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Project Evaluation Report

Conservation of Natural Breeding Ground of Fishes and Development Project in the Halda River

Implemented by
Integrated Development Foundation (IDF)
Funded by
Palli Karma-Sahayak Foundation (PKSF) International Fund for Agricultural Development (IFAD)

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Palli Karma-Sahayak Foundation (PKSF) and International Fund for Agricultural Development (IFAD) under Promoting Agriculture Commercialization and Enterprises (PACE) Project

Third Part Review by

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Executive Summary

Palli Karma-Sahayak Foundation (PKSF) and International Fund for Agricultural Development (IFAD) under the "Promoting Agriculture Commercialization and Enterprises (PACE) Project" partnered with Integrated Development Foundation (IDF) to implement a value chain project to conserve the natural breeding ground of major carps in the River Halda. The project titled **"Conservation of Natural Breeding Ground of Fishes and Development Project in the Halda River''** was implemented from 2016 to 2020. The goal of the project was to conserve and develop the natural breeding ground of carp fishes (Rui, Catla, Mrigal and Kalibaush) of the Halda River in Hathazari and Raozan Upazila and Kharachari hill district by safeguarding the mother carps from extinction to increase eggs production and to create livelihood opportunities for Halda dependent people. The targeted beneficiary population was 4000 individuals having livelihood dependency on Halda.

Accordingly, the project activities by IDF included organizing training programmes for the Halda-dependent stakeholders to improve the egg and fish-fry yield and to make their livelihood more resilient and less dependent on resources extraction from Halda. In this connection, as tobacco cultivation in Manikchari became a major threat to the ecosystem of Halda –this project provided livelihood support to tobacco farmers through IDF to refrain them from tobacco cultivation. Also, IDF has implemented awareness-building activities for the conservation of Halda. The project deployed volunteers to liaison with the local administration to curb the activities detrimental to Halda. The project also successfully established the Halda River Research Laboratory at the University of Chittagong and sponsored several research and extension activities related to Halda.

PKSF set several performance indicators to evaluate the activities done by IDF for the conservation of Halda and its resources through this project besides completing a baseline survey report at the onset of the project. Accordingly, this evaluation report assessed the actual implementation of activities compared to the planned mainly through the assessment of stakeholder perception on the activities and changes or improvements in their eyes due to the implementation of the project. The report, therefore, is based on both primary and secondary data to assess the project's achievements in comparison to the project log frame and the baseline situation. Primary data were collected by focus group discussion, field visits, face to face interviews, telephone interviews and key informant

interviews with the local administration, IDF, tobacco farmers, egg collectors, egg to fry producers, hatchery owner, fishermen, farmers, boatmen, volunteer, technical committee member, researcher, and coordinator of Halda river research lab established under the project. A total of 197 stakeholders were interviewed excluding the UNOs, chairmen, councilors, researchers, technical committee members and trainers.

In all, compared to the plan, the actual implementation was quite satisfactory – reaching targets in the majority of the activities while exceeding in some and lagging in a few. The impacts of the project, as per stakeholders' assessment, were mostly positive and substantially contributed towards the conservation of Halda. Most prominently, UNO Hathazari considered the project success since the local administration got required support from it to conduct effective pro-conservation activities. However, on the awareness side, there is still a lot to improve in terms of the training scope, diversity, modalities, materials, continuity, etc. One of the most notable successes is the increase in egg and fry production due to the combined effect of several project interventions. Unfortunately, this has not been translated into an increase in income – an anomaly that needs deep investigation. Another impressive success is the substantial reduction in the number of tobacco cultivators which will diminish in absence of continuous efforts as the tobacco companies keep on investing to motivate them to revert to tobacco farming. The establishment of HRRL and sponsoring the range of research activities have enriched the knowledge base on the Halda river. More research projects are to be adopted with enhanced quality and follow through till referred publication of research and actual application of the research outcomes. This requires long-term commitment to support the lab – both infrastructural and financial – to make the lab an exemplary global hub for river conservation research. The evidence on the reduction in the use of agrochemicals in the Halda catchment area was not substantiative and more focused programmes and activities are required to that end. Establishing a dashboard for data-driven decision-making accessible to all based on the routine or at-interval monitoring of Halda related multitude of data is the logical next step to keep all the stakeholders of Halda on the same page. The success achieved will diminish quickly in absence of continuous follow-up and efforts to build upon the achievements. The report contains the data-driven suggestions and recommendations for IDF, PKSF and for all policy-making stakeholders and programme designers to consolidate the momentum gained from the implementation of the project for the overall conservation of Halda with minimal impact on the livelihood of the Halda dependent people.

1 Introduction

The Halda (22° 54′ North and 91° 48′ East to 22° 24′ North and 91° 53′ East) is the 3rd main river of Chittagong after Karnafuli and Sangu. Originated from the Haldachora of Batnatali hill of Ramgarh Upazila in Khagrachari district and discharged into the Karnaphuli River (Kibria et al., 2020), Halda has flown through Fatikchari, Hathazari, Raozan Upazilas and Chandgaon thana of Chittagong district (Islam et al., 2020). Halda is a unique inimitable natural heritage of Bangladesh by being the only tidal river of the world that serves as a natural breeding ground for major Indian carps *viz.,* Rui (*Labeo rohita*), Catla (*Catla catla*), Mrigal (*Cirrhinus cirrhosus*), Kalibaush (*Labeo calbasu*), etc. (Kabir et al., 2015; Alam et al., 2013). The amount of fertilized carp eggs collected from Halda are 16500, 2800, 735 kg respectively in 2014, 2015 and 2016 (Sharanika, 2020). Eggs from the Halda River are the main source of carp fish fries fueling carp fish farming throughout the country and contributing to national GDP substantially (Bangladesh National Portal, 2021).

Many people are directly or indirectly dependent on this river for egg and fry collection, irrigational water extraction, fishing, boating, sand collection, transportation, etc. (Khan, 2019). But the natural breeding phenomenon makes this river a unique heritage site of the country where a total of about 1100 egg collectors and 2000 fishermen catch fish all year round in the spawning area starting from Garduara to Maduna Ghat (Kibria et al., 2018). However, there was a record of a total of 93 species of Ichthyofauna i.e., fish, shrimp and crab from the river from seven years (2004-2011) of investigation. But 3 species were critically endangered, 9 endangered and 8 vulnerable categories out of the 93 species (Azadi and Arshad-Ul-Alam, 2011). Besides, investigation on carp species of Halda from 2013 to 2014 revealed the identification of a total of 15 species among which 5 were not threatened, 2 vulnerable, 2 endangered and 3 exotics (Ferdous et al., 2015). But now the river is facing threat because of natural disasters and different types of anthropogenic hazards among which navigation of the engine operated water vehicles; cutting of oxbow bends; disposal of industrial effluents and sewage contamination; unplanned construction of a good number of sluice gates and rubber dam for irrigation purpose; massive quarry of sands from river bed illegally by a section of unscrupulous traders; using excessive toxic insecticide in cultivation lands near to river bank, tobacco farming in the upstream areas of the river, etc. are most significant. (Islam et al., 2017; Saha et al., 2019). Unfortunately, over the years 26 species of fish have disappeared from the Halda (The Daily Star, 2017) including Goni Chapila, Iisha, Telipasha, Chital, Foli, Mrigal, Koksa, Ghor Poia, Guijja Ayre, Meni, Dhela, Chep Chela, Teri

Punti, Baleetora, Pabda, Madhu Pabda, Tengra, Shilong. Other lost species include Dhain, Batasi, Pangwash, Ghajal, Koitor Poa, Poa, Baila and Nuna Baila (The Daily Star, 2017). Losing any additional species from the iconic river is completely unacceptable and to meet that end there is no alternative than to conserve the river and its ecosystem without putting the life, livelihood, and culture of the local people in jeopardy. Many sporadic and discrete initiatives have been taken by different organizations in the past with mixed results and mostly detrimental outcomes for the river.

Against this backdrop, Palli Karma-Sahayak Foundation (PKSF) and International Fund for Agricultural Development, (IFAD) involved the Integrated Development Foundation (IDF) in implementing an integrated value chain project for conserving the natural breeding ground of major carps in the River Halda. The project titled **"Conservation of Natural Breeding Ground of Fishes and Development Project in the Halda River"** received support from the "Promoting Agriculture Commercialization and Enterprises (PACE) Project" of PKSF and IFAD from April 2016 to December 2020. The overall objective of the project was to intensify fish production, conservation of fish from threat to extinction and creating livelihood opportunities for entrepreneurs by conserving and developing natural breeding ground of carp fishes (Rui, Catla, Mrigal and Kalibaush) of the River Halda in Hathazari and Raozan Upazila and Kharachari hill district with a targeted population of 2750 fish farmers, 1000 farmers and 250 tobacco cultivators (IDF, 2016).

PKSF set several performance indicators (PIs) to measure the progress and achievements of the project activities implemented by IDF for the conservation of Halda and its resources. In line with those PIs, the evaluation report has been prepared based on primary and secondary data sources. Secondary data were obtained mainly from the records of IDF activities. Primary data has been collected with a combination of focus group discussion (FGDs), field visits, face-to-face interviews, over the telephone interviews and key informant interviews. The target respondents included egg collectors, egg to fry producers, hatchery owners, fishermen, farmers, tobacco farmers, boatmen, the local administration, IDF representatives, volunteers, technical committee members, researchers, and coordinators of the Halda river research lab established under the project. Appropriate questionnaires for the interviews, FGDs and KIIs have been designed and finalized in consultation. For interview purposes, several survey teams were created by research

assistants who have been trained with proper guidance to conduct the survey and input the data. Based on the records of IDF, several people have been interviewed either face-to-face or over the phone from each of the target beneficiary groups of the project based on the availability under the pandemic-induced limitations. Key informant interviews were done to get the perception and assessments from the UNO, chairman, councilor, researchers, technical committee members and trainers. The lack of proper records and documentation of the beneficiaries at IDF led to the poor sample size in this report.

Within the conservation endeavors, sanctuary areas of the river, research on protecting river environment, training workshops for Halda dependent people, alternative livelihood options through sustainable income-generating activities, production of insecticide-free vegetables, navigation of water vessels, fishery legislation, voluntary activities, inspiring tobacco cultivators through alternative income-generating activities, etc. have been focused by IDF through the project. Improvement has been found for the reduction in the number of tobacco cultivators and increasing trend in the number of collected eggs that might be a combined effect of initiatives taken by the government, local administration, and this value chain project. Attention on illegal fish catch and sand extraction; purity of Halda fish fry and initiatives for sharing research outcomes with the Halda communities should be prioritized now. Moreover, several suggestions have come out from the relevant stakeholders that need to be addressed in the future which will be helpful for PKSF and IDF to contribute to ensure the sustenance of Halda.

2 Project Background

PKSF and IFAD provided funding under the “Promoting Agriculture Commercialization and Enterprises (PACE) Project” to IDF to implement the value chain project titled “Conservation of Natural Breeding Ground of Fishes and Development Project in the Halda River” to conserve the natural breeding ground of major carps in Halda. Implemented from April, 2016 to December, 2020, the conservational endeavors of the project included - patrolling around the sanctuary announced area of the river during spawning time, tree plantation on both sides of riverbank, conducting research on protecting natural environment of the river, arranging workshops for increasing public awareness, creating alternative livelihood of egg collectors through involving them in sustainable income-generating activities, increasing capability of production of lethal

insecticide-free vegetables, supplying modern and developed technologies (e.g. sex pheromone trap, organic pesticide and organic fertilizer) for production of insecticide-free vegetables, improving efficiency in hatching fish fries from fertilized spawn and management of hatchery, providing training on hatching strategy in mud- made scoop to produce carp fries on the riverbank and carp fish culture, expanding fish market of Halda carp fries and building relation among people who related to the Halda River, training on navigation of water vessels and fishery legislation for growing public consciousness etc. are the main. The progress of activities has been reviewed by the technical and expert committee regularly (IDF, 2016)

3 Project Objective

The overall objective was to intensify fish production, conservation of fish from extinction threat, creating livelihood opportunities for entrepreneurs by conserving and developing natural breeding ground of carp fishes (Rui, Catla, Mrigal and Kalibaush) of the River Halda (IDF, 2016).

3.1 Specific objectives of the programme

With the help of concerned government department and administration:

- To convert the project area as a cluster for the production of standardized fishes, fish fries and increasing the production of eggs by preventing the illegal killing of the brood fishes with the help of local people and administration.
- To produce quality standard carp fish fries by applying modern methods in a mud-made scoop and increase the capacity of entrepreneurs to easily identify distinctions between hybrid/crossbreed fish fires and the Halda River's fries.
- To introduce fish-friendly pesticides instead of toxic insecticides on agricultural lands adjacent to the riverbank area.
- To build up green circumambient for conservation of biodiversity of the Halda River by implementing tree plantation programs.
- To create self-livelihood and alternative livelihood opportunities for the fish cultivators near the bank of the Halda River.
- To stop Tobacco cultivation along the banks of Halda upstream.

3.2 Working areas

- **Hathazari:** Mekhal, Garduara, Uttar Madarsa, Dakshin Madrsha and Burirchar Union Parishad,
- **Raozan:** Gahira, Binajuri, Raozan Paurosabha, West Guzara and Noajispur Union Parishad in Chittagong District.
- **Khagrachari hill** district**:** Manikchhari Upazilla

3.3 Target beneficiaries

The project targeted a total of 4000 beneficiaries including 2750 fish farmers, 1000 farmers and 250 tobacco cultivators to provide training and livelihood support from the project with an overall aim to conserve the Halda river ecosystem.

3.4 Activity and Performance Indicator

The duration of the project was 4 years and 8 months (April 2016 to December 2020). Several performance indicators have been set by PKSF to evaluate the activities done by IDF for the conservation of Halda and its resources (Table 1).

Table 1: Activity and relevant performance indicator

Activity	Performance indicator	Reference to section
Training on the production of carp fish fries from fertilized spawn by using modern technology and hatchery management practice	● Annual Carp fry production (kg) ● Hatching rate of carp eggs in a hatchery	● 5.3.2.5.3 Ongoing
Training on modern egg collecting techniques, hatching of fish fries in a mud-made scoop and conducting various income-generating activities of egg collectors and fishermen during the off season	● Annual Carp egg production (kg) ● Hatching rate of carp eggs in the earthen well ● Modernization of earthen well ● Status of a deep pool in the river (the ground of egg release) ● The annual income of the entrepreneur	● 5.3.1.4.2 ● 5.3.1.4.3 ● 5.3.1.6 Ongoing ● 5.3.1.7.2
Training on culture practice of Halda River's carp fish by using advanced technology.	● Traditional hatching method in the earthen well	● 5.3.3.1
Training on using sex pheromone trap and organic pesticide instead of toxic	● Uses of pesticides and chemical fertilizers in the field besides river	● 5.3.4.1 ● 5.3.4.2 ● 5.3.4.3

insecticide on the agricultural land of farmer and fishermen who live in adjacent area of the Halda River and creating fish friendly environment		
Training on-water navigation and fishery legislation to maintain a fish-friendly environment in the Halda River	● Mechanize/engine boat status ● Illegal fishing status ● Status of egg collection boats	● 5.3.5.1.4 ● 5.3.5.3.1 ● 5.3.5.3.1
Introducing improve technology for production of fingerlings of the Halda River and making exhibition plot	● Active fingerling producers ● Hatching of carp eggs in the hatchery	● 5.3.6.1 ● 5.1 (3 i, k)
Making exhibition plot of improving hatching technique of fish fries in mud-made scoop among local entrepreneurs	● Hatching of carp eggs in the earthen well ● Traditional hatching method in the earthen well ● Modernization of earthen well	● 5.3.6.1 ● 5.1 (4 a, b) ● 5.1 (4 f)
Making exhibition plot of sex pheromone trap as an alternative of insecticide, bio-pesticide, and vermicompost	● Uses of pesticides and chemical fertilizers in the field beside the river	● 5.1 (4 c, d, e)
Taking initiatives to release carp fish fries and expanding it to other areas through IDF.	● Annual Carp fry production (kg)	● 5.1 (3 e)
Exchange visit of hatchery owners and fish cultivators of other places of the country to observe the Halda brood fishes and fish fries production from the Halda stock for aiming to expand fish production	● Active fry producers ● Active fingerling producers	● 5.3.2.1 ● 5.3.2.1 ● 5.3.3.5 ● 5.3.3.6
Undertake tree plantation program for the protection of the river bank and biodiversity	● Biodiversity status of the river	● 5.1 (4 g-m)
Patrolling in the sanctuary area through local people	● Illegal fishing status ● Illegal sand erection ● Mechanize/engine boat status ● Pollution status of river	● 5.2.2.6 ● 5.3.5.1.4
Organizing workshops, seminars, expert and technical and advisory committee meetings to review the progress of project activities	● Comments from UNO, Chairman, technical committee member	● 5.2.1 ● 5.2.2
Celebration of fish week festival and participating in fish	● IDF's activities records	● 5.1 (5 e, o, 3 f)

fair, making during spawning time, signboard installation, distribution of leaflets and publishing report.	● Volunteers' activity	● 5.5.1
Survey of pre and post status of Halda	● Biodiversity status of the river (Halda River Research Lab) ● Pollution status of the river (Halda River Research Lab)	● 5.4.1.2.6 ● 5.4.1.2.7 ● 5.4.2.1
Explore alternative crops of tobacco along the banks of the upper part of Halda	● Tobacco cultivators near Halda river ● Active tobacco cultivator ● The alternative livelihood of tobacco cultivator	● 5.3.7 ● 5.3.7.1 ● 5.3.7.1

4 Methodology

4.1 Study area

This evaluation report has been written based on visits to areas included within the implementation plan for the project - Khagrachari, Hathazari and Raozan as shown in figure 1.

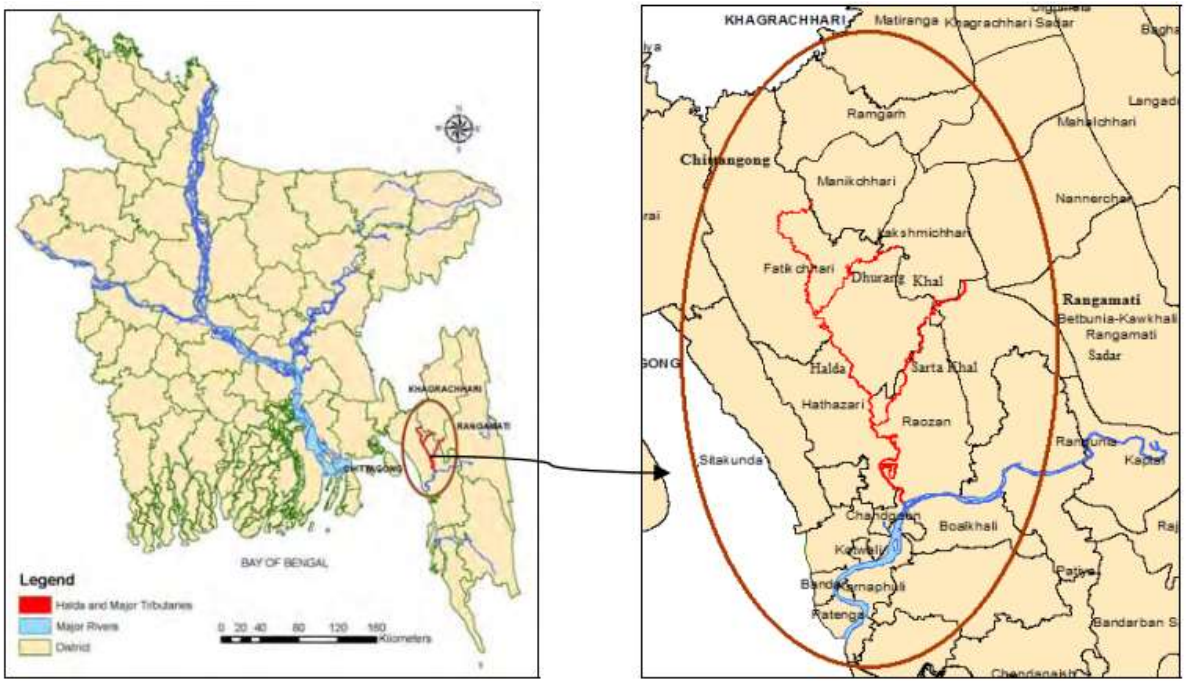


Figure 1: Location of the project area. Source: Akhter, F (2015)

4.2 Data sources

The Evaluation report has been prepared based on primary and secondary data sources. Primary data has been collected with a combination of focus group discussion, field visits, face-to-face interviews, over the telephone interviews and key informant interviews with the stakeholders of this project concerning the Halda River. Secondary information has been gathered with the consultation of the Halda experts, concerned govt. and non-govt organizations, resource persons, etc. Besides, published journal articles, newspaper reports, baseline survey information provided by IDF, published articles, policy reports, newspapers, different blogs, and websites, etc. were the sources of secondary information.

4.3 List of Interviewees:

A detailed category of the interviewee has been mentioned in Table 2.

Table 2: Breakdown of relevant interviewee categories

Group	Relevant interviewee	Nos. interviewed	Mode of interview	Date and place of interview	Corresponding issues
Local people	Tobacco farmer	25	Focus group discussion	30.12.2020 (Manikchhari, Khagrachhari)	Agricultural practices before and after tobacco cultivation, pros and cons, merits and demerits of training from the project, expectations vs reality.
	Volunteer	32	Face to face And Telephone	March 2021	Roles and responsibilities, impact on life, support required, barriers for The conservation of Halda, illegal fishing, sand extraction, the continuation of the project's activities, good and bad experience
	Egg collector	59	Face to face and Telephone	01.04. 2021 (Garduara, Hathazari; West Guzara, Raozan) 03.04. 2021 (Napiterghat and Khalifar ghona, Raozan) End of March (over the phone)	Observations related to river environment, dependency on the river, merits and demerits of training, comment on trainer, expectations, the impact of training on The conservation of Halda.
	Fry producer	18			
	Fisherman	31			
	Farmer	16			
	Boatman	13			
	Private hatchery owner	2			
	Govt. hatchery	1			
Institutional	UNO		Telephone	Beginning of April 2021	Current roles and responsibilities, barriers, way to overcome, waste management, lease of balumohal, suggestions regarding river conservation through an integrated approach.
	Chairman	7			
	Councilor	1			

Group	Relevant interviewee	Nos. interviewed	Mode of interview	Date and place of interview	Corresponding issues
Researcher	Researcher	8	Telephone	Beginning of April, 2021	Research outcome relating to existing Halda river environment, the project's role for research, future needs and way forward to conserve the Halda.
	Co-Ordinator of Halda River research lab	1			
Key Informant	Technical committee member	6	Telephone	Mid-April 2021	Role of the project for the conservation of Halda, knowledge dissemination meeting, the continuation of the project's activities.
Professional	Trainer	8		Mid-April, 2021	Training details, Performance of the trainee, drawbacks and suggestions for future.

4.4 Data collection and data cleaning

Primary data has been collected from both field surveys and over the phone due to a pandemic situation using semi-structured questionnaires for each of the above-mentioned professions to get a clear picture of activities implemented by IDF under the project. Before the interview, the questionnaires have been reviewed by IDF and PKSF professionals (Annex). For interviewing of the adjacent communities who were the beneficiaries of the project, the target groups have been divided into distinct professions according to the project activities to capture the best scenario. The categories are Egg collectors, Egg to fry producers, People involved with private and government hatchery management, Fishermen, Boatmen, Farmers, Tobacco farmers of Manikchhari, Volunteers, Researchers and coordinator of Halda research lab, UNOs of Raozan and Hathazari, Chairman, Councilors, Members of the technical committee that was formed by IDF and Trainers of the target groups in Raozan and Hathazari Upazilas. They have been interviewed either face-to-face or over the phone to collect necessary information which has given a clear picture of the project performance. For interview purposes, a group of survey teams has been formed with proper guidance who was continuously involved with the survey (Plate 1). The number of beneficiaries

mentioned in IDF's document is 3750. In total 197 of them could be reached for the interview due to the pandemic situation which excludes the UNOs, chairmen, councilors, researchers, technical committee members and trainers.

(a) Garduara, Hathazari

(b) Napiterghona, Raozan

(c) West Guzara, Raozan

(d) Khalifarghona, Raozan

Plate 1: Some snapshots of field visits in Hathazari and Raozan

4.5 Data analysis

Prior analysis, data has been undertaken by several processing activities aiming for cleansing and quality control. Collected data has been inspected to remove data-related errors such as whether there is any missing value or repeated data, misallocation of data under the wrong column, the

unusual value of data, change in data type, etc. Finally, before starting the analysis, data has been formatted into desired structures that serve the purpose of study objectives.

5 Project Performance – Achievements and Shortfalls

5.1 Summary of Project activities

Summary of planned activities and actual implementation or achievements as per reports and documentations of IDF has been shown in table 3.

Table 3: Project activities – plan vs achievement

Sl. No.	Activity name	Unit	Target	Implementation (till November 2020)
1.	**Administrative**			
	The baseline survey report by the third party	Nos	1	1
2.	**Training/ workshop**			
	(a) Training on the modern egg to fry production technique and hatchery management	Batch	25	25 Trainee per batch: 25
	(b) Training for egg collectors on modern egg collection techniques, hatching of fish fries in the mud-made scoop and various off-season income-generating activities for egg collectors to enhance their livelihood resilience	Batch	90	90 Duration:1 day Trainee per batch: 25
	(c) Training for fishermen on carp farming techniques, and various income-generating activities during the off season	Batch	8	8 Duration: 2 days Trainee per batch: 25
	(d) Training for farmers from the project on using pheromone traps & bio pesticides instead of using harmful insecticides.	Batch	45	45 Duration:1 day Trainee per batch: 25
	(e) Training program for boatmen from the project on boat riding by maintaining a fish-friendly environment and on fisheries law	Batch	2	2 Duration:1 day Trainee per batch: 25
	(f) Workshop for communication with fish farming material providers of Upazila level	Batch	6	6 Duration:1 day Trainee per batch: 20
	(g) Refreshers' training on the egg to fry production and hatchery management	Batch	10	10

	(h) Training on modern egg collection and egg to fry production method, technique and awareness (including protection technique of prawn fry and other fries)	Batch	2	2 Duration: 2 days Trainee per batch: 25
	(i) Training on alternative income generation activities for tobacco farmers	Batch	22	20 Duration:1 day Trainee per batch: 25
3.	**Logistic activities**			
	(a) Recruitment of MS students for research purposes	Nos	36	36
	(b) Monthly allowances to volunteers	Nos	54	52 Number of volunteers: 40
	(c) Logistic support to volunteers	Nos	40	40
	(d) Marking the boundaries of the sanctuary area with signboards	Nos	65	65
	(e) Adopting fish fry release program for extending fish fry of Halda to other partner organizations such as JCF, RRF, SUS and NGF, etc. through IDF	Nos	2	2
	 			
	(f) Leaflet printing and distribution for public awareness creation	Nos	2	1
	(g) Making video documentary	Nos	2	1
	(h) Purchasing equipment for Halda River Research Lab of University of Chittagong	Nos	2	2
	(i) Establishment of hatchery	Nos	1	Running

(j)	Education of the children of fisherman	Nos	1	1
(k)	Building Halda broodstock in a privately owned hatchery	Nos	1	1

(l)	Grants for tobacco farmers to create alternative livelihood	Nos	1	1
(m)	Waste management (Hathazari and Roazan Pourashava)	Nos	1	1
4.	**Demonstration activities**			
(a)	Establishing technology and exhibition of Halda fingerling production in fish farming	Nos	50	50

(b)	Setting up demonstration plots for entrepreneurs on hatching methods in local earthen well and modern hatching techniques	Nos	70	70

(c)	Setting up demonstration plots for farmers on using pheromone trap and bio pesticides as an alternative for poisonous insecticides and pesticides	Nos	38	38

(d)	Establishing exhibition plots for vegetable cultivation in a safe manner	Nos	10	10

(e)	Establishing vermicompost demo plots	Nos	40	40

(f)	Renovation of old earthen wells	Nos	54	54

(g)	Assistance in setting up Papaya garden exhibition	Nos	40	40

(h)	Assistance in setting up Orange garden exhibition	Nos	10	10

(i)	Assistance in setting up Rambutan garden exhibition	Nos	5	5

(j)	Assistance in setting up Yellow lemon garden exhibition	Nos	5	5

(k)	Assistance in setting up Dragon fruit cultivation exhibition	Nos	2	2

(l)	Planting fruit trees in surrounding areas of the house	Nos	100	100

(m)	Assistance in safe vegetable cultivation and fruit tree care	Nos	90	90

				
	(n) Assistance in setting up safe vegetable cultivation exhibition	Nos	10	10
				
	(o) Signboard installation	Nos	5	5
				
5.	**Knowledge dissemination**			
	(a) Project start-up workshop	Nos	1	1
	(b) Expert committee meeting	Nos	5	4
	(c) Technical committee meeting	Nos	6	4
	(d) Policy dialogue seminars/workshops with stakeholders at the national level	Nos	5	3

	(e) Celebration of National Fisheries Week and participation in fish fairs	Nos	8	8

	(f) Workshop with Halda stakeholders	Nos	1	1
	(g) Awareness (school/ madrasa campaign)	Nos	Lump Sum	2
	(h) Awareness (workshop with Imam)	Nos	3	3
	(i) Exchange meeting with volunteers/guards	Nos	39	38
	(j) Monthly project progress meeting	Nos	54	53
	(k) Coordination meeting with local administration	Nos	3	3
	(l) Issue-based discussion meeting	Nos	40	38
	(m) Miking (in fish breeding season)	Nos	20	20
	(n) Exchange meeting with tobacco cultivation prevention committee	Nos	3	3
6.	**Capital related**			
	(a) Furniture	Nos	6	6

(b) Easy bike	Nos	5	5	

(c) Camera	Nos	1	1	

(d) Buying research equipment	Nos	1	1	

	(e) Buying solar boat	Nos	2	2

	(f) Repairing solar boat station	Nos	2	2
	(g) Buying speed boat	Nos	1	1

	(h) Close circuit (CC) camera	Nos	2	2

7.	**Project evaluation and report preparation**			
	(a) Determining the quality of earthen well water and what to do	Nos	1	1
	(b) Creating a database of tobacco farmers	Nos	1	1
	(c) To survey the reasons for decreasing nos of egg collectors including boats	Nos	1	1
	(d) Final evaluation and preparation of the report by the third party	Nos	1	1
	(e) Publication of evaluation report	Set	1	

5.2 Perception of supervisory stakeholders on the project

5.2.1 Project technical committee

A technical committee was formed by representatives from egg collectors, Upazila and District Fisheries Officers and faculty members of the University of Chittagong for knowledge dissemination purposes on The conservation of Halda issues. All 6 members of the PEC were reached and interviewed over the phone.

5.2.1.1 Role of the project in the overall development of the Halda

All the technical committee members agreed on the significant role of this project in the overall development and conservation of the Halda River (Fig. 2). The majority of them (50%) emphasized the logistic support, volunteer recruitment, and awareness creation to have a positive bearing on the protection of Halda through the project.

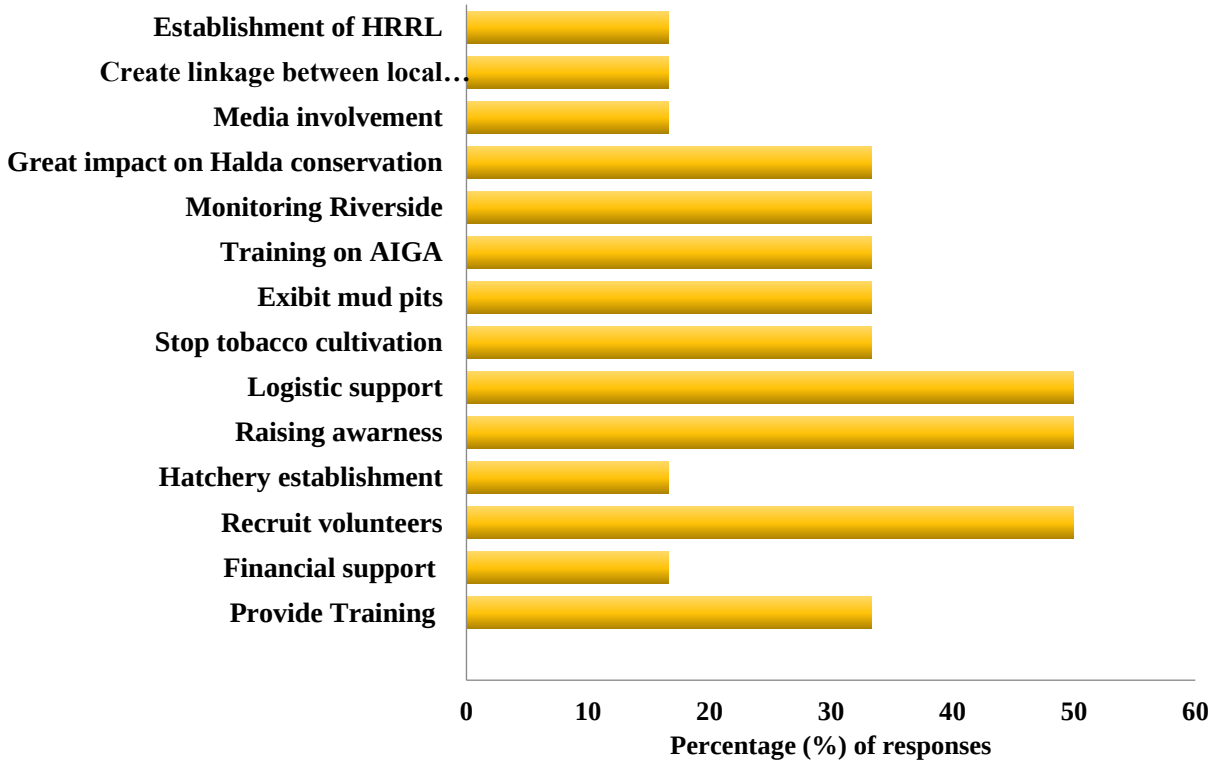


Figure 2: Comments on the role of the project in the overall conservation of Halda

One-third of them maintained that routine monitoring of riverside areas, training activities, phasing out of tobacco cultivation, mud pit demonstration plots, and training on alternative income-generating activities (AIGA) has played critical roles in the overall conservation of Halda. According to them, other roles of the project are financial support, hatchery establishment, media involvement, creating a linkage between local administration and IDF for the conservation of Halda, establishment of Halda River Research Lab has also been identified as important contributors towards The conservation of Halda.

5.2.1.2 Expectations from the project

All the technical committee members made some suggestions to consolidate the progress made in the conservation of Halda by IDF through this project (Fig. 3). These included financial support (50%), a continuation of all ongoing activities (50%), closer collaboration with local administration (33.33%) and continuation of training activities (33.33%), Few of them emphasized the creation of more AIGA opportunities, modification of training programs, enhancement of monitoring activities, increasing the number of hatcheries, recruitment of more volunteers, the establishment of a 'Halda Branding center' and enhanced logistic supports for Halda River Research Lab (HRRL), etc.

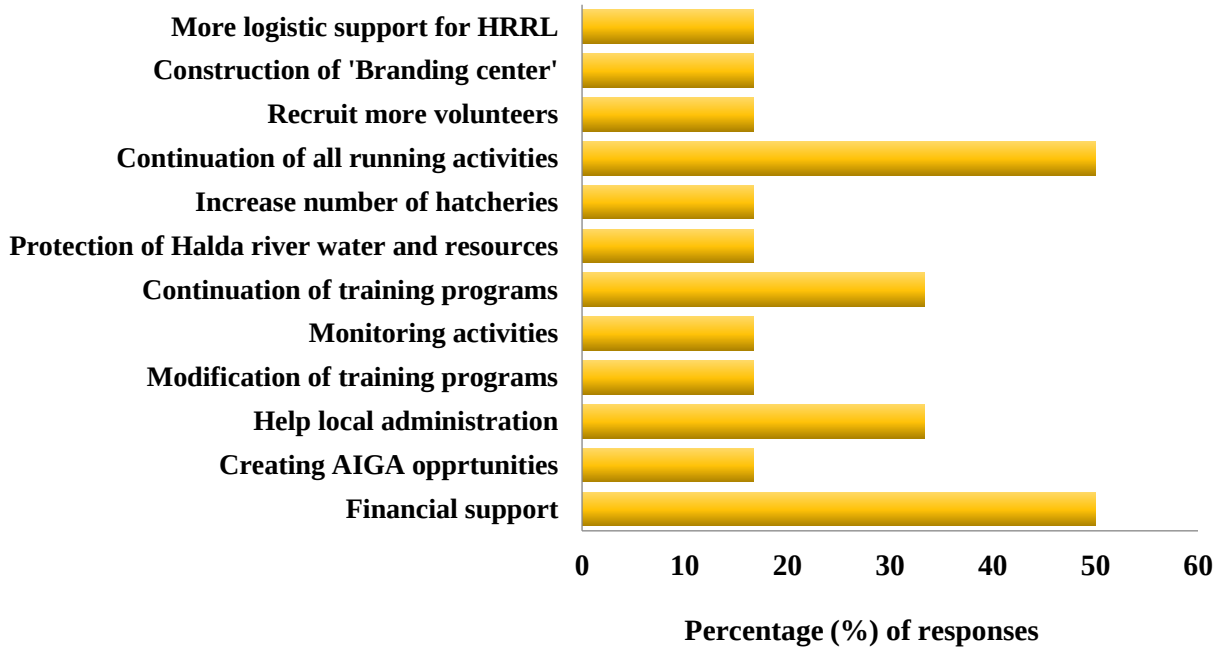


Figure 3: Expectations of the technical committee from the project

5.2.1.3 Knowledge dissemination programme for the technical committee

IDF arranged a knowledge-sharing programme for the technical committee members. Their responses indicated a high level (83.30%) of satisfaction with the knowledge products from the project as developed by IDF based on the project activities (Fig. 4). However, the dissatisfaction of a few of them should be explored further to learn what better could be done.

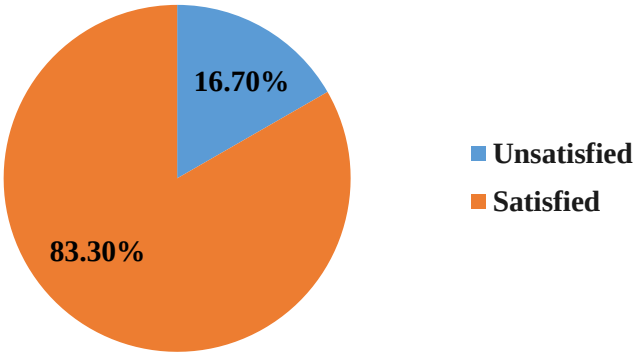


Figure 4:Satisfaction level on knowledge dissemination program

5.2.1.4 The overall success of the activities under the project

All technical committee members showed positive expectations of outcomes and strong support for the continuation of programs adopted by this project in the future. The technical committee members marked two-third of the project's activities as successful with one-sixth of them marking the activities as highly successful and remaining marked the activities as failed (Fig. 5). IDF and PKSF can learn lessons for improvement from the comments of skeptical technical committee members who saw options for improvement in the activities.

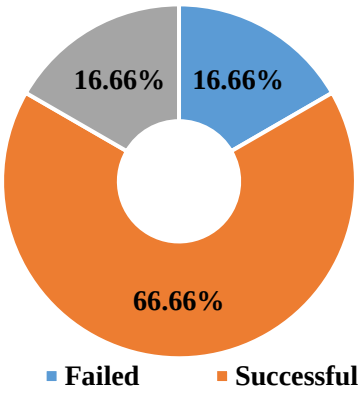


Figure 5: Comment on the overall success of the project

5.2.2 Macro-level actors: UNO/Chairman/Councilor

One of the activities of IDF under the project was knowledge dissemination for local administration like Upazila Nirbahi Officer (UNO), Chairman and Councilors. Among 11 chairmen and 2 councilors from Hathazari and Raozan, 7 chairmen, 1 councilor and 1 UNO have been interviewed.

5.2.2.1 Supports provided by the project through IDF for Halda conservation

IDF provided various types of supports for The conservation of Halda through the project (Table 3) and the perception of local leaders on these supports are summarized in figure 6. Around half of the respondents identified recruitment of volunteers for The conservation of Halda as the major support from the project. Nearly 40% of the respondents identified stopping illegal fish catching and increased fish production as supports derived from the project. UNO Hathazari showed his satisfaction with the coordination, logistics support, volunteer information which helped the administration to conduct 175 mobile courts with a 70% success rate and 75% of the logistic support for those drives was given by the project.

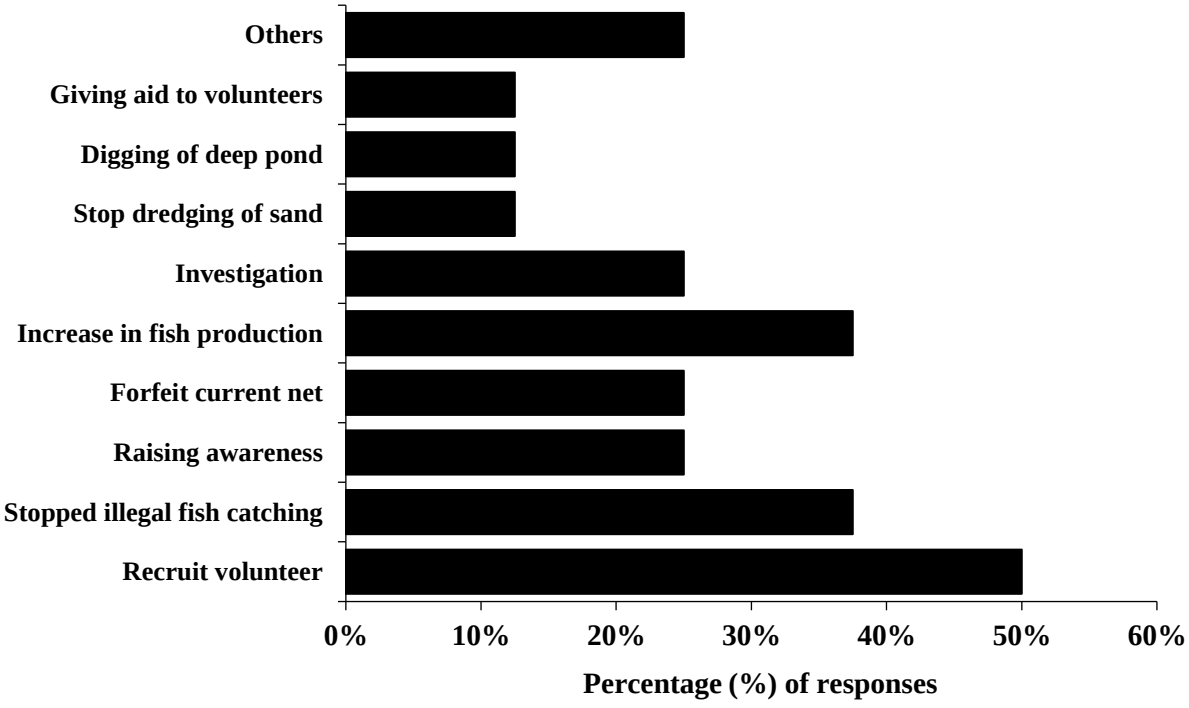


Figure 6: Types of supports provided by IDF through the project

Raising awareness, investigation of occurrences and forfeiting of illegal fishing nets were identified as substantial supports from the project for the conservation of Halda. A relatively small number of them (12.5%) were aware of the support from the project in stopping illegal sand quarrying, digging of deep ponds and logistics provided to the volunteers as supports provided by the project. Additional supports including watch over mother fishes, establishing hatchery, providing dustbins have also been mentioned but by a small percentage of them.

5.2.2.2 Future support requested

All the respondents mentioned the need to continue the supports mentioned in section 5.2.2.1 while emphasizing additional supports required in the future for the conservation of the river (Fig. 7). Around 37.50% of them requested additional financial and logistics support and emphasized more training in the future to conserve the river. A quarter of them mentioned the need for the establishment of hatchery and increased collaboration with local people. Some (12.5%) suggested the use of close circuit (CC) cameras and increasing volunteers' honorarium. Moreover, around 25% of the respondents suggested stringer action against illegal sand extraction and seeking help from local authorities. Local Upazila administration requested more speed boats and on-demand availability of logistics for prompt drives against activities. The support for waste management requested to be substantially increased in addition to more fast-paced research.

