

# Report on Fish and Fishery Awareness Campaign 2014



**Report prepared by-**

**Abdul Wakid, Sunny Deori, Bikash Sonowal, Manoj Das**

**Gangetic Dolphin Research and Conservation Initiative, Aaranyak  
50, Samanwoy Path, Survey, Beltola, Guwahati-28  
Assam, India**



# Content

Abstract

Introduction

Study Area

Method

Results and Discussions

Recommendations

## List of Tables and Figures:

- Table 1. Total districts and the sites in each districts covered during Assam fishery rules (1953) campaign conducted by the DCN members with the support from the Assam fishery department officials. Additional information on the total number of participants and total actual fishermen participants present on the campaign.

### List of figures

- Fig. 1 DCN members introducing the participants on the meeting About the GDRCI of Aaranyak with the help of the flex given to them.
- Fig. 2 Fishery officials demonstrating Assam fishery rules (1953) among the participants of the awareness campaign at different DCN sites.
- Fig. 3 DCN members conducting questionnaire survey among the participants before and after the demonstration of the Assam fishery rules by the fishery officials
- Fig. 4 Fishery officials and DCN members while doing the registering the actual fishermen names for Life insurance policy.
- Fig. 5 Percentage of participants belonging to various age groups.
- Fig. 6 Percentage composition of Education qualifications of the participants in the questionnaire survey for Fishery rules awareness campaign.
- Fig.7 Percentage of different livelihood sources of the participants.
- Fig. 8 Information on previous awareness campaigns on Fishery rules on the sites.
- Fig. 9 The opinion of the participants regarding the quality of performance given by the fishery officials during demonstrating the fishery rules.
- Fig. 10 The opinion of the participants regarding the percent understood by them on fishery rules from the lecture presented by fishery officials.
- Fig. 11 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of permission for drying out or drained out water from the leased fisheries within Fishery rules, 1953.
- Fig. 12 Correct and incorrect answers in the post- lecture questionnaire survey to the question of permission for drying out or drained out water from the leased fisheries within Assam Fishery rules, 1953.
- Fig. 13 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of minimum *bana* size allowed according to Assam Fishery rule for fishing from 1<sup>st</sup> May to 15<sup>th</sup> July.
- Fig. 14 Correct and incorrect answers in the post- lecture questionnaire survey to the question to the question of minimum *bana* size allowed according to Assam Fishery rule for fishing from 1<sup>st</sup> May to 15<sup>th</sup> July.
- Fig. 15 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of minimum mosquito net mesh size banned for all seasons under Assam Fishery rule for fishing.
- Fig. 16 Correct, incorrect and unknown answers in the post- lecture to the question of minimum mosquito net mesh size banned for all seasons under Assam Fishery rule for fishing.
- Fig. 17 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of minimum fishing net mesh size which can be used for fishing from 1<sup>st</sup> Apr to 15<sup>th</sup> Jul under Assam Fishery rule.
- Fig. 18 Correct, incorrect and unknown answers in the post- lecture to the question of minimum fishing net mesh size which can be used for fishing from 1<sup>st</sup> Apr to 15<sup>th</sup> Jul under Assam Fishery rule.
- Fig. 19 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of the time period in which the fishes with eggs (Rohu,

Bahu, Mirika, Mali, Chital, Kharia, Pithia, Gharia, Kudhi) can't be fished out from leased fisheries under Assam Fishery rule.

- Fig. 20 Correct, incorrect and unknown answers in the post- lecture to the question of the time period in which the fishes with eggs (Rohu, Bahu, Mirika, Mali, Chital, Kharia, Pithia, Gharia, Kudhi) can't be fished out from leased fisheries under Assam Fishery rule.
- Fig. 21 Comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture questionnaire survey to the question of time period in which 7sq cm *bana* is banned for fishing in any leased fisheries under Assam Fishery rule.
- Fig. 22 Correct, incorrect and unknown answers in the post- lecture questionnaire survey to the question of time period in which 7sq cm *bana* is banned for fishing in any leased fisheries under Assam Fishery rule.
- Fig. 23 Comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of legal punishment under Assam Fishery rule for breaking fishery rules.
- Fig. 24 Percentage of correct, incorrect and unknown answers in the post- lecture questionnaire survey to the question of legal punishments under Assam Fishery rule for breaking fishery rules.
- Fig. 25 Percentage of opinions of the participants regarding implementation of fishery rules in their locality before and after listening to the demonstration on Assam fishery rules, 1953, given by the fishery officials.
- Fig. 26 Percentage of opinions of the participants regarding implementation of fishery rules in their locality after listening to the demonstration on Assam fishery rules, 1953, given by the fishery officials.

