingles	Odia	
84	2021-22	Coastal Aquaculture Authority	Video/radio jingles	Odia	
85	2021-22	ORSAC- Survey of BW suitable lands	Video/radio jingles	Odia	
86	2021-22	Radio Jingle on Natural Calamity	Video/radio jingles	Odia	
87	2021-22	Radio Jingle on Sagar Kabacha Sea Security	Video/radio jingles	Odia	
88	2021-22	Radio Jingle on Marine programmes	Video/radio jingles	Odia	

## 6.4 Policy contributions

Sl. No.	Policy	MEL link
1	The Government Policy Corrigendum on Grant of Long-term lease of Gram Panchayat Tanks for Pisciculture is a new policy promulgated in Odisha (India) in 2018	<a href="https://mel.cgiar.org/projects/usaidipp/120/the-government-policy-corrigendum-on-grant-of-long-term-lease-of-gram-panchayat-tanks-for-pisciculture-is-a-new-policy-promulgated-in-odisha-india-in-2018">https://mel.cgiar.org/projects/usaidipp/120/the-government-policy-corrigendum-on-grant-of-long-term-lease-of-gram-panchayat-tanks-for-pisciculture-is-a-new-policy-promulgated-in-odisha-india-in-2018</a>
2	Decision by the Government for investment to establish GIFT tilapia multiplication center and hatchery at Kausalyaganga, Odisha	<a href="https://mel.cgiar.org/projects/fard/231/investment-approved-for-the-genetically-improved-farmed-tilapia-gift-multiplication-center-and-hatchery-establishment-at-government-fish-farm-in-odisha-india">https://mel.cgiar.org/projects/fard/231/investment-approved-for-the-genetically-improved-farmed-tilapia-gift-multiplication-center-and-hatchery-establishment-at-government-fish-farm-in-odisha-india</a>
3	Policy guidelines for taking up of Fish Cage Cultures in Reservoirs by private sector actors	<a href="https://mel.cgiar.org/projects/fard/338/worldfish-assisted-the-government-of-odisha-india-in-preparing-the-policy-guidelines-for-taking-up-of-fish-cage-cultures-in-reservoirs-by-private-sector-actors">https://mel.cgiar.org/projects/fard/338/worldfish-assisted-the-government-of-odisha-india-in-preparing-the-policy-guidelines-for-taking-up-of-fish-cage-cultures-in-reservoirs-by-private-sector-actors</a>
4	WorldFish technical inputs to the Government on supplementary nutrition contribute to the inclusion of fish in the newly launched State Nutrition Strategy in Odisha, India	<a href="https://mel.cgiar.org/projects/usaidipp/333/worldfish-technical-inputs-to-the-government-on-supplementary-nutrition-contribute-to-the-inclusion-of-fish-in-the-newly-launched-state-nutrition-strategy-in-odisha-india">https://mel.cgiar.org/projects/usaidipp/333/worldfish-technical-inputs-to-the-government-on-supplementary-nutrition-contribute-to-the-inclusion-of-fish-in-the-newly-launched-state-nutrition-strategy-in-odisha-india</a>
5	Odisha Government Orders on emergency responses during and after India's COVID-19 lockdown, based on the co-designed recommendations by WorldFish	<a href="https://mel.cgiar.org/projects/fard/339/odisha-government-orders-on-emergency-responses-during-and-after-indias-covid-19-lockdown-based-on-the-co-designed-recommendations-by-worldfish">https://mel.cgiar.org/projects/fard/339/odisha-government-orders-on-emergency-responses-during-and-after-indias-covid-19-lockdown-based-on-the-co-designed-recommendations-by-worldfish</a>
6	The FISH technical support to the conservation efforts of the Government of Odisha (India) contributes to the fishing ban around olive ridley turtles' nesting sites	<a href="https://mel.cgiar.org/projects/fard/342/the-fish-technical-support-to-the-conservation-efforts-of-the-government-of-odisha-india-contributes-to-the-fishing-ban-around-olive-ridley-turtles-nesting-sites">https://mel.cgiar.org/projects/fard/342/the-fish-technical-support-to-the-conservation-efforts-of-the-government-of-odisha-india-contributes-to-the-fishing-ban-around-olive-ridley-turtles-nesting-sites</a>

## 6.5 Key field study reports and documents prepared under the project

Sl. No.	Year	Description	Survey period	Outputs
1	2016-17	Assessment of GIFT Tilapia entry: Extensive fish market and farm survey in different districts of Odisha	January-February 2017	Report prepared and included in the inception phase reports
2	2016-17	Assessment of carp farms and hatcheries	January-February	Report prepared and included in the inception phase reports
3	2017-18	Baseline survey of carp mola beneficiary household	2017-18	
4	2017-18	Baseline study of 46 reservoir and detailed reservoir-wise planning	June-July 2018	Report prepared and included in the 2018-19 Annual report
5	2018-19	Feasibility study: site selection for installation of circular cages in Hirakud reservoir in collaboration with ICAR-CIFRI	29-31 January 2019	Feasibility report for site Section of Circular cage installation in Hirakud reservoir, Odisha
6	2018-19	Assessing the status of cages installed by DoF in 8 reservoirs under NMPS scheme in Odisha	9-27 October 2018	A Report on Present Status of Cage Culture in 8 Reservoirs of Odisha
7	2018-19	Gender-integrated empirical studies in Odisha in 2018	2-8 Jan 2018	Report on Gender-integrated empirical studies in Odisha in 2018
8	2018-19	Gender Scoping Study	14-19 May 2018	Highlights of findings from Gender Scoping Study: Year 1 mini-interim assessment of the Odisha-WorldFish Project
9	2019-20	Internship - Mr. Anshuman Gupta, IMPA candidate, Cornell University and intern of Tata Cornell Institute	June-Aug 2019	Report on Identifying critical factors for enabling success of SHG based community aquaculture in Odisha
10	2019-20	Internship- Mr. Axel Letondot, Intern, Tata Cornell Institute	June-Aug 2019	Incorporating Small Dried Fish Into Food Safety Net Programs in Odisha: Issues of Acceptability and Supply
11	2020-21	Crop outcome survey of the scheme "Fish Farming in Gram Panchayat Tanks by Women SHGs	June 2020 - February 2021	Scientific fish farming in Gram Panchayat tanks by Women Self Help Groups in Odisha, India: Crop outcome survey report 2018–2019 and 2019–2020
12	2020-21	Book and documentary showcasing achievements of the scheme Self Help Groups in Odisha and Better Management Practices for Sustainable Fish Farming",	Sept 2020	Coffee table book submitted to FARD