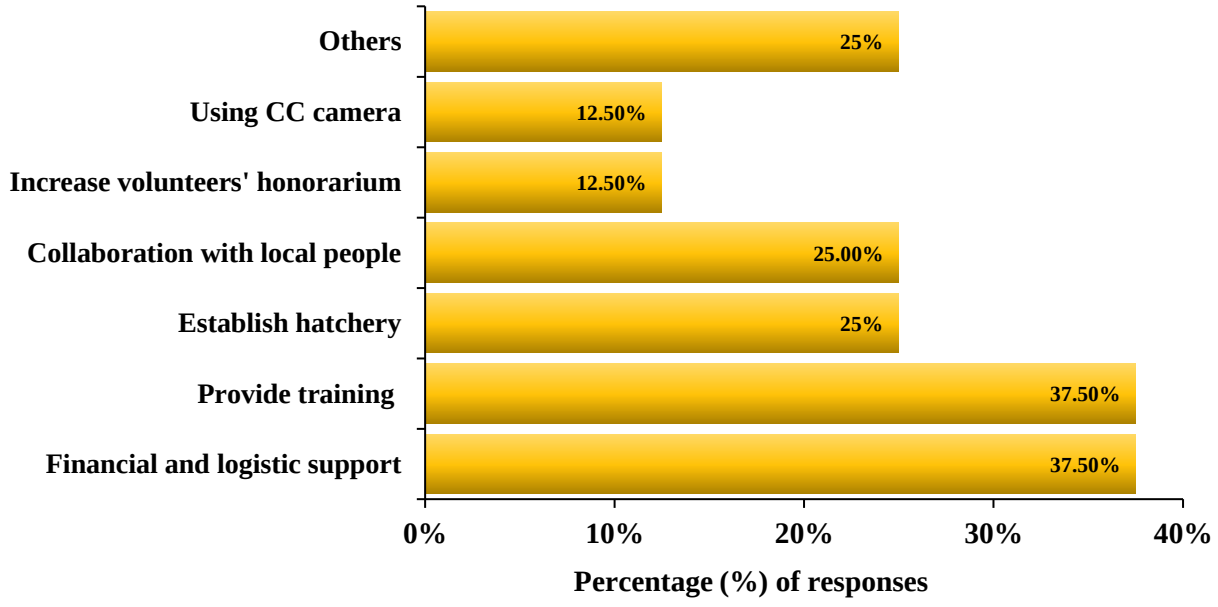


Figure 7: Future expectations regarding supports

5.2.2.3 Coordination with IDF staffers and satisfaction from a coordination meeting

As seen in figure 8 (A and B) most 87% of respondents had coordination with IDF related to the project activities. All the respondents attended coordination meetings organized by IDF. Among them nearly two-third (62%) were satisfied, a quarter of them was dissatisfied regarding the outcomes of coordination meetings while around 13% of them maintained a neutral opinion. The local Upazila administration of Hathazari was highly satisfied with IDF's coordination.

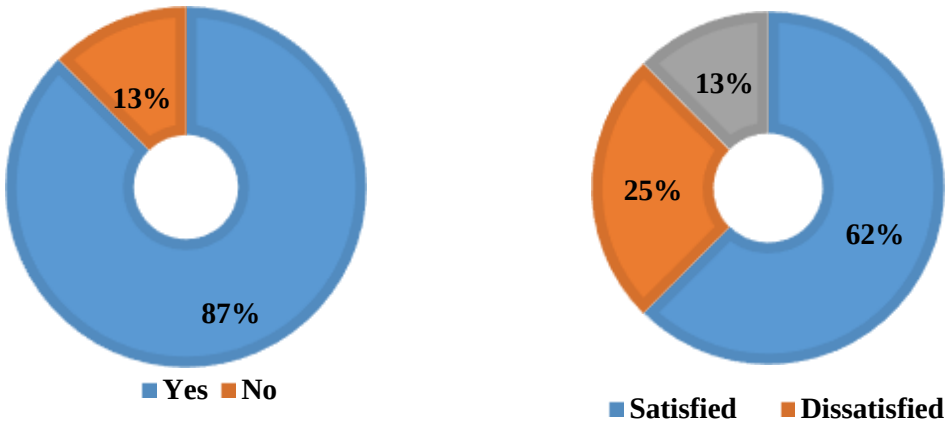


Figure 8: (A) Coordination with IDF staffers (B) Satisfaction from the coordination meeting

5.2.2.4 Role of the project in waste management

Half of the respondents stated that IDF played a good role in waste management through the project by providing dustbins (Fig. 9 Left). According to their rating, the progress in waste management was 0 (33.3%), 4 (33.3%), 6 (16.7%) and 8 (16.7%) on a scale of 10 (Fig. 9 Right).

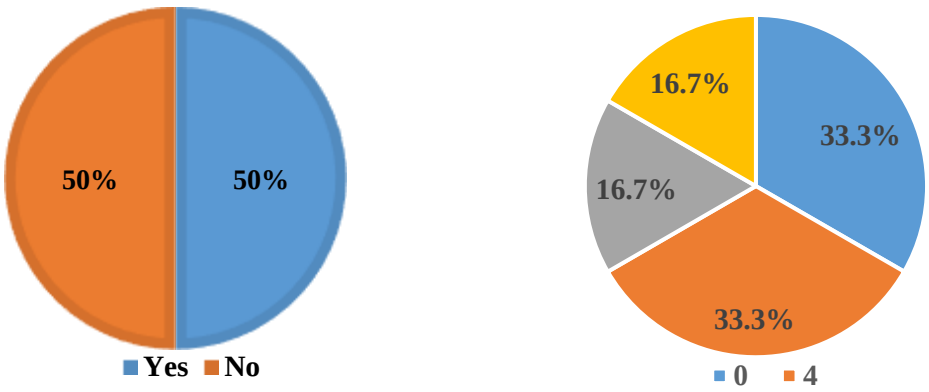


Figure 9: Opinion on the project's role in waste management (Left) and Rating on progress (Right)

5.2.2.5 Opinion on illegal sand extraction

All the respondents mentioned that leasing of balumohal (sand query) is stopped, yet half of the respondents said some illegal sand extraction is continuing in the Halda (Fig. 10). However, UNO Hathazari confirmed that the government has stopped giving leases for sand quarrying from Halda completely and due to frequent mobile courts, the illegal sand collection is halted.

Figure 10: Opinion on illegal sand extraction

5.2.2.6 Administrative steps against illegal fishing

All the respondents agreed that they had taken various steps against illegal fishing in coordination with IDF (Fig.11). Two-third of them confiscated illegal net, boat, and fishing hooks while more than one-third (38%) took part in patrolling against illegal fish catching, confiscated engine boats and participated in awareness-raising campaigns. Besides, 25% of respondents mentioned that they recruited additional volunteers and ensured regular monitoring of illegal fishing. Due to frequent mobile courts by local administration and identification of illegal fish catchers, as mentioned by UNO Hathazari, illegal fishing is quite regulated in Halda.

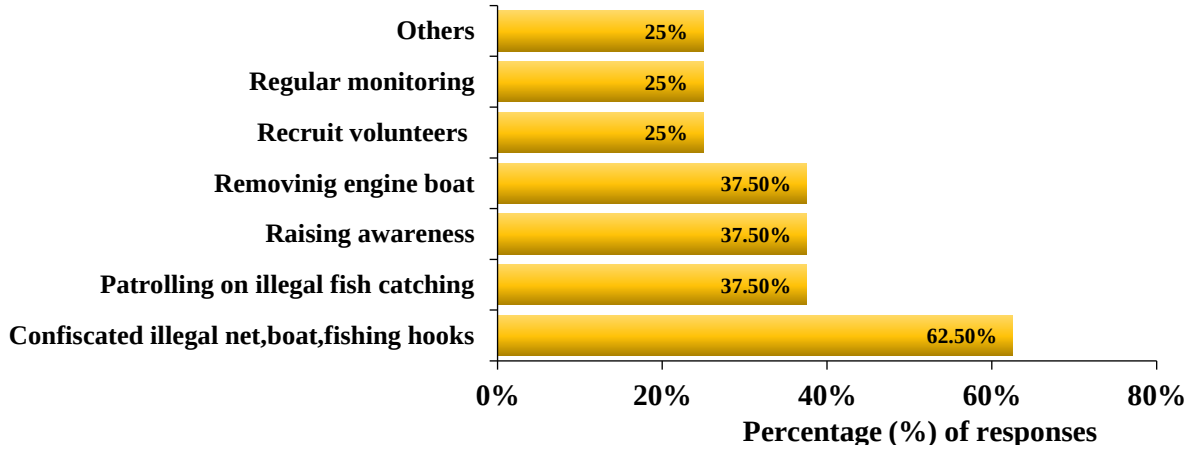


Figure 11: Administrative steps taken against illegal fishing

5.2.2.7 Role of the project on the overall conservation Halda

Around 57% of respondents believe that the project for the conservation of Halda implemented by IDF was successful (Fig.12). The rest of the respondents maintained a neutral opinion. However, all the respondents opined that conservation activities initiated/implemented under the project should be continued in the future which indicated their approval of the activities under the project for the conservation of the river. UNO Hathazari considered the project a success by citing that 175 mobile courts have been conducted against different crimes against with a 75% success rate for which 75% of the logistic support was provided by IDF through the project. These mobile brought major crimes against the conservation of the river under control. However, he specifically noted about lack of adequate support from the project in waste management. Besides, he emphasized research, more frequent awareness campaigns and stronger support for mobile courts by increasing the number of speed boats and ensuring their availability on demand at any time.

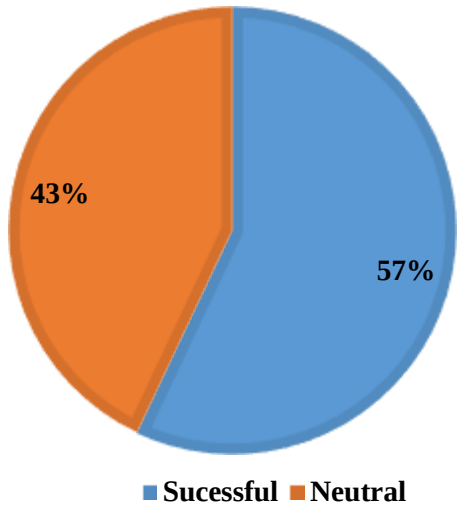


Figure 12: Opinion on the project's role for the overall conservation of Halda

5.3 Local people: Livelihood and resources

5.3.1 Egg Collector

Under the project, IDF organized training for egg collectors on modern egg collecting techniques, hatching of fish fries in a mud-made scoop and various off-season income-generating activities for egg collectors to enhance their livelihood resilience. Almost 2000 egg collectors in 80 batches (25

trainees per batch) received one-day training up to November 2020. Among them, 59 egg collectors were interviewed by field survey and over the phone.

5.3.1.1 Problem faced in egg collection

All the egg collectors use conventional methods learned from their ancestors, which include using boats, fishing nets, buckets, etc. Following the traditional methods, they often undergo different problems. As seen from their response summary in figure 13, almost 37% of them faced no problem while collecting eggs while another 37% blamed salinity intrusion as a damaging factor for eggs. Stormwater also thwarts the egg collection process according to a quarter of the respondents. Nearly 8% of them blamed polluted water from industries, poisoning by illegal fishermen, waste from poultry farms as factors for reduction in the amount of egg collected. Unavailability of adequate logistics like a fishing net, bucket, boat, manpower was mentioned by 10% of them as limiting factors for efficient collection of eggs. Other problems like internal collisions, temperature fluctuations, physical labor, etc. also limited the amount of egg collected.

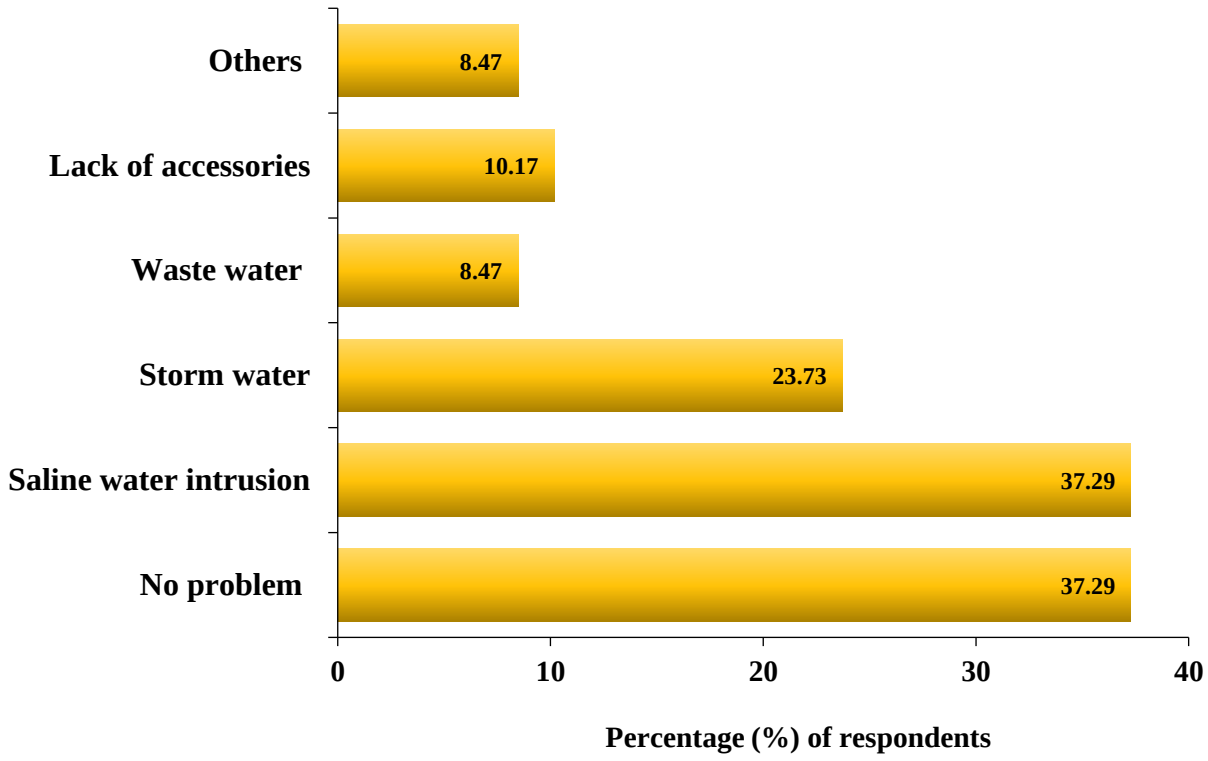


Figure 13: Problems faced in egg collection

5.3.1.2 Opinion of egg collectors on the method of training

Overall, 88% of the respondents showed satisfaction with the training that they received from the project on modern egg collection methods (Fig. 14, Left). While around 92% received theoretical training, a mere 6% received both practical and theoretical training (Fig. 14, Right).

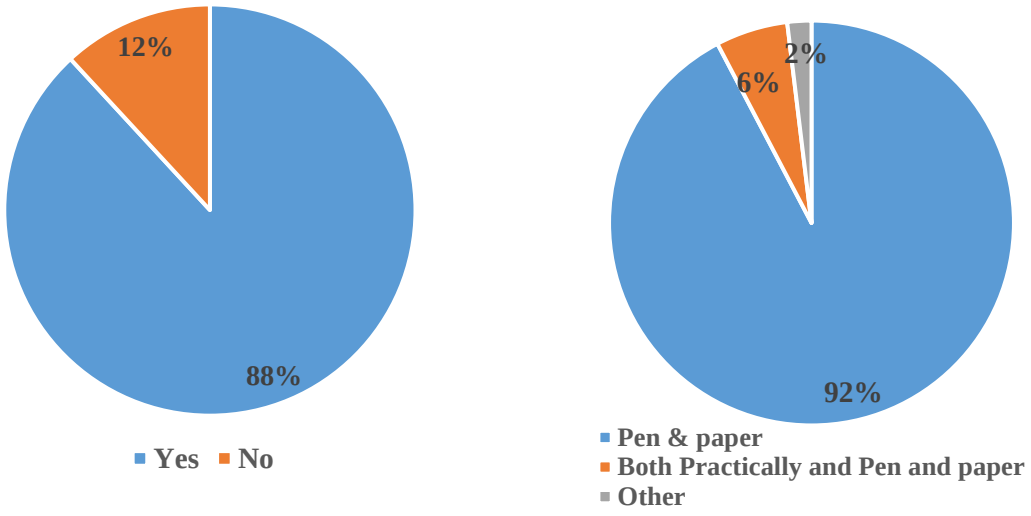


Figure 14:Training received by egg collector (left) and method of training (right)

5.3.1.3 Training on egg loss and unwanted fish fry loss reduction

Around 88% of the respondents received training on egg loss reduction (Fig. 15). On the other hand, almost 56% of the respondents recalled receiving additional skills from the training on the reduction of loss of unwanted fish fry during egg collection which needs to be enhanced further.

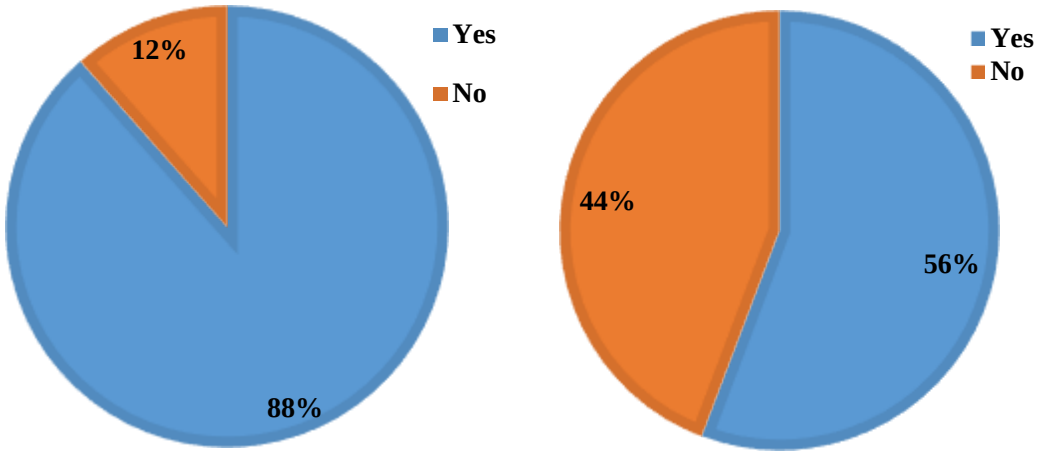


Figure 15: Training on loss reduction of egg (left) and fish fry (right)

5.3.1.4 Post-training impact

5.3.1.4.1 Change in the amount of eggs collected

As evident from figure 16, around 71% of the egg collectors of Halda claimed that the amount of egg they have collected has increased following the training activities. It indicated the need to keep on refreshers training for the egg collectors to enhance the collection efficiency.

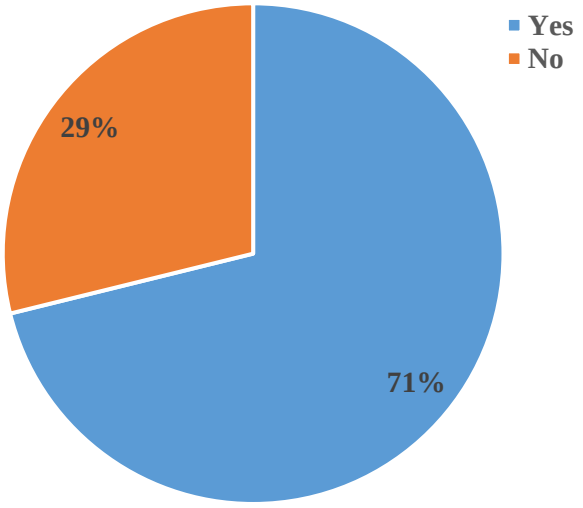


Figure 16:Opinion on change in egg amounts

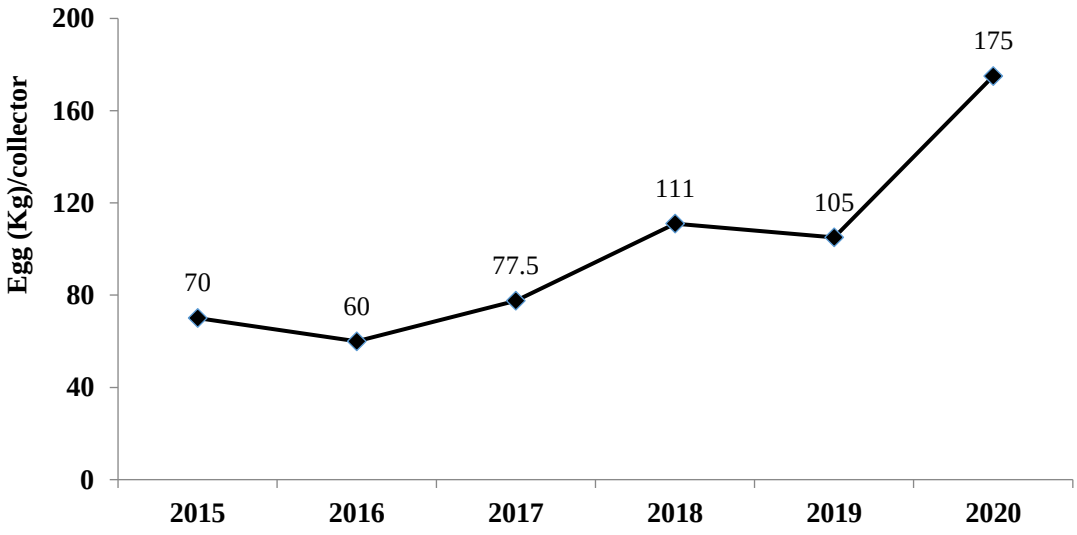


Figure 17: Yearly egg collection trend as per the egg collectors

5.3.1.4.2 Year-wise egg collection trend

The mean amount of egg per collector has increased in recent years, starting from around 70 kg in 2015 that reached 175 kg in 2020 (Fig.17). This indicated a role of the training besides the impact of the improvement in the river environment and the overall amount of eggs available in the river.

5.3.1.4.3 Egg: Trend of collection and damage

After 2017, the amount of egg collection has improved, however, the damage is still fluctuating (Fig.18). The mean amount of egg collected by the egg collectors has substantially increased except for a slight decrease from 2015-2017 and reached around 175 kg in 2020. Though the collection has increased, the percentage of egg damage remained fluctuating which seemed a frustrating outcome and calls for enhanced hands-on training to control the factors contributing to egg loss determined through research. However, as the figure depicts the data reported by the collectors from their memory, it should be taken into consideration accordingly with caution.

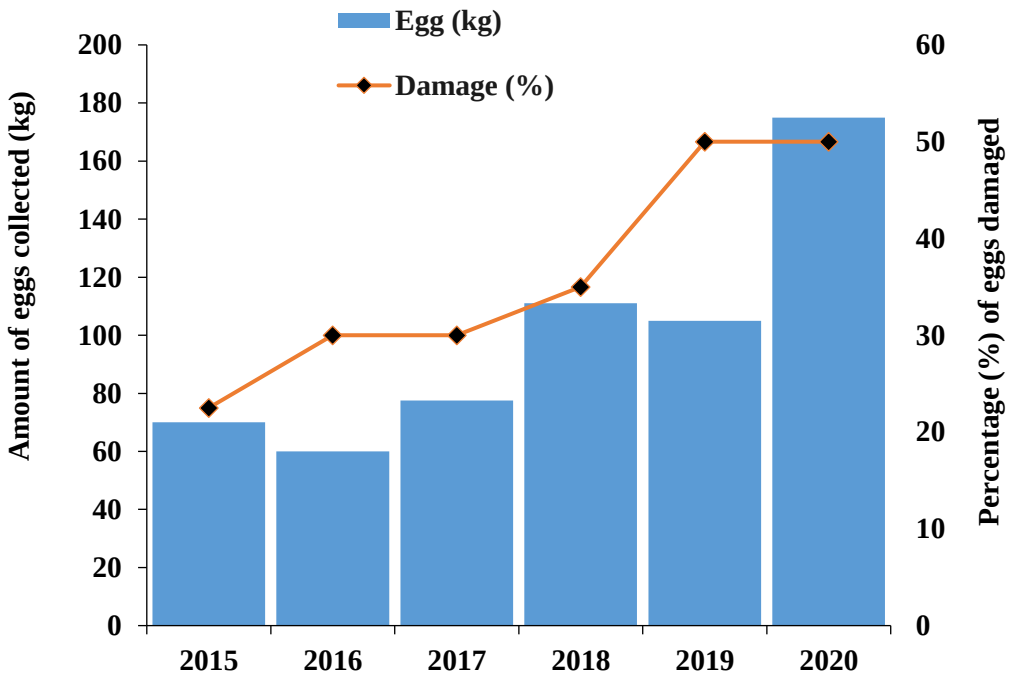


Figure 18: Yearly collection of egg and egg damage trend

5.3.1.5 Problem limiting the fry production

As per the egg collectors, 32% of the fry producers who hatch eggs in earthen wells, didn't face any problems (Fig.19). Others faced setbacks and blamed saline water in the river (37%), wiping out of wells by the storm water (21%), wastewater in the river (9%), personal problems (7%), or other problems (14%) inducing the lack of logistics, temperature fluctuations for the damages.

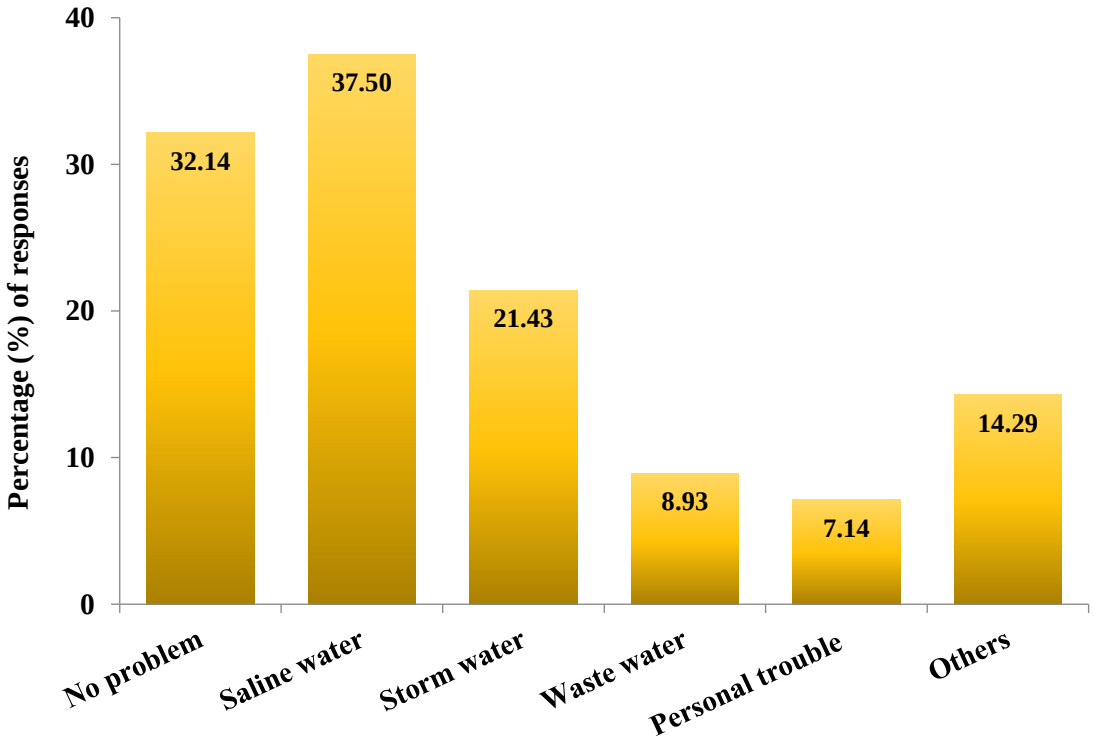


Figure 19: Problem faced in fry production in the earthen well

5.3.1.6 Training on modern fry production and method of training

Among the respondents, 71% received training on modern fry production methods in earthen well, and among them, 77% received theoretical training and 17% trainee received both hands-on and theoretical training (Fig. 20). It indicated the need for more intensive field and practical oriented training besides theoretical ones.

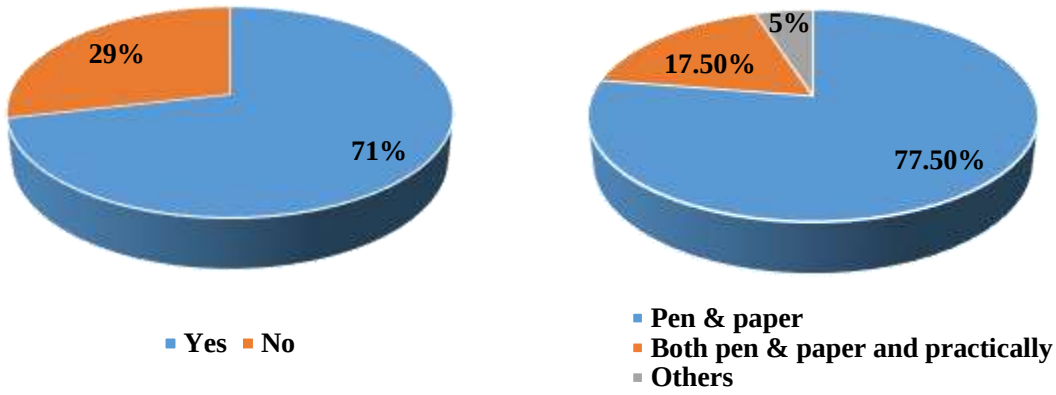


Figure 20: Training on modern fry production (left) and method of training (right)

5.3.1.7 Post-training impacts

5.3.1.7.1 Change in fry amount

Figure 21 shows that 60% of the training recipients experienced increased fry production due to the training provided by the project. It needs to be validated by an actual increase in the fry production based on eggs collected. However, the observation based on responses from the fish-fry producers indicated the need to keep the refreshers training on to further consolidate the conversion of eggs to fish fries.

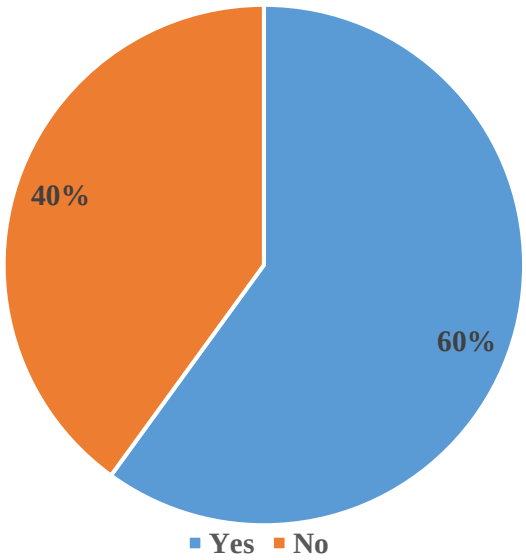


Figure 21: Change in fry amount after training

5.3.1.7.2 The trend of income and egg to fry ratio (EFR)

The income of fry producers increased steadily (Fig. 22). Median income was BDT 150000 in 2020 compared to only BDT 30000 in 2016 which is explained by the increased amount of eggs and the market price trend. In 2017, EFR was the highest and it gradually declined till 2020. This decline in EFR is unacceptable and interventions need to be designed to improve this aspect.

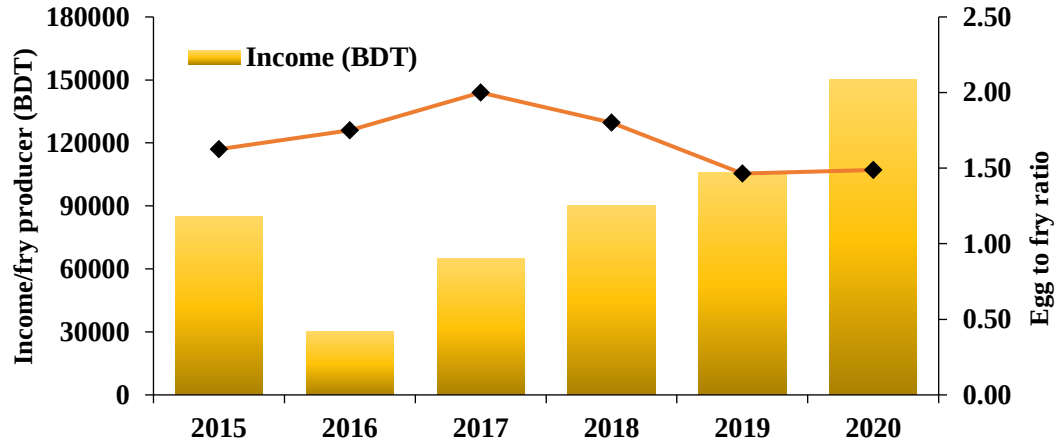


Figure 22: Yearly income and egg to fry ratio trend

5.3.1.8 Off-season profession before training

During the off season, when they are not involved in activities related to Halda, more than 40% of respondents get engaged in business, 32% in farming, 17% work as day labourers, 15% are drivers and 8% remain engaged in other professions in terms of off-season activity (Fig. 23).

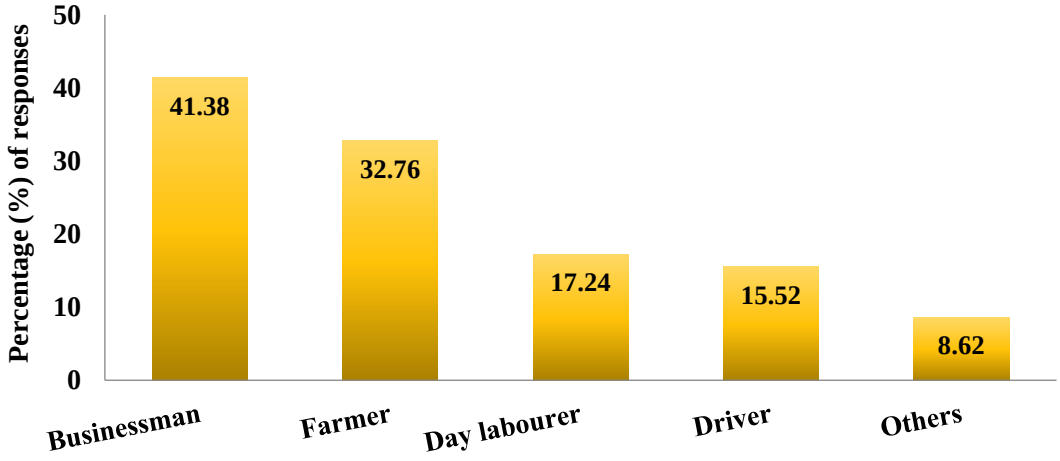


Figure 23: Off season activities before training

5.3.1.9 Training on off season activity and method of training

Only 14% of respondents mentioned that they have received training from IDF on off-season occupation though it is quite important (Fig.24). Among the training recipients, half got classroom-based theoretical training, 25% received both practical and theoretical training, and the rest of one-fourth received other forms of training (Fig.24). Above 60% got training-related documents, half of them found the training program helpful for off-season activities with an increase in their income.

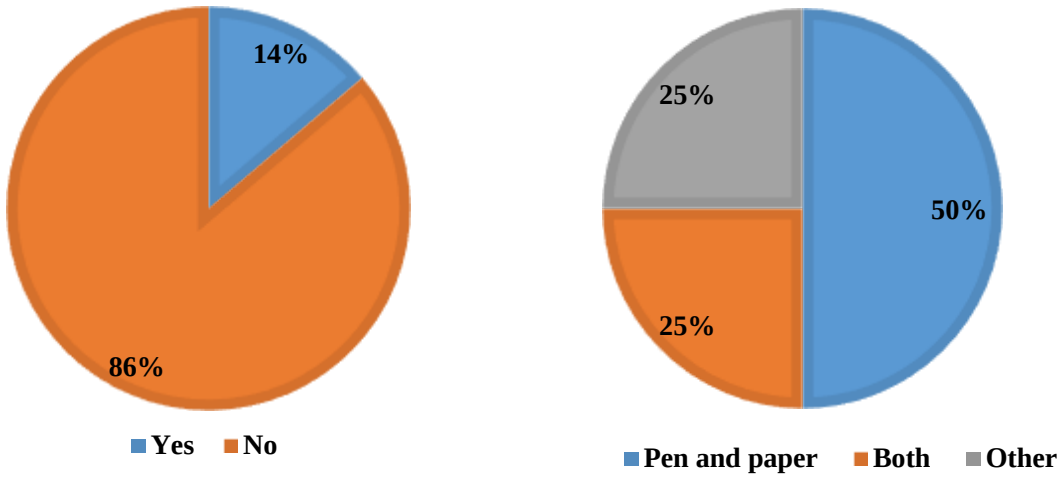


Figure 24: Training on off season activity and method of training

5.3.1.10 Perception on the benefits of training

5.3.1.10.1 Rating on benefit gained from training

The respondents were asked to rate benefits gained from training on egg collection and to evaluate trainers on a scale of 5. The summary of their response is shown in table 4. Among the participants who have received training on egg collection, above 50% of them rated the training above 4 expressing their satisfaction, 36% rated 3 indicating their neutral position. Besides, around 55% of the participants in training on egg-fry production rated the training as beneficial with above 4 ratings and a quarter of them rated 5 indicating their full satisfaction. Regarding the benefits received from the training of off-season activity, almost half of the respondents rated 4 on a scale of 5, 13% rated 5. Overall, the responses indicated a scope of improvement to enhance the satisfaction of the trainee.

Table 4: Rating on benefit gained after training

Activity	Rating (On a scale of 5)				
	1	2	3	4	5
Egg collection	2%	8%	36%	36%	18%
Egg to fry production	3%	8%	31%	33%	25%
Off season activity	0%	12%	25%	50%	13%

Table 5: Rating of trainer involved in training related to egg collectors

Activities	Rating (On a scale of 5)				
	1	2	3	4	5
Egg collection	0%	4%	8%	30%	58%
Egg to fry production	0%	2%	3%	31%	64%
Off season activity	0%	0%	12%	38%	50%

5.3.1.10.2 Rating of trainer

Overall, the trainers engaged in the training related to egg collection, fry production and off-season activities were well accepted by the beneficiaries as above 85% of the trainees have given them 4 and above rating on a scale of 5 (Table 5). It indicated a good selection of trainer pool by IDF for these training activities.

5.3.1.10.3 Comments on training duration and trainee cohort size

According to 62% of them, as depicted by table 6, a 1-day training for egg collection was enough whereas 38% opined that training longer than a day would be more beneficial. On the other hand, 55% of the respondents opined that 1 day was enough for eggs to fry production-related training while 42% mentioned that 1 day was not enough; more than 1 day should be preferred. For off-season vocation-related training, around 62% of respondents reported that 1 day was enough for this type of training where nearly 38% of respondents requested training for more than 1 day. On

the other hand, as evident from table 7, most of the respondents (84%) were satisfied with the trainee cohort size of 25 for all the three training programmes related to the egg collectors.

Table 6: Opinion on the duration of training programmes

Activity	Duration		
	1 day is enough	More than 1 day	Less than 1 day
Egg collection	62%	38%	0%
Egg to fry production	55%	42%	3%
Off season activity	62%	38%	0%

Table 7: Opinion on the maximum number of trainees in a training session

Activity	Number		
	25 is enough	More than 25	Less than 25
Egg collection	84%	8%	8%
Egg to fry production	95%	0%	5%
Off season activity	87%	13%	0%

5.3.1.11 Perception of project's intervention

The perceptions of trainees on different aspects of IDF's activities under the project are shown in table 8. Notably, 64% of the trainees reported that they have not watched any video documentary during training while all of them expressed the efficacy of video documentaries to clearly convey training on the collection of eggs and fry production techniques. Therefore, IDF/PKSF may consider making training video documentaries for more effective training and share these videos with the trainees so that they can refresh their knowledge without attending refreshers training. Unfortunately, many trainees didn't visit demonstration plots (46%) and demonstration on the repair of earthen wells (41%) as established by IDF under the project which emphasized the need to arrange such visits for all.

Miking by IDF at the time of spawning season has been considered effective as a tool for mass awareness by almost all of them (95%) and the message through miking reached a handsome 97% of them. Only 33% of the egg collectors received leaflets provided by IDF for creating awareness on the conservation of Halda and more than 90% of respondents know fry producer and hatchery users' training.

Among the respondents, only 7% reported receiving financial aid for the education of their children while all of them showed intent to receive such support for making their future generation less dependent on the river. This is an area that PKSF/IDF may consider making people more supportive of the conservation of Halda.

Table 8: Egg collectors' perception on project interventions by IDF

Project interventions by IDF	Perception (%)	
	Yes	No
Watched a video documentary during training	36	64
Visited IDF's demo plot	54	46
Activities taken by IDF for visiting demo plot on repairing old earthen well	59	41
Familiar with miking by IDF	97	3
Miking is effective for awareness creation	95	5
Received aid from the project for the education of children	7	93
Aid needed in the future	100	0
Received leaflet distributed by IDF for awareness creation	33	67
Knowledge on fry producer and hatchery users' training	91	9

5.3.1.12 Suggestions from egg collectors

5.3.1.12.1 Regarding egg collection

More than half of the respondents (56%) considered banning illegal fishing and above one-third of them (34.48%) cogitated stopping industrial wastewater dumping as critical to the overall yield of eggs (Fig.25). One-fifth of the respondents (20%) backed support from local governments in times of patrolling and other initiatives as a means to increase the egg quantity. Interestingly, only 12% of them blamed salinity for lower egg yield.

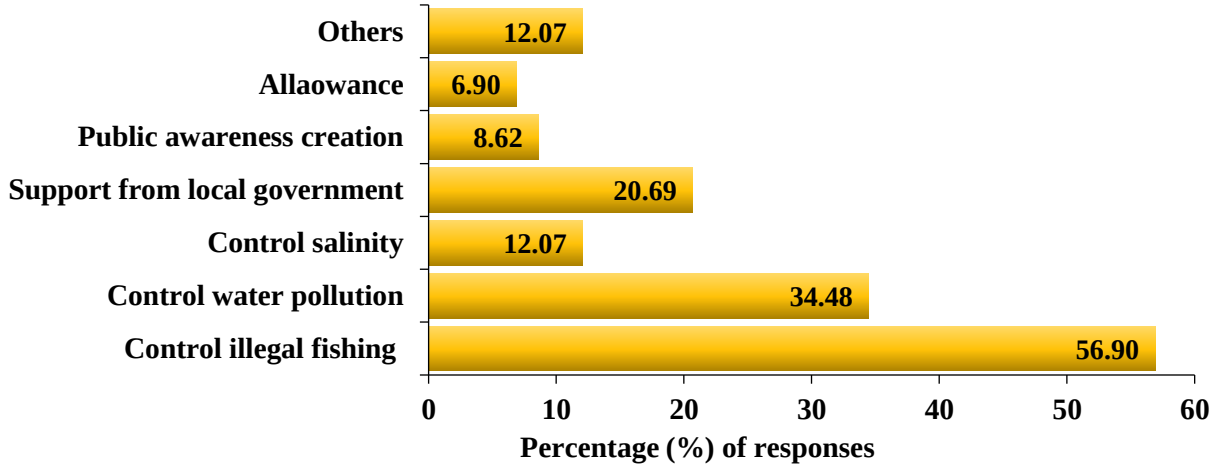


Figure 25: Suggestions from egg collector regarding egg collection

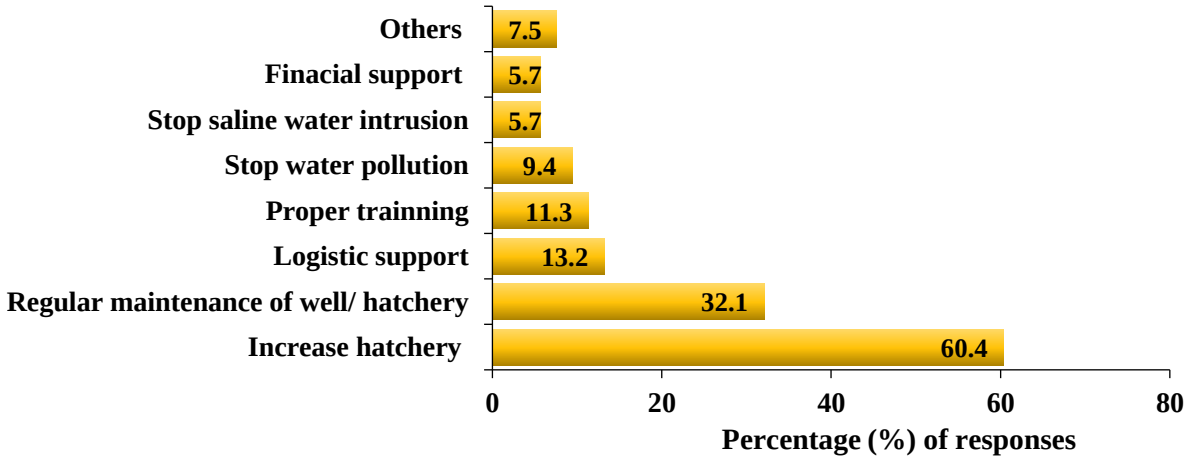


Figure 26: Suggestions regarding egg to fry production

5.3.1.12.2 Regarding egg to fry production

As shown in figure 26, 60% of the respondents expressed the need to increase the number of hatcheries and improvement of facilities while one-third of them (32%) considered regular maintenance of facilities are the key to get more yield. On contrary, less emphasis was given on arrangements of proper logistics at the right moment (13%), proper training (11%), wastewater regulation (10%) as important factors to increase fry production which contradicted earlier findings to some extent.