## Abstract

In collaboration with the State Fishery Department of Govt of Assam, we conducted fish and fishery awareness campaign for the sustainable fishery development in June-July, 2014. Unlike last year, where the campaign was conducted in Dolphin Conservation Network (DCN) sites directly by project staff in association with the concerned District Fishery Development Offices, this year we encouraged the DCN Members to lead the campaign in their areas in association with the concerned district fishery officials. During this season campaign, total 32 awareness campaigns were conducted in 32 river side villages of DCN sites covering 11 districts. Total 23 fishery officers from 11 District Fishery Development Offices participated in this awareness campaign. Total 2187 number of community people participated in this awareness campaign, out of which 1728 were fishermen. Total 2293 number of fishermen were insured during this awareness campaign. To assess the impact of the awareness campaign, total 562 number of questionnaire survey was conducted.

## Introduction

Practice of commercial fishing was started for the first time in Columbia after 30 years of the discovery of Columbia River by Robert Grey in 1792. Hudson's Bay Company began to explore the possibility of commercial trade for salmon (Lachatowich, 1999). It is practice of catching fishes of commercial profit, mostly from wild fisheries. The common fishing gears used today includes surrounding nets (e.g., purse seine) seine nets (e.g. beach seine), trawls (e.g. bottom trawl), dredges, hooks and lines (e.g. long line and headline), lift nets, gillnets, entangling nets and traps. According to the Food and Agriculture Organisation (FAO), the world harvest in 2005 consisted of 93.3 million tonnes captured by fishing in wild fisheries.

The problem occurred only when the issue of overfishing arisen. It occurs when fishing activities reduces fish stocks below an acceptable level. This can occur in any waterbody from a pond to the oceans. A report of UNEP says that in 2002, 72% of the world's marine fish stocks were being harvested faster than they could reproduce. The greatest concern is the rapid depletion of fish population due to extensive commercial fishing. A full one- fourth of the total catch (27 million tonnes in 2003) were the by- catches and most often are lost. Ultimately overfishing is leading towards resource depletion in cases of subsidized fishing, low biological growth rates and critical low biomass levels (e.g. by critical dispensation growth properties) (Turner, *et.al.*, 1999). Dolphin by-catch and mortality in Tuna purse seine is a very common incident in marine fisheries (Ramanov, 2002). Edwards, 2007, has reviewed the effects on Dolphins targeted by Tuna Purse seiners in the Eastern tropical Pacific Ocean. A workshop was done to study the current conflicts between dolphins and fisheries in the Mediterranean Sea (Roma, 2001). The reason for the conflict is that their diet is diverse and likely includes many of the demersal fishes that are the targets of small- scale fisheries.

Fish production in India has increased to more than fivefold since its independence and now it is a major industry in the coastal states. Along with this, new methods of fishing were getting introduced to increase the Catch effort in Indian fisheries. A recent research communication by Varghese, *et.al.*, 2010, reported the impact of tuna long line fishery on the Sea Turtles of Indian seas. The population of Olive Ridley, Green and Hawksbill turtle is getting affected through such practices.

Apart from marine fisheries, India is a leading producer of Inland water fishery also. An FAO report says that the country's fresh water resources consist of 195210 kilometres of rivers and canals, 2.9million hectares of minor and major reservoirs, 2.4 million hectares of ponds and lakes and about 0.8 million hectares of flood plain lakes and derelict water bodies. During the ten-year period of 1995-2004 inland capture production grew from 600,000 tonnes to 800,000 tonnes and at present

contributes to 13% of total fish production of the country. The fishermen practices fishing gears like gill nets of different mesh size according to the target species; lift nets, cast nets, mosquito nets, according to the demand of the product. The Ganges and Brahmaputra riverine systems along with many endemic and ornamental fishes (Biswas and Baruah, 2000) also have the endangered Gangetic Dolphins.

Till 19<sup>th</sup> century there was abundance of its population, though there is no actual data on the population is available. It is just within the past 50 years that the population reduces to its half (Wakid, 2005). Dolphins feed on several species of fish and invertebrates such as prawns, clams, catfish, gobies and carp and possibly turtles and birds as well (Klinowska, 1991 and Culik, 2003). They usually prey on dweller fish and mud fish in shallow water with the help of their snout (Jefferson et al., 1994). Reported prey species include prawns, *Wallago attu*, *Saccobranchnus fossilis* and *Palaemon carcinus* (Anderson, 1878) mud-frequenting fishes and freshwater shrimps (Norman & Fraser, 1948) and crustaceans, molluscs, and fish especially of the catfish family (Shrestha, 1989) Biswas & Michael (1992) noticed that the dolphin severed the head of prey, especially the cat fish, with their teeth. Sinha et al.(1993) observed a wide variety of food fishes including *Mastacembelus panculus*, *Puntius sophore*, *Colisa fasciatus*, *Chela laubuca*, *Chanda ranga*, *Glossogobius giuris*, *Nangra punctata* and *Puntius sp.* in the gut content analysis . Interestingly these species were also in the list of high market demand value which gave us a direct evidence of resource competition between human and the animal could be a major reason behind this happening.