13	2020-21	Suitability analysis of 6 reservoir (Hirakud, Indravati, Hariharjor, Rengali, Salandi and Jambhira) for cage culture	June 2020 - Feb 2021	Suitability report and zonation mapping of all the reservoir submitted to FARD
14	2020-21	Study on impact of COVID-19 on Odisha fish value chain actors	Feb-July 2020	<a href="https://digitalarchive.worldfishcenter.org/handle/20.500.12348/4676">https://digitalarchive.worldfishcenter.org/handle/20.500.12348/4676</a>
15	2020-21	Fish value chain study in Odisha	December 2020 and September 2021	Detailed study Report submitted to FARD
16	2021-22	Crop outcome survey of the MPY scheme	July-Oct 2021	Scientific fish farming in new earthen tanks under Matsya Pokhari Yojana in Odisha, India: Crop outcome survey report 2017–2018 and 2018–2019
17	2021-22	Crop outcome survey of the scheme “Promotion of Intensive Aquaculture through Introduction of Bio-floc Technology”	March 2022	Study findings have been included in Odisha-WorldFish Annual Report for Year 3 of Phase 2 (2021-22).
18	2021-22	Reservoir atlas consists the information of 79 reservoir of Odisha	May -October 2021	Reservoir atlas of Odisha For sustainable fisheries management Volume I
19	2021-22	Odisha Fisheries Foresight Analyses	April 21-Jan 2022	Detailed study Report submitted to FARD
20	2021-22	Odisha Fisheries Master Plan - 2030		Draft under preparation

## 6.6 Exposure visits

1. Training Programme on GIS & Spatial Planning for Fisheries Officials of Govt. of Odisha at ICAR-CIFRI during 18-20 February 2019.
2. A high-level official delegation of the Government of Odisha lead by Mr. Suresh Chandra Mohapatra, IAS, then Development Commissioner-cum-Additional Chief Secretary and members consisting of Mr. Pradipta Kumar Mahapatra, IAS, then Agriculture Production Commissioner-cum-Additional Chief Secretary, Mrs. Anu Garg, IAS, Principal Secretary, Women and Child Development and Mission Shakti Department, and Mr. R. Raghu Prasad, IFS, Commissioner-cum-Secretary, Fisheries & ARD Department visited WorldFish HQ in Penang, Malaysia followed by field visit to Cambodia during 3–9 November 2019 for the brainstorming and program discussions with the senior management officials of WorldFish lead by Dr. Gareth Johnstone, former Director General.
3. An exposure visit was conducted to cage culture sites in Pune, Maharashtra during 08-10 January 2020 for high-level government delegation including Shri. Pradipta Kumar Mohapatra, IAS, Agriculture Production Commissioner-cum-ACS, Shri. Raghu Prasad, IFS, Commissioner-cum-Secretary, F&ARD Dept., Dr. Thirumala Naik, IAS, Director of Fisheries, Mr. Umesh Kumar Mohanty, Additional Director of Fisheries (Admin), Mr. Prasada Rao Dora, President, FISHFED, Odisha.

4. An exposure visits for 18 nos. of Government officers (DFOs, DDFs and hatchery managers) and 12 nos. of Odisha-WorldFish project officers to aquaculture hub of Andhra Pradesh (West Godavari and Krishna Districts) was conducted during 7-12 February 2020.
5. Exposure visits to Convergence Department officials from Government of Odisha (FARD, WCD and Mission Shakti) to Bangladesh during 28.02.2020 to 04.03.2020.
6. Exposure visit of 2 nos. of FARD officers and an officer from Bhubaneswar Municipal Corporation to Modern Hygienic Fish market constructed by National Fisheries Development Board (NFDB), Government of India in Hyderabad on 15 December 2021. The exposure visit was aimed at providing a first-hand understanding of the key aspects of hygienic fish markets development.



### **About WorldFish**

WorldFish is a nonprofit research and innovation institution that creates, advances and translates scientific research on aquatic food systems into scalable solutions with transformational impact on human well-being and the environment. Our research data, evidence and insights shape better practices, policies and investment decisions for sustainable development in low- and middle-income countries.

We have a global presence across 20 countries in Asia, Africa and the Pacific with 460 staff of 30 nationalities deployed where the greatest sustainable development challenges can be addressed through holistic aquatic food systems solutions.

Our research and innovation work spans climate change, food security and nutrition, sustainable fisheries and aquaculture, the blue economy and ocean governance, One Health, genetics and AgriTech, and it integrates evidence and perspectives on gender, youth and social inclusion. Our approach empowers people for change over the long term: research excellence and engagement with national and international partners are at the heart of our efforts to set new agendas, build capacities and support better decision-making on the critical issues of our times.

WorldFish is part of One CGIAR, the world's largest agricultural innovation network.

For more information, please visit [www.worldfishcenter.org](http://www.worldfishcenter.org)