5.3.2 Egg-to-fry producers in hatcheries

IDF organized training on the modern egg to fry production technique for fry-producers and hatchery management for hatchery owners. Almost 500 egg-to-fry producers in 20 batches (25 trainees per batch) received two-day long training on this issue up to November 2020. Among the training recipients, only 18 could be reached during the field survey and over-the-phone interviews.

5.3.2.1 Egg collector, fry and fingerling producers involved at Halda

According to the respondents' opinion at present approximately 1650 egg collectors, 1100 fry producers and 450 fingerling producers are involved at Halda (Fig. 27) while IDF trained 2000 egg collectors and 500 egg-to-fry producers as per the project document. This indicates either the lack of awareness of the associated people or the inclusion of non-stakeholders in the training by IDF.

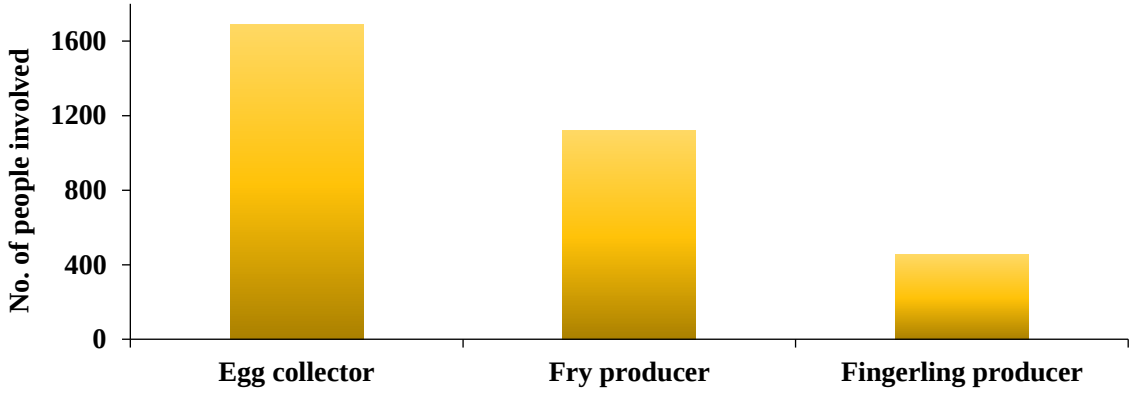


Figure 27: Average number of egg collector, fry and fingerling producers involved at Halda

5.3.2.2 Problem faced in egg to fry production in the traditional method

Respondents engaged in egg-to-fry production and hatchery management, mainly follow traditional methods. However, as evident from figure 28 they were facing many problems such as fry damage (56%), water quality (22%) and lack of accessories (11%). Many of them mentioned that they are not facing any problems. Worrisome is the reported high loss of fish fries by the conventional methods which arrested the need to research innovation in this aspect.

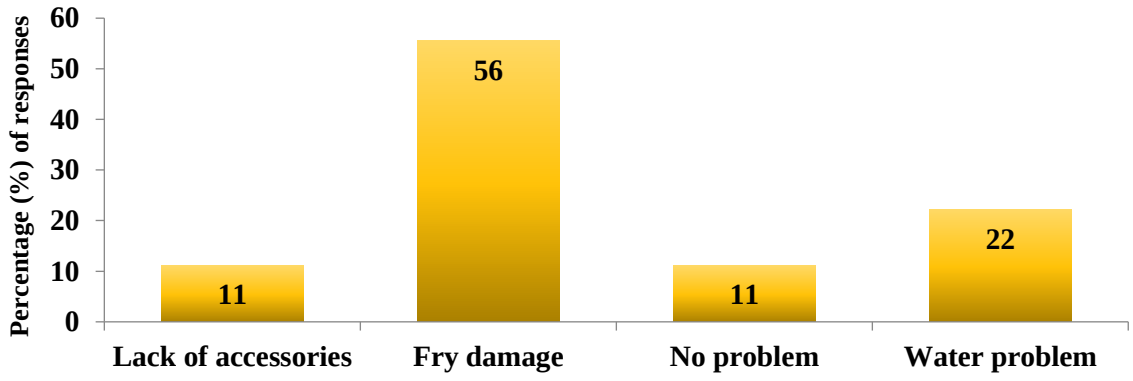


Figure 28: Problem faced in egg to fry production in the traditional method

5.3.2.3 Problem faced in egg to fry production in hatchery

Respondents who have used hatchery for the egg to fry production purposes, also faced some management problems such as water quality (39%), well problems (17%), a limited number of hatcheries (17%), fry death (22%), while 16% of them reported no problem (Fig. 29).

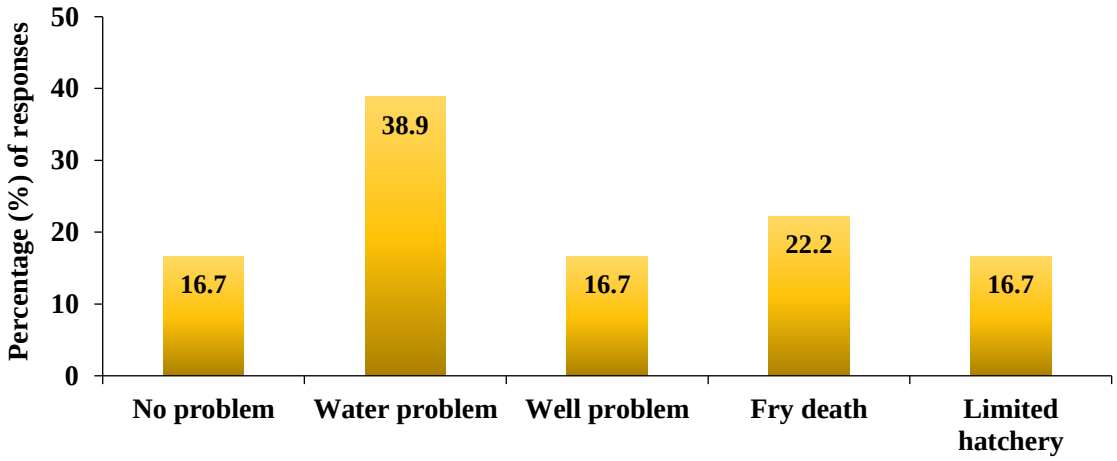


Figure 29: Problem faced in egg to fry production in hatchery

5.3.2.4 Training regarding modern egg to fry production technique in a hatchery

Among the respondents, about two-thirds (65%) have got training on the modern egg to fry production technique and hatchery management (Fig. 30 A) and among the training recipients, the majority (76%) noted that the training was beneficial for them (Fig. 30 B).

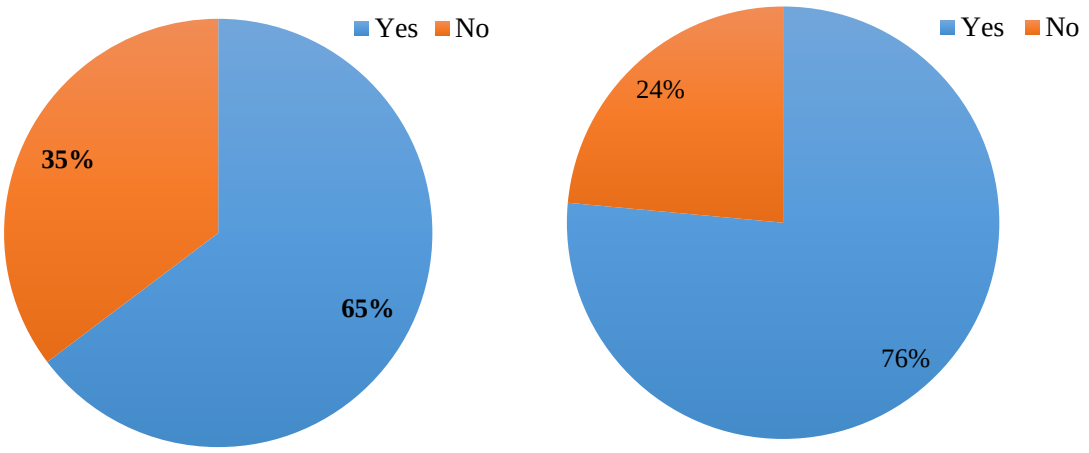


Figure 30: (A) Training on modern hatchery management (B) Benefitted from training

5.3.2.5 Post-training impact

5.3.2.5.1 Change in fry amount after training

More than half of the respondents (59%) opined that due to the training the egg-to-fry amount was increased (Fig. 31).

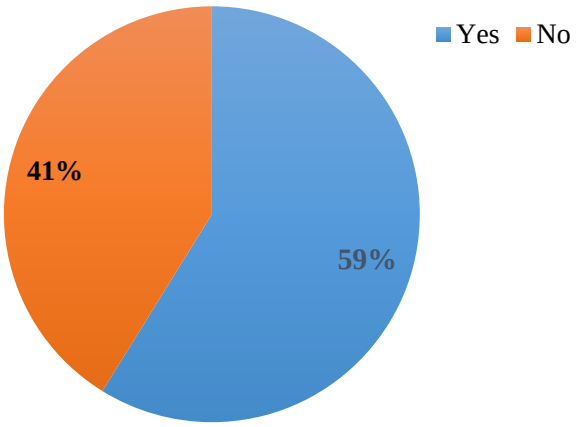


Figure 31: Change in fry amount after training

5.3.2.5.2 Change in income from egg

Based on respondents' opinions, yearly egg collection and egg to fry production per person involved were estimated to understand the trend and compare the consensus among different groups. This measure should not, by any means, be considered as the actual amount of eggs or fry yield from Halda. Figure 32 represents the yearly median amount of eggs collected and income as

per the respondents. The collection of eggs increased gradually from 2017 to 2020 and reached 170 kg in 2020. But the highest median income sharply reduced subsequently after reaching the peak of BDT 100000 in 2017 – an anomaly that should be further investigated.

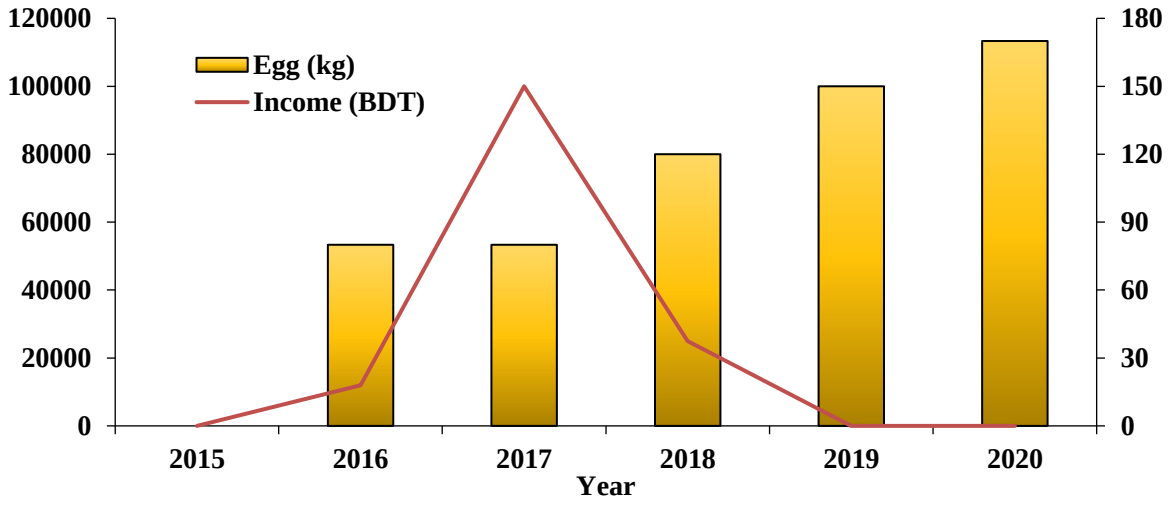


Figure 32: Median per capita annual egg collection (kg) and income (BDT)

5.3.2.5.3 Change in income from fry

Figure 33 represents the median per capita annual egg-to-fry production in kg and income in BDT. In line with the egg production fry production increased gradually from 2017 to 2019 which reached the maxima of 2.5 kg in 2019. Surprisingly, income maxima were BDT 120000 in 2017 that sharply decreased in succeeding years.

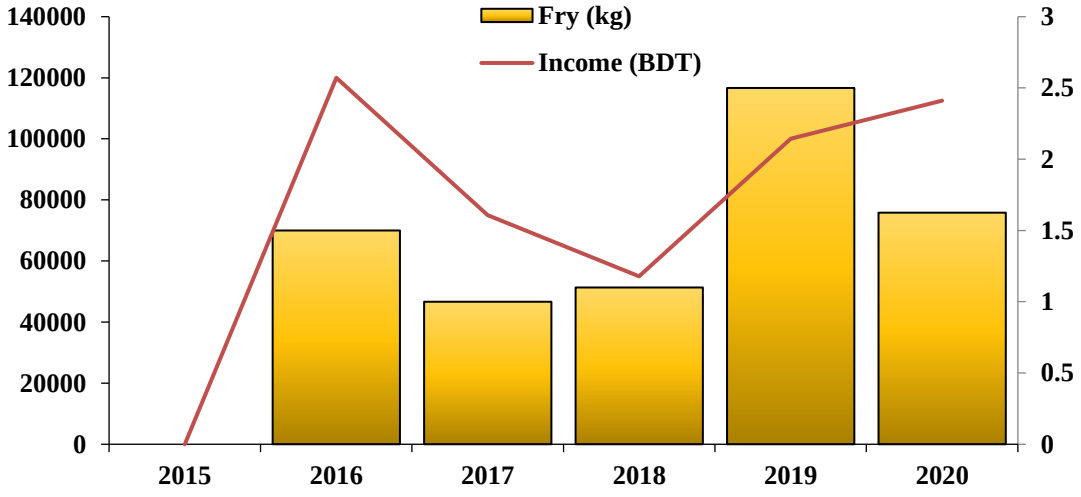


Figure 33: Median per capita annual egg-to-fry production (kg) and income (BDT)

5.3.2.6 Respondents' Comments on training on egg collection

5.3.2.6.1 Training documents

Among the training recipients, only 36% had received training-related documents (Fig.34).

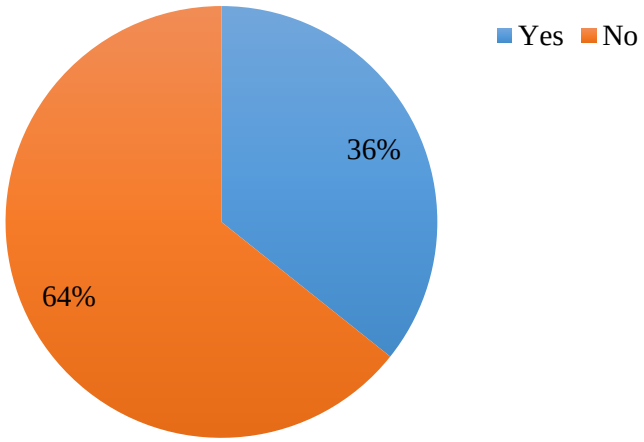
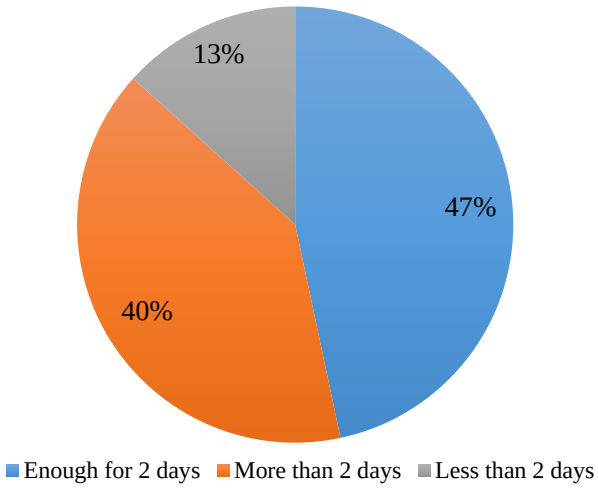


Figure 34: Received training related paper

5.3.2.6.2 Training duration and rating of trainer

Respondents' opinion on training duration and trainers as summarized in figures 35 A, B. Nearly half of them considered 2-days training as sufficient but a handsome 40% of them requested more than 2-days for training. A total of 28% of respondents rated their trainer on the egg to fry production and hatchery management 5 out of 5 and 50% rated 4.



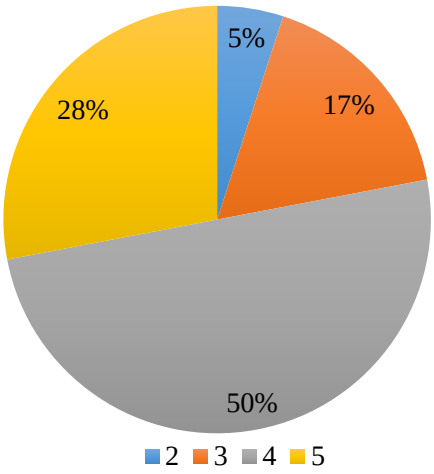


Figure 35: (A) Comments on training duration **(B) Rating of trainer**

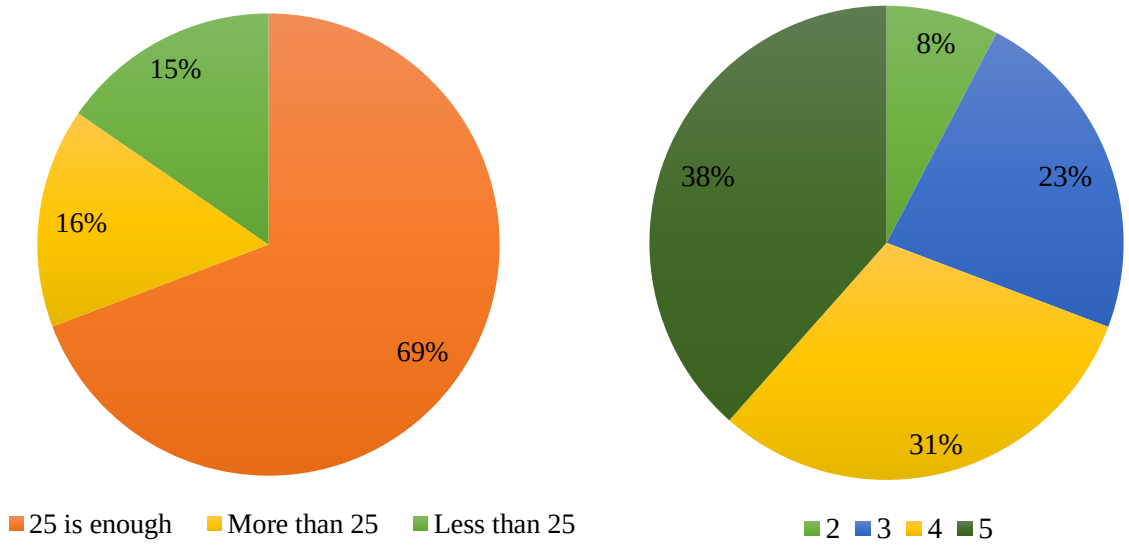


Figure 36: (A) Opinion for the maximum number of trainees (B) Rating on benefit gained

5.3.2.6.3 Maximum number of trainee

Most of the respondents (69%) considered 25 trainees per batch as perfect for the egg to fry production and hatchery management training (Fig. 36 A). Besides, the respondents were asked to rate benefits gained after training on the egg to fry production and hatchery management on the scale of 5 and more than two-thirds (69%) rated 4 and above ((Fig. 36 B).

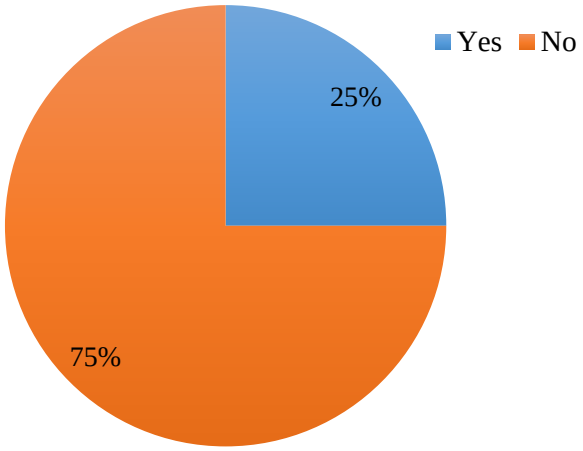


Figure 37: Attended refreshers' training

5.3.2.6.4 Refreshers' training

Only 25% of the respondents received refresher training on hatchery management and egg-to-fry production, which is low relative to expectation (Fig. 37). As refresher training are important to consolidate the lessons learned from any training, IDF may keep refresher training as a routine activity following up all training activities.

5.3.2.6.5 Perception on project interventions by IDF

Most of the respondents (76%) reported watching video documentaries during training on egg-to-fry production techniques while more than half (56%) of them visited the demonstration plot established by IDF (Table 9). However, the leaflets IDF distributed for mass motivation and awareness creation didn't reach more than half of them (56%). IDF needs to find a more effective way to distribute leaflets based on the investigation of the efficacy of leaflets as a means to distribute information.

Table 9: Egg to fry producers' perception on project interventions by IDF

Project interventions by IDF	Perception (%)	
	Yes	No
Watched a video documentary during training	76	24
Visited demo plots established by IDF	56	44
Received leaflet distributed by IDF for awareness creation	44	56

5.3.3 Fisherman

Project activities included training for fishermen on carp farming techniques, and off-season alternative income-generating activities (AIGAs). Up to November 2020, a total of 200 fishermen in 8 batches (25 trainees per batch) received two-days long training. Among them, 31 fishermen were interviewed for this evaluation through field surveys and over-the-phone interviews.

5.3.3.1 Problems faced in the traditional method of fish farming

Almost all the respondents (97%) followed the traditional method for fish farming (Fig. 38) and almost half of them reported facing any problem with the traditional method. However, 23% of them reported poor fish production in the traditional method.

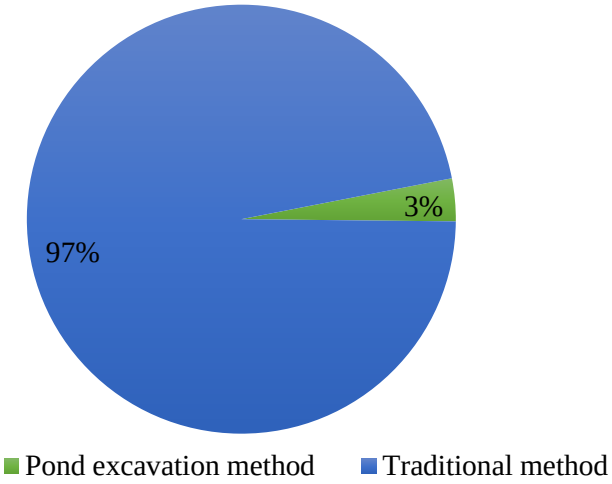


Figure 38; Previous method of fish farming

Additionally, 13% of them blamed flood water and loss of eggs several times for lower production in traditional methods while few of them faced issues like fish diseases (10%), water quality issues (10%), etc. (Fig. 39).

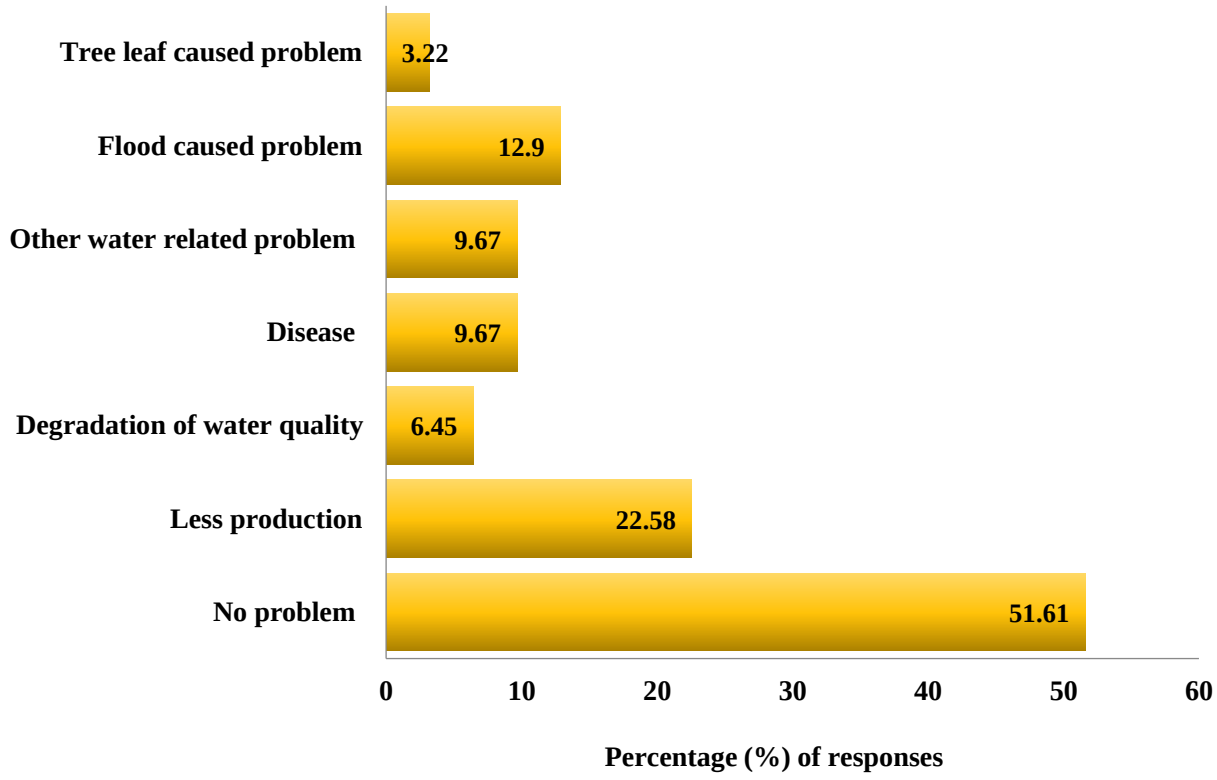


Figure 39: Problem faced in the previous method

5.3.3.2 Off season income

5.3.3.2.1 Income loss

About 81% of the respondents were not facing any loss in total income due to the fishing ban from March to June (off-season) as they are engaged in different economic activities (Fig. 40). Therefore, the small portion (19%) of respondents who face financial loss due to the fishing ban should be duly taken care of by giving them training and financial support to increase their resilience.

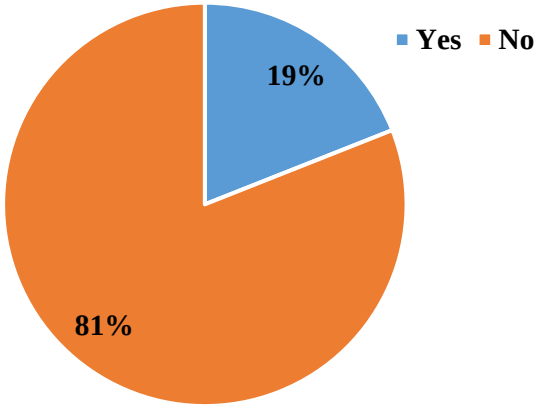


Figure 40: Fishermen's income loss in the off season

5.3.3.2.2 Sources of off-season income

The majority of the respondents (50%) were engaged in farming during the off-season (Fig. 41). The remaining respondents showed several sources of income including fish trade, fry business, grocery shop, working as a boatman, assisting in village patrolling, electrician, etc.

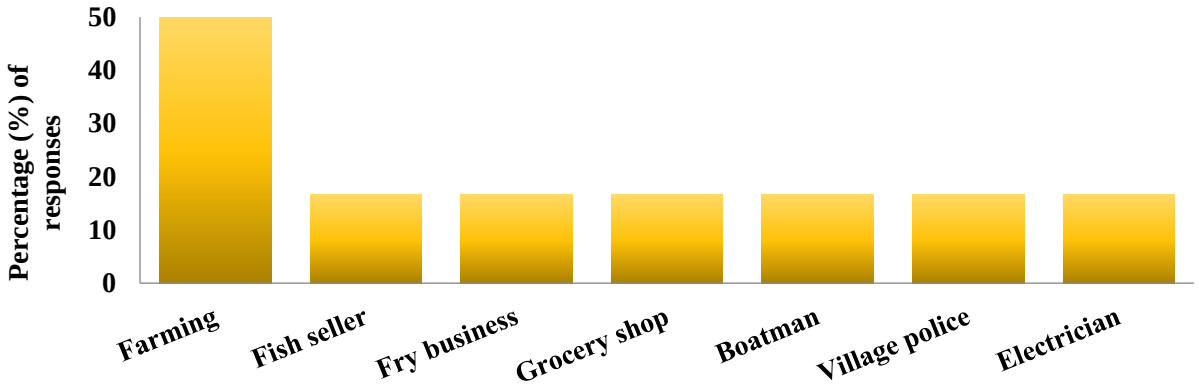


Figure 41: Fishermen's source of income during the off season

5.3.3.3 Training of the fishermen from the project

Among the surveyed respondents, 87% got training on carp culture methods (Fig. 42) - the majority (96%) theoretical, and few (3.7%) practical training with 56% receiving training documents.

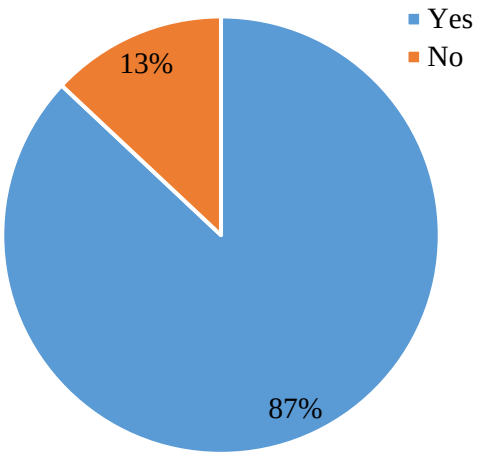


Figure 42: Fishermen received IDF's training

5.3.3.3.1 Opinion on training duration and number of trainees

Most of the respondents (55%) preferred the 2-days training schedule as they remain busy during the daytime while a significant portion of them (41%) requested longer (Fig. 43) which needs to be paid heed to in future training designs. Besides, the majority of them (86%) considered 25 as the maximum number of trainees in a training session to ensure a better outcome (Fig. 44).

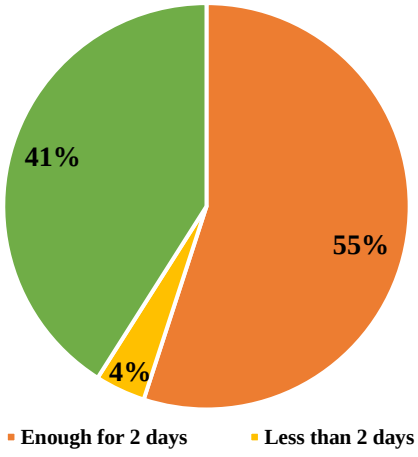


Figure 43: Opinion on training duration

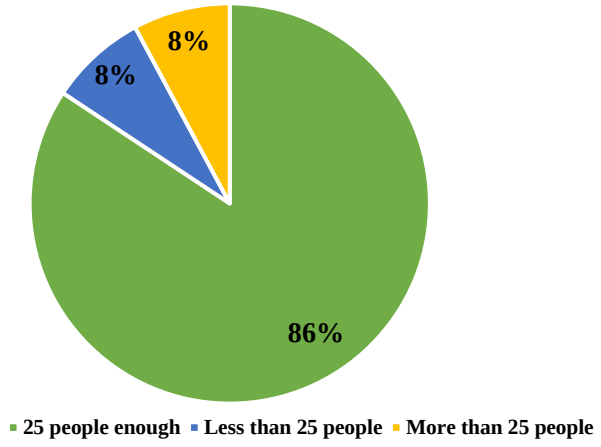


Figure 44: Opinion for maximum trainee

5.3.3.3.2 Rating on benefit and trainer

Among training recipients, almost 70% found the training beneficial and rated the training 4 and above on a scale of 5. Similarly, they have been satisfied with the trainer selection as evident from the 4 and above rating for trainers by 85% of them (Fig. 45 and Fig. 46).

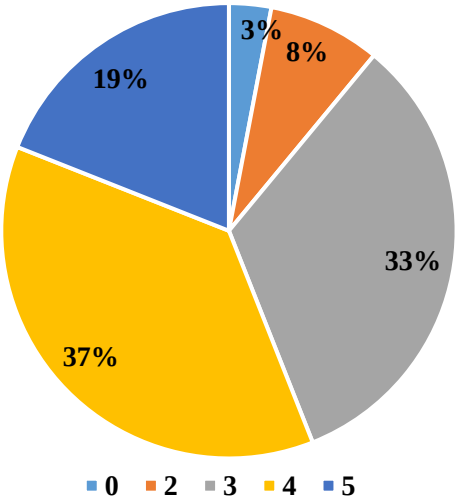


Figure 45: Rating on benefit gained

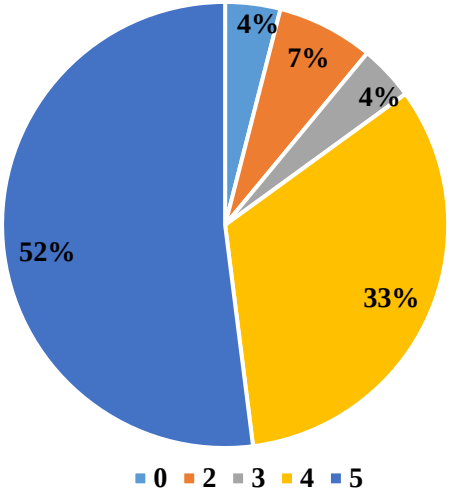


Figure 46: Rating of trainer

5.3.3.4 Post-training impact

5.3.3.4.1 The previous problem solved

More than half of the trainees (55%) reported that their problems were not solved after training which indicated the need to curate the training content more cautiously (Fig. 47).

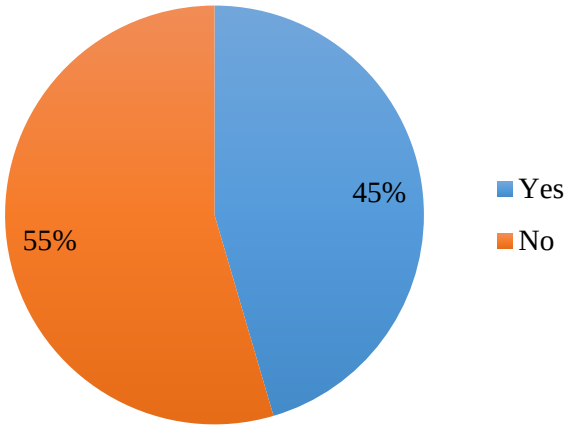


Figure 47: Fishermen's previous problem solvedChanges in fish production and income

Figure 48 represents changes in production and related income per hectare as reported by the fishermen for the last six years. The median income was above 4,50,000 BDT in 2018 which decreased slightly below 4,00,000 per hectare in 2020 (Fig. 48). Fish production was the lowest in 2017 (about 320 kg) which crossed 2000 kg in 2020. Overall, after training, both production and income have increased but some fluctuations may be linked to market price.

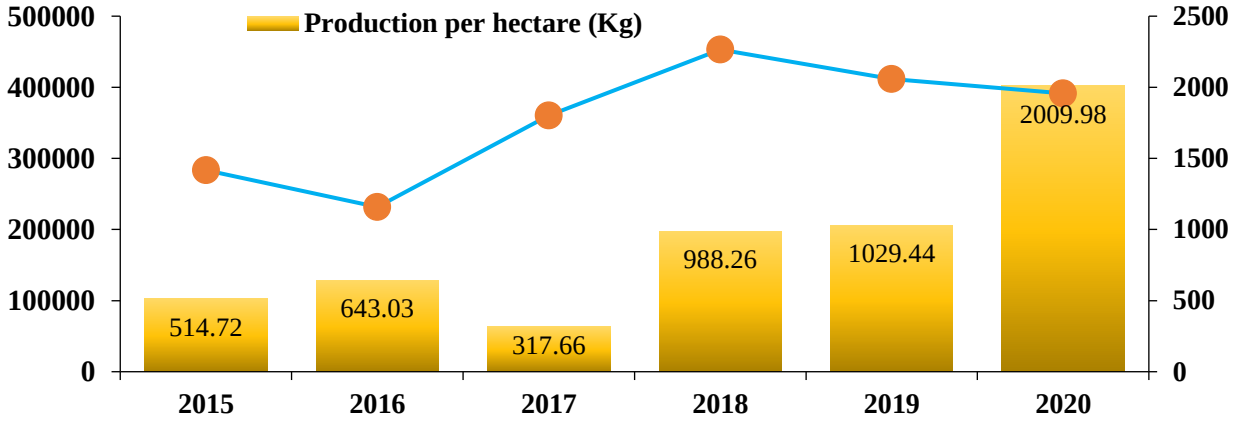


Figure 48: Year-wise change in fish production and income per hectare

5.3.3.5 Workshop for communication with fish farming material providers

Less than half (41%) of the respondent trainees attended workshops with fish farming materials providers. Almost a third of them (31%) considered the workshop meaningless while 23% of them thanked it for raising their awareness and knowledge on fish farming (Fig. 49).

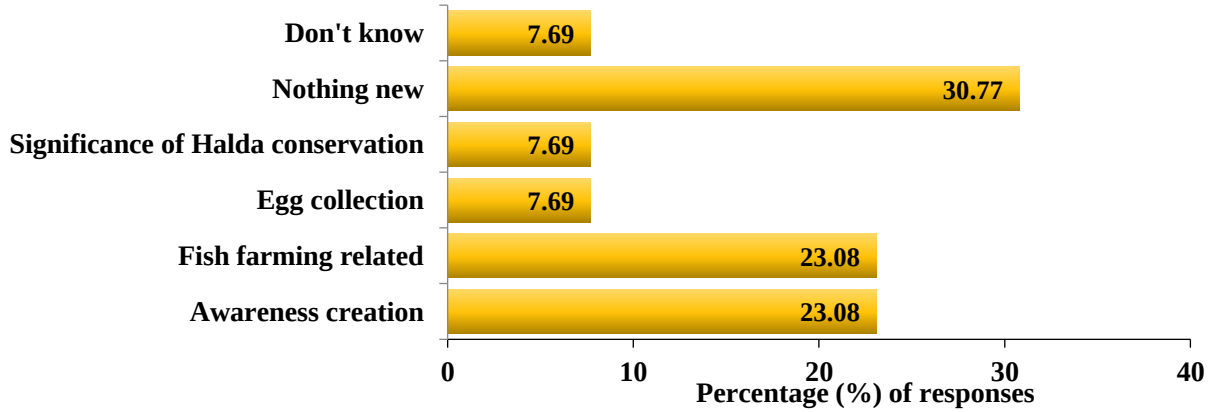


Figure 49: Knowledge gained from the workshop

5.3.3.6 Perception on project interventions by IDF

Among the fishermen respondents, 74% didn't watch a video documentary by IDF on modern fish farming technology while 96% of them considered it an effective tool for training (Table 10). Again, 61% of them didn't receive leaflets distributed by IDF while 97% of them heard miking by IDF. Only 7% of them received support for the education of their children while all of them expected to get such support. Most of the respondents (90%) have agreed that they know about fry producers and hatchery users training arranged by IDF. Moreover, 93% of trainees stated that the AIGA training to reduce financial loss during the off-season was not useful at all for them.

Table 10: Fishermen's perception on project interventions by IDF

Project interventions by IDF	Perception (%)	
	Yes	No
Watched a video documentary during training	26	74
Video usefulness	96	4
Received leaflet distributed by IDF for awareness creation	39	61
Familiar with miking by IDF	97	3
Received aid for child education	7	93
Need aiding for child education	100	--
Training arranged for well user and other fishermen	100	--
Know about fry producer and hatchery users training by IDF	90	7
Off-season activities training usefulness	7	93

5.3.3.7 Perception on illegal fishing

All the respondents stated that they know about illegal fishing activities in the Halda River and stated their opinion regarding the negative effects of illegal fishing (Table 11). Illegal fishing has been blamed by 55% for the death of brood fish, 48% for a decrease in the amount of eggs.

Table 11: Perception on the negative impact of illegal fishing

Negative impact	**Percentage (%) of responses**
Death of brood fish	55
Decrease in egg quantity	48
National loss	6

5.3.3.8 Expectations from training

Those who did not benefit from training expressed their expectations not fulfilled from training. More than half of them (55%) asked for a training allowance (Fig. 50). Almost 21% expressed that besides training, financial support including loans, grants may be given for native fishermen only to buy necessary appliances. Around 7% of trainees emphasized job creation, more effective training and logistic support. Besides, all the respondents have agreed to this point that such training is required in the future upon fulfillment of their expectations.

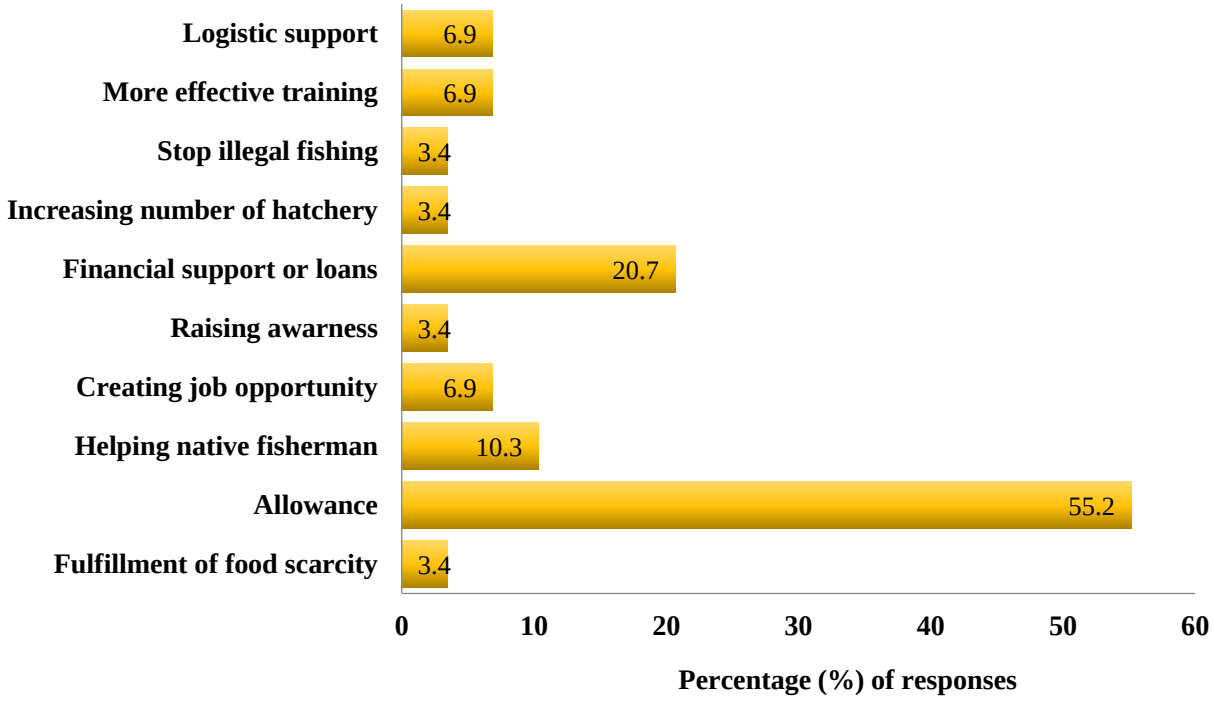


Figure 50: Expectation from training

5.3.4 Farmer

There was a training program for farmers from the project on the use of pheromone traps and bio-pesticides instead of using harmful insecticides to reduce the flow of such chemicals into Halda. Almost 1000 farmers in 45 batches (25 trainees per batch) received one-day training regarding this issue up to November 2020. Among them, only 14 could be reached during the field survey and interview over the phone.