To reduce such conflicts and competitions, our State Government has developed Assam fishery Rules in 1953 under the Indian fishery Act, 1897 and Assam Land Revenue Act, 1886. They introduced fish ban seasons (1<sup>st</sup> of April to 15<sup>th</sup> of July), ban of harmful fishing practices such as fish poisoning, use of small mesh size gill nets in fish ban season, mosquito nets etc. Despite of all those fishery rules and regulations the report of Wakid, 2010, says that a mortality of altogether 21 dolphins in 2008 and 2009 happened in the Brahmaputra river system, out of which 20 were the victims of fisheries net entanglement. This shows that a proper management of these rules and regulation is lagging behind.

This non- cooperation of the fishers with the management can be either because of the lack of awareness regarding various rules and regulation among the fishers or may be intentional, resulting into unsustainable fishing. As an attempt to develop the sustainable fishery in and around important dolphin habitats of Assam, an awareness campaign among the river side communities, specially targeting the fishermen, was conducted during fishing ban season (2014) with special focus on Assam fishery rules (1953), in association with Fishery Department of Assam.

## Study Area

The Assam fishery rules (1953) awareness campaign was conducted in 11 districts of Assam covering the fisherman of Brahmaputra, Subansiri and Kulsi fisheries and general people. In those 11 districts a total of 32 villages were covered in 20 DCN sites (Table 1).

Table 1. Total districts and the sites in each districts covered during Assam fishery rules (1953) campaign conducted by the DCN members with the support from the Assam fishery department officials. Additional information on the total number of participants and total actual fishermen participants present on the campaign

District	DCN sites	Villages	Total Participants	Total actual fishermen participant
Tinsukia	Guijan	7 No.	20	20
		Erahuti	50	50
Dibrugarh	Aklandghat	Nagaghuli	50	50
		Aklandghat	20	15
		Rowmari	25	30
Sibsagar	Dihingmukh	Teteliguri	40	40
		Dihingmukh	60	50
		Lachang gaon	50	50
	Disangmukh	Alichiga	35	35
	Dikhowmukh	Saraguri Chapori	40	35
Nagaon	Roha	Roha	25	20
Lakhimpur	Khabolu	Alichiga	300	250
		Bordubi Chanang	167	100
	Dikrang	Botamchuk	100	50
		1No. Dahgariya	6	6
		Bhalukaguri	13	10
Sonitpur	Biswanathghat	Biswanathghat	100	50
	Bhomuraguri	Bhomraguri	100	100
Darrang	Jiadhansirimukh	Rowmari	200	150
	Kuruwa	Kuruwa	80	50
Kamrup	Kukurmara	Kaibartra Gaon	106	95
		Madhupur	30	30
		Kukurmara	65	65
	Samariya	Bharalimari	100	80
		Puthimari	50	50
	Malibari	Malibari Bazar	40	40
		Badla	60	50
Borpeta	Pahumara	Kalani Bazar	80	80
	Bohori	Kaltuli	25	20
Goalpara	Goalpara	2No. Baladmari Char	50	20

	Chunari	Chunari	30	20
Bongaigaon	Jugighopa	Kantika	70	17

## Method

Before the main fishery awareness campaign, we trained total 54 DCN Members from 27 DCN sites on sustainable fishery development and implementation of Assam Fishery Rules, 1953 during fishing ban season (April-July) in a workshop in Guwahati. These trainings were given by Fishery Department officials. The Director of Assam Fishery Department was also present during this training programme. Another training was given to these DCN Members on fishermen insurance by the officials of FISOFED, a Govt of India agency dedicated for fishermen insurance. After these training, we instructed the trained DCN Members to conduct fishery awareness campaign in the fishermen villages of their area in association with the concerned District Fishery Development Offices (DFDO), whereas the Directorate of Fishery directed all the DFDOs to collaborate with the approached DCN Members. DCN Members duty was to (a) organize the meeting in selected fishermen villages, (b) prepare the fishermen list for insurance scheme, and (c) conduct questioner survey after the campaign to assess the campaign, whereas the role of DFDO officials was to work as a resource person from the Department. A dedicated DCN Coordinator from the Project Core team was appointed to coordinate the whole awareness campaign by keeping close communication in between the DCN Members and the DFDOs.



Fig-1A: Director of Assam Fishery Department delivering speech during DCN training 2014 on DCN members involvement in sustainable fishery development



Fig-1B: Fishery Officer D. Sharma teaching DCN members on how to conduct fishermen awareness campaign on sustainable fishery in DCN sites



Fig-1C: FISCOFED (National Federation of Fishermen's Cooperative) officials are informing DCN members on how to do fishermen insurance under FISCOFED schemes



Fig. 2 Fishery officials demonstrating Assam fishery rules (1953) among the participants of the awareness campaign at different DCN sites.