5.3.4.1 Farming inputs

People living on the banks of Halda are engaged in agriculture for generations. In the old-time, farmers were dependent on cow dung and organic manure but with the advent of chemical fertilizers and pesticides due to the pressure to increase productivity per unit of land, in line with the trend in Bangladesh and elsewhere, the use of chemical fertilizer and insecticides increased in the farmland within the Halda watershed. It is evident from figure 51 based on responses from the farmers in areas adjoining to Halda that about 46.60% of them used fertilizer, 16.7% were muck and insecticides and 6.7% of the farmers were using cow-dung and black and white fertilizer while another 3.33% were using red potash and pesticides, respectively.

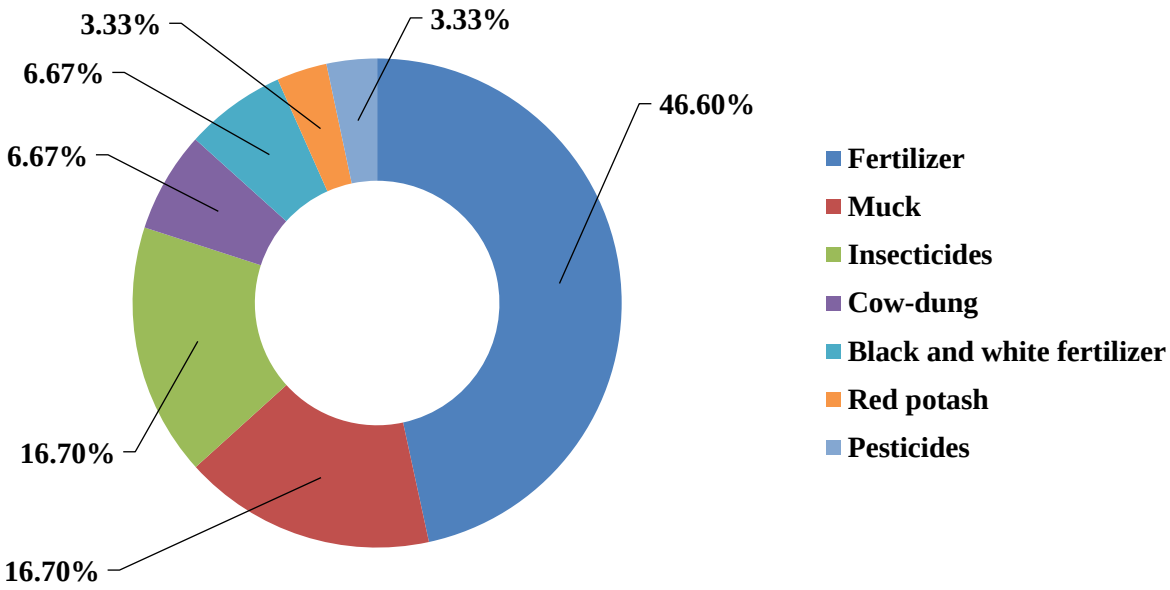


Figure 51: The previous method applied for farming

5.3.4.2 Problem faced in traditional farming method

Nearly half of the farmers (45%) reported facing insect attacks and accordingly they use pesticides to control them (Fig. 52). Among them 15% blamed floods for damaging their crops each year, 20% mentioned pest attack and red leaf disease as other problems. As a result of lack of records, data gaps were found for calculating the amount of insecticides, pesticides and fertilizer used in the Halda watershed as well as the production and income data of crops per hectare.

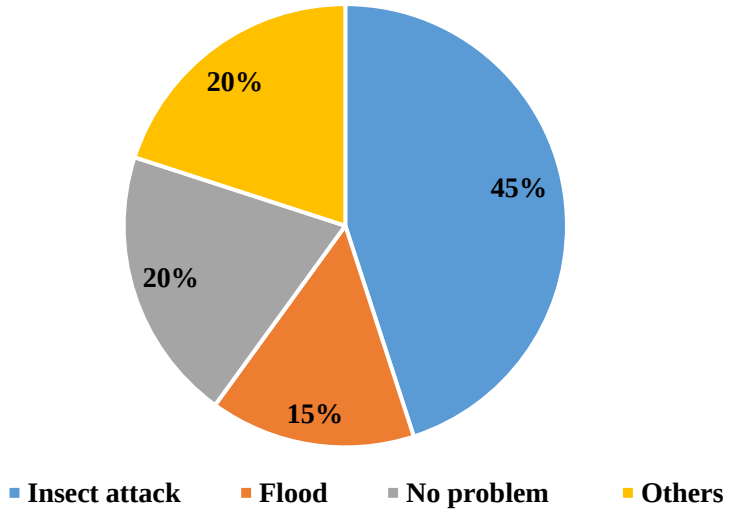


Figure 52: Problem faced by farmers in cultivation

5.3.4.3 Training on using pheromone trap and biopesticides and training method

About 86% of the surveyed farmers received training from the project on using pheromone traps & biopesticides and the rest 14% did not receive any training about it. Most of the respondents (about 70%) received training on a pen & paper basis and the rest 30% got both practical and pen & paper-based training (Fig. 53).

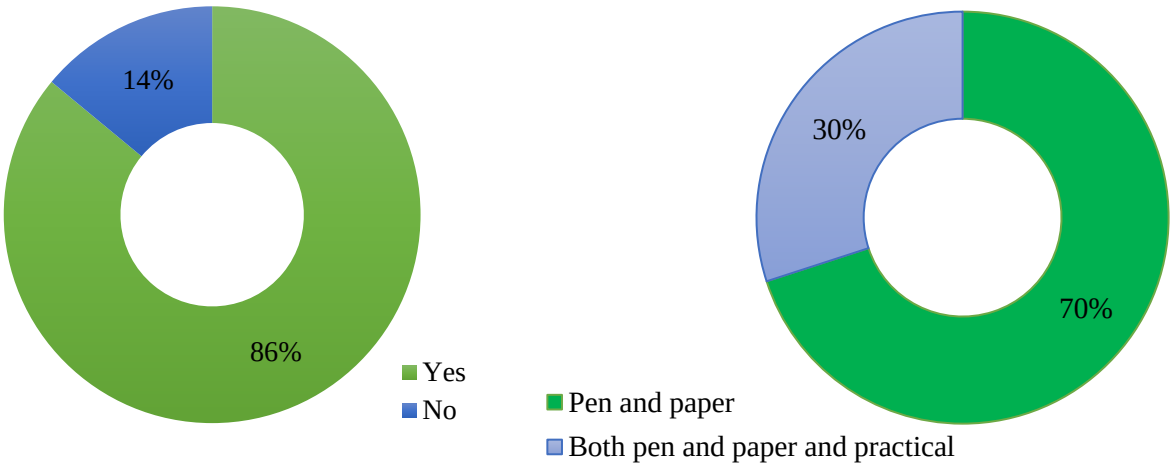


Figure 53: Training on using pheromone trap and biopesticides and training method

5.3.4.3.1 Rating on benefit and trainer

Participants who received training, none of them rated the training 5 while 50% rated it 4 in a scale of 5. The overall indication is to design future training for farmers should be taken more seriously. Among the trainees who rated the trainers, 89% rated them 4 or above on the scale of 5 which indicated satisfaction with the trainers (Fig. 54).

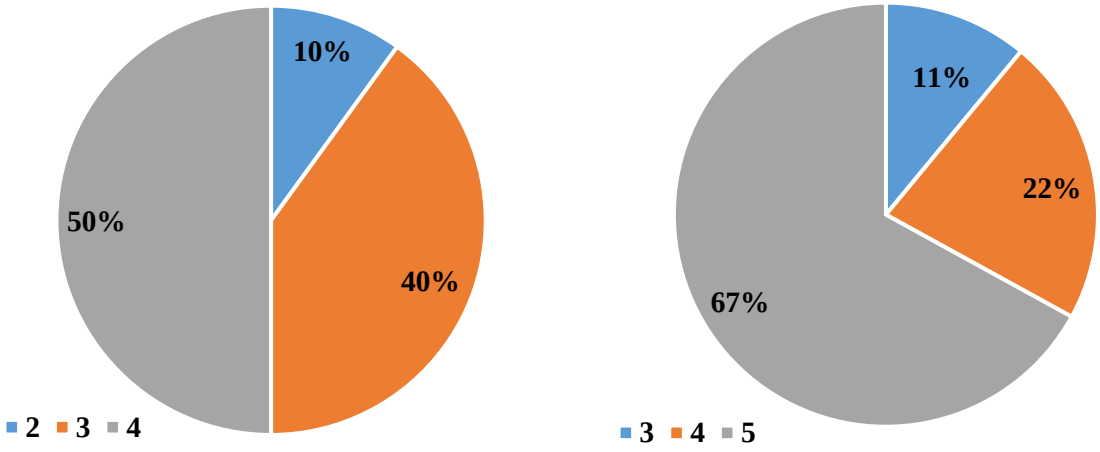


Figure 54: (A) Rating on benefit gained from training (B) Rating of trainer

5.3.4.3.2 Opinion on training duration and number of trainees

The majority (63%) requested longer training than one day while they agreed (82%) on the maximum trainee number should at 25 (Fig. 55).

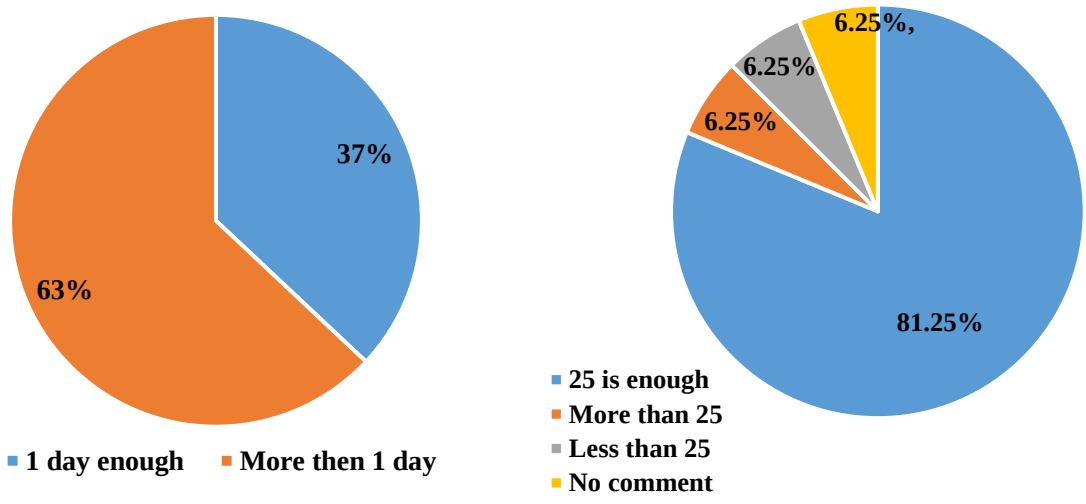


Figure 55: Opinion on training duration and maximum number of trainees

5.3.4.4 Post-training impact

5.3.4.4.1 Problem solved after training

Half of the farmers (50%) considered training from the project by IDF as ineffective to solve their problems, 33% found it effective and 17% refrained from commenting on the matter (Fig. 56).

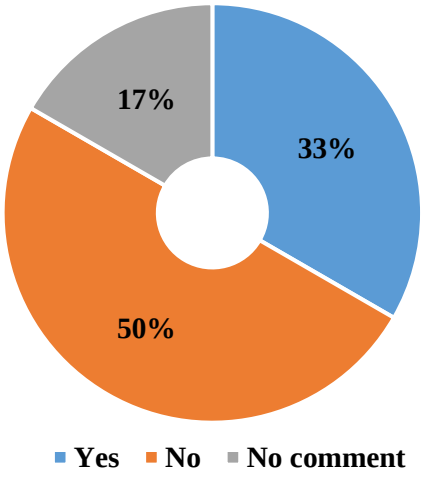


Figure 56: Problem solved after training

5.3.4.4.2 Changes in production and using insecticides and bio-pesticides

The majority (58%) of the farmers reported no change in production after receiving the training while 34% of the farmers reported a reduction in the amount of insecticides use (Fig. 57). Surprisingly, 58% did not agree on this issue which means further awareness building is essential.

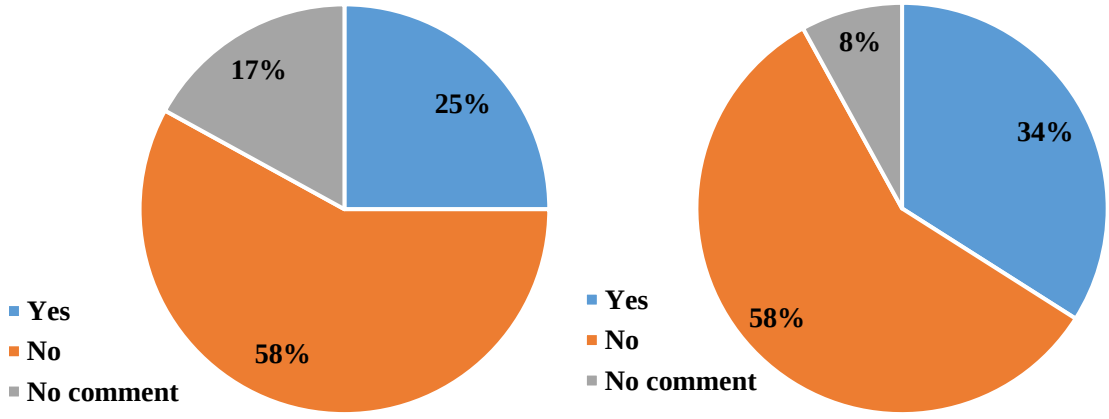


Figure 57: Changes in production and using insecticides and biopesticides after training

5.3.4.4.3 Constraints in applying lessons from training

Half of (50%) the farmers indicated some limitations of training against 42% who considered the training comprehensive. However, 8% of the respondents had no comment on this issue. The limitations as mentioned by the farmers included lack of logistic support (57%), not providing organic pesticides after training (29%) and lack of manpower (14%) (Fig. 58).

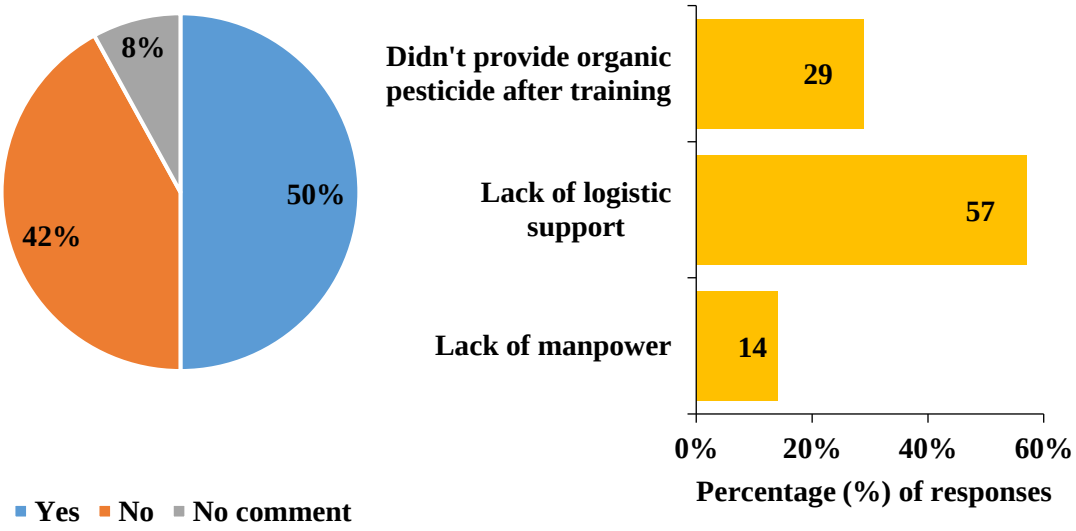


Figure 58: Percentage (%) of responses (Left) and types of limitations identified on constraints in applying training lessons (Right)

5.3.4.5 Perception on project interventions by IDF

Table 12 summarizes the perception of farmer groups on project activities. All of them mentioned that video documentaries would help understand the learning from training more effectively while 62.5% haven't seen any video documentary. Among them, 43.8% visited demo plots for pheromone trap and biopesticides and among them, 41.7% mentioned it as helpful compared to 58.3% who have not considered it helpful. Almost 94% of participants showed ignorance on vermicompost exhibition plots. Leaflets from IDF reached 62.5% of them and them, 90% found it helpful.

Table 12: Farmer's perception on project interventions by IDF

Project interventions by IDF	Perception (%)	
	Yes	No
Watched a video documentary during training	37.5	62.5
Visited demo plot on use of pheromone trap and biopesticide	43.8	56.2
Visiting the demo plot was helpful	41.7	58.3
Visited demo plot on the application of vermicompost	6.3	93.7
Received leaflet distributed by IDF for awareness creation	62.5	37.5
The received leaflet was useful	90	10

5.3.4.6 Suggestions from the farmer for solving limitations

Farmers made some suggestions to overcome the limitations of training provided from the project by IDF which included providing organic pesticide (33%), providing allowance and logistics (33%), providing loans for equipment (33%) to the farmers, etc. (Fig. 59)

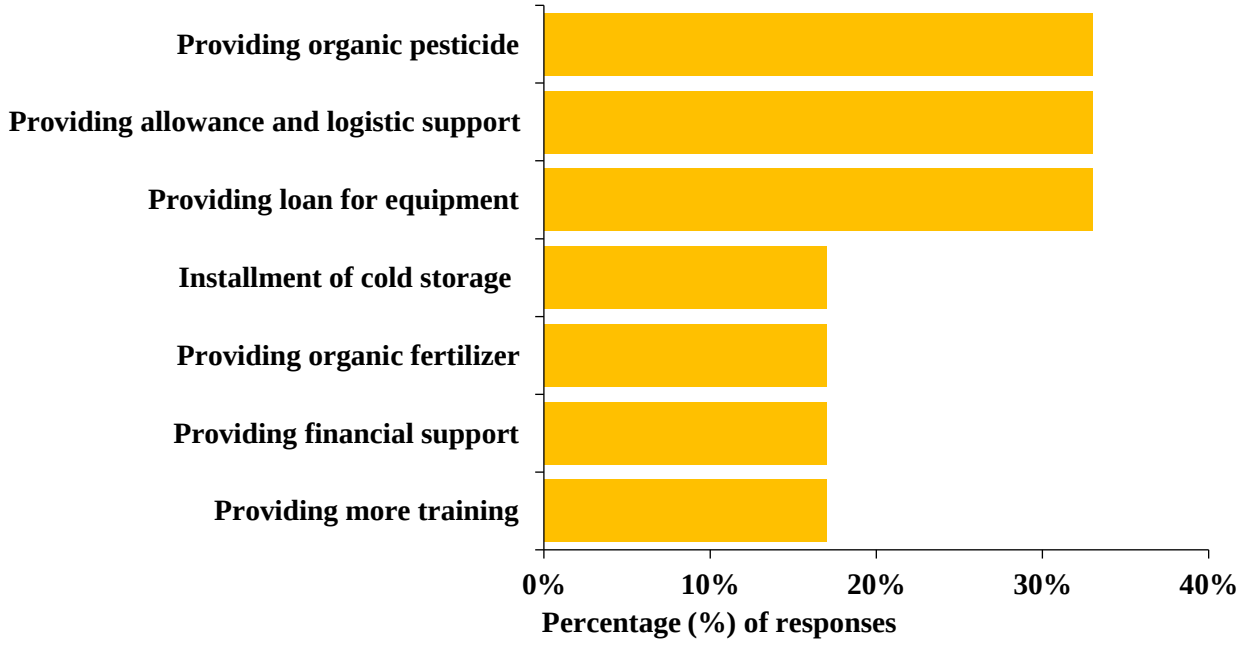


Figure 59: Suggestions from farmers for solving limitations

5.3.5 Boatmen

There was a one-day training from the project for boatmen by IDF on maintaining a fish-friendly environment and on fisheries law. Up to November 2020, 50 boatmen were trained in 2 batches (25 trainees per batch). Among them, 13 boatmen were reached through field survey and phone interview.

5.3.5.1 Boatmen's perception of Halda

5.3.5.1.1 Perception of Fish-friendly environment

The boatmen of Halda River were asked about what a fish-friendly environment meant to them, and their responses are summarized in figure 60. Around 47% of respondents indicated a fish-friendly environment as a place where large numbers of fish can move safely and easily without any interruption by fishing nets, fishing hooks and engine boats. Such places are recognized as 'kum' by local people. Another 39% of respondents also mentioned prohibiting fine-mesh nets as fishery-friendly environments. Besides, prohibiting engine boats (31%), good water depth (31%), banning illegal sand extraction (15%), noise-free environment (15%), stopping saltwater intrusion (8%), pollution-free water (8%) were the responses marked as characteristics of a fish-friendly environment. However, 23% of boatmen did not know about fishery-friendly environments. The level of awareness among the boatmen was satisfactory but it needs further enhancement.

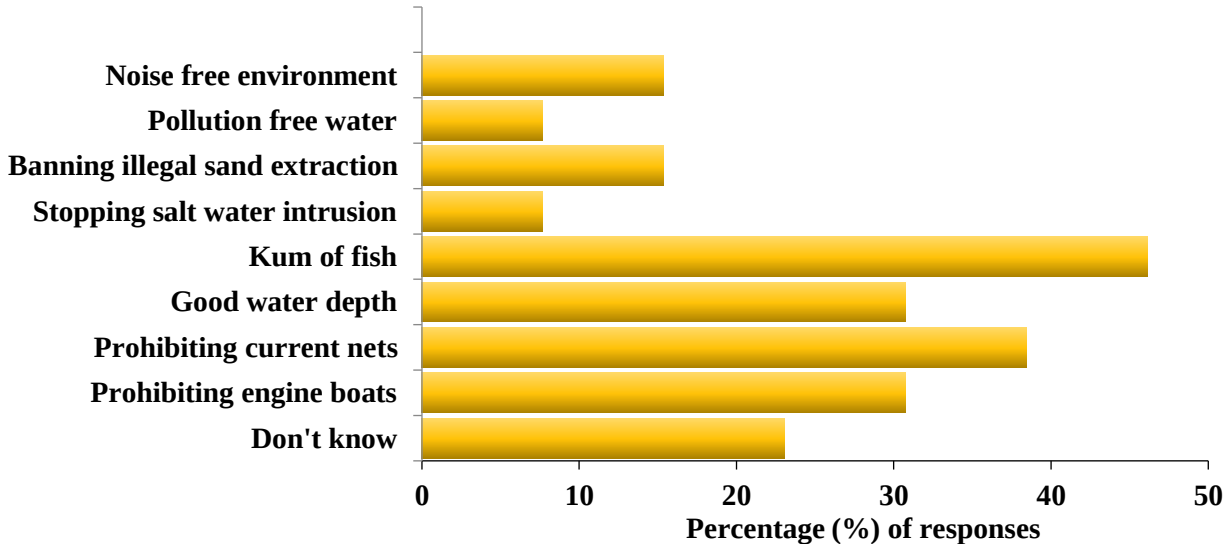


Figure 60: Opinion on the fish-friendly environment to boatmen

5.3.5.1.2 Perception on rules followed to ensure a fish-friendly environment

Boatmen who are engaged in boat navigation need to ensure that they follow some rules to maintain a fish-friendly environment according to the respondents which included not catching mother fishes (38%), stop riding engine boats (38%), avoiding kums during spawning season (23%), discourage others from doing illegal activities (8%), etc. (Fig. 61). Unfortunately, around 31% of the respondents didn't follow these rules indicating the need for more activities.

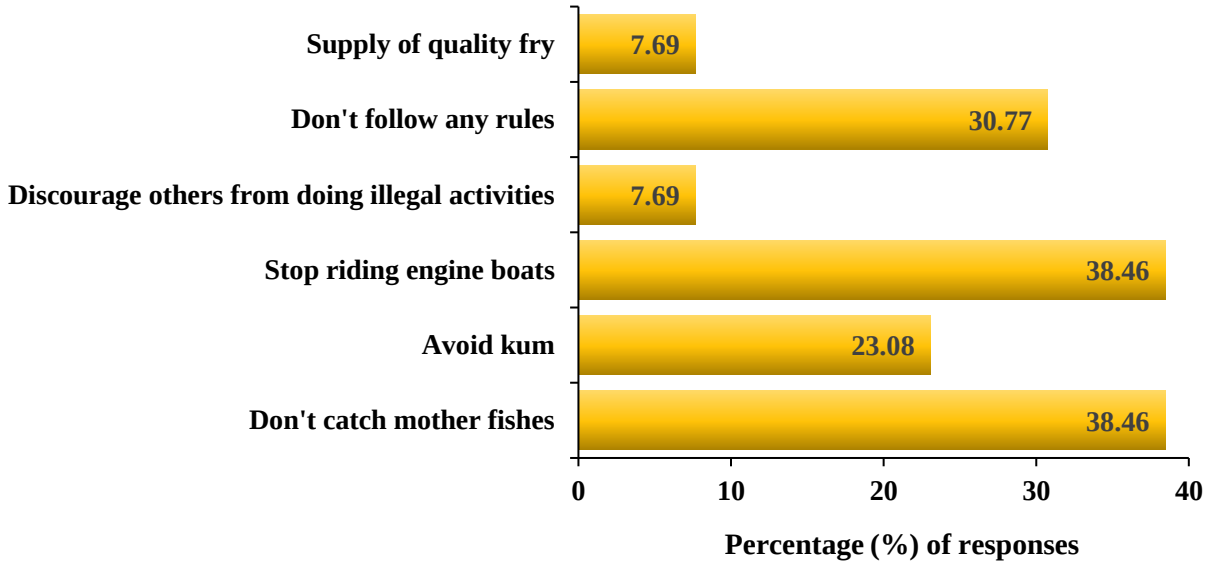


Figure 61: Rules followed by boatmen to ensure fishery friendly environment

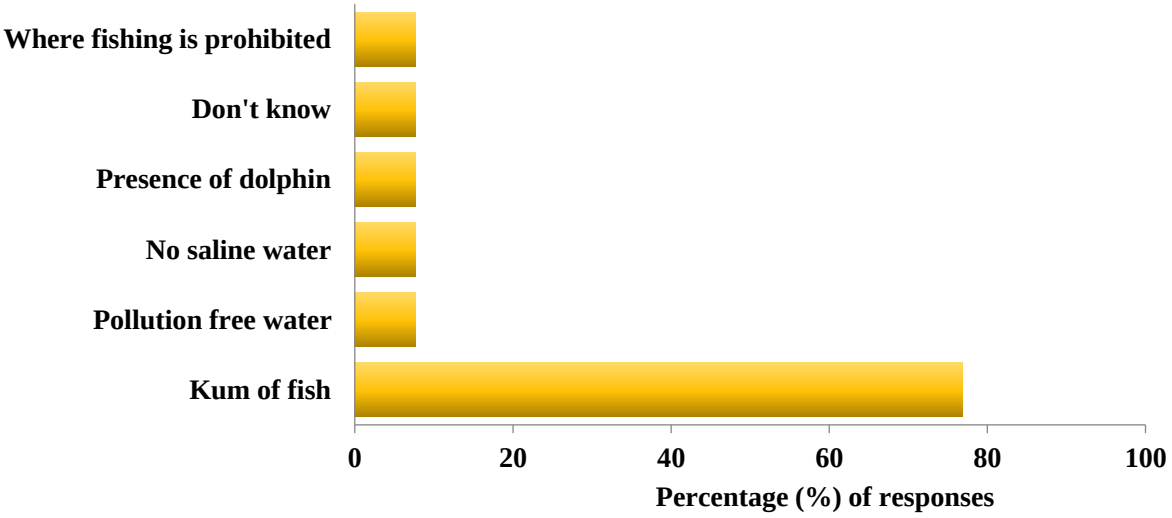


Figure 62: Boatmen's perception on fish sanctuary

5.3.5.1.3 Perception on fish sanctuary

As seen from figure 62, among all respondents, about 77% indicated 'kum of fish' like a fish sanctuary. They also included some more conditions such as pollution-free water, presence of dolphins, prohibited fishing zones, no saline water intrusion for sanctuary. The observation indicated the need for further awareness building on fish sanctuary among the boatmen.

5.3.5.1.4 Perception on rules followed to operate boats in a fish sanctuary

Among the boatmen interviewed, 23% stop riding engine boats and avoid fishing routes during spawning seasons (Fig. 63). Others responded that they avoid kum (15%), don't catch mother fish (8%), ride boats carefully (8%). Surprisingly, around 15% of them don't follow any rules.

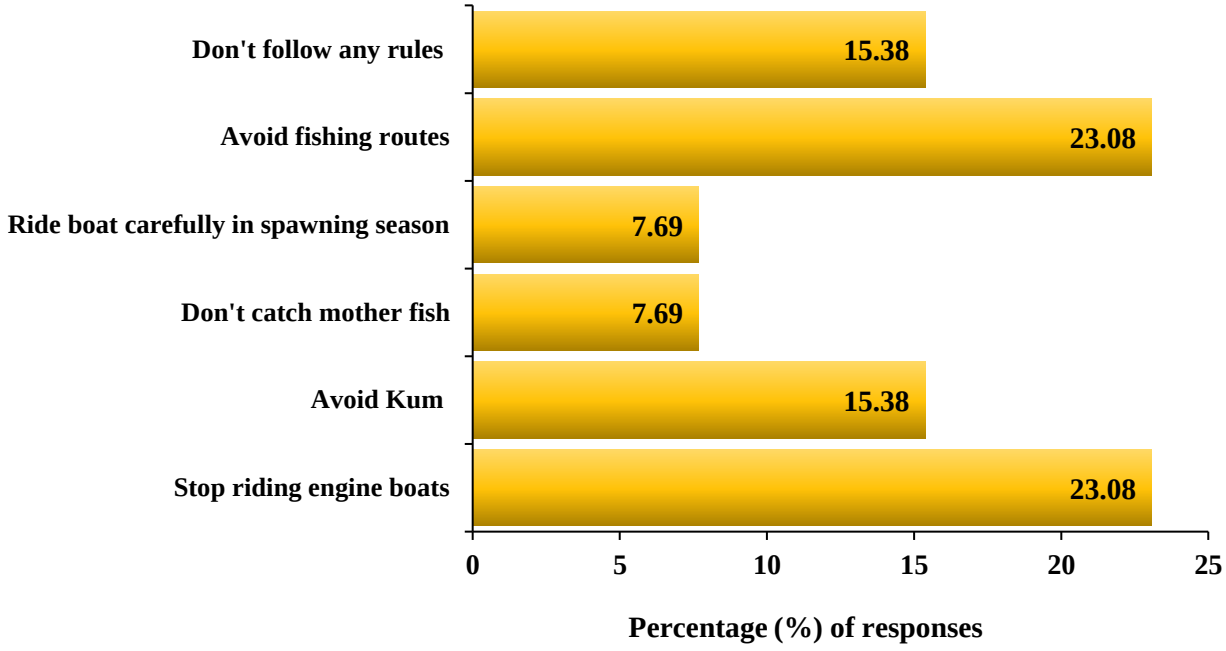


Figure 63: Rules followed by boatmen to ride boats in the sanctuary

5.3.5.1.5 Perception on sufferings due to law enforcement in future

As figure 64 shows, the majority of the respondents (62%) considered that the implementation of fisheries law is will not push them into suffering and the rest 38% are worried about economic loss (60), loss of employment (20%) and reduction in fish production (20%).

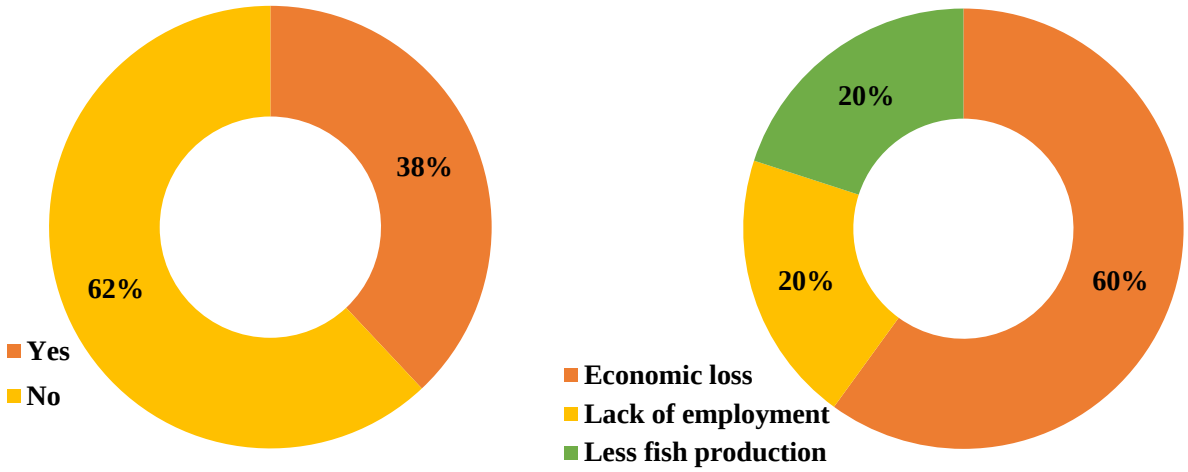


Figure 64: Perception of sufferings due to law enforcement in the future and types of sufferings

5.3.5.1.6 Perception on potential financial loss due to changes in boat navigation

Boatmen who envisaged suffering also recommended some solutions including financial support (75%), government aid and strict prohibition of illegal activities (16.7%), promotion of AIGA training (<10%) as shown in figure 65.

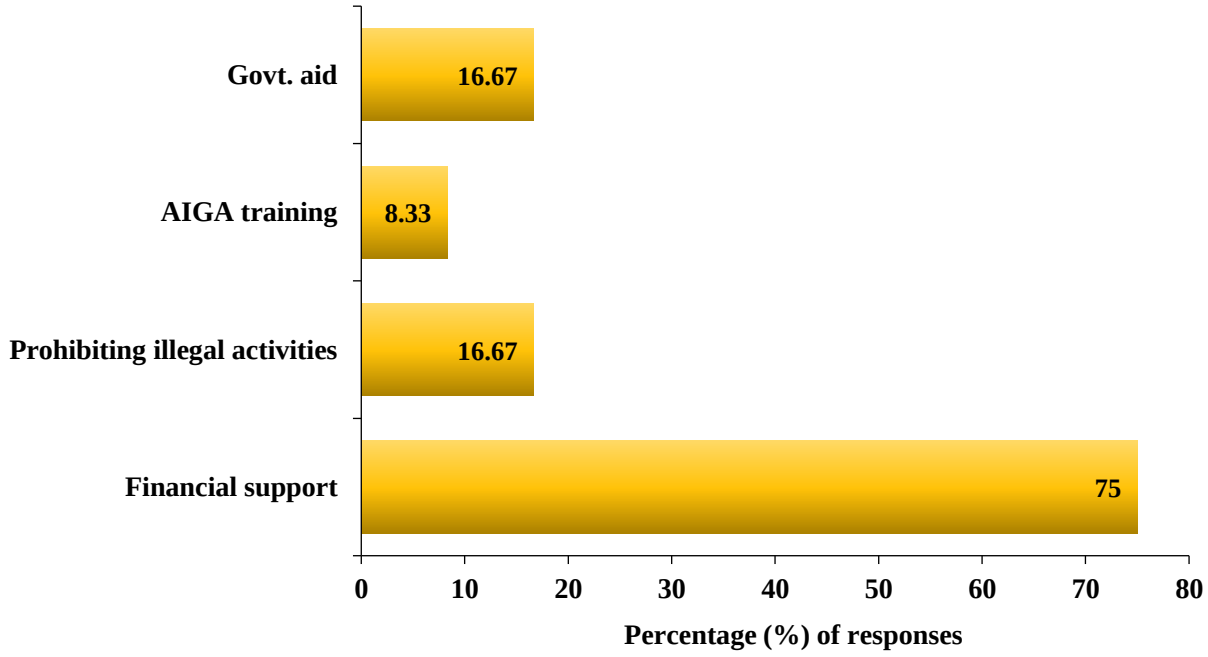


Figure 65: Steps to be taken to resolve the loss of boatman

5.3.5.2 Training for Boatmen from the project

5.3.5.2.1 Training on boat navigation and fish law and training method

Among the respondents, almost 54% of boatmen received training from the project regarding boat navigation and fishing law (Fig. 66). Those who got training mentioned that they have received theoretical training (85.71%) and some experienced both theoretical and practical (14.29%).

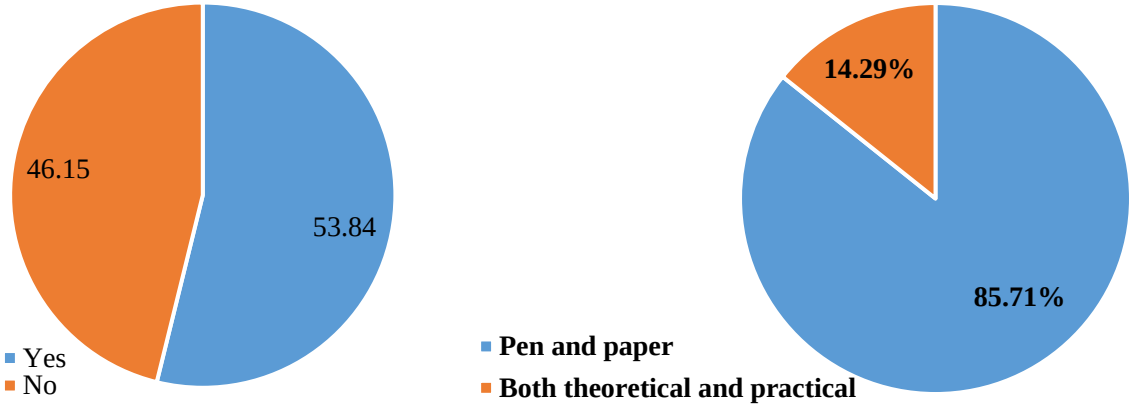


Figure 66: Boatmen received training and method of training

5.3.5.2.1.1 Rating on benefit gained and trainers performance

Respondents were asked to rate the efficacy of training and the trainers on a scale of 5. Only 15% and 23% give 5 out of 5 for the gained benefit and trainers' performance, respectively which indicated scope for improvement (Fig. 67).

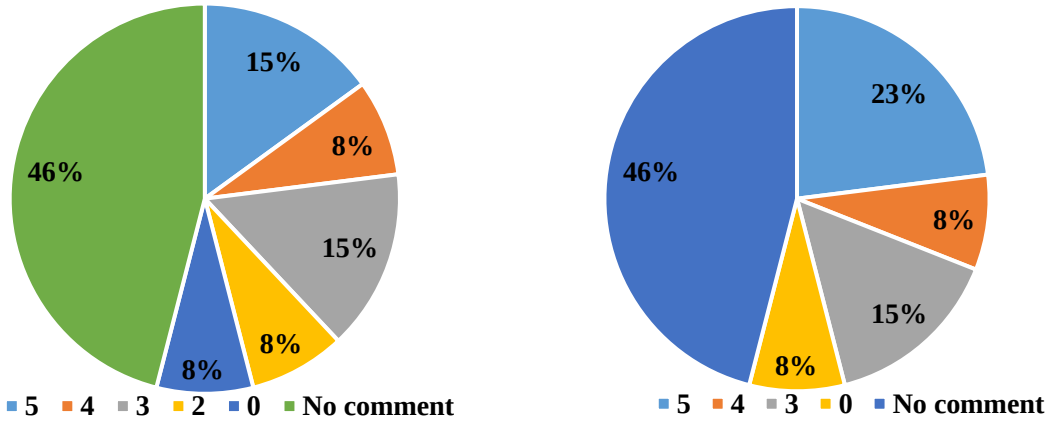


Figure 67: Rating on benefit gained from training and trainers' performance

5.3.5.2.1.2 Opinion on training duration and maximum trainee

Regarding training duration, 39% voted for more than one day, 15% agreed that one day while 46% responded that they have no idea or opinion about the duration (Fig. 68). On the other hand. Regarding the cohort size or the maximum number of trainees in a session 31% preferred 25 trainees, 15% voted for > 25 and 8% would like < 25 number of trainees as maximum.

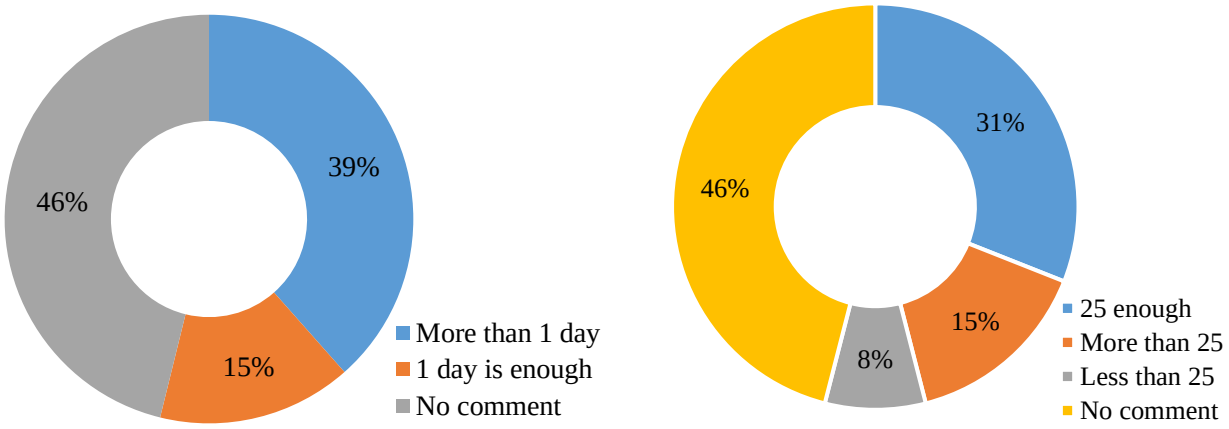


Figure 68: Boatmen's opinion on training duration and maximum number of trainees

5.3.5.3 Post-training impact

5.3.5.3.1 Changes of activities

Among 13 respondents, 54% mentioned changes to the business-as-usual because of navigation training while 15% replied negatively (Fig. 69). Changes they mentioned like before training they caught mother fish, rode engine boats randomly, involved with illegal sand extraction activities but after training sessions, they have changed their mind. According to the boatmen who mentioned positive changes, 75% of them rode engine boats during the spawning season and separately 12.5% were involved with catching mother fish and illegal sand extraction. But after receiving navigation training, 57.14% now started to avoid engine boats and 14.3% started riding hand boats and14.3% stopped catching mother fish.

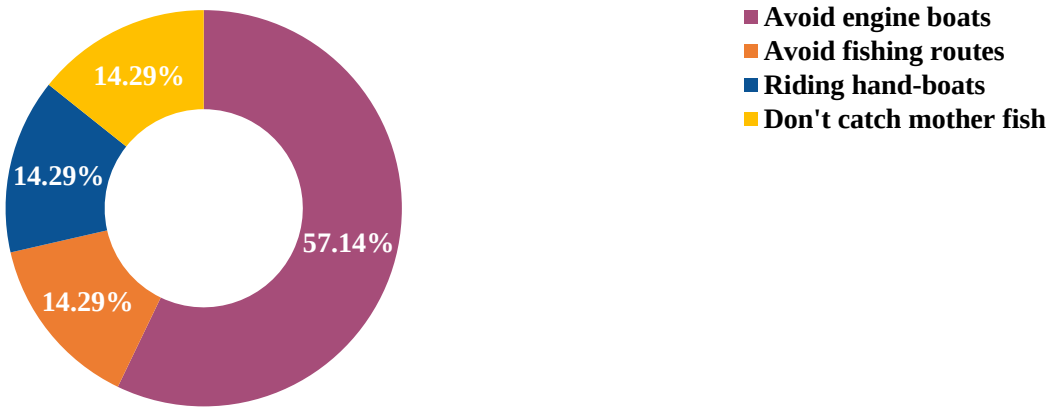


Figure 69: Changes in boatmen's activities after training

5.3.5.3.2 Knowledge on fisheries and awareness creation

Among all the respondents only 31% knew fisheries law before training whereas 46% gained knowledge about fisheries law after training and 23% of total respondents did not respond (Fig. 70). Besides, 23.1% of boatmen received leaflets provided by IDF regarding awareness creation but 30.8% did not get any leaflet. The rest of the respondents had no opinion on the leaflet issue (Fig. 70).

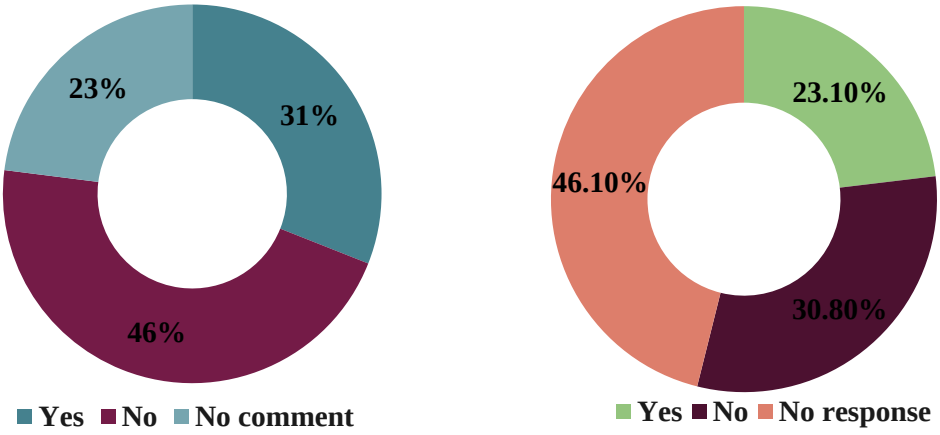


Figure 70: Boatman's knowledge on fisheries and awareness creation

5.3.5.3.3 Assistance in law enforcement

Regarding their role in law implementation, 61.54% mentioned that they stopped riding engine boats while a few respondents (7.69%) mentioned that they are motivating others (Fig. 71).

Besides, the percentage of informing authorities about illegal activities and no more involvement in such activities were 46.15% and 15.38% respectively.

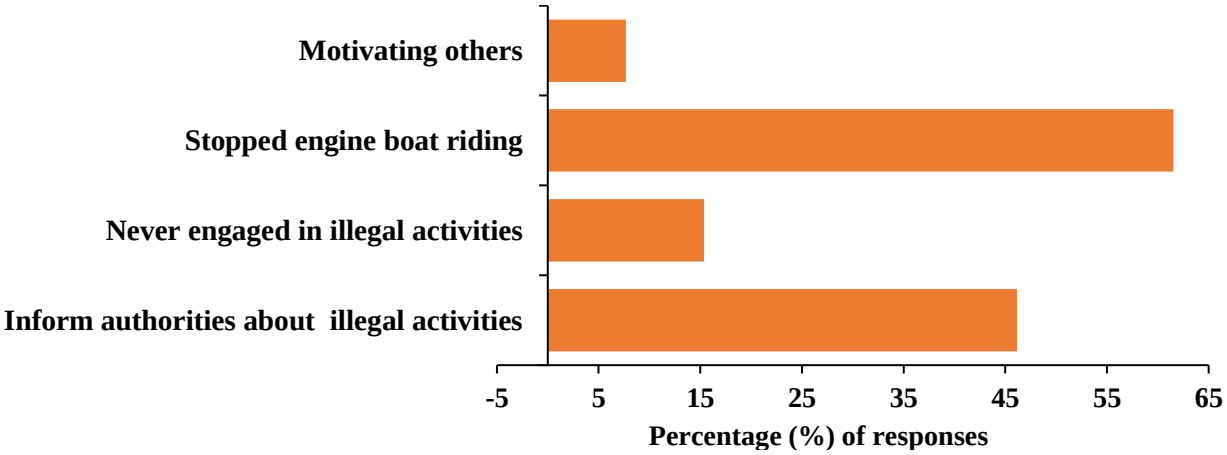


Figure 71: Ways of assistance in law enforcement

5.3.6 Hatchery Owner

Growing Halda brood stock in the hatchery was one of IDF's activities. Two private hatchery owners in Rajshahi (Plate 2) and Mymensingh and one govt. hatchery in Natore was involved with IDF in growing Halda brood stock of Rui, Katla and Mrigel fish up to 2020. Owners/managers of all the three hatcheries have been interviewed over the phone amidst this pandemic period.

5.3.6.1 Support from the project to maintain brood stock

Both private hatchery owners mentioned that they did not get any assistance from the project for growing Halda brood stock. On the other hand, the govt. hatchery received BDT 8 thousand as support from IDF to feed fish. All the hatchery owners have a lack of records regarding the amount of brood stock, amount of fry produced from brood stock and selling place. Besides, they couldn't give any definite observations on the advantages of using Halda's brood stock in comparison to general brood stock.

Plate 2: Snapshots of Monika Hatchery in Bagmara, Rajshahi (Source: Hatchery owner)

5.3.6.2 Problems faced and suggestions made by the hatchery owners

Hatchery owners indicated a low survival rate of broods due to inconvenient transportation systems and infection during carrying broods and mentioned the late maturity of broods. They also suggested some remedies such as a good transportation system, supply of freshwater and efficient training to reduce the infection rate.

5.3.6.3 Steps were taken to maintain the purity of brood stocks

They took the initiative to separate every species by tagging them to maintain the purity of brood stocks. The private hatchery owners informed that it would be wise to produce fry in govt. hatchery and supply brood stocks from there systematically and they also ask for some logistic support like tagging machine, marker, cutting rings so that the purity of the brood stock can be maintained.

5.3.6.4 Opinion on the contribution of brood stocks to conserve Halda

The hatchery owners seem to be very aware of the importance of Halda which was reflected in their comment when they mentioned that to get pure brood stock, people will be dependent on Halda and this makes it mandatory to conserve Halda and conserve its mother carps.

5.3.6.5 Plan and support needed

The hatchery owners were concerned about maintaining the purity and reduction of inbreeding of brood stock so that in the future people from all over the country may be interested in getting more brood stock from Halda. They need some support from both Government and actors like PKSF/IDF to implement these plans including a dependable transportation system, tagging machine to maintain purity and continuous financial and technical support.

5.3.7 Tobacco cultivators

Traditionally, much of the country's tobacco is grown in the northern region and the hills of the Bandarban region but farmers have started cultivating it as a cash crop at the upper watershed of Halda a few years back. According to a report of The Daily Star (2016), from 2013 the number of tobacco farmers has increased from none to 50 in Khagrachhari's Manikchhari Upazila, which lies within the sensitive Halda catchment. This posed a great threat to Halda as tobacco requires large amounts of fertilizers and pesticides and in the rainy season, the runoffs from tobacco fields fell into Halda carrying these fertilizers, pesticides as well as harmful chemicals from the decomposed tobacco plant. As the production of eggs suddenly reduced in 2016 almost to nothing compared to preceding years, it was natural to consider the negative effect of contaminated water from tobacco farming.

Considering all these, IDF included training the tobacco farmers to move them to alternative income generation as a core project activity to stop tobacco cultivation in the Halda valley. Almost 250 farmers received one-day training in 22 batches (25 trainees per batch) on different AIGA options in 2020 and 2021. There was a focus group discussion (FGD) in presence of 25 beneficiary tobacco farmers in Manikchhari Upazila and visits to their homestead and farmland to observe the AIGA activities for the evaluation of this activity.

Before tobacco farming, they were used to cultivate paddy, taro, potato, eggplant, etc. They started tobacco farming in 2008 and ended up in 2016 due to various reasons (Table 13). At first 48 families were involved in tobacco farming but now the number of families has decreased to 3-4 only.

Table 13: Reasons for starting and stopping tobacco cultivation

Reasons for starting tobacco farming	Reasons for ending up tobacco farming
Tobacco ensures a secure market of product	
It costs 15000-20000 BDT/40 decimal, selling price 65 thousand BDT	● Labor intensive job
The company provides the whole loan at a time and gives seed, plant, fertilizer, and pesticide	● Requires insects picking ● The tobacco curing process is dangerous and harmful to health ● Loss of land fertility
Get training from British American Tobacco (BAT) on tobacco cultivation	
Profit is almost 20-50 thousand BDT per Kani	● High-interest rate, loss of farmer ● Profit for ginger is 70-80 thousand BDT and 50-60 thousand BDT for taro per Kani

5.3.7.1 Role of the project in regulating tobacco cultivation

IDF started activities under the project aiming to stop tobacco cultivation at the Halda catchment of Manikchari in June 2018 by providing seeds and seedlings of beans, bottle gourd, radish, peanut, potato (in 2019), seedlings of rambutan, orange and papaya. Also provided support for poultry farming and gave 2-4 cocks worth 1400 BDT as parent stock to the interested farmers. All the tobacco leaf curing furnaces (Plate 3) were found phased out and inactive during the visit which indicated the success of IDFs intervention. Also, crop fields under tobacco in preceding years have been found stocked with alternative crops provided by IDF through the project. Several households have been observed to have an excellent batch of poultry (Plate 4) in their homestead. The ex-tobacco farmers, after being refrained from tobacco cultivation, have already tried paddy cultivation, cow, goat rearing, desi chicken, corn cultivation, sweet potato, pulse, crookneck pumpkin cultivation by self-funding and tried cucumber but not been successful due to yellow disease of cucumber leaves.

Plate 3: Snapshots of inactive tobacco furnace at Manikchhari Upazila

Plate 4: Poultry farm of ex-tobacco farmer funded by the project

But the farmers have started to face some problems with these alternative income generation activities while practicing instead of tobacco farming. The problems are:

- ***Long-term harvesting problem:*** Rambutan takes at least 3 years for harvesting, while orange takes 2 years and papaya takes 4-5 months respectively and peanuts are yet to harvest. However, these people need cash for their subsistence weekly, if not daily.
- ***Land required for cultivation:*** Tobacco companies were giving farmers cash for tobacco cultivation that the farmers pay back after harvesting when they receive the full payment for their tobacco harvest. But for alternative farming farmers had no such option and they

had to invest their own savings/loan money for inputs. This cash incentive is the main trap that makes the farmers prefer hazardous tobacco farming over more health and environment-friendly alternative crops which they have been farming traditionally.

- ***Financial losses from alternative farming:*** Farmers also faced financial losses for papaya plantations because of inundation problems in low land.

5.3.7.2 Supports requested by the tobacco farmers

Tobacco farmers who have resorted to AIGAs due to the intervention by the project requested further support to refrain from tobacco cultivation. As the tobacco companies are in constant efforts to revert them to tobacco farming, addressing these requests, at least in phases and after proper assessment, needs to be considered seriously.

- ✓ Providing landless farmers who cultivated tobacco on leased land 1-2 goats or cows
- ✓ Providing training and input support for ginger as the crop can be stored for one year
- ✓ Increasing support in poultry farming for educated adults with IDF's own hilly chicken farming technique which requires 3000 BDT per shed as almost half of the participants in the FGD showed interest in starting poultry farming to ensure a flow of cash at shorter intervals than the fruit crops. To ensure proper marketing channels of suggested alternative products.
- ✓ Establishment of a storage facility for harvested crops as in. peak season they usually don't get the proper price from their harvest which is one of the main reasons of their inclination away from traditional crops.
- ✓ Providing a crop calendar for mixing of crops for better income and resilience
- ✓ Helping them to have better collaboration with Upazila Agricultural Officer
- ✓ Arrangement of regular training on advanced crop cultivation and harvesting, on grafting and nursery development
- ✓ Organizing visits to demonstration plots for practical learning for farmers who have their land and facilities for alternative crop production
- ✓ Arranging vaccination camp at least one day per month for poultry and dairy

5.3.7.3 Sahera Begum's story: lesson for tobacco farmer

Sahera Begum - a middle-aged lady who was the worst sufferer among the participants, told of her bitter experience on tobacco farming. She mentioned that only self-interest is the prerequisite for stopping tobacco cultivation as a farmer other than any issue. From her opinions, it was clear that at the beginning of tobacco cultivation, the tobacco company people showed high respect to the cultivators and paid high. But with the increase in the number of farmers, they start to decrease the rate of tobacco leaf and show disrespect to the farmer saying that the quality of the leaf is not up to the mark. Becoming a victim of this trend, she also lost a huge amount of money at the time when she was also involved in tobacco farming. After this huge loss, she started to cultivate taro, bottle gourd, ginger, crookneck farming by self-funding and now has promised to stop tobacco farming forever. Nowadays she is a beneficiary of the project and involved with poultry farming. This story of Sahera is a great lesson for other tobacco farmers.

5.4 Research and Development (R&D)

5.4.1 Research and Extension

Halda River Research Laboratory (HRRL) has been established under this project where researchers work on the conservation of Halda issues (Plate 5).

5.4.1.1 Halda River Research Laboratory (HRRL)

Dr. Manzoorul Kibria: Coordinator (HRRL) was interviewed to assess the lab-related activities of the project.

5.4.1.1.1 The physical infrastructure of Halda research lab with project funding

The project has supported the establishment of HRRL by providing interior designing and construction with all furnishings, and lab Inauguration with a range of equipment including BOD incubator and analyzer, BOD nutrient buffer pillows, Digital reactor block, Single block, Programmable Spectrophotometer, COD vials - HIGH and LOW range, Ekman dredge, pH probe, precision (3-digit) balance, Underwater camera, Ethyl alcohol and specimen jar, Garmin map GPS, Digital echo sounder, Multi parameter portable water quality meters, Turbidity meter, Deep fridge, Air conditioner for the Lab, Glassware for the lab.

Plate 5: Some snapshots of Halda River Research Lab (HRRL)

5.4.1.1.2 List of research conducted by HRRL

HRRL has been active in Halda related research projects since its inception with routine support from the project through IDF and other sources. The completed and ongoing research footprint of HRRL included:

- Whole-genome sequencing of Indian Major Carps from Halda river and their genome annotation to explore genetic variations
- Status and diversity of zooplankton in Halda during the breeding season (April to June)
- Abundance and biodiversity of benthos in the Halda river during the breeding season
- Assessment of water quality variations (pH, DO, salinity, BOD, COD, turbidity, conductivity and TDS) in Halda river in high tide and low tide during the breeding season (April to June)
- Investigation into non-carp organisms collected along with carps eggs from Halda
- Development of collection and counting methods of carps' eggs and fry from Halda
- Identification of breeding spots of Halda river
- Assessment of species diversity of *Trichodina ciliates* from freshwater fishes of Meghna river, Salimgonj, Nabinagar, Brahmanbaria

- Study on aquatic insects including hemimetabolous and holometabolous insects of Halda and its associated water bodies
- Diversity of arthropods and its ecological role on natural fish breeding ground Halda
- Water quality and benthos diversity of Krishnakali, Purakopali, Katakhali, Khondokia, Madari, Kagotia and Chandkhali canals of Halda
- Status of gigantic river dolphin in Halda river and their habitat identification by using an echo sounder
- Survey of kum (deeper areas of the river) of Halda river by using Echo-sounder
- Study on Embryotic larval and fry development of carps spawn from Halda river

5.4.1.1.3 Number of students at present working in HRRL

Currently**, 1** M.Phil., 5 MS and 4 undergraduate students are working on their projects at HRRL.

5.4.1.1.4 Programmes organized by HRRL

HRRL, besides the research projects, also undertook several programs with and without IDF support including

- Workshop on the determination of egg and fish fry of Halda river
- Online training on integrated river management
- Training on river conservation for sustainable life
- Webinar on inseparable water, wetlands, and life
- Awareness programs like documentary presentation, drawing and quiz competition
- Participating in 5th international water conference 2020
- Arrangement of awareness program at Madarsha Bohumukhi High School, Hathazari
- Seminar and reception program in the context of declaring Halda river as "Bongobondhu National Heritage"
- Online training program in collaboration with Malaysian World Academy of River and Environment
- Write about dolphin killing at virtual court at 2020
- Identification of quantity of eggs and fry by HRRL, Dept. of Fisheries, BFRI, IDF collaboratively
- Celebrating World Environment Day, 5th June 2020

- Virtual meeting about Dolphin killing
- Programs held on topic ' Effects of Covid 19 on river and riverside livelihood'
- Arranged webinar in collaboration with BAPA
- Virtual seminar on the 'Conservation of river and wetlands for healthy nature’
- Discussion meeting about overall conservation of Halda river
- Special webinar program on the celebration of 'World River Day'
- Meeting on the presentation of Environmental Impact Assessment (EIA) report of ' Water distribution from MWTP to Bongobondhu Sheikh Mujib Industrial City ' Project at DOE
- Joint exchange meeting with Wildlife Crime Control Unit for conservation of Dolphin of Halda river
- Participation in a live program arranged by America times in the context of conservation of Halda river
- Several exchange meetings at the riverside of Halda, Garduara
- Introductory and exchange meetings with volunteers about conservation of brood fish at IDF's office, Garduara
- Webinar on 'water extraction and its effects on Halda with collaboration with "pran-pokriti surokkha moncho'
- Educational initiatives program arranged with 'Chittagong University Journalist Association' collaboratively for recognition and conservation of Halda at the riverside of Halda, Garduara.
- Wide range of activities on reduction of tobacco cultivation

5.4.1.1.5 Future research plans to conserve Halda

HRRL’s plan includes the continuation of similar research works about the conservation of Halda with plans to research other rivers of Chittagong for better conservation of nature and ecosystem.

5.4.1.1.5.1 Supports for future research works

HRRL envisaged the needs for logistic supports, instrumentation, manpower as lab attendant and field work level, scholarship for students, etc., as continued support from PKSF/IDF to grow into standalone research and knowledge extension facility for Halda.

5.4.1.1.6 Future challenges for HRRL

HRRL's challenges included rough handling of the instrument due to lack of technically sound lab assistant, risk of damage to the expensive instrument like pH meter, multi-parameter due to unskilled handling, shortage of space for expansion as needed, possibilities of damages to valuable samples and specimen due to the distance between Halda river and lab, risk of taking instruments to the riverside for experiment due to lack of proper transportation facility, less cooperation of local people in the context of the experiment. Support from projects like that of the project is critical to the existence and flourishing of this unique laboratory by assuring the presence of a technical person for proper handling of instruments, ensuring the safety of instruments and increasing logistic support, establishing riverine station of HRRL at the riverside, establishing lab-owned hatchery for better observation and experiments and ensuring other facilities for conducting better research and fruitful experiments.

5.4.1.1.7 Future potentialities of Halda research lab

HRRL's can play more crucial roles in saving rivers of Bangladesh for better overall ecological and environmental conservation by fostering future river experts for Bangladesh, take steps to provide diplomas on the conservation of Halda and other rivers, creating more conservation employment opportunities in the context of river conservation, augmenting livelihood of people living adjacent to Halda riverside, playing roles in phasing out hazardous practices following the successful example of HRRL at tobacco reduction at Manikchhari. However, HRRL will need a range of supports in implementing these activities which includes support in outsourcing of Halda related works, support for the continuation of all running programme and arranging funds.

5.4.1.1.8 Impacts of research outcomes implementation

Due to the works of HRRL, now Halda is recognized politically and internationally for which concerns for Halda reached already the policy-making level. Besides, the research work done, data, the information provided by HRRL helped everyone and governing panels to recognize Halda in broader aspects which greatly assisted in the declaration of Halda as "Bangabandhu Motsho Heritage". HRRL's collaboration with the project resulted in the 95% eradication of tobacco cultivation for Manikchhari. HRRL's research and advocacy were instrumental to stop Asian Paper Mill at Halda bankside, closing of power plant damaging Halda due to proper reporting, stopping the mega project of Chittagong WASA and LGED ministry which would be severely detrimental

for the river, liaison with the different ministry, commissions, etc. to stand beside Halda, positive move to stop killing of dolphin in Halda river. Overall, now Halda has become a role model for all river conservation activities due to HRRL's activities which is a great success of IDF's project.

5.4.1.1.9 The present state of publication of research

The publication process of research works completed at HRRL has started but due to the lack of funding, HRRL's plan to publish a book covering 10 papers related to genome sequence may face an obstacle.

5.4.1.1.10 Dissemination of research outcome to stakeholders

HRRL has provided information on Halda when solicited, arranged different training programs in line with its findings. However, the HRRL management envisaged the need for increasing the collaboration of research and lab work, enhancement of logistic and logical support with more instrumentation and increasing manpower besides establishing a riverine station of HRRL to be more effective in the dissemination of its findings.

5.4.1.2 Information outcomes on Halda related matters from HRRL

5.4.1.2.1 Number of modernized earthen well in IDF's working area

Previously there were 30 modernized earthen wells bit at present it reached 160; which indicates modernization of earthen wells has undergone major changes in number.

5.4.1.2.2 Number of egg collectors in Halda

HRRL estimated this number of egg collectors has been calculated from the number of boats. It is noticed that the highest number of egg collectors is seen in 2018. After that, it decreased a little in 2019 but in 2020 an increasing trend is being noticed again (Fig. 72). There is a large gap between this information and the information from egg collectors (~1650 egg collectors) and IDFs records indicating the inclusion of 2000 egg collectors in the training. It may vary due to differences in the method of determination, but the variation seems quite large to consider anyone as the representative number to the real situation.

5.4.1.2.3 Amount of collected egg annually (kg)

According to the assessment of HRRL, the lowest amount of egg collection was observed in 2016 which increased after 2017. But there was a sharp decrease in 2019 (Fig. 73). Among all the respective years the highest amount of egg was collected in 2020 in an amount of 25536 kg. In comparison to the estimations by the egg collectors, this is more reliable as it followed a structured method. However, the scope to improve the estimation indicated a research topic for consideration.

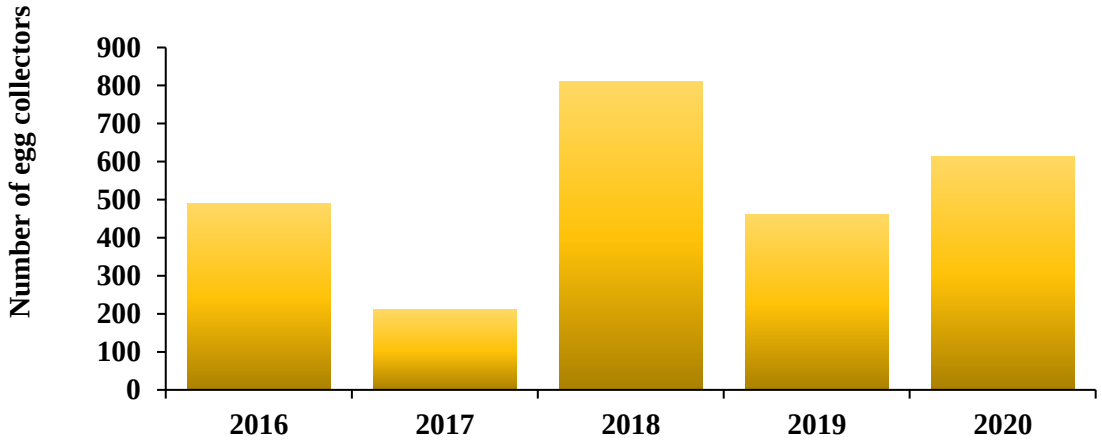


Figure 72: Year-wise number of egg collectors in Halda

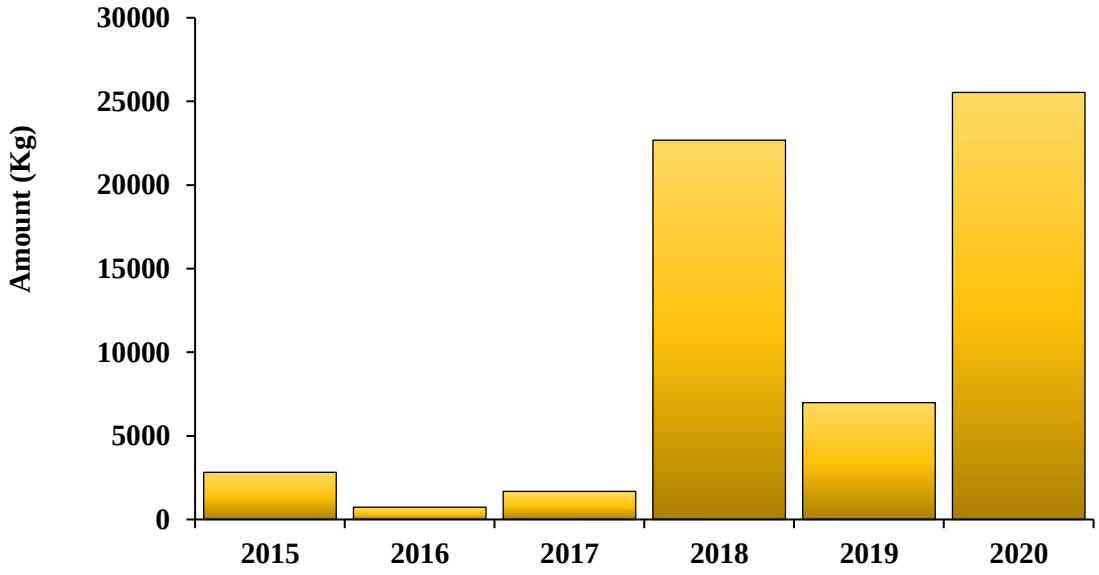


Figure 73: Amount of collected egg (kg) annually

5.4.1.2.4 Amount of fry production annually

According to HRRL, as shown in figure 74, the highest amount of fry production (393.74 kg) was observed in 2020 compared to 378 kg in 2018. This production followed a decrease in 2019 to 191.2 kg. As mentioned in the last section, in comparison to the estimations by the egg collectors, this methodical estimation is more reliable. However, as this can be improved it indicated a potential research topic.

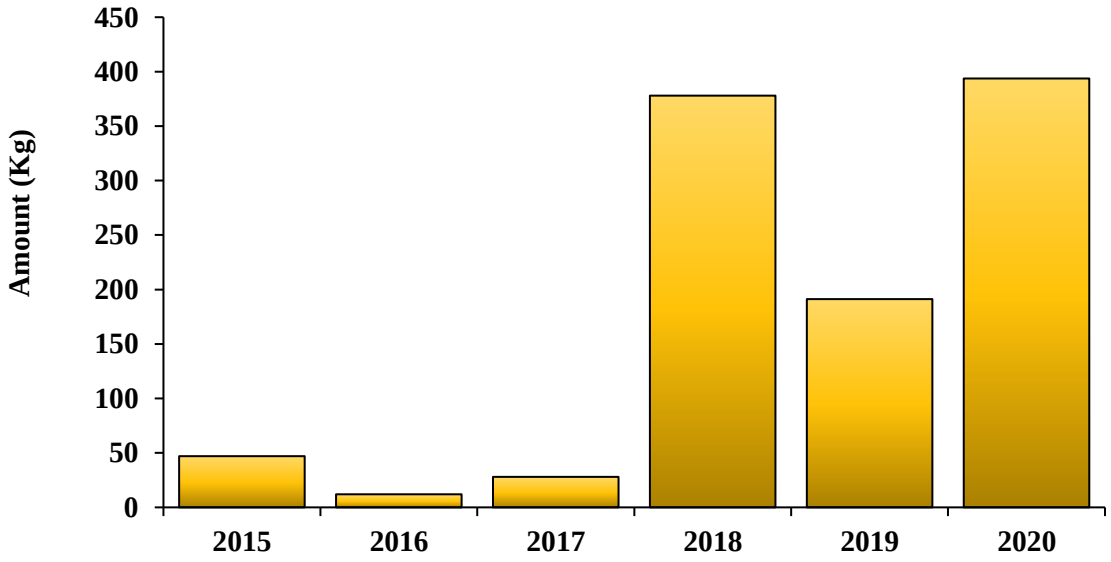


Figure 74: Amount of fry production (kg) annually

5.4.1.2.5 Number of fish hotspots in Halda

As per the assessment of HRRL, a total of 24 fish hotspots or kums were found in Halda in the year 2020. These need to be properly marked and monitored for the conservation of the river. Also, a detailed study on the ecology, biodiversity, geological formation, affecting factors to be identified for each kum as HRRL found the external condition of the Kum in a bad condition with deterioration of the kum environment as many of them has already been filled due to sand extraction, fish-catching from these hotspots, etc.

5.4.1.2.6 Opinion on biodiversity condition of Halda

The overall environmental and biodiversity condition of Halda, as per HRRL's assessment, is much better in comparison to other rivers of the country. The coordinator of the research lab happily said that now it has been taken as a role model for river conservation activities in

Bangladesh. Nowadays a significant number of dolphins can be seen in the river Halda. He hoped that a day would come when the world will talk about Halda and its adjacent canals like we praise the river, Thames.

5.4.1.2.7 Opinion about environmental pollution of Halda River

The coordinator of HRRL pointed out the different successes of his laboratory regarding this topic. Due to the data-driven approach of HRRL, the working sources of river pollution at Halda like – Asian Paper Mill, Hathazari power plant, etc. have been shut down. The pollution from Annannya residential area in the Khandakia canal has already been checked, the tobacco cultivation in the Halda catchment at Manikchari is reduced by 95% and the pollution of the Bamasia-Khandakia canal has been checked. After the fulfillment of all pending activities, Halda will achieve a record of 80-90% pollution-free river in our country.

5.4.1.2.8 Opinion about egg collecting boats, their types and legality in Halda

As HRRL assessed, the number of egg-collecting boats is more than 300. All of them follow traditional techniques which are completely legal. However, HRRL emphasized more investment in egg collection to enhance the overall egg collection activities for greater benefits of the Halda River. Because only after egg collection the possibilities of production of fry will be increased. Fry are only produced outside the river in kums. So, an increase in the number of boats will increase fry production as an outcome.

5.4.1.2.9 Opinion on the market chain of fish fry from Halda

The coordinator of HRRL stated some problems and expectancies regarding the market chain of minnow from Halda. The problems they identified are:

- All the egg collectors don’t get price equally
- It increases the chance of quality degradation
- The tendency of mixing hatchery fry with river fry for more profit is a visible problem
- Buyers eventually are less confident on egg collectors about the quality of eggs.

And the remedies proposed included

- The plan of the establishment of 'Branding center" will be highly effective in these contexts where they will fix some egg collectors to work with IDF so that

- They will bring out the eggs to the Branding Center
- 100% pure fish fry will be produced under the Branding Center
- The buyer will get pure river fry without adulteration
- No one will get deceived or deprived

5.4.2 Researchers

Halda River Research Lab (HRRL) has been established in the University of Chittagong by IDF for research purposes under this project. At present, the number of researchers involved with this lab are 10. Among them, 8 researchers' responses had been addressed from online responses.

5.4.2.1 Research topics

The majority of researchers cover the physical, chemical and biological parameters monitoring regarding Halda river water. Physical parameters include turbidity, conductivity, total dissolved solid (TDS), salinity variation and resistivity. Chemical parameters include chemical oxygen demand (COD), biological oxygen demand (BOD), dissolved oxygen (DO) and pH. Finally, biological parameters include zooplankton and different other organisms. Only one research was conducted on the collection and counting method of carp eggs. Some research outcomes will contribute to future The conservation of Halda like improving water quality, increasing biodiversity and carp breeding. All the researchers agree that the main beneficiaries from these researches are other researchers and local people as well as our country.

5.4.2.2 Research purposes

- ✓ Assessment of water quality variation of Halda River for quantifying the amount of oxidized pollutants found in Halda
- ✓ Investigation on different fish species which may breed with carps in the Halda River
- ✓ Determination of the variation in pH and dissolved oxygen (DO) in the breeding season of the Halda River
- ✓ Identification of conservation methods of Halda
- ✓ Improvement of methods to count carp egg and fry amount
- ✓ Assessment of means to improve water quality for effective breeding purposes
- ✓ Assessment of status and diversity of zooplankton

5.4.2.3 Assistance from the project

The majority (75%) of the researchers opined that the assistance they got from the project through IDF for research purposes is substantial. The rest of them had no comment (Fig. 75)

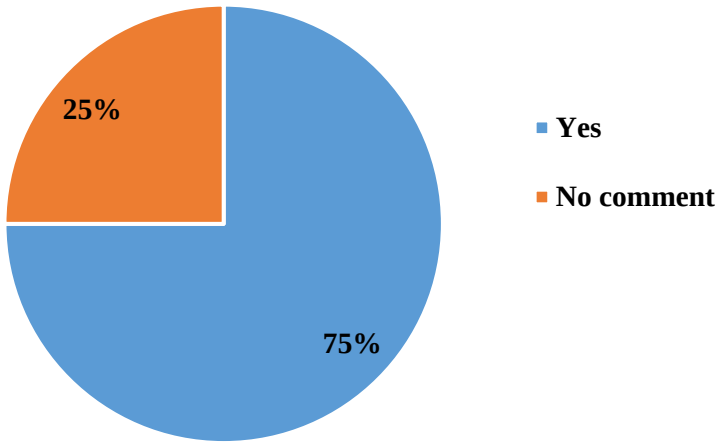


Figure 75: Opinion on assistance from the project

5.4.2.4 Continuation of research aid in future

Around 63% of researchers wanted IDF to continue the research aid in the future (Fig 76). The rest of them had no comment. They added that both financial and logistic assistance is needed for future research.

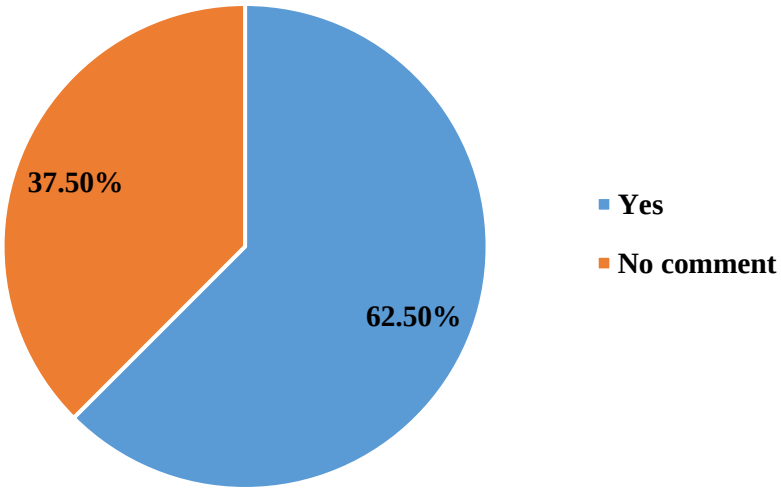


Figure 76: Opinion on the continuation of research aiding from the project in future

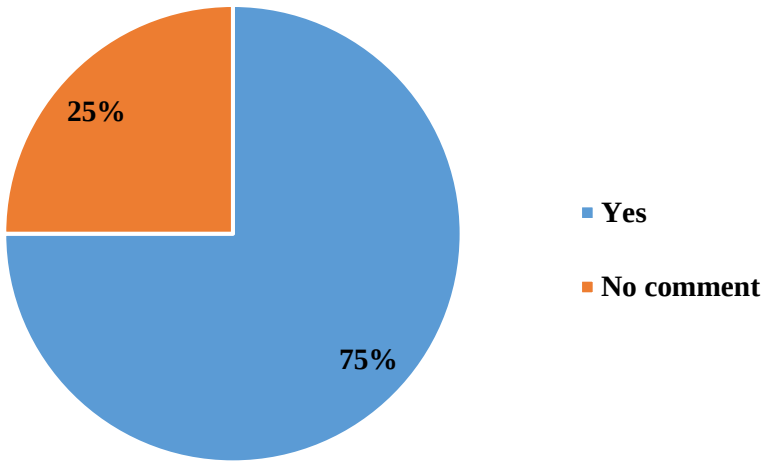


Figure 77: Opinion on impact on research outcome without the support from the project

5.4.2.5 Impact on research outcome without the support from the project

The majority (75%) of the researchers agreed that the supports from the project through IDF had impacts on their research outcome (Fig. 77). Financial, logistic and transport facilities were the major assistance from the project.

5.4.2.6 Suggested future research for the conservation of Halda

Researchers suggested some research topics that should be done in the future for fish breeding ground conservation and development of Halda.

- ➔ Egg collection methods and collection amount
- ➔ Egg to fry production by using modern technologies
- ➔ Identify specific fish hotspot and conservation
- ➔ Identify the threats of dolphins, research on dolphins breeding
- ➔ Water quality and water flow to sort out scientific measurements for future
- ➔ Point out the specific breeding places
- ➔ Measure pollution level and impact of pollution in breeding

5.5 Other groups

5.5.1 Volunteers

IDF recruited 40 volunteers for this project, however, though the numbers of volunteer positions remained the same the number of persons who worked as volunteers changed due to many reasons. Therefore, the number of persons who worked as volunteers for the project is about 60. Among them, for this evaluation report, 32 volunteers were interviewed partly by field survey and partly by telephone interview.

5.5.1.1 Activities as volunteers

Volunteers played a crucial role in the implementation of overall project activities geared mainly at the conservation of Halda by acting against the forces damaging Halda. The modus operandi by a volunteer on conservation of natural breeding ground of fishes and development projects in the Halda River varied and the spectrum of their activities. Seizing illegal nets (78%) and guarding during the spawning period (75%) and providing information to the authorities relevant incidents (47%) were the most common (Fig. 78).

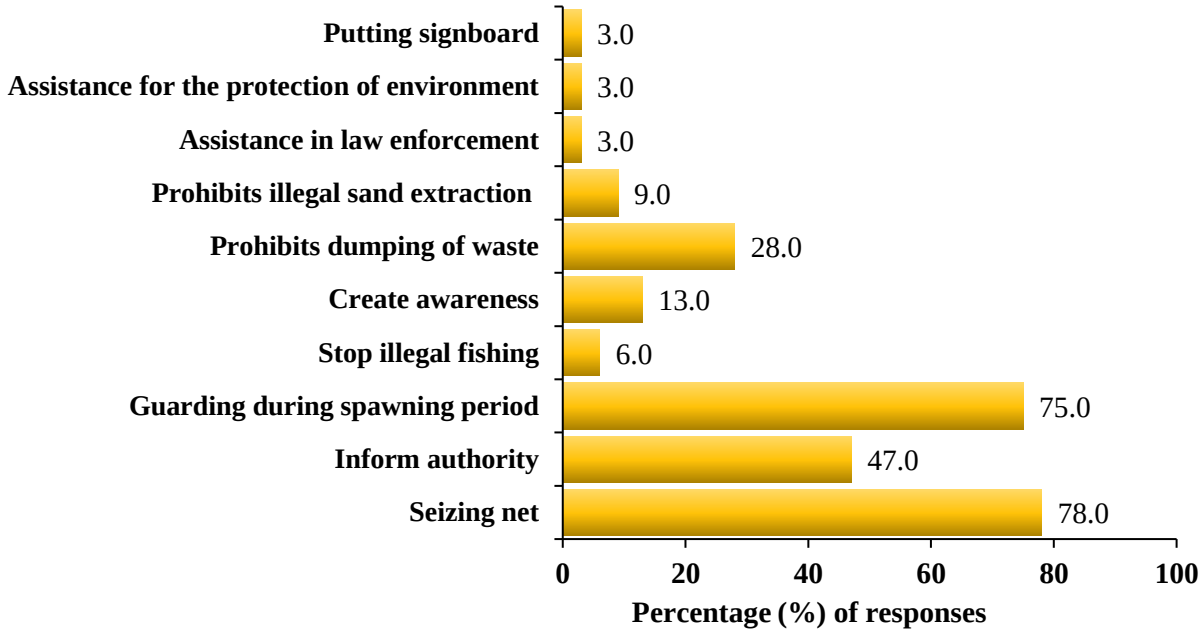


Figure 78: Volunteers' involvement with the spectrum of activities

5.5.1.2 Establishment of signboard under the project

According to volunteers interviewed, they have erected 94 signboards prepared by IDF for raising awareness on the Halda issue within the local communities at different places. Among these 87 signboards have been in existence when the interviews were taken which means 92.5% of signboards are still intact.

5.5.1.3 Time commitments and duration of involvement

It was calculated from their responses in the survey that most of them (28.12%) have spent about 41-60 hours per month for volunteering activities while 25% of volunteers spent 21-40 hours per month. 15.63% spent 61 –80 hours. Besides, a few (3.13%) volunteers spent the highest 221-240 hours in a month (Fig 79). In case of the involvement, more than half (62.5%) of the respondents got involved with IDF in 2020 and the rest started their volunteering tenure in the project at a different time since 2016 (Table 14).

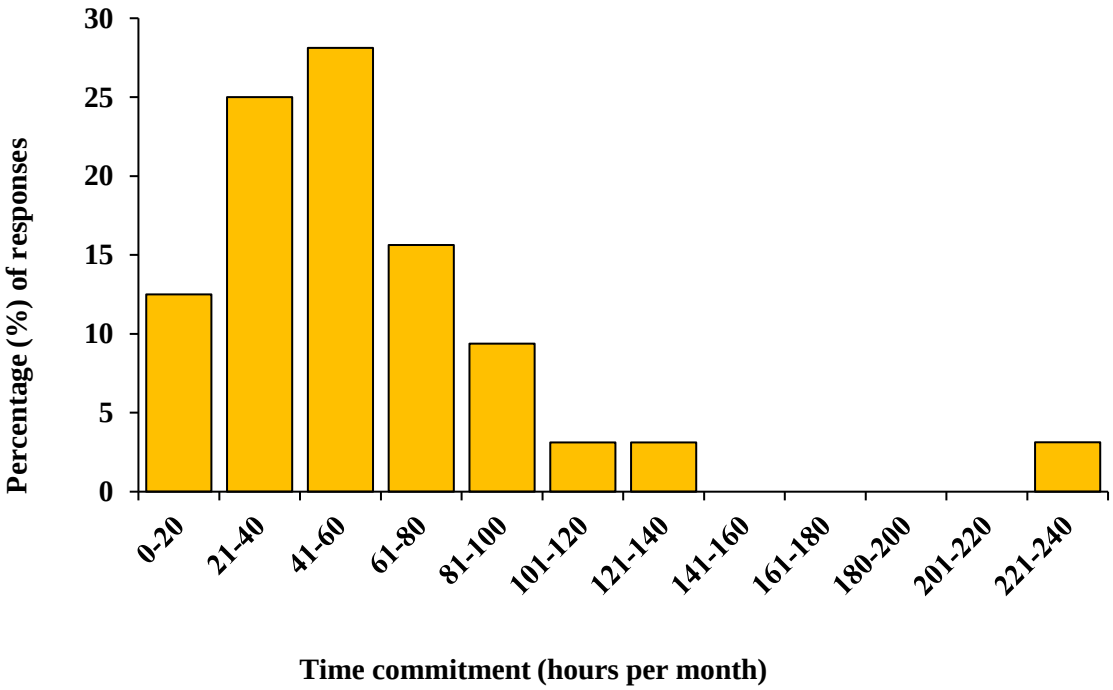


Figure 79: Spent hours per month for voluntary activities

Table 14: Starting period of involvement with voluntary activities

Starting Year	Percentage (%) of responses
2016	9.4
2017	18.8
2018	6.3
2019	3.1
2020	62.5

5.5.1.4 Logistic support for volunteers

5.5.1.4.1 Logistic support provided by the project

IDF gave some logistic support from the project to the volunteers to assist their work. The findings should be considered in the context that there had been changes in the person filling up the position of 40 volunteers and about two-third of them joined at a later stage of the project in 2020. Among these, most of the respondents got honorarium (37.5%) beside mobile phone (31%), torch (31%), raincoat (31%), boot and speed boat support for voluntary activities. Maybe as the respondent volunteers joined late, 31.25% mentioned that they did not get any logistic support from the project (Fig. 80).