DCN members conducting Questionnaire surveys in Pahumara



DCN member helping participants to filled up questionnaires in Chammariya.



Participants participating in Questionnaire surveys in Kukuramar



Participants submitting their questionnaires after completion in Dikrong

Fig. 3 DCN members conducting questionnaire survey among the participants before and after the demonstration of the Assam fishery rules by the fishery officials.

Apart from the awareness campaign, the fishermen were also encouraged to do life insurance under the life insurance policy of fishery department for fishermen community and the fishermen present on the meeting were immediately insured (Fig. 4). The left out actual fishermen on those sites were identified by the DCN members and their names their names were also registered for insurance afterwards by visiting the residence of those fishermen (Fig. 4).



Fishery official registering the actual fishermen names on the campaign for life insurance.



DCN member listing up the actual fishermen at their residence for life insurance.

Fig. 4 Fishery officials and DCN members while doing the registering the actual fishermen names for Life insurance policy.

## Results and Discussion

**Survey Effort:** The awareness campaign was completed in 30 days (13<sup>th</sup> Jun to 12<sup>th</sup> Jul, 2014) covering 11 districts with a total of 32 meetings. A total of 2187 number of people participated in the meetings and out of which 1728 were fishermen of Brahmaputra, Subansiri and Kulsu river fisheries. A total of 562 number of questionnaire survey was completed. Total 23 fishery officials from total 11 District Fishery Development Offices of the Assam Fishery Department participated as resource persons. A total of 2293 number of fishermen were insured during the month of June and July, 2014.

### Fishery awareness campaign assessment:

Each question asked in the questionnaire has been dealt separately. The results have been shown as a percentage of respondents and the significant difference between the answers given by the participants in both the rounds of questionnaire survey was estimated and shown below:

1. *Participants Age Groups:* We observed a wide range of age of people participated in the meeting. We divided the wide range into 9 categories (Fig.5). We observed a highest participation belonging to the age group of more than 20 to 25 yrs (16.26%) followed by age group more than 25 to 30 yrs (15.76%). Least participants belonged to age group from more than 45 to 50 yrs (5.91%). 2.96% of participants couldn't provide the information (Fig.5).

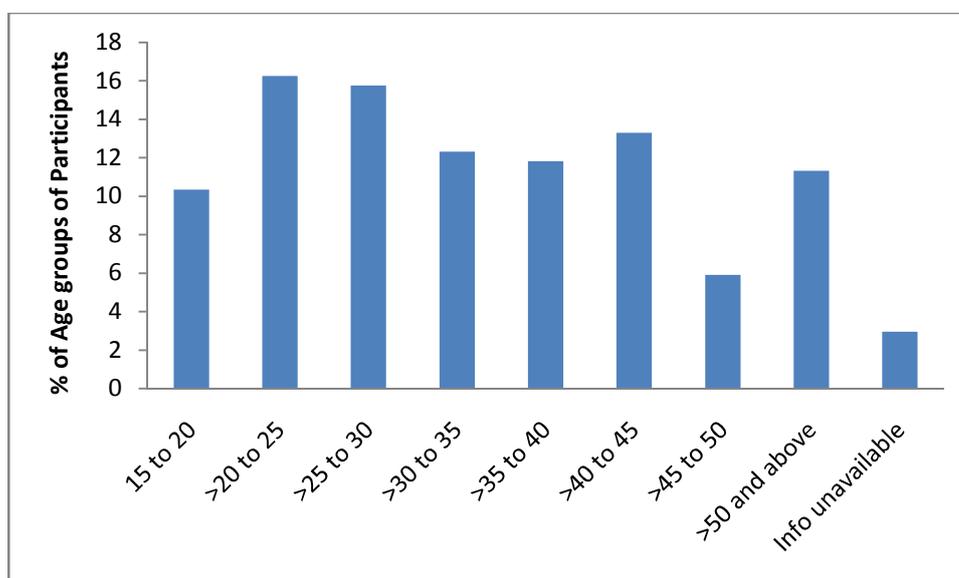


Fig. 5 Percentage of participants belonging to various age groups.

2. *Education qualification:* An overview of the awareness campaigns gave us a rough idea of the education qualification of the participants. The questionnaire survey says that about 31% of the

participants were without any education qualification. Highest number of the participants was composed of people with qualification up to under- matriculation (33%) followed by matriculate people (13%) and least were graduates (4%) (Fig.6). 0.4% information was unavailable.

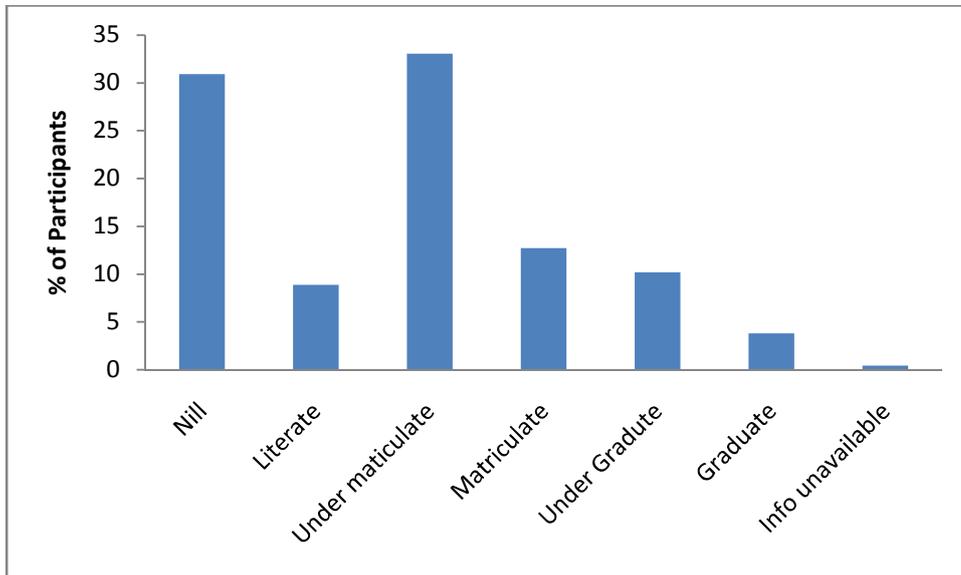


Fig. 6 Percentage composition of Education qualifications of the participants in the questionnaire survey for Fishery rules awareness campaign.

3. *Livelihood source:* In this awareness campaign, mainly the fishermen communities, whose source of livelihood is only fishing, of the Brahmaputra, Subansiri and Kushi river fisheries were targeted in different DCN sites, however, we also observed the participation of people with different livelihood sources. Although the highest participation was from the targeted group, i.e., fishermen (62%) which was followed by a participation of cultivators (14%) (Fig.7).

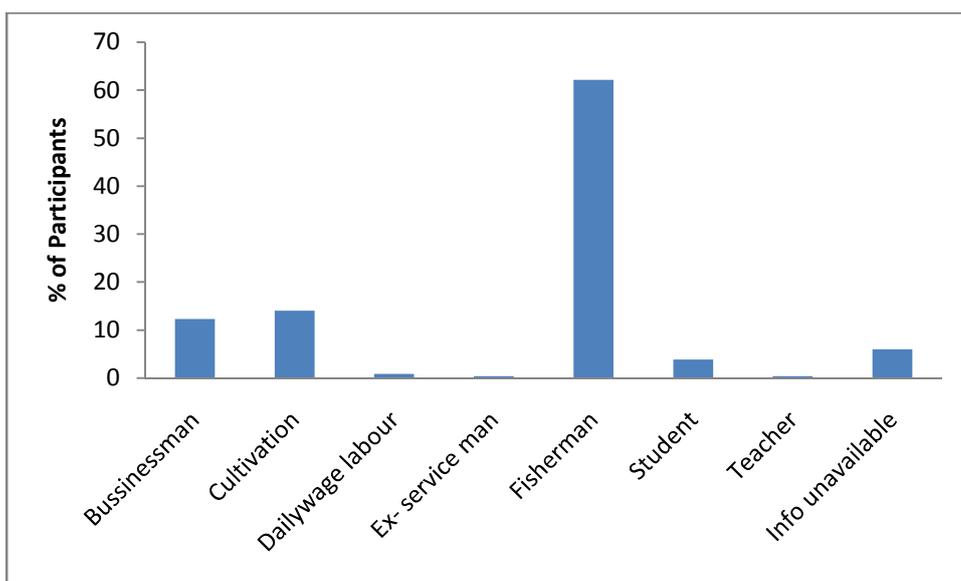


Fig.7 Percentage of different livelihood sources of the participants.

4. *Information on previous awareness campaigns on fishery rules on the site:* Majority of the sites replied that no previous awareness meeting on sustainable fishery have been conducted in their locality before this one. However, in some sites; Akland (25% ), Guijaan (60%), Dihingmukh (9%), Dichangmukh (100%), Dikhowmukh (53%) and Dikrongmukh (8%); towards the upper part of Brahmaputra (Fig. 8), respondents have replied that in 2013 such meetings was conducted in their locality of which 97% respondents have said Aaranyak was the organiser and 3% said fishery department was organiser.