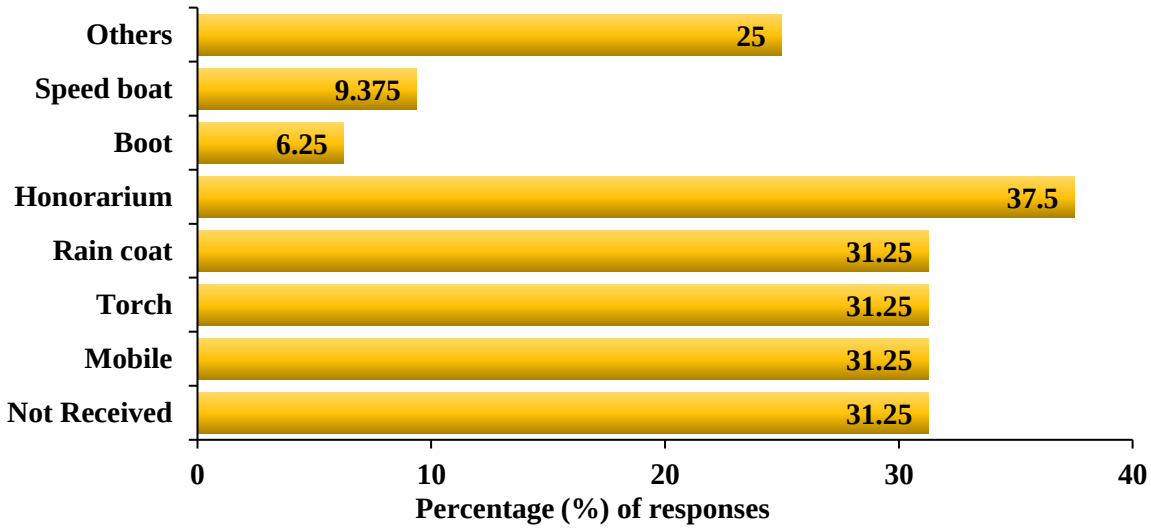


Figure 80: Logistic support received from the project

5.5.1.4.2 Logistic support requested for volunteering in the future

According to volunteers' opinion, they were supposed to receive more logistic support like torch light (46.8%), raincoat/umbrella (43.75%), ID cards (37.5%), speedboat (21.88%), mobile (21.88%), security (15.63%), incentives (12.5%) and so on (Fig. 81). The reasons why and when this logistic support are important to them have been addressed in the interviews. For example, they felt IDs are needed for their security purpose as soon as possible, umbrellas are needed during the rainy season. Mobile phones, speed boat support and bamboo sticks are needed during the guarding period. Furthermore, incentives are needed to boost their will and cover their transportation cost.

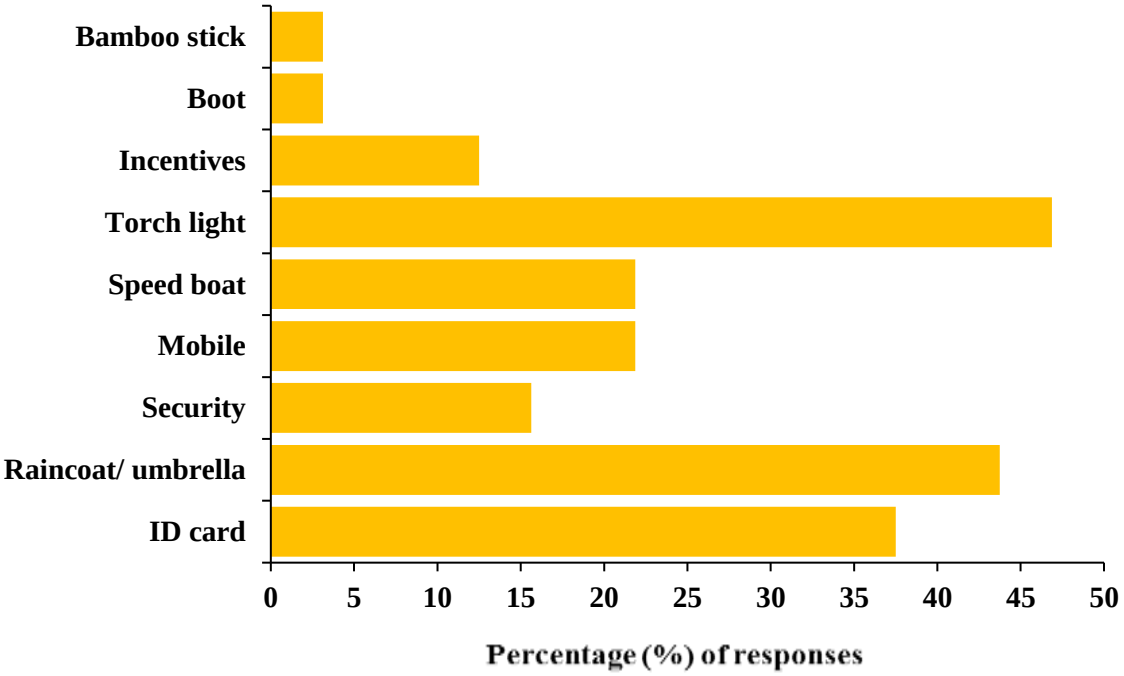


Figure 81: Logistic support required for future

5.5.1.4.3 Opinion on Allowance from the project for volunteers

Among the respondents, almost 88% opined that the amount of allowance provided by IDF was not sufficient for them because the transportation cost of voluntary activities requires more investment. The rest of them said that the amount was enough because they did the job as a basic duty not for money and treated the Halda as a national and regional treasure.

5.5.1.5 Impacts on volunteers

5.5.1.5.1 Experience from voluntary activities

Volunteering was not pleasant for most of them (60%) as they have faced various problems and threats. About 60% of them claimed facing harassment, threat, and lack of speed boats in the crackdown period. Reasons behind these problems and ways to overcome them have also been identified from respondents' surveys. According to their opinion, terrorist groups, informing the authorities and most importantly net seizing activities (50%) are the main reasons. All these issues with ways to overcome these problems are enlisted below in Table 15.

Table 15: Experience from voluntary activities

Problem faced	Source of problems	Ways to overcome
Harassment	Net seizing activity	Mass motivation
Threat	Terrorist group	Making Taskforce Security
Speedboat support (crackdown time)	Net seizing activities	Increasing speed boats
Economic loss	Informing authority Net seizing activities	Generating income source Allowance

5.5.1.5.2 Impacts of volunteering involvement on personal life

More than 80% of respondents said they had no impact on their family life due to their involvement in volunteering activities, the family of few of them (<4%) were happy for their involvement while 12.4% of respondents did not get any family support. In the case of social life, 31.25% of respondents to have no impact, 18.75% reported facing harassment, and 41% got appreciation from the local people. More than half of them reported no economic impact while 41% mentioned that volunteering helped them to support their families financially.

5.5.1.5.3 Sweet and bitter experiences during volunteering

While reporting the most pleasant experience, almost 40% of the volunteers mentioned patrolling, 35% mentioned confiscating illegal fishing nets. However, around 25% had no such feeling. On the other hand, around 60% of volunteers were harassed by the illegal fishermen at the time of patrolling. Someone even reported occasional altercation with the offenders where 40% of respondents had no such bitter experiences.

5.5.1.6 Continuation of voluntary activities

Respondents were asked about their role as a volunteer after ending this project. Around 91% of respondents were eager to remain engaged in volunteering even after the project ends. The reasons for involvement mentioned by themselves were that they know Halda as a national treasure, economic benefits and responsibility as a volunteer (Fig. 82). Another 9% of respondents said that they won't get involved after the project ends to a lack of time to commit (33.3%) while 66.7% didn't mention any reason.

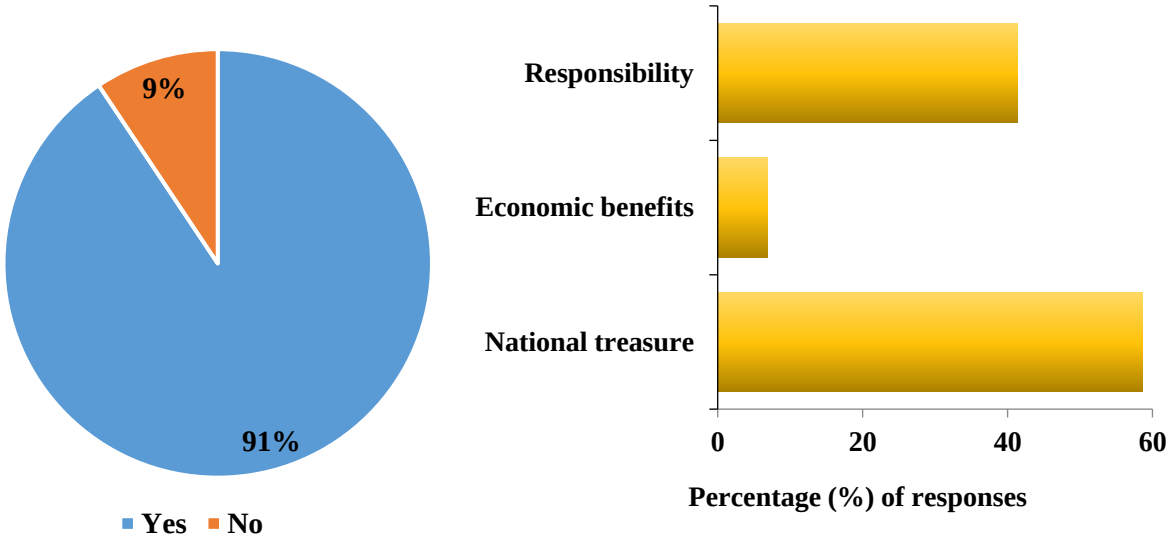


Figure 82: (Left) Involvement after ending project and (Right) Reasons behind the involvement

5.5.1.7 Volunteers' perception

5.5.1.7.1 Perception on illegal fishing

As per volunteers' opinion, in 2015, the median number of people involved in illegal fishing was 40 which came down to less than 6 in 2021. Due to a lack of records, the trend of decrease in the number of illegal fishermen of the last five years cannot be identified. According to respondents' interviews, the most identified hotspots where illegal fishing is more frequent are North Madarsha (18.75%), Noazishpur (9.38%), Urkirchar (9.38%) and Noyahat (9.38%). Attention should be given to these areas (Fig. 83).

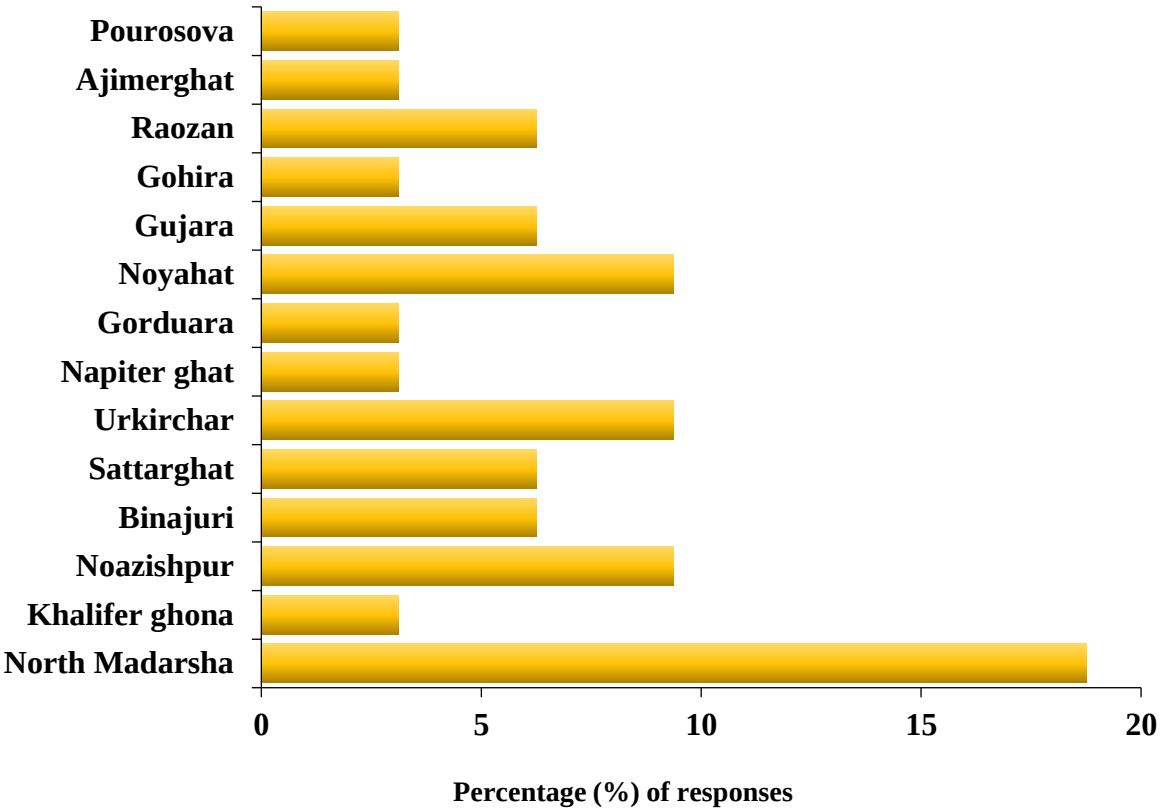


Figure 83: Volunteers' perception of places where illegal fishing occurs

5.5.1.7.2 Perception on ways to stop illegal fishing

Volunteers were asked about their opinion regarding modality to stop illegal fishing and their opinions are enlisted below:

- Continuous vigilance during the illegal fishing period
- Recruitment of more volunteers with handsome allowance
- Assuring securities for volunteers and provide more speed boats
- Stopping dumping dirt on the verge of the river
- Raising awareness and promote AIGA through training and financial support
- Making a list of illegal fishermen and take necessary action from the government
- Administrative support and monitoring the entire area with close circuit camera
- Encourage fish farming instead of illegal fishing
- Regular patrolling with police

5.5.1.7.3 Perception on ways to stop illegal sand extraction

Respondents believed that administrative intervention (41%), patrolling (13%), raising awareness (9%) and financial support (6%) are the key means to stop illegal sand extraction (Fig. 84). On the other hand, 31% of respondents had no comment.

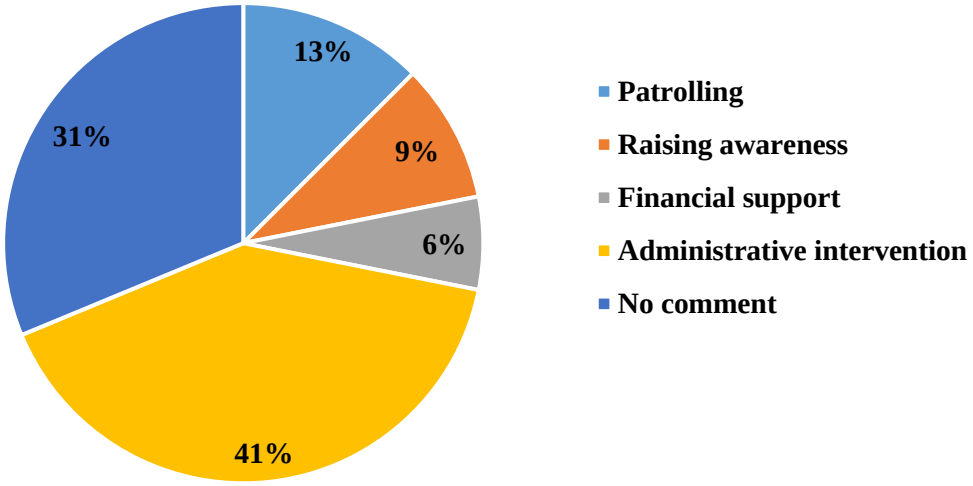


Figure 84: Steps to be taken to stop illegal sand extraction

5.5.1.7.4 Perception on key obstacles for the conservation of Halda

Volunteers considered catching mother fish (47%), wastewater (37.5%), steamer (9.4%), sand extraction (9.4%) and saline water (6.3%) are the key obstacles against the conservation of Halda. They also mentioned dependency on Halda for livelihood (43.8%), lack of training and awareness (22%), lack of accessories (12.5%) and industry (12.5%) as reasons for these obstacles (Fig. 85).

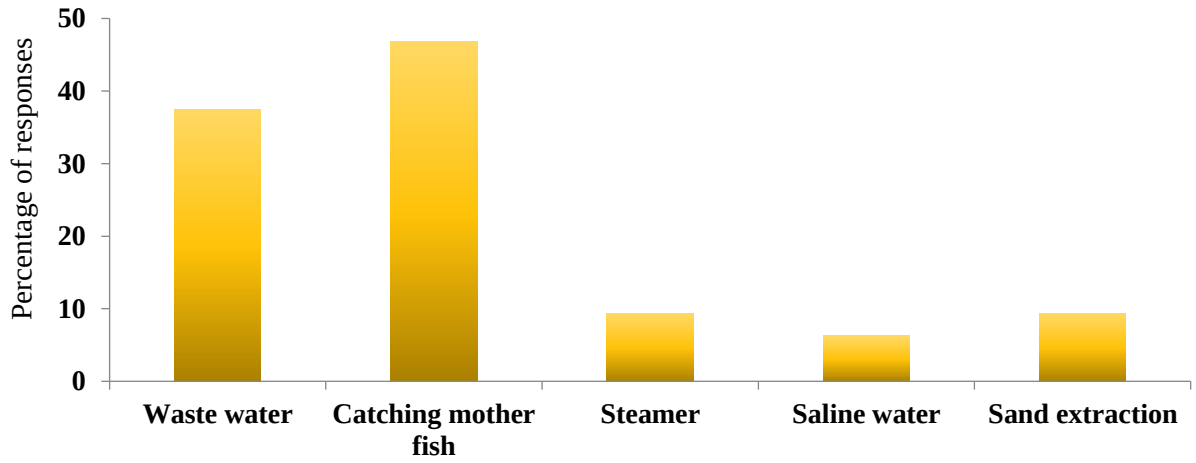


Figure 85: Obstacles for the conservation of Halda

5.5.1.7.5 Perception on ways to overcome obstacles for The conservation of Halda

Respondents were asked how to overcome obstacles for The conservation of Halda and what steps should be taken. The proposed better allowance (34.4%), creation of employment opportunity (12.5%), government support (22%) and steps taken from the government (9.4%) as the ways to overcome the obstacles.

5.5.2 Trainers

IDF organized different training programs related to Halda River conservation during their project tenure by several experts such as Upazila Agricultural Officer, livestock officer, fisheries officer and faculty member of the University of Chittagong. All the eight trainers were reached and interviewed over the phone.

5.5.2.1 Training provided by trainers

Most of the trainers (87%) were involved in the modern method of egg collection, hatching techniques and precautions-related training. Training on modern methods of egg collection, hatching at the earthen well and income initiative in the off season was conducted by 75% of the surveyed trainers, 50% of them involved in both "training on the egg to fry production and hatchery management" and "training related to pheromone trap and bio-insecticides use instead of insecticides" (Fig. 86).

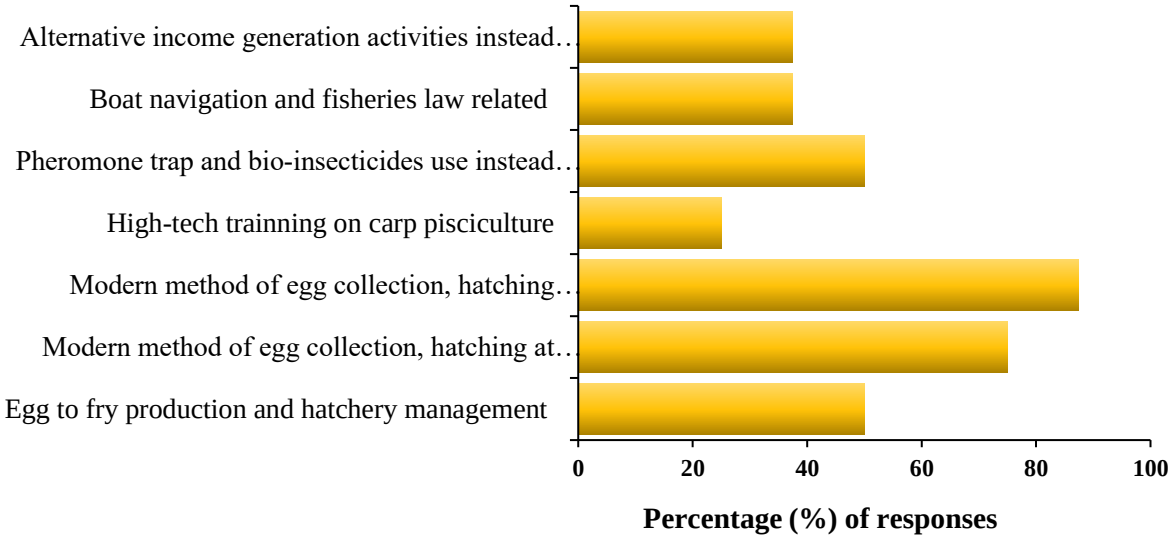


Figure 86: Subject of training provided by the trainers

5.5.2.2 Training periods

The summary of the timeline for training organized is shown in table 16.

Table 16: Training periods on different activities provided by the trainers from 2016 to 2021

From egg to fry production and hatchery managemen t related	The modern method of egg collection, hatching at the earthen well and income initiative in off season-related	The modern method of egg collection, hatching techniques and precautions related	High-tech training on carp culture	Training related to pheromone trap and bio-insecticides use instead of insecticides	Boat navigation and fisheries law-related training	Alternative income generation instead of Tobacco cultivation
2016-2017 2018-2019 2020-2021	2016-2017 2018-2019 2020-2021	2016-2017 2018-2019 2020-2021	2016 2017 2018 2019	2018-2019 2020	2016- 2017 2018- 2019	2019 2020 2021

5.5.2.3 Opinion on training duration and maximum number of trainees

According to 62.5% of trainers, training duration should be more than one day while 37.5% considered one-day training to be enough. Besides, 62.5% of trainers believe that the maximum number of trainees should be 25, where 25% preferred less than 25 and 12.5% of them think that more than 25 would be fine (Fig. 87).

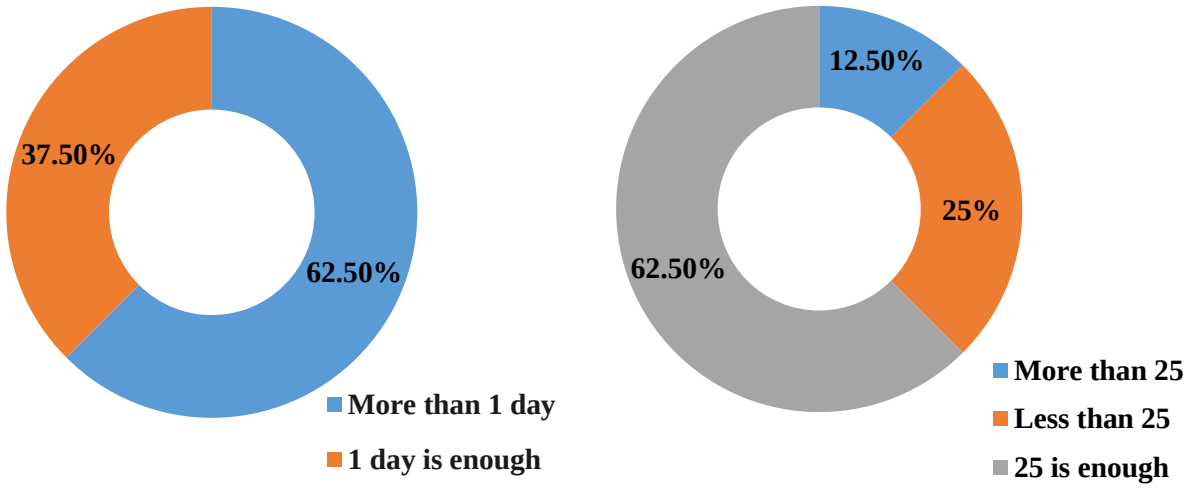


Figure 87: Opinion on training duration (Left) and Maximum number of trainee (Right)

5.5.2.4 Number of average trainees present during training

On average, around 35 people were present at the training on modern methods of egg collection, hatching at earthen well and income initiative in off-season related training (Table 17). Modern methods of egg collection, hatching techniques and precautions related training were participated by 35 trainees similarly. In training on ‘’high-tech carp pisciculture’’, “pheromone traps and bio-insecticides use” and “boat navigation and fisheries law” there were 30 trainees individually. On average 29 people participated in “alternative income generation instead of tobacco cultivation” related training. The training method was a combination of both theoretical and practical sessions. Interestingly, the numbers mentioned by them differed from the numbers mentioned in IDF documents.

Table 17: Number of average trainees present during training

Subject of training	Average no. of trainees
Egg to fry production and hatchery management	32.5
The modern method of egg collection, hatching at earthen well and income initiative in the off season	35
Modern method of egg collection, hatching techniques and precautions	35
High-tech training on carp pisciculture	30
Training related to pheromone trap and bio-insecticides use instead of insecticides	30
Boat navigation and fisheries law-related training	30
Alternative income generation instead of tobacco cultivation	29

5.5.2.5 Rating training activities

In the case of “egg to fry production and hatchery management” and “alternative income generation instead of tobacco cultivation” training, a median rating value from the trainers was 4.5 on a scale of 5 (Table 18). Trainers of “modern method of egg collection, hatching at earthen well and income initiative in the off-season” and “modern method of egg collection, hatching techniques and precautions” programs rated 3.75 on the same scale as of median value. Where

trainers of "pheromone trap and bio-insecticides use" rated their activities 4 and trainers of "boat navigation and fisheries law-related training" rated the activities as 3 out of 5.

Table 18: Rating on training activities by trainers

Training activities	Rating
Egg to fry production and hatchery management	4.5
The modern method of egg collection, hatching at earthen well and AIGA for off season	3.75
Modern method of egg collection, hatching techniques and precautions	3.75
High-tech training on carp pisciculture	3.5
Pheromone trap and bio-insecticides use instead of insecticides	4
Boat navigation and fisheries law-related	3
Alternative income generation instead of tobacco cultivation	4.5

5.5.2.6 Comments on training received by the trainee

Trainers think that trainees are getting benefits from training.

- Θ According to the egg to fry production and hatchery management-related trainers, people become familiar with advanced and successful methods of egg collection under their supervision which increase the amount of egg collection.
- Θ From the modern method of egg collection, hatching at earthen well and income initiative in off season-related trainers' view, these training sessions increased interest of local people towards AIGAs like cattle farming, fish farming, vegetable selling, seasonal vegetable production, etc. with upgrading the quality of production and economic condition.
- Θ Modern methods of egg collection, hatching techniques and precautions training taught them hatchery management and methods to increase egg collection and fry production.
- Θ From high-tech training on carp pisciculture, trainees gained knowledge about the high technology of fish farming and increased their production and income.
- Θ Training related to pheromone traps and bio-insecticides uses helped people to increase income through organic farming. People are using biopesticides at a mass level, reducing

chemical pesticide usage and increasing vermicompost usage. These types of training also encourage local people towards AIGAs instead of further involvement in illegal activities.

- Θ Boat navigation and fisheries law-related training provide knowledge on navigation rules and fisheries law. Some trainers claimed that due to fisheries law implementation and naval movement change some local people faced a financial crisis.
- Θ Training on AIGAs instead of tobacco cultivation contributes to a huge reduction of tobacco cultivation in the adjacent areas. Local riverside people started farming, cultivating and being involved in different activities spontaneously. They are also getting free advice or treatments for cattle and domestic animals from the training sessions.

5.5.2.7 Merits of training

Trainers mentioned some advantages about training such as-

- Θ The appropriate site and target group selection
- Θ Good organization of training sessions through IDF and local administrations
- Θ Teaching rural people, trying to visit door to door to upgrade their livelihood
- Θ Reduce tobacco cultivation. At the same time, increase public inspiration and interest towards alternative earning activities like cattle farming
- Θ Huge amount of egg collection in 2020 that breaks all records of the past, combines fishermen's practical knowledge with modern and technical aspects, training finding out if there is any mistake in the total procedure of egg production from first to last
- Θ Awareness creation among root-level people to conserve Halda River.

5.5.2.8 Demerits of training: reasons and resolutions

Some demerits as identified by trainers are summarized for future reference in table 19.

Table 19: Reasons behind demerits of training and solutions identified by trainers

Demerits	Reasons behind the demerits	How to solve
Irregular training sessions	Remote venue Lack of logistic support, annual planning, and schedule	● Ensure regular monitoring. ● Execute well planned and effective sessions through skilled people ● Provide equipment

Demerits	Reasons behind the demerits	How to solve
Less effective training contents and curriculum Different categories of training merged in a session	Shortage of skilled people and manpower Due to network problems, trainers could not provide any PowerPoint presentations. Lack of financial and logistic support	● Specific subject-based training ● Include more practical and field-oriented activities ● Sessions should be organized more than one day (at least 1 week) instead of daylong ● Audio-visual curriculum ● Demonstrations
Failed to catch the attention of the trainees	Daylong program -couldn't provide interesting presentations or exhibitions Insufficient sitting space	● Choose appropriate contents and relevant target group ● Arrangement of lunch for trainee ● Attractive and planned presentations ● Exhibitions ● Training session should be 10am-1pm
Over expectation from training sessions occur silent conflict with local people Seeking immediate benefits	People lost interest because they expected some money or food from training	● Marketing skill development related training ● Provide loan or financial aid for start-up ● Establishment of modern hatcheries
Informing about training within a short period	Lack of futuristic planning Absence of prudent decision-makers and planners	● Ensure early reminders to both trainers and trainees ● Provide advance schedule to the trainers ● Follow a planned and structured way

5.6 Improvement of the situation compared to baseline

The overall achievements of the project in improving the conservation status of the Halda river was compared to the status described as different parameters in the project's baseline report (Table 20). The comparison should be read cautiously as the sample size, the prime objectives and the methodologies had differences. In general, the improvement of the conservation status of Halda was apparent. Primarily, the egg production and associated awareness among the stakeholders has been improved over the baseline with a reduction in the number of egg collectors and adoption of better egg collection and post-collection processing activities due to the efficacy of training. The

scope of improvement has been indicated in improving the use of agrochemicals and modern and more sustainable agricultural practices to check the pollution of the Halda river by agrochemicals.

Table 20: Comparison between baseline survey report and post-project evaluation report

Medium of comparison	Baseline survey report	Post project evaluation report
Sampling area	Hathazari and Raozan	Hathazari and Raozan
Total sample size	410	206
Sample distribution	Egg collector: 208	Egg collector: 59
	Fry and fingerling producer: 48	Fry and fingerling producer: 77
	Fisherman: 28	Fisherman: 31
	Farmer: 126	Farmer: 14, 25 (Ex-tobacco farmer)
Egg collector		
Mean egg collection	Gradually decreasing up to 2016 Average: 0.926 kg (in 2016; Egg collector: 208)	Gradually increased from 2017 to 2020, Average 175 kg in 2020 (Egg collector: 59) with fluctuations in the percentage of egg damage
Training on egg collection	• Yes: 35% • No: 65%	• Yes: 88% (training on modern egg collection technique) • No: 56% (training on the reduction of loss of unwanted fish fry during egg collection)
Change in egg amount after training	Opinion on change if get training • Yes: 79% • No: 21%	Opinion after receiving training • Yes: 71% • No: 29%
Off-season profession of egg collectors	Electrician, businessman, animal husbandry, dairy and poultry farming, carpenter, wood cutter, contractor, motor mechanic, day labourer, decorator, mason, a rickshaw puller, driver, service holder, etc.	Businessman, farmer, day labourer, driver, others.
Fry and fingerling producer		
Method of egg incubation followed by fry producers	• Earthen well: 48% • Hatchery: 52%	• Earthen well: 77% • Hatchery: 23%
Advantages of using earthen well for incubation of the egg	• More hatching of the egg • Fishes are adaptable and long-lasting • Good quality • High demand • Better oxygen supply	• Faced no problem: 32%

Medium of comparison	Baseline survey report	Post project evaluation report
	• Good quality water and water remains cool • Rapid growing • Use as mother fish	
Disadvantages of using earthen well for incubation of the egg	• Affected by flood • Fingerling production is less • Egg damage • Lack of pure water • Need own earthen well • Saline water intrusion • Well drainage problem	• Saline water intrusion (37.5%) • Affected Storm water (21%) • Affected by wastewater (9%) • Personal problem (7%) • Others (14%) Problems faced by in earthen well by hatchery owners: • Fry damage (56%) • Water problem (22%) • Lack of accessories (11%)
Advantages of using hatchery for incubation of the egg	• Low damage of egg • High production • Easy to clean • Ensure water quality • Healthy fish • No disturbances of water • No effect of calamity • Protected from flood • Rapid growing • Safe • Comparatively easy to produce • Protected from salt water	• Faced no problem: 16.7%
Disadvantages of using hatchery for incubation of the egg	• Insufficient air and light • Not adaptable • Not good quality and lasting • Need for water purification • Cost of medicine & incubation • Improper incubation • Low demand • Machine disturbances • Egg damage • Low fish growth	• Water problem (39%) • Fry death (22%) • Well problem (17%) • Limited hatchery (17%)
Profit from fry	• Fry amount: Not given • Profit: 28413 BDT in 2016 (mean value)	Earthen well scenario: • Fry amount: 1.49 kg in 2020 (median value) • Profit: 150000 BDT in 2020 (median value)

Medium of comparison	Baseline survey report	Post project evaluation report	
		Hatchery scenario: • Fry amount: 1.625 kg in 2020 (median value) • Profit: 112500 BDT in 2020 (median value)	
Received training on fry production	Not mentioned	Earthen well	Hatchery
		• Yes: 71% • No: 29%	• Yes: 65% • No: 35%
Change in fry amount after training	Not mentioned	Earthen well	Hatchery user
		• Yes: 60% • No: 40%	• Yes: 59% • No: 41%
Opinion on fry quality based on the method	• Good in earthen well: 79% • Good in hatchery: 21%	Not identified	
Fisherman			
Training on fish farming	Feels necessary: 68% (Fisherman: 28)	Received training: 87% (Fisherman: 31)	
Change in fish production after training	Not identified	Gradually increased from 2017 to 2020	
Earning from fishery	BDT 50000 in Hathazari in 2016 (mean value) BDT 126000 in Raozan in 2016 (mean value)	BDT 391177 in 2020 (median value)	
Off-season activity	Business, farming, service	Farming, fish seller, fry business, grocery shop, boatman, village police, electrician	
Farmer			
Use of bio-fertilizer	86.5% (farmer: 126)	23% (farmer: 14)	
Training for farmers	Use of bio-fertilizer: 49%	Use of pheromone trap and bio-pesticides: 86%	
Changes in production after training	• Not mentioned	• No change: 58% • Yes: 25% • No comment: 17%	
Problems identified for farming	• Lack of sufficient capital: 58%	• Lack of logistic support: 57% • No supply of organic pesticide: 29% • Lack of manpower: 14%	

5.7 Measuring achievements against the project log frame

The results from the evaluation have been utilized to assess the achievements of the project against targets as outlined in the log frame of the project (Table 21). The project shows successful implementation by IDF as it achieved most of the targets with overachievement in most indicators while underachievement in few. Fitting recommendations in light of the analysis of the reasons for lower achievements have been made accordingly.

Table 21:Recommendations based on evaluation of achievements vs. targets

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
Goal To increase the production of quality carp species (Rui, Katla, Mrigel, Kalbous) through conservation and development of Halda River fish breeding grounds and to increase fish production and conserve endangered fish species and create employment opportunities for entrepreneurs.	After the end of project duration: 1) Through conservation of habitat, the mortality rate of fish eggs and fries will be reduced at a significant rate and biodiversity will be protected.	• Though the collection has increased, the percentage of egg damage remained fluctuating which seemed a frustrating outcome • Decline in egg to fry ratio is unacceptable • Tree plantation through volunteers were done	✓ Primary data • Discussion with egg collectors, egg to fry producers and volunteers	• As the data reported by the egg collectors and egg to fry producers from their memory, it should be taken into consideration accordingly with caution • Biodiversity is a broader term to measure though half of the local administration believed on project's success for Halda conservation	• Hands-on training to control the factors contributing to egg loss and egg to fry damage determined through research. • Interventions (financial and logistic supports) needs to be designed to improve this aspect • Need more quality research to focus
	2) Through Income Generating Activity (IGA), employment will be created with a positive change in the socio-economic condition of the entrepreneurs.	Training was provided on alternative income generation activities to egg collectors, egg to fry producers, fisherman, and tobacco farmers	✓ Primary data • Discussion with egg collectors, egg to fry producers, fisherman, and tobacco farmers, trainers	Training program was helpful for off-season activities with an increase in egg collectors' income but not helpful for fisherman due to lack of financial support and logistics	• Need to revise training module, duration, and more refreshers training • Need to update database • More focus on hands on training • Provide logistic and financial support
Objectives A) To increase knowledge and skills for proper and planned collection of eggs.	After the end of project duration: 1) Egg production will increase by 35-50%	Gradual increase in egg collection amount from 2016 to 2020	✓ Primary data • Discussion with egg collectors	Positive indication	• Hands on training should be continued with revised training module, duration, and more refreshers training with follow up

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
B) To assist in the production of quality carp fry in a scientific manner. C) To enable entrepreneurs to identify hybrid / cross breed fry and Halda River fry. D) To conserve the biodiversity of Halda River and create employment opportunities for entrepreneurs.	2) At least 2500 kg more eggs will be produced by conserving biodiversity	**2016:** 735 kg **2017:** 1680 kg **2018:** 22680 kg **2019:** 6986.7 kg **2020:** 25536 kg	✓ Primary data • Discussion with coordinator of Halda River Research Lab	Positive indication	Hands on training should be continued with revised training module, duration, and more refreshers training with follow up
	3) Modernization of hatching system in earthen wells with modern technology, fingerling production technology and agricultural exhibition plots will be set up to increase egg hatching rate in a natural way.	• Training was provided to egg to fry producers both for earthen well and hatchery users • Many trainees didn't visit demonstration plots (46%) and demonstration on the repair of earthen wells (41%)	✓ Primary data • Discussion with egg collectors, egg to fry producers on relevant issues • Photo record	• Though the collection has increased, the percentage of egg and fry damage remained fluctuating which seemed a frustrating outcome • As the data reported by the egg collectors and egg to fry producers from their memory, it should be taken into consideration accordingly with caution.	• Need to keep the refreshers training and exchange visits to further consolidate the conversion of eggs to fish-fries. • Demonstration of video documentary • Research needed on the comparative assessment of effective egg to fry production method between earthen well and hatchery
Outcome Production and marketing business through conservation and development of Halda River fish breeding grounds in the fisheries sector to	After the end of project duration: A) 500 egg collectors will produce fries from eggs using modern technology.	• 500 egg collectors received training on producing fries from eggs using modern technology.	✓ Primary data • Discussion with egg collectors, egg to fry producers on relevant issues • Photo record ✓ Value chain project progress report	Most of the egg collectors received theoretical training	• Need to make the future-training more field and practical oriented. • Need to create database and regular update

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
sustainably expand the fish business, adopt production strategies and increase market access for poor and extremely poor small entrepreneurs.	B) 2000 egg collectors will hatch eggs in earthen wells following proper method.	2250 egg collectors received training on hatching eggs in earthen wells following proper method.	✓ Primary data • Discussion with egg collectors, egg to fry producers on relevant issues • Photo record ✓ Value chain project progress report	Recipients experienced increased fry production due to the training provided	• Need to be validated by actual increase in the fry production based on eggs collected • Need to keep the refreshers training on to further consolidate the conversion of eggs to fish-fries.
	C) 200 fish farmers will cultivate fish with modern technology.	200 fish farmers received training on cultivating fish with modern technology.	✓ Primary data • Discussion with fisherman • Photo record ✓ Value chain project progress report	• More than half of the trainee reported that their problems were not solved after training which indicated • Video documentary was considered as an effective tool by the trainee	• Need to curate the training content more cautiously • Training through video documentary • Refreshers and follow up training • Updated database • Beside training, financial support including loans, grants to buy necessary appliances
	D) 1000 farmers will use pheromone traps and organic pesticides instead of toxic pesticides in riparian lands.	1125 farmers received training on using pheromone traps and organic pesticides instead of toxic pesticides in riparian lands	✓ Primary data • Discussion with farmers • Photo record ✓ Value chain project progress report	• Half of the trainees considered the training as ineffective to solve their problems due to lack of logistic support and supply of organic pesticides. • Video documentaries and demo plot visit were considered for fruitful understanding.	• Training through video documentary • Refreshers and follow up training • Updated database • Demo plot visits • Providing organic pesticide • Providing allowance and logistics • Providing loan for equipment

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
	E) 50 boatman will navigate their boats in a fish friendly environment.	50 boatman received training on navigating their boats in a fish friendly environment	✓ Primary data • Discussion with boatman ✓ Value chain project progress report	• Changes to the business-as-usual scenario because of navigation training • Almost half of the trainees gained knowledge about fisheries law after training • Enforcement of law will be cause of sufferings according to majority of the trainees	• Financial support • Government aid • Promotion of AIGA training
	F) The people of the riparian areas will get proper knowledge of river use so that the fish friendly environment will return to the river.	• Leaflets were distributed to create mass awareness • Meetings with Imams and Purohits were held on relevant issues • Involvement of volunteers to foresee river environment	✓ Primary data • Discussion with egg collectors, egg to fry producers both in earthen well and hatchery, fishermen, farmers, boatman, volunteers, local administration, researchers ✓ Value chain project progress report	Technical committee members and local administration agreed on the significant role in the overall development and conservation of Halda River like routine monitoring of riverside areas, training activities, phasing out of tobacco cultivation, earthen well demonstration plots, and training on alternative income generating activities (AIGA)	• Logistic support • More volunteers • Financial support • Continuation of all ongoing activities • Closer collaboration with local admin • Creation of more AIGA opportunities • Modification of training programs • Enhancement of monitoring activities • Starting of a 'Halda Branding center' • Enhanced logistic supports for Halda River Research Lab • Prohibition of illegal sand extraction through local people • Waste management

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
Output Small and fisheries business run by the poor and the extremely poor will be included in the sustainable value chain activities through conservation and development of Halda River fish breeding grounds	A) Identification of problems at all levels of sub-sector value chain regarding conservation and development of natural breeding grounds of fish in Halda River and taking necessary activities will result in increase in egg and fry production by about 40-60%.	• Training provided to egg collectors, egg to fry producers, fishermen, farmer, boatman • Gradual increase in egg collection amount from 2016 to 2020	✓ Primary data • Discussion with egg collectors, egg to fry producers, fishermen, farmer, boatman, technical committee members, local administration, researcher ✓ Value chain project progress report	Most of the egg collectors, egg to fry producers and fishermen received theoretical training though increase in yearly egg amount	• Training through video documentary • Refreshers and follow up training • Updated database • Demo plot visits • Providing allowance and logistics • Modification of training programs • Enhancement of monitoring activities
	B) Production of fry, fingerling, brood fish will increase and business will expand.	Training provided to egg collectors, egg to fry producers both for earthen well and hatchery users, private hatchery owner and fishermen	✓ Primary data • Discussion with egg collectors, egg to fry producers, fishermen	• Recipients experienced increased fry production due to the training provided • Though the egg to fry amount has increased, the percentage of egg and fry damage remained fluctuating	• Research on egg to fry production method for identifying the effectiveness between earthen well and hatchery system • Workshop for communication with fish farming material providers • Dependable transportation • Tagging machine to maintain purity • Continuous financial and technical support

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
	C) Fish-friendly breeding environment will be created due to pesticide free cultivation so that biodiversity will be protected.	Training provided to farmers Intervention for stopping tobacco cultivation	✓ Primary data Discussion with farmers and ex-tobacco farmers	• Majority of the trainees reported that there was no change in production after receiving the training • Lack of organic fertilizers availability • Financial crisis • Land availability • Harvesting problem	• Hands on training with video • Visit to demo plot • Providing organic pesticide • Providing allowance and logistics • Providing loan for equipment
Activities 01) Advanced entrepreneur will get training in modern method of fry production from eggs.	01) 500 advanced entrepreneurs will get 2 days training on modern method of fry production from eggs.	500 advanced entrepreneurs received 2 days training on modern method of fry production from eggs.	✓ Primary data • Discussion with egg to fry producer and trainer • Annual Carp fry production (kg) • Hatching rate of carp eggs in hatchery ✓ Value chain project progress report	Increased from 2017 to 2019, decreased in 2020 Ongoing	• Show documentaries on egg collection and egg to fry production techniques • Training to maintain earthen well or hatchery for egg to fry production • Refreshers' training for better output
02) Training on skill development of fish entrepreneurs.	02) 2000 fish entrepreneurs will get one day skill development training.	2250 fish entrepreneurs received one day skill development training.	✓ Primary data ● Discussion with fisherman and trainer ● Annual Carp egg (kg) ● Hatching rate of carp eggs in earthen well ● Modernization of earthen well ● Status of Kums ● Annual income of the entrepreneur ✓ Value chain project progress report	Egg to fry producers experienced increased fry production due to the training provided	• Need to be validated by actual increase in the fry production based on eggs collected • Need to keep the refreshers training on to further consolidate the conversion of eggs to fish-fries.