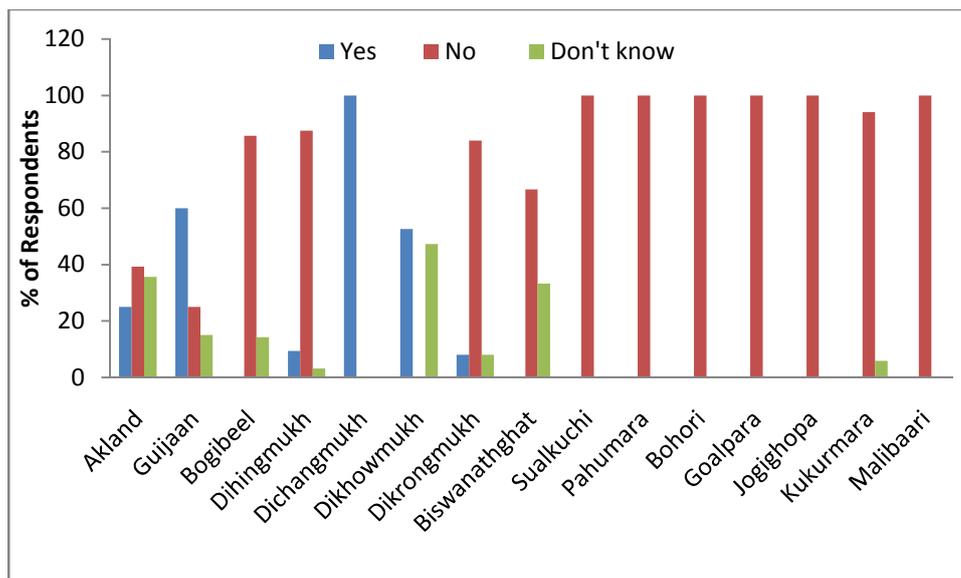


Fig. 8 Information on previous awareness campaigns on Fishery rules on the sites.

5. *Quality of performance of the fishery officials during awareness campaign on sustainable fisheries:* Significantly higher number of the participants had replied that the talks and interactions by the fishery officials on sustainable fishery development as well as fishery rules was of *very good* quality, especially in sites of Bogibeel, Dihingmukh, Dikhowmukh, Goalpara and Maalibaari more than 80% of the participants replied that the lecture was of very good quality (Fig.9).

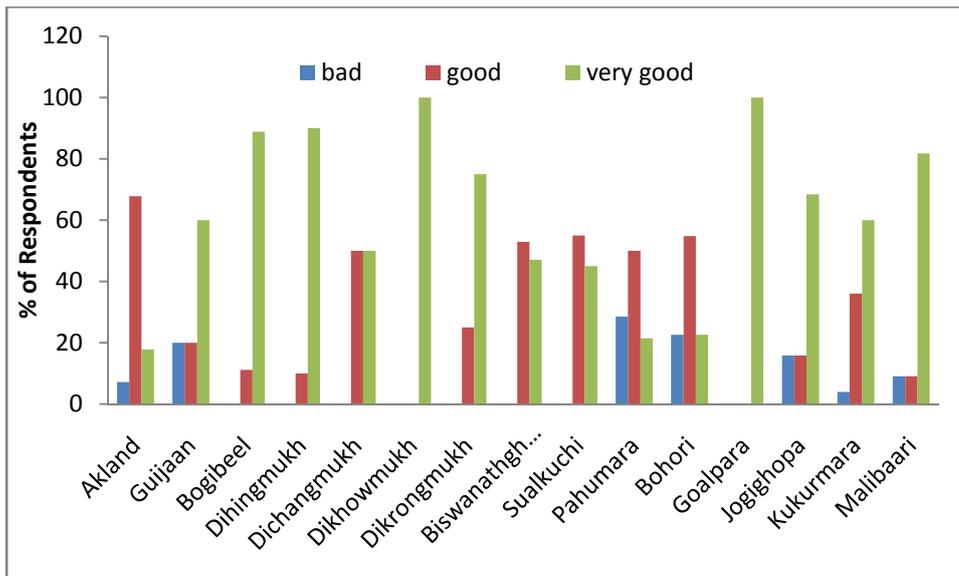


Fig. 9 The opinion of the participants regarding the quality of performance given by the fishery officials during demonstrating the fishery rules

6. *Percent understood by the participants from the lecture:*

We divided this question into four ranks which implies that the person with highest rank, i.e. Rank 4, have understood the lecture properly without any confusion and gradually with lower rank the level of understanding decreases with lowest Rank 1. We have estimated a highest percentage of respondents for Rank 4 in Bogibeel and Dihingmukh (77.78%), lowest in Bohori (3.13%) and nill in Maalibari (Fig. 10).