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
03) Training of fish farmers on modern fish farming technology.	03) 200 fish farmers will get 2 days training on modern fish farming technology.	200 fish farmers received 2 days training on modern fish farming technology	✓ Primary Data • Discussion with egg to fry producer and trainer • Traditional hatching method in earthen well ✓ Value chain project progress report	• More than half of the trainee reported that their problems were not solved after training which indicated • Video documentary was considered as an effective tool by the trainee	• Need to curate the training content more cautiously • Training through video documentary • Refreshers and follow up training • Updated database • Besides training, financial support including loans, grants to buy necessary appliances.
04) 1 day training on how to operate boat in a controlled way in the sanctuary area.	04) 50 boatmen will get 1 day training on operating boats in a controlled way in the sanctuary area.	50 boatmen received 1 day training on operating boats in a controlled way in the sanctuary area.	✓ Primary Data • Discussion with boatman and trainer • Mechanize/engine boat status • Illegal fishing status • Status of egg collection boats ✓ Value chain project progress report	• Changes to the business-as-usual scenario because of navigation training • Almost half of the trainees gained knowledge about fisheries law after training • Enforcement of law will be cause of sufferings according to majority of the trainees	• Financial support • Government aid • Promotion of AIGA training
05) Fish farming materials/ equipment traders will be trained.	05) 20 fish farming materials / equipment traders will get 1 day training	120 fish farming materials / equipment traders received 1 day training	✓ Value chain project progress report	Lack of detailed documentation Priority on manual documentation consume more time and effort	• Need proper documentation • Need to update as online version • Required pre, ongoing and post training monitoring

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
06) Training on alternative use of pesticides to farmers.	06) 1000 farmers will get 1 day training on alternative use of pesticides.	1125 farmers received 1 day training on alternative use of pesticides.	✓ Primary Data ● Discussion with farmers on uses of pesticides and chemical fertilizers in the field besides river ✓ Value chain project progress report	• Half of the trainees considered the training as ineffective to solve their problems due to lack of logistic support and supply of organic pesticides. • Video documentaries and demo plot visit were considered for fruitful understanding.	• Training through video documentary • Refreshers and follow up training • Updated database • Demo plot visits • providing organic pesticide • Providing allowance and logistics • Providing loan for equipment • Installation of cold storage
07) Organizing project start-up workshops.	07) 01 start-up workshop will be organized.	01 start-up workshop was organized.	✓ Value chain project progress report	Lack of detailed documentation Priority on manual documentation consume more time and effort	• Need proper documentation • Need to update as online version • Required pre, ongoing and post project monitoring
08) Organizing workshops at project national level.	08) 03 national level workshops will be organized.	03 national level workshops were organized.	✓ Value chain project progress report	Lack of detailed documentation Priority on manual documentation consume more time and effort	• Need proper documentation • Need to update as online version • Required pre, ongoing and post project monitoring

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
09) To bring back the fish friendly environment in Halda River as per the advice of experts and technical committee.	09) As per the advice of experts and technical committee, fish friendly environment will be brought back in Halda River.	04 technical committee meeting and 04 expert committee were organized	✓ Primary data ● Comments from UNO, Chairman, technical committee member ✓ Value chain project progress report	• Majority marked project activities as successful • Majority emphasized on the logistic support, volunteer recruitment, and awareness creation to have a positive bearing on the protection of Halda through the project • Indicated a high level of satisfaction on the knowledge products from the project • Identified stopping illegal fish catching and increased fish production as supports that they have envisaged to derive from the project. • Satisfaction on the coordination, logistics support, volunteer information which helped the upazila administration to conduct 175 mobile courts with 70% success rate and 75% of the logistic support for those drives were given by the project	• More fund support • Continuation of all ongoing activities • Closer collaboration with local admin • Continuation of training activities • Creation of more AIGA opportunities, • Modification of training programs • Enhancement of monitoring activities • Increasing the number of hatcheries • More volunteers • Establish 'Halda Branding center' • Enhanced supports for Halda River Research Lab (HRRL) • More CC cameras • Increasing volunteers' honorarium. • More speed boats • Prompt availability of logistics for drives against illegal fishing or sand quarrying • Support for waste management needs to be substantially increased with more fast-paced research

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
10) Printing and distribution of leaflets on modern method of fry's production from eggs and protection of Halda River.	10) 5,000 leaflets will be printed and distributed on modern methods of fry production from eggs and protection of Halda River.	Distributed leaflets for awareness creation (Once)	✓ Primary data • Discussion with stakeholders ✓ Value chain project progress report	• Majority egg collectors, egg to fry producers and farmers received leaflet • More than half of the interviewed trainee did not receive leaflet.	• Continuation of leaflet distribution on modern method of fry's production from eggs and protection of Halda River during spawning and fish ban season
11) Demonstration of video on modern method of fry production from eggs, video on non-toxic vegetable cultivation, display of new IGA based video.	11) Video documentary on modern methods of fry production from eggs, video documentary on non-toxic vegetable cultivation, new IGA based videos will be displayed.	2 video documentaries have made on modern methods of fry production from eggs, video documentary on non-toxic vegetable cultivation	✓ Primary data • Discussion with egg collector, egg to fry producer, fisherman and farmer ✓ Value chain project progress report	• Not available in website or YouTube • More than half of the egg collector and egg to fry producer, farmer watched video documentary. • Majority of the fisherman did not watch video documentary but believed to be useful	• Should be available on website or youtube for easy access when required • Continuation of video presentation based on demand and updating video content
12) Miking to prevent catching of brood fish during the breeding season.	12) Miking will be done to prevent catching of brood fish during the breeding season.	Arrangement of miking to prevent catching of brood fish during the breeding season (Number: 20)	✓ Primary data • Discussion with egg collector, egg to fry producer and fisherman ✓ Value chain project progress report	Almost all the trainees (egg collectors, egg to fry producers and fishermen) opined for miking as effective tool for awareness creation	Continuation of miking to prevent catching of brood fish and for protection of Halda River during spawning and fish ban season
13) Establishment of signboards to mark the project area.	13) Signboards will be set up to mark the project area.	Establishment of signboards to mark the project area (Number: 65)	✓ Primary data • Discussion with volunteer • Photo record from field visit	Installed by volunteers Most of the signboards are still intact based on volunteers' opinion and field visit	Protection of already installed signboards and reinstallation of damaged ones

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
			✓ Value chain project progress report		
14) Celebration of Fisheries Week and participation in fish fairs.	14) Celebration of Fisheries Week and participation in fish fairs.	Celebrated Fisheries Week and participated in fish fairs. (8 times)	✓ Primary data Photo record ✓ Value chain project progress report	• Photo record • Lack of detailed documentation • Priority on manual documentation consume more time and effort	• Need proper documentation • Need to update as online version • Participation of egg to fry producers and fishermen needs to be ensured
15) To take the fry release activities for the expansion of Halda River fry through IDF to other partner organizations like CCDA, ADI and CDAAP.	15) Fry release activities will be undertaken for the expansion of 40,000 Halda River fry through IDF to other partner organizations such as CCDA, ADI and CDAAP.	Fry release activities were undertaken for the expansion of Halda River fry through IDF to other partner organizations such as JCF, RRF, SUS and NGF (2 times; number of fries were not mentioned)	✓ Primary data Photo record ✓ Value chain project progress report	• Photo record • Lack of detailed documentation	• Need to create a list of priority organizations for efficient expansion of Halda River fry • Need to monitor the purity of Halda fries shared by other organizations
16) Establishment of Halda river fingerling production technology and exhibition plots for entrepreneurs in fish farming.	16) Halda River fingerling production technology and exhibition plots will be set up for fish farming of 30 entrepreneurs.	50 exhibition plots were set up for fish farming on Halda River fingerling production	✓ Primary data ● Discussion with egg collector, egg to fry producer, fisherman on active fingerling producers, hatching of carp eggs in hatchery, and in earthen well and traditional hatching	• More than half of the egg collectors, egg to fry producers visited demo plot • Though the production has increased, the percentage of egg and fry damage remained fluctuating which	• Research needed on the comparative assessment of effective egg to fry production method between earthen well and hatchery besides visits to exhibition plots

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
			method in earthen well, modernization of earthen well • Photo record ✓ Value chain project progress report	seemed a frustrating outcome • As the data reported by the egg collectors and egg to fry producers from their memory, it should be taken into consideration accordingly with caution.	• Updated database of year wise production of fingerling from the beneficiaries record
17) Modernization of hatching system and setting up of demonstration plots of local earthen wells for entrepreneurs.	17) Modernization of hatching system and demonstration plots will be set up of local earthen wells for 40 entrepreneurs.	Modernization of hatching system and demonstration plots (Number: 70) were set up of local earthen wells for entrepreneurs. Modernization of earthen well (Number: 54)	✓ Primary data ● Discussion with egg collector, egg to fry producer, fisherman on active fingerling producers, hatching of carp eggs in earthen well and traditional hatching method in earthen well, modernization of earthen well • Photo record ✓ Value chain project progress report	• More than half of the egg collectors, egg to fry producers visited demo plot • Though the production has increased, the percentage of egg and fry damage remained fluctuating which seemed a frustrating outcome • As the data reported by the egg collectors and egg to fry producers from their memory, it should be taken into consideration accordingly with caution.	• Research needed on the comparative assessment of effective egg to fry production method between earthen well and hatchery besides visits to exhibition plots • Updated database of year wise production of fry and fingerling from the beneficiaries record

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
18) Establishment of 18 demonstration plots of pheromone trap bio pesticides and 10 vermi compost as an alternative to pesticides in crop production among farmers.	18) 18 demonstration plots of pheromone trap bio pesticides and 10 vermi compost demonstration plots will be set up among 28 farmers as an alternative to pesticides for crop production.	38 demonstration plots of pheromone trap bio pesticides and 40 vermi compost demonstration plots were set up as an alternative to pesticides for crop production.	✓ Primary data • Discussion with farmers • Photo record from field visit ✓ Value chain project progress report	• Demo plot visit were considered as effective tool for fruitful understanding. • Only demo plot visit was not ineffective to solve problems due to lack of logistic support, own land and supply of organic pesticides.	• Continuation of visits • Meetings with farmers to identify their problems • Providing organic pesticide • Providing allowance and logistics • Providing loan for equipment
19) Sanctuary and tree planted area are guarded locally through social organization consisting of Chairman at Union level.	19) Sanctuary and tree planted areas will be guarded locally at the union level through a social organization consisting of a chairman (2 contract based labor groups with a total of 20 members).	Patrolling in the sanctuary area through local volunteers Exchange meeting with 40 volunteers (38 times)	✓ Primary data • Discussion with volunteers on illegal fishing status, illegal sand extraction, mechanize/engine boat status, pollution status of river ✓ Value chain project progress report	Sanctuary and tree planted area are guarded by local volunteers by seizing illegal nets, guarding during spawning period, providing information to the authorities about relevant incidents	Required logistic supports like torch light, raincoat/umbrella, ID cards for security, speedboat mobile and incentives
20) In order to expand the market, hatchery owners or fish farmers in other parts of the country should inspect the brood and fry production activities from Halda stock.	20) In order to expand the market, 2 visits of 30 people in 1 day will be carried out to inspect the activities of brood and fry production from hatchery owners or fish farmers in other parts of the country.	Construction of hatchery (ongoing), Distribution of Halda fry to private hatchery owners	✓ Primary data • Discussion with egg to fry producers in hatchery and private hatchery owner • Photo record ✓Value chain project progress report	• Growing of Halda brood stock in hatchery was one of the project activities but no visit of fish farmers to the hatcheries were mentioned. • Lack of records regarding the amount of brood stock, amount of fry produced from	• Required support such as dependable transportation system, tagging machine to maintain purity and continuous financial and technical support • Need to ensure visit of fish farmers to this type of hatcheries

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
				brood stock and selling place. • Hatchery owners couldn't give any definite observations on the advantages of using Halda's brood stock in comparison to general brood stock.	• Research needed on the comparative assessment between Halda brood stock and hatcheries to ensure quality fry and fishes.
21) Conducting research activities.	21) 2 (1 + 1) postgraduate students will be appointed for 2 years to conduct research activities.	2 (1 + 1) postgraduate students were appointed at Halda River Research Lab for 2 years to conduct research activities. At present number of researchers: 1 M.Phil., 5 postgraduate and 4 undergraduate students	✓ Primary data • Discussion with Co-Ordinator of Halda River Research lab and the researchers • Photo record ✓ Value chain project progress report	• Research on water quality of Halda River, genome sequencing, species diversity, dolphin study, survey of Kum got focus • Publication process of research works completed at HRRL has started but facing lack of funding	• Need logistic supports, instrumentation, manpower as lab attendant and field work level, • Scholarship for students as continued support • Need for increasing the collaboration of research and lab work, • Need to increase manpower besides establishing a riverine station of HRRL to be more effective in the dissemination of its findings. • Research outcome needs to be shared with riverbank people and local administration for effective decisions on river conservation.

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
22) Preparation and printing of pre and final assessment report of the project by 3rd party.	22) Pre and final assessment report of the project will be prepared, printed and distributed by the third party.	Baseline survey report and submission of final assessment report by the third party.	Draft assessment report was submitted to PKSF by May, 2021	Comments are being addressed for finalization	• Pre, ongoing and post project monitoring should be ensured • All the project documents should be available in soft copy for prompt monitoring.
23) Effective steps to improve the quality of water.	23) Research on water quality improvement will be conducted by two students at the postgraduate level.	• Majority researchers cover the physical, chemical and biological parameters monitoring regarding Halda river water. • Physical parameters include turbidity, conductivity, TDS, salinity variation and resistivity. • Chemical parameters include COD, BOD, DO and pH. • Biological parameters include zooplankton and different other organisms • Assessment of water quality variations (pH, DO, salinity, BOD, COD, turbidity, conductivity and TDS) in Halda river in high tide and low tide during breeding season (April to June)	✓ Primary data • Discussion with Co-ordinator of Halda River Research lab and the researchers	Challenges included • Rough handling of instrument due to lack of technically sound lab assistant, • Risk of damage to expensive instrument like pH meter, multi parameter due to unskilled handling, • Shortage of space for expansion as needed • Possibilities of damages to valuable samples and specimen due to distance between Halda river and lab, • Risk of taking instruments to the riverside for experiment due to lack of proper transportation facility, • Less cooperation of local people in the context of experiment	• Assuring the presence of technical person for proper handling of instruments, • Ensuring safety of instruments and increasing logistic support • Establishing riverine station of HRRL at riverside, • Establishing lab-owned hatchery for better observation and experiments

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
		• Study on aquatic insects including hemimetabolous and holometabolous insects of Halda and its associated water bodies • Water quality and benthos diversity of Krishnakali, Purakopali, Katakhali, Khondokia, Madari, Kagotia and Chandkhali canals of Halda			
24) Applying the lessons learned from other projects implemented earlier on Halda River and reflecting on the development of Halda River to be done by MoFL, DoF, BFRI, BWDB.	24) Proper reflection on the educational issues of other projects implemented in the river and the development of Halda River to be done by MoFL, DoF, BFRI and BWDB, such as policy formulation and law enforcement, construction of sanctuaries, training, prohibition of motorized boat movement during breeding season, activities like conservation of hatching unit, prevention of water pollution, conservation of habitat, joint management, motivation of fishing community etc. will be undertaken.	Patrolling in sanctuary areas, training on egg to fry production techniques, creation of awareness, prohibition of motorized boat through voluntary activities, motivation of fishing community	✓ Primary data Discussion with egg collector, egg to fry producer, boatman, fisherman, farmer, trainer, technical committee member, local administration: UNO, Chairman, Member	Halda Riverbank people and local administration are involved with protection and conservation activities	• Need exchange meeting with MoFL, DoF, BFRI and BWDB authorities with group of Halda stakeholders consisting riverbank people and local administration • Monitoring and follow up of activities

Description	Expected Target Indicator	Actual Achievements	Monitoring techniques and information sources	Evaluation/Reason for lower achievements	Recommendations
25) Establish effective linkages with local hatcheries such as Masua Ghona, Maduna Ghat, Mobarakkhil, Paschim Gahira, Kagotia Fish Hatcheries in association with the chairmen at the union level.	25) Effective linkages will be established with local hatcheries such as Mashua Ghona, Maduna Ghat, Mobarakkhil, Paschim Gahira, Kagotia Fish Hatcheries in association with the chairmen at the union level.	01-day workshop at union level for fisherman to establish effective linkages with fish farming material providers Number of fishermen attended: 120	✓ Primary Data • Discussion with fishermen ✓ Value chain project progress report	• Less than half of the respondent trainees attended workshops with fish farming materials providers. • Almost one third of them considered the workshop meaningless while some of them thanked it for raising their awareness and knowledge on fish farming	• Need to establish linkages between hatchery owners and fry, fingerling producers by ensuring the availability of fish farming materials and other logistic support
26) Activities through the formation of social organizations in a local way.	26) 02 contract based social organization will work for the development of Halda River by establishing sanctuaries, tree plantation, law enforcement and regular contact with local influential people.	A group of local volunteers consisting of 40 members was formed to serve the purposes mentioned Exchange meeting with 40 volunteers (38 times)	✓ Primary data • Discussion with volunteers ✓ Value chain project progress report	Sanctuary and tree planted area are guarded by local volunteers by seizing illegal nets, guarding during spawning period, providing information to the authorities about relevant incidents	Required logistic supports like torch light, raincoat/umbrella, ID cards for security, speedboat mobile and incentives
27) Publication of evaluation report.	27) The evaluation report will be published (copy in Bengali-200 copies and English-200 copies).	Submission of Post project evaluation report (draft)	Draft evaluation report was submitted to PKSF by May 2021	Report review comments are being addressed	• Pre, ongoing and post project monitoring • Digital copy of all the project should be kept

5.8 Recommendations for Sustenance of Project Impacts

5.8.1 Overall recommendation from the evaluation

Based on the insights from the project activities, project records and the survey of stakeholders for this evaluation report, we make the following recommendation to consolidate the achievements of the project and to take steps ahead to build on the achievements and address the shortcomings.

1. It is necessary to keep on supporting the local administration to conduct drives against illegal activities hampering the ecosystem health of Halda as a breeding ground. Logistic support such as increased number of boats and their prompt availability with fuel and driver, enhanced CC camera coverage, etc. are to be considered.
2. It seemed essential to continue the volunteer program with better logistics and an optimum honorarium adequate at least to cover the cost of their transportation and communications for their committed involvement. A mean to convert volunteering into social recognition to enhance participation can be considered. Many volunteers were replaced in between as evident from the selection of respondents during the survey which indicates the presence of issues with the recruitment process. A more transparent recruitment system should be adopted to ensure long-term service from the volunteers.
3. Refresher training of the trained stakeholders including fishermen, egg collectors, boatmen, farmers. Hatchery owners etc. need to be continued to ensure they retain the training knowledge. Producing video documentaries on the training materials in audio-visual and manual formats may assist in this pursuit by assisting them to refresh their knowledge at their time and convenience.
4. Awareness building should be a continuous process and the next generation of the local community i.e., the students should be included in the awareness campaign. Besides, the religious leaders and teachers at local schools and other educational institutions are to be included. Means of blending awareness-raising to local cultural activities and media focus may be considered. For example, content creation campaigns for social media will increase youth engagement and may help to gain wider visibility.
5. Halda river research laboratory (HRIL) should be further strengthened by adding to the existing research infrastructure, research grants and research assignments, etc. It should be converted into the data hub for Halda researchers from anywhere in the country or world

by creating facilities for archiving all Halda related scientific information, reports and data and making it available through the internet.

6. Fluctuations exist in the number of eggs collected, an egg-to-fry ratio under different techniques and the income generated per kg of eggs collected. Research, training, demonstration, and extension of technology as well as innovation for marketing of fish fries from Halda to address the underlying issues need to be included in future endeavors to maintain the conservation status.
7. Tobacco farmers will revert to tobacco cultivation provided they don't get continued support to remain in farming alternative crops with better returns on their investments. Hence, increased emphasis needs to be given to keep them on board the conservation initiatives and enhance their inclusion into more comprehensive alternative income generation activities.
8. As administrative and political leadership changes with time, it is essential to keep the newcomers informed with comprehensive information packages and awareness building. HRIL can be instrumental to this end by developing information modules for continued awareness building among this segment.
9. "Better showing than saying" motto should be utilized in training and skill-building for activities related to egg collection and subsequent processing. Establishing permanent demonstration plots is essential to this end. Continuous process improvement under HRRL needs to be undertaken to innovate in this area based on traditional knowledge.
10. Alternative livelihood-related training is to be supplemented with additional supports to ensure the trainees' engagement with alternative income generation activities permanently. The evaluation gave the impression that a wide gap between training and translation remains here and offers an opportunity to create a microcredit-based SME development initiative.
11. Besides socioeconomic drivers, the ecological and environmental factors need to be investigated to ensure the conservation of Halda against degradation of the upper watershed and the salinity intrusion. Otherwise, all achievements on the social front may get eroded from natural degradation.

5.8.2 Specific recommendations from the stakeholder groups

5.8.2.1 From Administrators

- Θ To provide logistic support and adequate training to the volunteers
- Θ To establish a hatchery in collaboration with local people
- Θ To use close circuit cameras and increase volunteers' honorarium
- Θ To stand against illegal sand extraction and seek help from local authorities

5.8.2.2 From egg collectors

- Θ To show video documentaries to egg collection and egg to fry production techniques
- Θ To provide training to ensure regular maintenance of earthen well or hatchery for egg to fry production
- Θ To provide more refreshers' training for ensuring better output

5.8.2.3 From fishermen

- Θ Fish production and price inequality and inconsistency need to be addressed.
- Θ PKSF/IDF can play a vital role here by recording the trainee's production per area and documenting these in year-by-year production.
- Θ For the betterment of fishermen, IDF can take steps to eradicate income inequality.
- Θ The majority of fishermen should be connected to similar workshop programs to build up communication with other fish farmers.

5.8.2.4 From farmers

- Θ Providing organic pesticide
- Θ Providing allowance & logistics
- Θ Providing loans for equipment
- Θ Required for organic fertilizer
- Θ Required financial support
- Θ Required installment of cold storage and
- Θ Required more training about effective farming

5.8.2.5 From boatmen

- Θ To provide financial support
- Θ To provide alternative income-generating activities (AIGA) training

5.8.2.6 From hatchery owners

- Θ Logistic supports like tagging machine, marker, cutting rings to maintain pure broodstock
- Θ Financial & technical support

5.8.2.7 From volunteers

- Θ Required logistic support like ID cards, umbrella, mobile, security, incentives, etc.
- Θ Required financial support and security for volunteers
- Θ Required more speed boats
- Θ Making a list of illegal fishermen and take necessary action from the government
- Θ Installation of close circuit cameras with regular police patrolling

5.8.2.8 From Trainers

- Θ Execute well planned and effective sessions through skilled people
- Θ Include more practical and field-oriented activities
- Θ Sessions should be organized more than one day (at least 1 week) instead of daylong
- Θ Training session should be 10am-1pm
- Θ Audio-visual curriculum with demonstrations of activities
- Θ Provide loan or financial aid for start up to establish modern hatcheries
- Θ Provide advance schedule to the trainers and follow a planned and structured training

5.8.2.9 From Technical committee members

- Θ The possible financial support
- Θ Continuation of all running activities
- Θ Increasing collaboration with local administration
- Θ Creating alternative income-generating activities (AIGA) opportunities
- Θ Modification of training programs as per evaluation
- Θ Enhanced monitoring by recruiting more volunteers

- Θ Increasing the number of hatcheries
- Θ Construction of 'Branding center' and
- Θ Providing more logistic supports for Halda River Research Lab (HRRL)

5.8.2.10 From Coordinator of HRRL

- Θ Logistic supports for better instrumentation
- Θ Manpower support such as lab attendants, field workers
- Θ Scholarship for students
- Θ Establishing riverine station of HRRL at riverside
- Θ Establishing a lab-owned hatchery for better observation and experiments
- Θ Establishment of 'Branding center" where some egg collectors will work with IDF

5.8.2.11 From Researchers

- Θ Financial and logistic assistance needed for future research

5.8.2.12 From Farmers

- Θ To provide 1-2 goats, cows who do not have their farming land
- Θ To increase the cultivation of ginger because of storage possibility up to one year
- Θ To aid poultry farming for educated adult people of the villages
- Θ To ensure proper marketing channels of suggested alternative products.
- Θ To establish proper storage capacity for harvested crops
- Θ To provide crop calendar for better cultivation
- Θ To make collaboration with Upazila Agricultural Officer
- Θ To provide knowledge on advanced crop cultivation and harvesting
- Θ To give training on grafting and nursery development
- Θ To organize a visit to demonstration plots in Matiranga and Khagrachhari who have their land and facilities for alternative crop production.
- Θ To organize vaccination camp at least one day per month

6 Conclusion

A value chain project was implemented by IDF from 2016 to 2020 with support from PKSF and IFAD for conserving the natural breeding ground of major carps in the River Halda. Among the conservation endeavors, the project focused on sanctuary areas of the river, research on protecting the river environment, training workshops for Halda dependent people, alternative livelihood options through sustainable income-generating activities, voluntary activities, production of insecticide-free vegetables, navigation of water vessels, fishery legislation, inspiring tobacco cultivators through alternative income-generating activities, etc. After analyzing the performance indicators, the best performance has come out from the perspective of reduction in tobacco cultivation and the gradual increase in the production of egg and fish fry. In addition, the establishment of HRRL has given Halda its rightful academic presence and research opportunities on various aspects of the river in the academic and research community for the generation of data and insights for data-driven informed policymaking and programme design. HRRL needs to be nurtured further to bring the current initiatives into fruition and to undertake deeper and focused research for giving the conservation of Halda a boost from the academic and research community. Also, due to the constant support from the project volunteers and the logistic supports, the local administration could keep the illegal activities largely checked through 175 mobile courts for which the overall conservation status of Halda has been improved. In many forums, the condition of Halda at present has been hailed the best in decades with the challenges of the continuation of all activities that led to the current status. However, ensuring the purity of Halda fry, assuring the off-season livelihood resilience; ensuring sustainable alternative income generation pathways for tobacco farmers; checking the flow of all agrochemicals from adjoining farmlands and tea-gardens in the Halda valley, complete eradication of illegal fishing and sand extraction from Halda; improving training methodology for lasting impacts with follow up and refresher training; inspiring the volunteers with routine and substantial support to overcome social challenges they face, timely documentation of activities and sharing research outcome generated from Halda River research lab with the stakeholders of Halda and the Halda dependent people need to be emphasized on a priority basis. Moreover, several suggestions have come out from the relevant stakeholders that need to be addressed in the future which will be helpful for PKSF/IDF to play the role for ensuring the sustenance of the Halda. There are also emerging issues that may pose threats to the conservation of Halda initiatives and these need to prioritize and given due attention. Among these,

the case of increasing salinity in the absence of a reduction in the flushing water from the upper watershed due to massive deforestation and erroneous land-use practices is the major one. Linked to it is the sedimentation which will exacerbate in the absence of illegal sand extraction and will essentially require routine monitoring with research on the development of a sustainable method to keep the fish hotspots or Kum at an optimum depth for mother fishes. A dashboard showing all concurrent data and insights from all sources to a central place, hosted by a suitable entity like HRRL, to be accessed by all stakeholders, planners, and policymakers to make sure all entities engaged in the conservation of Halda initiatives are the same page and there is no duplication of efforts, and all interventions are based on the reliable and contemporary data.

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8 Annex

ডিম থেকে রেণু উৎপাদনকারী এবং হ্যাচারি ব্যবস্থাপনায় জড়িতদের জন্য
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। ডিম থেকে রেণু উৎপাদনের জন্য পূর্বে কি ধরণের পদ্ধতি অনুসরণ করতেন?
২। পূর্বের পদ্ধতি অনুসরণ করতে গিয়ে কি কি সমস্যার সম্মুখীন হয়েছেন?
৩। আধুনিক প্রযুক্তিতে ডিম থেকে রেণু উৎপাদন সম্পর্কে আইডিএফ থেকে প্রশিক্ষণ পেয়েছেন কিনা?
ক) হ্যাঁ খ) না
৩। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

৪। প্রশিক্ষণ সম্পর্কিত কাগজপত্র পেয়েছেন কিনা?
ক) হ্যাঁ খ) না
৫। প্রশিক্ষণ লাভের পর ডিম থেকে রেণু উৎপাদনে পূর্ববর্তী সমস্যার সমাধান হয়েছে কিনা?
ক) হ্যাঁ খ) না
৬। প্রশিক্ষণ লাভের পর ডিম থেকে রেণু উৎপাদনের পরিমাণে পরিবর্তন এসেছে কিনা?
ক) হ্যাঁ খ) না
৬। ক) যদি হ্যাঁ হয় তাহলে উৎপাদনের পরিমাণ ও আয় কত?

সাল	ডিম (একক)	ডিম থেকে আয় (টাকা)	রেণু (একক)	রেণু থেকে আয় (টাকা)
২০১৫				
২০১৬				
২০১৭				
২০১৮				
২০১৯				
২০২০				

৭। হ্যাচারি ব্যবস্থাপনায় পূর্বে কি ধরণের পদ্ধতি অনুসরণ করতেন?
৮। পূর্বের পদ্ধতি অনুসরণ করতে গিয়ে কি কি সমস্যার সম্মুখীন হয়েছেন?
৯। আধুনিক প্রযুক্তিতে হ্যাচারি ব্যবস্থাপনায় বিভিন্ন কর্মকাণ্ড সম্পর্কে প্রশিক্ষণ পেয়েছেন কিনা?
ক) হ্যাঁ খ) না
৯। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

১০। প্রশিক্ষণ সম্পর্কিত কাগজপত্র পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

১১। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ২ দিনই পর্যাপ্ত

খ) ২ দিনের কম হলে ভালো

গ) ২ দিনের বেশি হলে ভালো

১২। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত

খ) ২৫ জনের কম

গ) ২৫ জনের বেশি

১৩। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১৪। ডিম থেকে রেণু উৎপাদন এবং হ্যাচারি ব্যবস্থাপনা বিষয়ক রিফ্রেশার্স প্রশিক্ষণ পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

১৪। ক) যদি হ্যাঁ হয় তাহলে রিফ্রেশার্স প্রশিক্ষণ থেকে কি কি শিখেছেন?

১৫। প্রশিক্ষণের কারণে বর্তমানে উপকৃত হচ্ছেন কিনা?

ক) হ্যাঁ খ) না

১৬। ভবিষ্যতে এই ধরণের প্রশিক্ষণের প্রয়োজনীয়তা আছে বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

১৭। আইডিএফ কর্তৃক প্রস্তুতকৃত ডিম থেকে রেণু উৎপাদন এবং হ্যাচারি ব্যবস্থাপনা বিষয়ক কোনো ভিডিও ডকুমেন্টারি দেখেছেন কিনা?

ক) হ্যাঁ খ) না

১৭। খ) যদি না হয় তাহলে ভিডিও ডকুমেন্টারি তৈরি করে দেখানো হলে তা থেকে লাভবান হবেন বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

১৮। আইডিএফ কর্তৃক মৎস্য চাষে হালদা নদীর আঙ্গুলি পোনা উৎপাদন প্রযুক্তির যে প্রদর্শনী স্থাপন করা হয়েছে তা দেখেছেন কিনা?

ক) হ্যাঁ খ) না

১৯। আইডিএফ কর্তৃক হালদা নদীর মাছ সংরক্ষণ ও উন্নয়নে জনসচেতনতা সৃষ্টির লক্ষ্যে ছাপানো লিফলেট পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

২০। মাটির কুয়ায় যারা ডিম ফোঁটায় এবং হালদার অন্যান্য মৎস্যজীবীরাও আইডিএফ কর্তৃক প্রশিক্ষণ পেয়েছেন বলে জানা আছে কিনা?

ক) হ্যাঁ খ) না

২১। হালদা নদী থেকে সরাসরি ডিম সংগ্রহকারী কতজন আছে বলে মনে করেন?

২২। হালদা নদী থেকে সরাসরি ডিম থেকে রেণু উৎপাদনকারী কতজন আছে বলে মনে করেন?

২৩। হালদা নদী থেকে সরাসরি রেণু থেকে আঙ্গুলি পোনা উৎপাদনকারী কতজন আছে বলে মনে করেন?

২৪। আধুনিক প্রযুক্তিতে ডিম থেকে রেণু উৎপাদন এবং হ্যাচারি ব্যবস্থাপনায় বিভিন্ন কর্মকাণ্ড সম্পর্কে প্রশিক্ষণ গ্রহণের পর প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

ডিম-সংগ্রহকারী

উত্তরদাতার নামঃ

ঠিকানাঃ

যোগাযোগের নম্বরঃ

ডিম সংগ্রহ সংক্রান্ত

১। হালদা থেকে রুই জাতীয় মাছের ডিম সংগ্রহের জন্য পূর্বে কি কি ধরণের পদ্ধতি অনুসরণ করতেন?

২। পূর্বের পদ্ধতি অনুসরণ করতে গিয়ে কি কি সমস্যার সম্মুখীন হয়েছেন?

৩। ডিম সংগ্রহের আধুনিক কলাকৌশল সম্পর্কে আইডিএফ থেকে প্রশিক্ষণ পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

৩। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

৪। ডিম সংগ্রহের সময় ডিমের ক্ষতি হ্রাসে করণীয় সম্পর্কে প্রশিক্ষণ থেকে জানতে পেরেছেন কিনা?

ক) হ্যাঁ খ) না

৫। ডিম সংগ্রহের সময় অন্যান্য পোনার ক্ষতি হ্রাসে করণীয় সম্পর্কে প্রশিক্ষণ থেকে জানতে পেরেছেন কিনা?

ক) হ্যাঁ খ) না

৬। প্রশিক্ষণ লাভের পর ডিম সংগ্রহের পূর্ববর্তী সমস্যার সমাধান হয়েছে কিনা?

ক) হ্যাঁ খ) না

৭। প্রশিক্ষণ লাভের পর ডিম সংগ্রহের পরিমাণে পরিবর্তন এসেছে কিনা?

ক) হ্যাঁ খ) না

৭। ক) যদি হ্যাঁ হয় তাহলে পরিমাণ ও আয় কত?

সাল	ডিম (কেজি)	ডিম থেকে আয় (টাকা)
২০১৫		
২০১৬		
২০১৭		
২০১৮		
২০১৯		
২০২০		

৮। প্রশিক্ষণ লাভের পর ডিমের ক্ষতির পরিমাণে পরিবর্তন এসেছে কিনা?

ক) হ্যাঁ খ) না

৮। ক) যদি হ্যাঁ হয় তাহলে পরিমাণ কত?

সাল	ডিমের পরিমাণ (কেজি)	ডিমের ক্ষতি (%)
২০১৫		
২০১৬		
২০১৭		
২০১৮		
২০১৯		
২০২০		

৯। প্রশিক্ষণ লাভের পর রুই জাতীয় মাছ ব্যাতিত অন্যান্য পোনার ক্ষতির পরিমাণে পরিবর্তন এসেছে কিনা?

ক) হ্যাঁ খ) না

৯। ক) যদি হ্যাঁ হয় তাহলে পরিমাণ কত?

সাল	ডিমের পরিমাণ (একক)	অন্যান্য পোনার ক্ষতি (%)
২০১৫		

২০১৬		
২০১৭		
২০১৮		
২০১৯		
২০২০		

১০। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ১ দিনই পর্যাপ্ত

খ) ১ দিনের কম হলে ভালো

গ) ১ দিনের বেশি হলে ভালো

১১। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত

খ) ২৫ জনের কম

গ) ২৫ জনের বেশি

১২। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১৩। প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

ডিম ফুটিয়ে রেণু উৎপাদন সংক্রান্ত

১৪। মাটির কুয়ায় ডিম ফোটানোর জন্য পূর্বে কি ধরণের পদ্ধতি অনুসরণ করতেন?

১৫। পূর্বের পদ্ধতি অনুসরণ করতে গিয়ে কি কি সমস্যার সম্মুখীন হয়েছেন?

১৬। মাটির কুয়ায় ডিম ফোটানোর আধুনিক কলাকৌশল সম্পর্কে প্রশিক্ষণ পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

১৬। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে

II. হাতে-কলমে

III. উভয়ই

IV. অন্যান্য

১৭। প্রশিক্ষণ লাভের পর ডিম ফোটানোর পূর্ববর্তী সমস্যার সমাধান হয়েছে কিনা?

ক) হ্যাঁ খ) না

১৮। প্রশিক্ষণ লাভের পর ডিম ফোটানোর পরিমাণে পরিবর্তন এসেছে কিনা?

ক) হ্যাঁ খ) না

১৮। ক) যদি হ্যাঁ হয় তাহলে পরিমাণ ও আয় কত?

সাল	ডিম (একক)	ডিম ফোটানো (একক)	ফোটানো ডিম থেকে আয় (টাকা)
২০১৫			
২০১৬			
২০১৭			
২০১৮			
২০১৯			
২০২০			

১৯। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ১ দিনই পর্যাপ্ত
খ) ১ দিনের কম হলে ভালো
গ) ১ দিনের বেশি হলে ভালো

২০। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত
খ) ২৫ জনের কম
গ) ২৫ জনের বেশি

২১। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

২২। প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

ডিম সংগ্রহ ও রেণু তোলার সময় ছাড়া অন্য সময়ের কাজ সংক্রান্ত

২৩। অফ সিজনে পূর্বে কি কাজ করতেন?

২৪। অফ-সিজনে আয়বর্ধনমূলক কর্মকাণ্ড পরিচালনার জন্য প্রশিক্ষণ পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

২৪। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

২৫। প্রশিক্ষণ লাভের পর অফ-সিজনে আয়ের পরিমাণে পরিবর্তন এসেছে কিনা?

ক) হ্যাঁ খ) না

২৫। ক) যদি হ্যাঁ হয় তাহলে আয়ের পরিমাণ কত?

সাল	অফ সিজনে আয় (টাকা)
২০১৫	
২০১৬	
২০১৭	
২০১৮	
২০১৯	
২০২০	

২৬। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ১ দিনই পর্যাপ্ত
খ) ১ দিনের কম হলে ভালো
গ) ১ দিনের বেশি হলে ভালো

২৭। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত
খ) ২৫ জনের কম
গ) ২৫ জনের বেশি

২৮। প্রশিক্ষণ সম্পর্কিত কাগজপত্র পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

২৯। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

৩০। প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

৩১। ভবিষ্যতে এই ধরণের প্রশিক্ষণের প্রয়োজনীয়তা আছে বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

আইডিএফ কর্তৃক প্রস্তুতকৃত মাল্টিমিডিয়া কন্টেন্ট সংক্রান্ত

৩২। আইডিএফ কর্তৃক প্রস্তুতকৃত ডিম সংগ্রহের আধুনিক কলাকৌশল, মাটির কুয়ায় ডিম ফোটানো বিষয়ক কোনো ভিডিও ডকুমেন্টারি দেখেছেন কিনা?

ক) হ্যাঁ খ) না

৩২। খ) যদি না হয় তাহলে ভিডিও ডকুমেন্টারি তৈরি করে দেখানো হলে তা থেকে লাভবান হবেন বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

৩৩। আইডিএফ কর্তৃক মাটির কুয়ায় হ্যাচিং পদ্ধতির আধুনিকায়ন প্রযুক্তির যে প্রদর্শনী প্লট স্থাপন করা হয়েছে তা দেখেছেন কিনা?

ক) হ্যাঁ খ) না

৩৪। আইডিএফ কর্তৃক পুরাতন মাটির কুয়া সংস্কারের কোনো প্রদর্শনী পরিদর্শনের পদক্ষেপ নেয়া হয়েছে কিনা?

ক) হ্যাঁ খ) না

৩৫। মাছের প্রজনন ঋতুতে আইডিএফ কর্তৃক মাইকিং এর ব্যাপারে অবহিত আছেন কিনা?

ক) হ্যাঁ খ) না

৩৬। মাছের প্রজনন ঋতুতে আইডিএফ কর্তৃক মাইকিং কার্যকর কিনা?

ক) হ্যাঁ খ) না

৩৭। সন্তানদের শিক্ষার জন্য আইডিএফ থেকে কোনো সহায়তা পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

৩৭।ক) যদি হ্যাঁ হয় তাহলে কি সহায়তা পেয়েছেন?

৩৮। ভবিষ্যতেও এরকম সহায়তা প্রয়োজন কিনা?

৩৯। আইডিএফ কর্তৃক হালদা নদীর মাছ সংরক্ষণ ও উন্নয়নে জনসচেতনতা সৃষ্টির লক্ষ্যে ছাপানো লিফলেট পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

৪০। ডিম থেকে রেণু উৎপাদন এবং হ্যাচারি ব্যবস্থাপনার সাথে জড়িত ব্যক্তিরাও আইডিএফ কর্তৃক এধরনের প্রশিক্ষণ পেয়েছেন বলে জানা আছে কিনা?

ক) হ্যাঁ খ) না

৪১। হালদা নদী থেকে সরাসরি ডিম সংগ্রহকারী কতজন আছে বলে মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

৪২। হালদা নদী থেকে সরাসরি ডিম থেকে রেণু উৎপাদনকারী কতজন আছে বলে মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

৪৩। হালদা নদী থেকে সরাসরি রেণু থেকে আঙ্গুলি পোনা উৎপাদনকারী কতজন আছে বলে মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

৪৪। হালদা থেকে মাছের ডিম উৎপাদন ও রেনু উৎপাদন বৃদ্ধিতে কি কি করা যেতে পারে?

সময়	করনীয়
ডিম উৎপাদন	
রেনু উৎপাদন	

হালদা নদীর পোণা-নির্ভর মাছচাষিদের জন্য

উত্তরদাতার নামঃ

ঠিকানাঃ

যোগাযোগের নম্বরঃ

১। কার্প জাতীয় মাছ চাষের জন্য পূর্বে কি ধরণের পদ্ধতি অনুসরণ করতেন?

২। পূর্বের পদ্ধতি অনুসরণ করতে গিয়ে কি কি সমস্যার সম্মুখীন হয়েছেন?

৩। উন্নত প্রযুক্তিতে কার্প জাতীয় মাছ চাষ সম্পর্কে আইডিএফ থেকে প্রশিক্ষণ পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

৩। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

৪। প্রশিক্ষণ সম্পর্কিত কাগজপত্র পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

৫। প্রশিক্ষণ লাভের পর মাছ চাষে পূর্ববর্তী সমস্যার সমাধান হয়েছে কিনা?

ক) হ্যাঁ খ) না

৬। প্রশিক্ষণ লাভের পর মাছের উৎপাদনের পরিমাণে পরিবর্তন এসেছে কিনা?

ক) হ্যাঁ খ) না

৬। ক) যদি হ্যাঁ হয় তাহলে উৎপাদনের পরিমাণ ও আয় কত?

সাল	পুকুরের জমির পরিমাণ (একক)	উৎপাদন (পরিমাণ)	আয় (টাকা)
২০১৫			
২০১৬			
২০১৭			
২০১৮			
২০১৯			
২০২০			

৭। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ২ দিনই পর্যাপ্ত
খ) ২ দিনের কম হলে ভালো
গ) ২ দিনের বেশি হলে ভালো

৮। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত
খ) ২৫ জনের কম
গ) ২৫ জনের বেশি

৯। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১০। প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১১।আইডিএফ এর মাধ্যমে মৎস্য চাষ সামগ্রী/ উপকরণ সরবরাহকারীদের সাথে আপনাদের সংযোগ বৃদ্ধির জন্য উপজেলা পর্যায়ে কোনো কর্মশালার আয়োজন করা হয়েছে কিনা?

ক) হ্যাঁ খ) না

১১। ক) যদি হ্যাঁ হয় তাহলে কর্মশালা থেকে নতুন কি কি তথ্য জানতে পেরেছেন?

১২। প্রশিক্ষণের কারণে বর্তমানে উপকৃত হচ্ছেন কিনা?

ক) হ্যাঁ খ) না

১৩। ভবিষ্যতে এই ধরণের প্রশিক্ষণের প্রয়োজনীয়তা আছে বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

১৪। আইডিএফ কর্তৃক প্রস্তুতকৃত উন্নত প্রযুক্তিতে কার্প জাতীয় মাছ চাষ বিষয়ক কোনো ভিডিও ডকুমেন্টারি দেখেছেন কিনা?