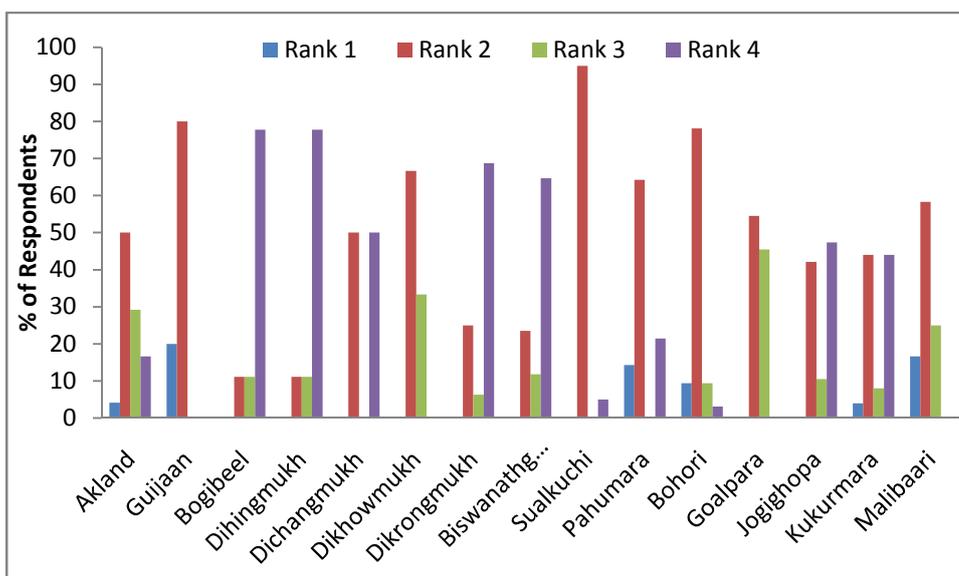


Fig. 10 The opinion of the participants regarding the percent understood by them on sustainable fishery and fishery rules and regulations from the lecture presented by fishery officials.

7. According to fishery rules (1953) the water can't be dried out and drained out in the leased fishery: Yes or No

The correct answer to the question was "No" water cannot be dried out or drained out in the leased fishery according to Fishery Rules, 1953. We estimated a more negative or incorrect result for this question than positive or correct answer on both sessions. A total of 8 DCN sites followed this format of questionnaire survey and accomplished the pre- and post- lecture questionnaire session (Fig. 11).

The questionnaire surveys before and after the lectures shows no significant difference between the options selected by the participants ( $Z = -1.153$ ,  $sig. = 0.25$ ), however the rank for correct answer prior to lecture was more compared to after the lecture.

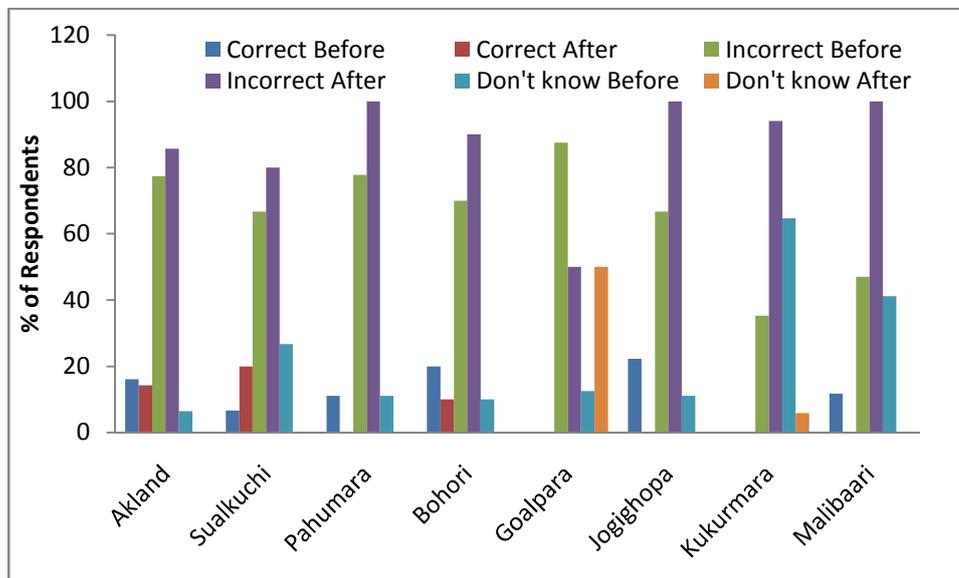


Fig. 11 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of permission for drying out or drained out water from the leased fisheries within Fishery rules, 1953.

There were 7 sites where the DCN members didn't performed a double round questionnaire survey and completed the task only after the campaign was over. In those sites we couldn't perform a comparative analysis for the pre- and post- lectures and thus we only estimated the results of the post- lecture. Even in these sites also, we observed that there was an understanding problem to the question and significantly lesser number of participants have given correct answers (Fig. 12).