ক) হ্যাঁ খ) না

১৪। খ) যদি না হয় তাহলে ভিডিও ডকুমেন্টারি তৈরি করে দেখানো হলে তা থেকে লাভবান হবেন বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

১৫। আইডিএফ কর্তৃক হালদা নদীর মাছ সংরক্ষণ ও উন্নয়নে জনসচেতনতা সৃষ্টির লক্ষ্যে ছাপানো লিফলেট পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

১৬। মাছের প্রজনন ঋতুতে আইডিএফ কর্তৃক মাইকিং এর ব্যাপারে অবহিত আছেন কিনা?

ক) হ্যাঁ খ) না

১৭। সন্তানদের শিক্ষার জন্য আইডিএফ থেকে কোনো সহায়তা পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

১৭।ক) যদি হ্যাঁ হয় তাহলে কি সহায়তা পেয়েছেন?

১৮। ভবিষ্যতেও এরকম সহায়তা প্রয়োজন কিনা?

১৯। মাটির কুয়ায় যারা ডিম ফোঁটায় এবং হালদার অন্যান্য মৎস্যজীবীরাও আইডিএফ কর্তৃক প্রশিক্ষণ পেয়েছেন বলে জানা আছে কিনা?

ক) হ্যাঁ খ) না

২০। ডিম থেকে রেণু উৎপাদন এবং হ্যাচারি ব্যবস্থাপনার সাথে জড়িত ব্যক্তিরাও আইডিএফ কর্তৃক এধরনের প্রশিক্ষণ পেয়েছেন বলে জানা আছে কিনা?

ক) হ্যাঁ খ) না

২১। হালদা নদী থেকে সরাসরি ডিম সংগ্রহকারী কতজন আছে বলে মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

২২। হালদা নদী থেকে সরাসরি ডিম থেকে রেণু উৎপাদনকারী কতজন আছে বলে মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

২৩। হালদা নদী থেকে সরাসরি আঙ্গুলি পোনা উৎপাদনকারী কতজন আছে বলে মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

২৪। হালদা নদী থেকে অবৈধভাবে মাছ ধরার বিষয়ে আপনি অবহিত আছেন কিনা?

২৫। অবৈধভাবে মাছ ধরার কারণে কি ধরণের ক্ষতি হয় বলে আপনি মনে করেন?

২৬। কতজন জেলে অবৈধভাবে মাছ ধরার সাথে জড়িত বলে আপনি মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

২৭। অফ সিজনে (মার্চ থেকে জুন) মাছ ধরা বন্ধ থাকার কারণে আপনার মোট আয়ের ক্ষতি হয় কিনা?

ক) হ্যাঁ খ) না

২৭। ক) যদি হ্যাঁ হয় সেসময় আপনার আয়ের উৎস কি?

২৮। আইডিএফ থেকে প্রাপ্ত প্রশিক্ষণ মাছ ধরা বন্ধ থাকার কারণে আপনার আর্থিক ক্ষতি পুষিয়ে নিতে সহায়ক ভূমিকা পালন করে কি?

ক) হ্যাঁ খ) না

২৮। ক) যদি হ্যাঁ হয় তাহলে কিভাবে?

২৮।খ) যদি না হয় তাহলে অফ সিজনেও লাভবান হতে হলে প্রশিক্ষণ থেকে আপনার প্রত্যাশা কি?

কৃষক
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। জমিতে চাষাবাদের জন্য পূর্বে কি কি প্রয়োগ করতেন?
২। পূর্বের পদ্ধতি অনুসরণ করতে গিয়ে কি কি সমস্যার সম্মুখীন হয়েছেন?
৩। বিষাক্ত কীটনাশকের বিকল্প ফেরোমন ফাঁদ ও জৈব বালাইনাশক ব্যবহার করে চাষাবাদ নিয়ে আইডিএফ থেকে প্রশিক্ষণ পেয়েছেন কিনা?
ক) হ্যাঁ খ) না
৩। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

৪। প্রশিক্ষণ সম্পর্কিত কাগজপত্র পেয়েছেন কিনা? ক) হ্যাঁ খ) না
৫। প্রশিক্ষণ লাভের পর চাষাবাদের পূর্ববর্তী সমস্যার সমাধান হয়েছে কিনা? ক) হ্যাঁ খ) না
৬। প্রশিক্ষণ লাভের পর জমিতে কীটনাশক বা জৈব বালাইনাশক প্রদানের পরিমাণে পরিবর্তন এসেছে কিনা? ক) হ্যাঁ খ) না
৬। ক) যদি হ্যাঁ হয় তাহলে পরিমাণ কত?

সাল	জমির পরিমাণ (একক)	কীটনাশক (একক)	জৈব বালাইনাশক (একক)
২০১৫			
২০১৬			
২০১৭			
২০১৮			
২০১৯			
২০২০			

৭। প্রশিক্ষণ লাভের পর চাষাবাদের উৎপাদনের পরিমাণে পরিবর্তন এসেছে কিনা? ক) হ্যাঁ খ) না
৭। ক) যদি হ্যাঁ হয় তাহলে উৎপাদনের পরিমাণ ও আয় কত?

সাল	জমির পরিমাণ (একক)	উৎপাদন (একক)	উৎপাদন থেকে আয় (টাকা)
২০১৫			
২০১৬			
২০১৭			
২০১৮			
২০১৯			
২০২০			

৮। প্রশিক্ষণ থেকে প্রাপ্ত শিক্ষা প্রয়োগে কোনো সীমাবদ্ধতা আছে কিনা? ক) হ্যাঁ খ) না
৮। ক) যদি হ্যাঁ হয় তাহলে সীমাবদ্ধতাগুলো কি কি?
৮। ক) I. সীমাবদ্ধতাগুলো কাটিয়ে ওঠার জন্য করণীয় কি কি?

৯। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ১ দিনই পর্যাপ্ত খ) ১ দিনের কম হলে ভালো গ) ১ দিনের বেশি হলে ভালো

১০। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত খ) ২৫ জনের কম গ) ২৫ জনের বেশি

১১। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১২। প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১৩। প্রশিক্ষণের কারণে বর্তমানে উপকৃত হচ্ছেন কিনা? ক) হ্যাঁ খ) না

১৪। ভবিষ্যতে এই ধরণের প্রশিক্ষণের প্রয়োজনীয়তা আছে বলে মনে করেন কিনা? ক) হ্যাঁ খ) না

১৫। আইডিএফ কর্তৃক প্রস্তুতকৃত বিষাক্ত কীটনাশকের পরিবর্তে ফেরোমন ফাঁদ এবং জৈব বালাইনাশক ব্যবহার করে চাষাবাদ বিষয়ক কোনো ভিডিও ডকুমেন্টারি দেখেছেন কিনা? ক) হ্যাঁ খ) না

১৫। খ) যদি না হয় তাহলে ভিডিও ডকুমেন্টারি তৈরি করে দেখানো হলে তা থেকে লাভবান হবেন বলে মনে করেন কিনা?

ক) হ্যাঁ খ) না

১৬। আইডিএফ কর্তৃক ফসল উৎপাদনে বিষাক্ত কীটনাশকের পরিবর্তে ফেরোমন ফাঁদ এবং জৈব বালাইনাশক ব্যবহার করে চাষাবাদ বিষয়ক যে প্রদর্শনী প্লট স্থাপন করা হয়েছে তা দেখেছেন কিনা? ক) হ্যাঁ খ) না

১৬। ক) যদি হ্যাঁ হয় এর মাধ্যমে আপনার কোনো উপকার হয়েছে কিনা? I. হ্যাঁ II. না

১৬। ক) I. কি কি উপকার হয়েছে?

১৭। আইডিএফ কর্তৃক নিরাপদ উপায়ে সবজি চাষের যে প্রদর্শনী প্লট স্থাপন করা হয়েছে তা দেখেছেন কিনা? ক) হ্যাঁ খ) না

১৭। ক) যদি হ্যাঁ হয় এর মাধ্যমে আপনার কোনো উপকার হয়েছে কিনা? I. হ্যাঁ II. না

১৭। ক) I. কি কি উপকার হয়েছে?

১৮। আইডিএফ কর্তৃক ভার্মি কম্পোস্টের যে প্রদর্শনী প্লট স্থাপন করা হয়েছে তা দেখেছেন কিনা? ক) হ্যাঁ খ) না

১৮। ক) যদি হ্যাঁ হয় এর মাধ্যমে আপনার কোনো উপকার হয়েছে কিনা? I. হ্যাঁ II. না

১৮। ক) I. কি কি উপকার হয়েছে?

১৯। আইডিএফ কর্তৃক হালদা নদীর মাছ সংরক্ষণ ও উন্নয়নে জনসচেতনতা সৃষ্টির লক্ষ্যে ছাপানো লিফলেট পেয়েছেন কিনা?

ক) হ্যাঁ খ) না

১৯। ক) যদি হ্যাঁ হয় এর মাধ্যমে আপনার কোনো উপকার হয়েছে কিনা?

I. হ্যাঁ II. না

১৯। ক) I. কি কি উপকার হয়েছে?

নৌযান চালক
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ

১। মৎস্য বান্ধব পরিবেশ বলতে কি বোঝেন? তিনটি বিষয় উল্লেখ করুন।

২। মৎস্য বান্ধব পরিবেশ বজায় রাখার জন্য নৌযান চালানোর সময় আপনি কি কি নিয়ম পালন করেন?

৩। মাছের অভয়াশ্রম বলতে আপনি কি বোঝেন?

৪। অভয়াশ্রম এলাকায় নৌযান চালানোর ব্যাপারে আপনি কি নিয়ম পালন করেন?

৫। মৎস্য বান্ধব পরিবেশ বজায় রেখে নৌযান চলাচল ও মৎস্য আইন বিষয়ক কোনো প্রশিক্ষণ আইডিএফ থেকে পেয়েছেন কিনা?
ক) হ্যাঁ খ) না

৫। ক) যদি হ্যাঁ হয় তাহলে কি কি প্রশিক্ষণ পেয়েছেন?

I. কাগজে-কলমে
II. হাতে-কলমে
III. উভয়ই
IV. অন্যান্য

৬। প্রশিক্ষণের পূর্বে ও পরে নৌযান চলাচলের ধরণে পরিবর্তন এসেছে কিনা? ক) হ্যাঁ খ) না

৬।ক) যদি হ্যাঁ হয় কি ধরণের পরিবর্তন হয়েছে?

প্রশিক্ষণের পুর্বে	প্রশিক্ষণের পরে

৭। নৌযান চলাচলের ধরণে পরিবর্তনের কারণে আর্থিক ক্ষতির সম্মুখীন হচ্ছেন কিনা? ক) হ্যাঁ খ) না

৭। ক) যদি হ্যাঁ হয় কি ধরণের ক্ষতি?

নৌযান চলাচলের ধরণে পরিবর্তনের পুর্বে গড় মাসিক আয়	নৌযান চলাচলের ধরণে পরিবর্তনের পরে গড় মাসিক আয়

৮। ক্ষতি নিরসনে নৌযান চলাচল বিষয়ক কি কি ব্যবস্থা নেওয়া উচিৎ বলে মনে করেন?

৯। প্রশিক্ষণের পূর্বে মৎস্য আইন বিষয়ে জানতেন কিনা? ক) হ্যাঁ খ) না

১০। মৎস্য আইন বিষয়ে জানার পর আইন প্রয়োগে সহায়তা করছেন কিনা? ক) হ্যাঁ খ) না

১০।ক) যদি হ্যাঁ হয় কিভাবে করছেন?

১১। মৎস্য আইন বাস্তবায়িত হলে আপনি ক্ষতিগ্রস্ত হবেন বলে মনে করেন কিনা? ক) হ্যাঁ খ) না

১১।ক) যদি হ্যাঁ হয় কিভাবে?

১২। মৎস্য আইন প্রয়োগের ক্ষতি নিরসনে করণীয় কি হওয়া উচিৎ বলে মনে করেন?

১৩। মৎস্য বান্ধব পরিবেশ বজায় রেখে নৌযান চলাচল ও মৎস্য আইন বিষয়ক প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?
ক) ১ দিনই পর্যাপ্ত খ) ১ দিনের কম হলে ভালো গ) ১ দিনের বেশি হলে ভালো

১৪। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?
ক) ২৫ জনই পর্যাপ্ত
খ) ২৫ জনের কম গ) ২৫ জনের বেশি

১৫। প্রশিক্ষণ থেকে প্রাপ্ত উপকারকে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১৬। প্রশিক্ষককে মূল্যায়ন করতে বলা হলে পাঁচে (৫) কত দিবেন?

১৭। ভবিষ্যতে এই ধরণের প্রশিক্ষণের প্রয়োজনীয়তা আছে বলে মনে করেন কিনা? ক) হ্যাঁ খ) না

১৮। আইডিএফ কর্তৃক জনসচেতনতা সৃষ্টির লক্ষ্যে ছাপানো লিফলেট পেয়েছেন কিনা? ক) হ্যাঁ খ) না

গবেষকদের জন্য প্রণীত প্রশ্নমালাঃ
গবেষকের নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ

১। গবেষণার শিরোনাম উল্লেখ করুন।
২। গবেষণার উদ্দেশ্যসমূহ উল্লেখ করুন।
৩। গবেষণা থেকে প্রাপ্ত ফলাফলের সারসংক্ষেপ কি?
৪। এসব ফলাফল হালদা সংরক্ষণে কি ধরনের ভূমিকা রাখবে বলে আপনি মনে করেন?
৫। এসব ফলাফল থেকে কি কি ধরণের প্রকাশনা হয়েছে?
৬। গবেষণার ফলাফলের সম্ভাব্য উপকারভোগী অংশীজন কারা?
৭। গবেষণার ফলাফলের সম্ভাব্য উপকারভোগী অংশীজনের কাছে প্রচারের কি ব্যবস্থা নিয়েছেন?
৮। এসব ফলাফল আরও কার্যকরভাবে ব্যবহারের জন্য আর কি কি করা যেত বলে আপনি মনে করেন?
৯। হালদা নদীতে মাছের প্রাকৃতিক প্রজননক্ষেত্র সংরক্ষণ ও উন্নয়নের জন্য গবেষণার কাজে আইডিএফ কর্তৃক যে সহায়তা প্রদান করা হয়েছে সেটা কি যথেষ্ট? ক) হ্যাঁ খ) না
৯। খ) যদি না হয় তার কারণ কি?
১০। ভবিষ্যতে এ ধরনের গবেষণা সহায়তা অব্যাহত রাখার ব্যাপারে আপনার পরামর্শ কি?
১১। ভবিষ্যতে গবেষণা অব্যাহত রাখার জন্য কি ধরণের সহায়তা প্রয়োজন?

ক) আর্থিক ( )
খ) লজিস্টিক ( )
গ) অন্যান্য ( )

১২। আইডিএফ থেকে সহায়তা না পেলে গবেষণালব্ধ ফলাফলে কোনো প্রভাব পড়তো বলে মনে করেন কি? ক) হ্যাঁ খ) না
১২। ক) যদি হ্যাঁ হয় কি ধরণের?
১৩। হালদা নদীতে মাছের প্রাকৃতিক প্রজননক্ষেত্র সংরক্ষণ ও উন্নয়নের জন্য ভবিষ্যতে কি কি বিষয়ে গবেষণার ওপর বিশেষ গুরুত্ব দেওয়া উচিৎ বলে আপনি মনে করেন?
১৪। আপনার গবেষনার ভিত্তিতে আবাসস্থল সংরক্ষনের মাধ্যমে হালদাতে মাছের ডিম ও রেণুর মৃত্যুহারে পরিবর্তন এসেছে বলে মনে করেন কি? ক) হ্যাঁ খ) না
১৪। ক) যদি হ্যাঁ হয় কতটুকু?

সাল	ডিম	রেণু
২০১৫		
২০১৬		
২০১৭		
২০১৮		
২০১৯		
২০২০		

১৫। আপনার গবেষনার ভিত্তিতে আবাসস্থল সংরক্ষনের মাধ্যমে হালদাতে জীববৈচিত্র রক্ষিত হচ্ছে কি? ক) হ্যাঁ খ) না

১৫।ক) যদি হ্যাঁ হয় কতটা (পাঁচ স্কেলেঃ ১-সর্বনিম্ন ৫-সর্বোচ্চ) রক্ষিত হচ্ছে বলে আপনি মনে করেন?
১৬। বিগত পাঁচ বছরের তুলনায় ডিমের উৎপাদন কত শতাংশ বৃদ্ধি পেয়েছে বলে মনে করেন?

সাল	ডিমের উৎপাদন (একক)

২০১৫	
২০১৬	
২০১৭	
২০১৮	
২০১৯	
২০২০	

১৭। আইজিএ প্রশিক্ষণের ফলে সংশ্লিষ্টদের আর্থ-সামাজিক অবস্থার পরিবর্তন হয়েছে বলে আপনি মনে করেন? ক) হ্যাঁ খ) না

১৭।ক) যদি হ্যাঁ হয় কতটা (পাঁচ স্কেলেঃ ১-সর্বনিম্ন ৫-সর্বোচ্চ) পরিবর্তন হয়েছে বলে আপনি মনে করেন?

১৮। আইজিএ প্রশিক্ষণের ফলে সংশ্লিষ্টদের কর্মসংস্থান সৃষ্টি হয়েছে বলে মনে করেন? ক) হ্যাঁ খ) না

১৮।ক) যদি হ্যাঁ হয় কতটা কর্মসংস্থান সৃষ্টি হয়েছে বলে আপনি মনে করেন?

সাল	কাজের ধরন	লোকসংখ্যা
২০১৬		
২০১৭		
২০১৮		
২০১৯		
২০২০		

স্বেচ্ছাসেবক (আইডিএফ)
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ

১। "হালদা নদীতে মাছের প্রাকৃতিক প্রজননক্ষেত্র সংরক্ষণ ও উন্নয়ন" প্রকল্পে স্বেচ্ছাসেবক হিসেবে আপনি কি কি কাজ করেছেন?

কাজ	গুরুত্ব**	গড়ে মাসে কত ঘন্টা (আনুমানিক)

**১-৫ স্কেলে মার্কিং করুন। ১ মানে কম গুরুত্বপূর্ণ আর ৫ মানে অত্যন্ত গুরুত্বপুর্ণ

২। কবে থেকে আপনি এই কাজের সাথে সম্পৃক্ত আছেন?

৩। আইডিএফ থেকে আপনার কাজের জন্য কি কি লজিস্টিক সহায়তা পেয়েছেন?

৪। আরো লজিস্টিক সহায়তা প্রয়োজন বলে মনে করেন কিনা? ক) হ্যাঁ খ) না

৪। ক) যদি হ্যাঁ হয়, তবে আর কি কি সহায়তা পেলে আরো ভাল কাজ করা যেত বলে আপনি মনে করেন?

সহায়তা	কখন প্রয়োজন	কেন প্রয়োজন

৫। কাজ করতে গিয়ে কোন সমস্যার সম্মুখীন হয়েছেন কিনা? ক) হ্যাঁ খ) না

৫।ক) যদি হ্যাঁ হয় কি কি সমস্যার সম্মুখীন হয়েছেন?

সমস্যা	উৎস বা কারন	কাটিয়ে ওঠার উপায়

৬। স্বেচ্ছাসেবক হিসেবে যে পরিমাণ ভাতা প্রদান করা হয়েছে তা আপনার জন্য যথেষ্ট কিনা?

মন্তব্য	কারন
ক) হ্যাঁ	
খ) না	
গ) মতামত নেই	

৭। প্রকল্পের মেয়াদ শেষ হয়ে গেলেও স্বেচ্ছাসেবক হিসেবে ভূমিকা পালন করবেন কিনা?

মন্তব্য	কারন
ক) হ্যাঁ	

খ) না	
গ) মতামত নেই	

৮। স্বেচ্ছাসেবক হিসেবে আপনার জীবনে এই কাজের প্রভাব কি?

প্রভাবের ধরণ	প্রভাবসমূহ
পারিবারিক	
সামাজিক	
অর্থনৈতিক	

৯। অভয়াশ্রম এলাকার সীমানা চিহ্নিত করার জন্য আইডিএফ কর্তৃক এপর্যন্ত কয়টি সাইনবোর্ড বসানো হয়েছে?

১০। স্থাপিত সাইনবোর্ডগুলোর মধ্যে বর্তমানে কয়টি অক্ষত আছে? যেগুলো অক্ষত নেই, কেন নেই?

১১। কতজন জেলে অবৈধভাবে মাছ ধরার সাথে সম্পৃক্ত আছে বলে আপনি মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

১২। অবৈধভাবে মাছ ধরা বন্ধ করতে আর কি কি পদক্ষেপ নেওয়া উচিৎ?

১৩। অবৈধভাবে বালু উত্তোলনে কতজন সম্পৃক্ত আছে বলে আপনি মনে করেন?

সময়	কতজন	কোন কোন এলাকায়
২০১৫ সালেঃ		
২০২১ সালেঃ		

১৪। অবৈধভাবে বালু উত্তোলন বন্ধ করতে কি কি পদক্ষেপ নেওয়া উচিৎ?

১৫। আপনার দৃষ্টিতে হালদার সংরক্ষণে প্রধান প্রতিবন্ধকতাগুলো কি কি?

প্রতিবন্ধকতাগুলো	কারন/ উৎস	দূর করার উপায়

১৬। স্বেচ্ছাসেবক হিসেবে আপনার সবচেয়ে তিক্ত অভিজ্ঞতা কি?

১৭। স্বেচ্ছাসেবক হিসেবে আপনার সবচেয়ে মজার ও স্মরণীয় অভিজ্ঞতা কি?

ইউএনও জন্য প্রণীত প্রশ্নমালাঃ
উত্তরদাতার নামঃ
পরিচিতিঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ

১। হালদার সার্বিক উন্নয়নে আইডিএফ এর সহযোগিতা আছে বলে আপনি মনে করেন কিনা?
ক) হ্যাঁ খ) না
১।ক) যদি হ্যাঁ হয় সেগুলো কি কি?
২। ভবিষ্যতে হালদা সংরক্ষণের এ ধরনের প্রকল্প থেকে আর কি ধরণের সহযোগিতা আশা করেন?
৩। আইডিএফ কি আপনার সাথে সমন্বয় করে কাজ করে?
ক) হ্যাঁ খ) না
৪। আপনি কি আইডিএফ এর সাথে সমন্বয় সভায় উপস্থিত ছিলেন?
ক) হ্যাঁ খ) না
৪।ক) যদি হ্যাঁ হয় তাহলে সমন্বয়ের ব্যাপারে আপনি কতটুকু সন্তুষ্ট?
১) খুবই অসন্তুষ্ট
২) অসন্তুষ্ট
৩) নিরপেক্ষ
৪) সন্তুষ্ট
৫) খুবই সন্তুষ্ট
৫। বর্জ্য ব্যবস্থাপনার বিষয়ে আইডিএফ কোনো ধরণের সহায়তা করেছে কিনা?
ক) হ্যাঁ খ) না
৫। ক) যদি হ্যাঁ হয় তাহলে কি ধরণের সহযোগিতা করেছে?
৬। এসব সহযোগিতার কারনে বর্জ্য ব্যবস্থাপনায় যে উন্নতি হয়েছে তাকে আপনি ১০ স্কেলে কত নাম্বার দেবেন?

১	২	৩	৪	৫	৬	৭	৮	৯	১০

৭। আইডিএফ এর প্রকল্পের কারণে হালদা সংরক্ষণে সার্বিকভাবে আপনার মতামত কি?
১) একেবারেই ব্যর্থ
২) ব্যর্থ
৩) নিরপেক্ষ
৪) সফল
৫) খুবই সফল
৮। "ভবিষ্যতেও আইডিএফ হালদা সংরক্ষণের কার্যক্রম চালিয়ে যাক" – এ ব্যাপারে আপনার মতামত কি?
ক) হ্যাঁ খ) না
৯। বর্তমানে কোনো বালুমহাল ইজারা দেওয়া হয় কিনা?
ক) হ্যাঁ খ) না
১০। বর্তমানে অবৈধভাবে বালু উত্তোলন করা হয় বলে মনে করেন কিনা?
ক) হ্যাঁ খ) না
১১। অবৈধভাবে হালদার মাছ ধরার সাথে সম্পৃক্তদের চিহ্নিতকরণে আপনি কি কোনো পদক্ষেপ গ্রহণ করছেন?
ক) হ্যাঁ খ) না
১১। ক) যদি হ্যাঁ হয় সেগুলো কি কি?
১২। আইডিএফ প্রকল্পটিতে কি কি দূর্বলতা আপনার চখে পড়েছে এবং সেগুলো উত্তরণে আপনার অভিমত কি?

১৩। হালদার সংরক্ষণে দরকারি আরো কি কি কর্মকান্ড আইডিএফ প্রকল্পটিতে অন্তর্ভূক্ত করা দরকার ছিল কিন্তু করা হয়নি বলে আপনার মনে হয়?

চেয়ারম্যান এবং পৌরসভার লোকজনের জন্য প্রণীত প্রশ্নমালাঃ
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। হালদার সার্বিক উন্নয়নে আইডিএফ এর সহযোগিতা আছে বলে আপনি মনে করেন কিনা? ক) হ্যাঁ খ) না
১।ক) যদি হ্যাঁ হয় সেগুলো কি কি?
২। ভবিষ্যতে হালদা সংরক্ষণের এ ধরনের প্রকল্প থেকে আর কি ধরণের সহযোগিতা আশা করেন?
৩। আইডিএফ কি আপনার সাথে সমন্বয় করে কাজ করে? ক) হ্যাঁ খ) না
৪। আপনি কি আইডিএফ এর সাথে সমন্বয় সভায় উপস্থিত ছিলেন? ক) হ্যাঁ খ) না
৪।ক) যদি হ্যাঁ হয় তাহলে সমন্বয়ের ব্যাপারে আপনি কতটুকু সন্তুষ্ট?
১) খুবই অসন্তুষ্ট ২) অসন্তুষ্ট ৩) নিরপেক্ষ ৪) সন্তুষ্ট ৫) খুবই সন্তুষ্ট
৫। বর্জ্য ব্যবস্থাপনার বিষয়ে আইডিএফ কোনো ধরণের সহায়তা করেছে কিনা? ক) হ্যাঁ খ) না
৫। ক) যদি হ্যাঁ হয় তাহলে কি ধরণের সহযোগিতা করেছে?
৬। এসব সহযোগিতার কারনে বর্জ্য ব্যবস্থাপনায় যে উন্নতি হয়েছে তাকে আপনি ১০ স্কেলে কত নাম্বার দেবেন?
৭। আইডিএফ এর প্রকল্পের কারণে হালদা সংরক্ষণে সার্বিকভাবে আপনার মতামত কি?
১) একেবারেই ব্যর্থ ২) ব্যর্থ ৩) নিরপেক্ষ ৪) সফল ৫) খুবই সফল
৮। "ভবিষ্যতেও আইডিএফ হালদা সংরক্ষণের কার্যক্রম চালিয়ে যাক" – এ ব্যাপারে আপনার মতামত কি? ক) হ্যাঁ খ) না
৯। বর্তমানে কোনো বালুমহাল ইজারা দেওয়া হয় কিনা? ক) হ্যাঁ খ) না
১০। বর্তমানে অবৈধভাবে বালু উত্তোলন করা হয় বলে মনে করেন কিনা? ক) হ্যাঁ খ) না
১১। অবৈধভাবে হালদার মাছ ধরার সাথে সম্পৃক্তদের চিহ্নিতকরণে আপনি কি কোনো পদক্ষেপ গ্রহণ করছেন? ক) হ্যাঁ খ) না
১১। ক) যদি হ্যাঁ হয় সেগুলো কি কি?

চট্টগ্রাম বিশ্ববিদ্যালয়ের হালদা গবেষণাগার বিষয়ক প্রশ্নমালাঃ
উত্তরদাতার নামঃ
পদবিঃ
যোগাযোগের নম্বরঃ
১। আইডিএফ এর প্রকল্পের আওতায় হালদা গবেষণাগারের জন্য ক্রয়ক্রিত যন্ত্রপাতির তালিকাঃ
২। গবেষণাগারের ছবিঃ
৩। বর্তমানে কতজন শিক্ষার্থী গবেষণাগারে কাজ করছেন? ক) নামঃ খ) শিক্ষাগত যোগ্যতাঃ
৪। কি ধরণের গবেষণা হয় তার তালিকাঃ
৫। এ পর্যন্ত গবেষণাগারে অনুষ্ঠিত প্রোগ্রামের তালিকাঃ
৬। হালদা সংরক্ষণের জন্য চলমান ও কৃত গবেষণার বাইরে আরও কি কি ধরণের গবেষণা করার পরিকল্পনা আছে?
৭। নতুন গবেষণার জন্য আর কি ধরণের সহায়তা প্রয়োজন?
৮। হালদা রিসার্চ ল্যাবের ভবিষ্যৎ চ্যালেঞ্জগুলো কি কি?
৯। হালদা রিসার্চ ল্যাবের ভবিষ্যৎ চ্যালেঞ্জগুলো মোকাবেলায় করণীয় কি কি?
১০। হালদা রিসার্চ ল্যাবের ভবিষ্যৎ সম্ভাবনাগুলো কি কি?
১১। হালদা রিসার্চ ল্যাবের ভবিষ্যৎ সম্ভাবনাগুলো বাস্তবায়নে করণীয় কি?
১২। হালদা রিসার্চ ল্যাবের গবেষনালব্ধ ফলাফলের বাস্তব অভিঘাতগুলো কি কি?
১৩। হালদা রিসার্চ ল্যাবের গবেষনালব্ধ ফলাফলের প্রকাশনার বর্তমান অবস্থা কি?
১৪। হালদা রিসার্চ ল্যাবের গবেষনালব্ধ ফলাফলে সংশ্লিষ্ট অংশীজনদের কাছে পৌঁছানোর জন্য কি কি করা হয়েছে?
১৫। হালদা রিসার্চ ল্যাবের গবেষনালব্ধ ফলাফলে সংশ্লিষ্ট অংশীজনদের কাছে পৌঁছানোর জন্য আরও কি কি করা দরকার?
১৬। আইডিএফ এর প্রকল্প এলাকায় শতকরা কতভাগ মাটির কুয়া আধুনিকায়ন হয়েছে?
১৭। হালদা নদী থেকে সরাসরি ডিম সংগ্রহকারী কতজন আছে বলে মনে করেন? (২০১৫-২০২০)
১৮। হালদা নদী থেকে সরাসরি ডিম থেকে রেণু উৎপাদনকারী কতজন আছে বলে মনে করেন? (২০১৫-২০২০)
১৯। হালদা নদী থেকে বৎসরে কি পরিমাণ ডিম পাওয়া যায়? (২০১৫-২০২০)
২০। হালদা নদী থেকে বৎসরে কি পরিমাণ রেণু পাওয়া যায়? (২০১৫-২০২০)
২১। হালদা নদী থেকে সরাসরি আঙ্গুলি পোনা উৎপাদনকারী কতজন আছে বলে মনে করেন? (২০১৫-২০২০)
২২। মাটির কুয়ায় ডিমের হ্যাচিং রেট কত? (২০১৫-২০২০)
২২। ক) মাটির কুয়ায় রেণুর মৃত্যুর হার কত? (২০১৫-২০২০)
২৩। হ্যাচারিতে ডিমের হ্যাচিং রেট কত? (২০১৫-২০২০)
২৩। ক) হ্যাচারিতে রেণুর মৃত্যুর হার কত? (২০১৫-২০২০)
২৪। হালদা নদীর কুমের সংখ্যা কত? (২০১৫-২০২০)
২৫। কুমের বর্তমান অবস্থা সম্বন্ধে আপনার মতামত কি?
২৬। হালদা ও এর আশপাশের এলাকায় জীববৈচিত্রের বর্তমান অবস্থা সম্পর্কে আপনার মতামত কি?
২৭। হালদা নদীর পরিবেশ দূষণের ব্যাপারে আপনার মতামত কি?
২৮। হালদার মাছের ডিম সংগ্রহকারী নৌকার সংখ্যা, ধরণ এবং বৈধতা বিষয়ে আপনার মতামত কি?
২৯। হালদা পোনার মার্কেট চেইনের সমস্যা ও সম্ভাবনা বিষয়ক আপনার মতামত কি?

আইডিএফ এর জন্য প্রণীত প্রশ্নমালাঃ
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। হালদা নদীর রেণু পোনা আইডিএফ এর মাধ্যমে অন্যান্য সহযোগী সংস্থা যেমন – জেসিএফ, আরআরএফ, সাস ও এনজিএফ ইত্যাদি সংস্থায় সম্প্রসারণের জন্য পোনা অবমুক্ত কার্জক্রম গ্রহণের ফটো রেকর্ড এবং ডকুমেন্ট আছে কিনা?
থাকলে প্রদানের অনুরোধ রইলো।
২। আইডিএফ কর্তৃক হ্যাচারি স্থাপনের ফটো রেকর্ড এবং ডকুমেন্ট আছে কিনা?
থাকলে প্রদানের অনুরোধ রইলো।
৩। একটি আদর্শ হ্যাচারি তৈরি করার জন্য কি কি সহযোগিতা দেওয়া দরকার বলে মনে করেন?
৪। আইডিএফ কর্তৃক ব্যক্তিমালিকানাধীন হ্যাচারিতে হালদার ব্রুডস্টক গড়ে তোলার ফটো রেকর্ড এবং ডকুমেন্ট আছে কিনা?
থাকলে সেসব ব্যক্তিবর্গের সাথে যোগাযোগের নম্বর সহ প্রদানের অনুরোধ রইলো।

৫। আইডিএফ কর্তৃক ৪ এর (ক) থেকে (ণ) পর্যন্ত কর্মকাণ্ডের অধীনে যেসকল প্রদর্শনী প্লট স্থাপন করা হয়েছে সেগুলোর ফটো রেকর্ড প্রদানের অনুরোধ রইলো।

৬। প্রদর্শনী প্লট রক্ষণাবেক্ষণ এবং ফলোআপের জন্য আইডিএফ কর্তৃপক্ষ কি কি ভূমিকা পালন করছেন?

৭। আইডিএফ কর্তৃক ৬ এর (ক) থেকে (জ) পর্যন্ত কর্মকাণ্ডের অধীনে যেসকল প্রয়োজনীয় উপকরণ ক্রয় করা হয়েছে সেগুলোর ফটো রেকর্ড প্রদানের অনুরোধ রইলো।

৮। আইডিএফ কর্তৃক প্রস্তুতকৃত তামাক চাষিদের ডাটাবেজটি প্রদানের অনুরোধ রইলো।

৯। আইডিএফ কর্তৃক ডিম সংগ্রহে নৌকাসহ ডিম সংগ্রহকারীর সংখ্যা হ্রাস পাওয়ার কারণ জরিপের ফলাফল প্রদানের অনুরোধ রইলো।

১০। আইডিএফ কর্তৃক হালদা নদীতে মাছের প্রাকৃতিক প্রজননক্ষেত্র সংরক্ষণ ও উন্নয়ন প্রকল্পের জন্য ভবিষ্যতে আর কি ধরণের সহায়তা দরকার বলে আপনি মনে করেন?

১১। আইডিএফ এর প্রকল্প এলাকায় শতকরা কতভাগ মাটির কুয়া আধুনিকায়ন হয়েছে বলে মনে করেন?

১২। হালদা পোনার মার্কেট চেইনের সমস্যা ও সম্ভাবনা বিষয়ক আপনার মতামত কি?

ব্যক্তিমালিকানাধীন হ্যাচারি বিষয়ক প্রশ্নমালাঃ
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। আপনি কি আইডিএফ এর সহযোগিতায় হালদার ব্রুডস্টক গড়ে তুলেছেন? ক) হ্যাঁ খ) না
২। হালদার কোন কোন প্রজাতির মাছের ব্রুডস্টক গড়ে তুলেছেন?
৩। ব্রুডস্টক গড়ে তুলতে আপনি আই ডি এফ থেকে কি কি ধরণের সহযোগিতা পেয়েছেন?
৪। হ্যাচারির ছবিঃ
৫। ব্রুডস্টক এর পরিমানঃ (২০১৫-২০২০)
৬। ব্রুডস্টক রক্ষণাবেক্ষণে কোনো সমস্যার সম্মুখীন হচ্ছেন কিনা? ক) হ্যাঁ খ) না
৬।ক) যদি হ্যাঁ হয় তাহলে কি ধরণের সমস্যা?
৭। সমস্যা সমাধানে করণীয় কি?
৮। এখন পর্যন্ত এসব ব্রুডস্টক থেকে আপনি কি পরিমাণ পোনা উৎপাদন করেছেন?
৯। এসব পোনা দেশের কোন কোন জায়গায় বিক্রি করেছেন?
১০। সাধারণ ব্রুডস্টক এর তুলনায় হালদার ব্রুডস্টক ব্যবহারের উপকারিতা কি?
১১। হালদার ব্রুডস্টকগুলো যাতে হাইব্রিড না হয়ে যায়, পিওর থাকে সে জন্য কি কি ব্যবস্থা নিয়েছেন?
১২। এক্ষেত্রে আর কি কি সহযোগিতা করলে আপনি আরও ভালভাবে হালদার ব্রুডস্টক পিওর রেখে সংরক্ষণে আরও কার্যকর হতে পারবেন?
১৩। হালদার মাছের সংরক্ষণে আপনাদের এই ব্রুডস্টক কি ভূমিকা রাখবে বলে আপনি মনে করেন?
১৪। আপনার ভবিষ্যৎ কর্মপরিকল্পনা কি?
১৫। ভবিষ্যতে আইডিএফ থেকে আর কি ধরণের সহযোগিতা আশা করেন?

বিশেষজ্ঞ এবং কারিগরি কমিটির জন্য প্রণীত প্রশ্নমালাঃ
উত্তরদাতার নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। হালদার সার্বিক উন্নয়নে আইডিএফ এর ভূমিকা আছে বলে আপনি মনে করেন কি? ক) হ্যাঁ খ) না
১।ক) যদি হ্যাঁ হয় সেগুলো কি কি?
২। ভবিষ্যতে আইডিএফ এর আর কি ধরণের ভূমিকা আশা করেন?
৩। আপনি কি আইডিএফ এর সাথে প্রকল্পলব্ধ জ্ঞান বিতরণ সভায় উপস্থিত ছিলেন? ক) হ্যাঁ খ) না
৩।ক) যদি হ্যাঁ হয় তাহলে সভার ব্যাপারে আপনি কতটুকু সন্তুষ্ট?
১) খুবই অসন্তুষ্ট ২) অসন্তুষ্ট ৩) নিরপেক্ষ ৪) সন্তুষ্ট ৫) খুবই সন্তুষ্ট
৪। আইডিএফ এর প্রকল্পের কারণে হালদা সংরক্ষণে সার্বিকভাবে আপনার মতামত কি?
১) একেবারেই ব্যর্থ ২) ব্যর্থ ৩) নিরপেক্ষ ৪) সফল ৫) খুবই সফল
৫। "ভবিষ্যতেও আইডিএফ হালদা সংরক্ষণের কার্যক্রম চালিয়ে যাক" – এ ব্যাপারে আপনার মতামত কি? ক) হ্যাঁ খ) না

প্রশিক্ষকদের জন্য
প্রশিক্ষকের নামঃ
ঠিকানাঃ
যোগাযোগের নম্বরঃ
১। "হালদা নদীতে মাছের প্রাকৃতিক প্রজননক্ষেত্র সংরক্ষণ ও উন্নয়ন" প্রকল্পে হালদার ডিম সংগ্রহকারী, পোনা উৎপাদনকারী, মৎস্যজীবী, হালদাপাড়ের মাছ-চাষি, কৃষকদেরকে প্রশিক্ষণ দিয়েছেন কিনা?

বিষয়	হ্যাঁ / না	কখন	কতদিন	কোথায়	কিভাবে	কতজন	রিফ্রেশার্স প্রশিক্ষণ হয়েছে কিনা?	প্রশিক্ষণের পর মূল্যায়ন হয়েছে কিনা
আধুনিক পদ্ধতিতে ডিম হতে রেনু উৎপাদন ও হ্যাচারি ব্যবস্থাপনা								
মৎসজীবি ও ডিম সংগ্রহকারীদের ডিম সংগ্রহের আধুনিক কলাকৌশল, মাটির কুয়ায় ডিম ফোটানো এবং অফ-সিজনে আয়বর্ধনমূলক কর্মকান্ড								
ডিম সংগ্রহের ও ফোটানোর আধুনিক পদ্ধতি, কলাকৌশল ও সতর্কতা								
উন্নত প্রযুক্তিতে কার্প জাতীয় মাছ চাষের উপর প্রশিক্ষণ								
কৃষকদেরকে কৃষিজমিতে কীটনাশকের পরিবর্তে ফেরোমন ফাঁদ ও জৈব বালাইনাশক ব্যবহারের প্রশিক্ষণ								
মৎসজীবিদের নৌযান চলাচল ও মৎস্য আইন বিষয়ে প্রশিক্ষণ								
তামাক চাষিদের বিকল্প জীবিকায়ন								

২। প্রশিক্ষণের মেয়াদের ব্যাপারে আপনার মতামত কি?

ক) ১ দিনই পর্যাপ্ত

খ) ১ দিনের কম হলে ভালো

গ) ১ দিনের বেশি হলে ভালো

৩। প্রতি ব্যাচে কয়জন করে প্রশিক্ষণ পেলে ভালো হয় বলে মনে করেন?

ক) ২৫ জনই পর্যাপ্ত

খ) ২৫ জনের কম

গ) ২৫ জনের বেশি

৪। প্রশিক্ষণপ্রাপ্তদের প্রশিক্ষণের বিষয়ে আপনার মতামত কি?

বিষয়	উপকৃত হয়েছেন হ্যাঁ / না	হ্যাঁ হলে কিভাবে হয়েছেন	না হলে তার কারন	করণীয় কি?
আধুনিক পদ্ধতিতে ডিম হতে রেনু উৎপাদন ও হ্যাচারি ব্যবস্থাপনা				
মৎসজীবি ও ডিম সংগ্রহকারীদের ডিম সংগ্রহের আধুনিক কলাকৌশল, মাটির কুয়ায় ডিম ফোটানো এবং অফ-সিজনে আয়বর্ধনমূলক কর্মকান্ড				
ডিম সংগ্রহের ও ফোটানোর আধুনিক পদ্ধতি, কলাকৌশল ও সতর্কতা				
উন্নত প্রযুক্তিতে কার্প জাতীয় মাছ চাষের উপর প্রশিক্ষণ				
কৃষকদেরকে কৃষিজমিতে কীটনাশকের পরিবর্তে ফেরোমন ফাঁদ ও জৈব বালাইনাশক ব্যবহারের প্রশিক্ষণ				
মৎসজীবিদের নৌযান চলাচল ও মৎস্য আইন বিষয়ে প্রশিক্ষণ				
তামাক চাষিদের বিকল্প জীবিকায়ন				

৫। প্রশিক্ষক হিসেবে প্রশিক্ষণ কার্যক্রমকে মূল্যায়ন করতে বলা হলে পাঁচ স্কেলে কত দিবেন?

বিষয়	মূল্যায়ন**
আধুনিক পদ্ধতিতে ডিম হতে রেনু উৎপাদন ও হ্যাচারি ব্যবস্থাপনা	
মৎসজীবি ও ডিম সংগ্রহকারীদের ডিম সংগ্রহের আধুনিক কলাকৌশল, মাটির কুয়ায় ডিম ফোটানো এবং অফ-সিজনে আয়বর্ধনমূলক কর্মকান্ড	
ডিম সংগ্রহের ও ফোটানোর আধুনিক পদ্ধতি, কলাকৌশল ও সতর্কতা	
উন্নত প্রযুক্তিতে কার্প জাতীয় মাছ চাষের উপর প্রশিক্ষণ	

কৃষকদেরকে কৃষিজমিতে কীটনাশকের পরিবর্তে ফেরোমন ফাঁদ ও জৈব বালাইনাশক ব্যবহারের প্রশিক্ষণ	
মৎসজীবিদের নৌযান চলাচল ও মৎস্য আইন বিষয়ে প্রশিক্ষণ	
তামাক চাষিদের বিকল্প জীবিকায়ন	

** ১-৫ স্কেলে মূল্যায়ন করুন। ১ মানে কম গুরুত্বপূর্ণ আর ৫ মানে অত্যন্ত গুরুত্বপূর্ণ

৬। প্রশিক্ষক হিসেবে আপনার সার্বিক মতামত

প্রশিক্ষণের সুবিধা	প্রশিক্ষণের অসুবিধা	অসুবিধার কারন	উত্তরণে করণীয়