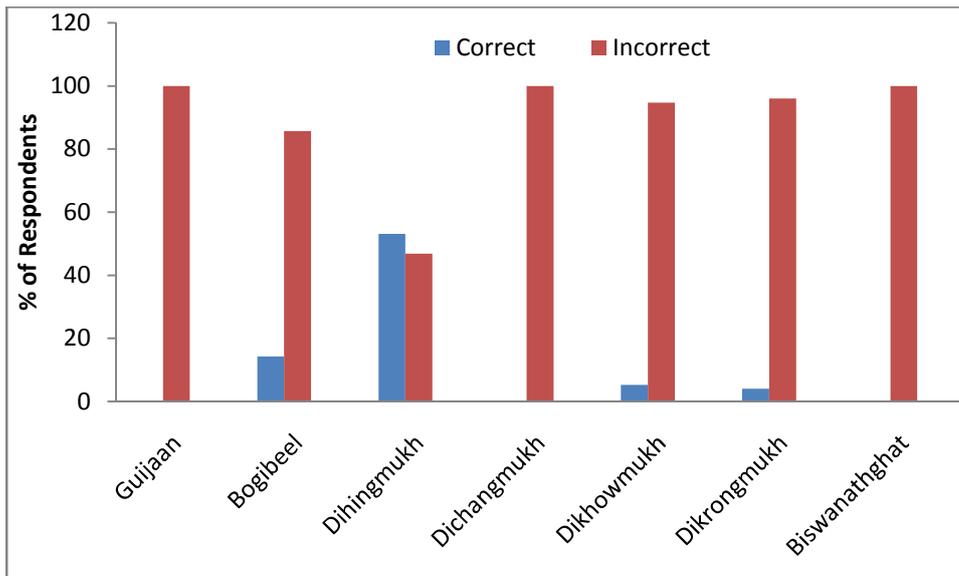


Fig. 12 Correct and incorrect answers in the post- lecture questionnaire survey to the question of permission for drying out or drained out water from the leased fisheries within Assam Fishery rules, 1953.

8. *The minimum size of "bana" that can be used for fishing from 1<sup>st</sup> May to 15<sup>th</sup> July*
  - a. 5cm
  - b. 6cm
  - c. 7cm

The correct answer was "7cm". To this question, the more participants have given correct answer after listening to the lecture than vice versa. Highest correct answer in the post- lecture questionnaire session was given by the participants of Pahumara (100%) which was 55% in the pre- questionnaire session followed by Bohori (90%) which was 70% in pre- questionnaire session (Fig. 13). Lowest correct answers after lecture was given by the participants of Akland and Goalpara (50%) which was 26% and 13% in the pre- sessions respectively (Fig. 13).

We have also estimated a significant increase in number of correct answers in the second round than the first round of questionnaires ( $Z = -2.52$ ,  $sig. = 0.01$ ).

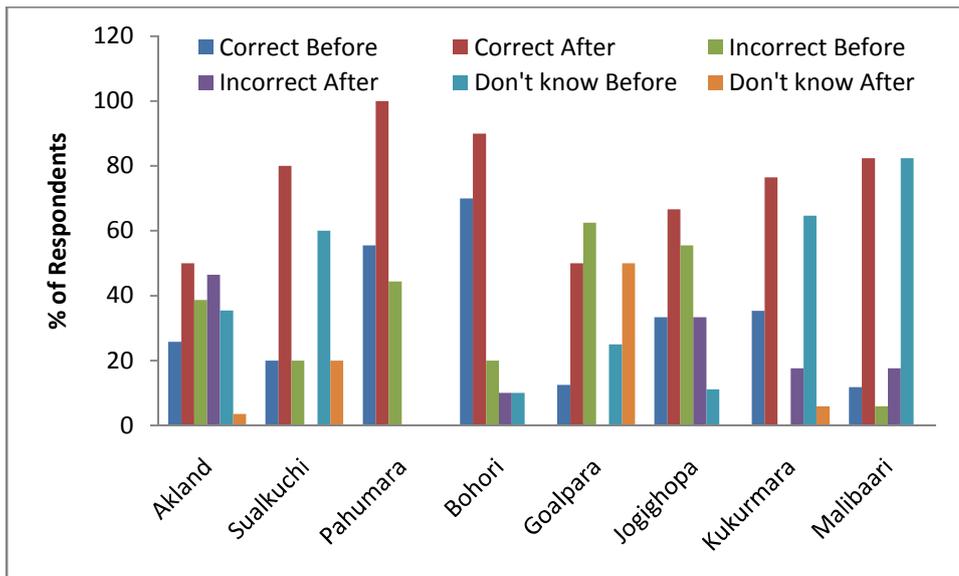


Fig. 13 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of minimum *bana* size allowed according to Assam Fishery rule for fishing from 1<sup>st</sup> May to 15<sup>th</sup> July.

The results of the DCN sites who performed only post- lecture assessment shows that except Guijaan (70%) and Dikhowmukh (84%) all the other sites gave more incorrect answers than correct answers. 100% participants of Dichangmukh have given incorrect answers to the question (Fig. 14).

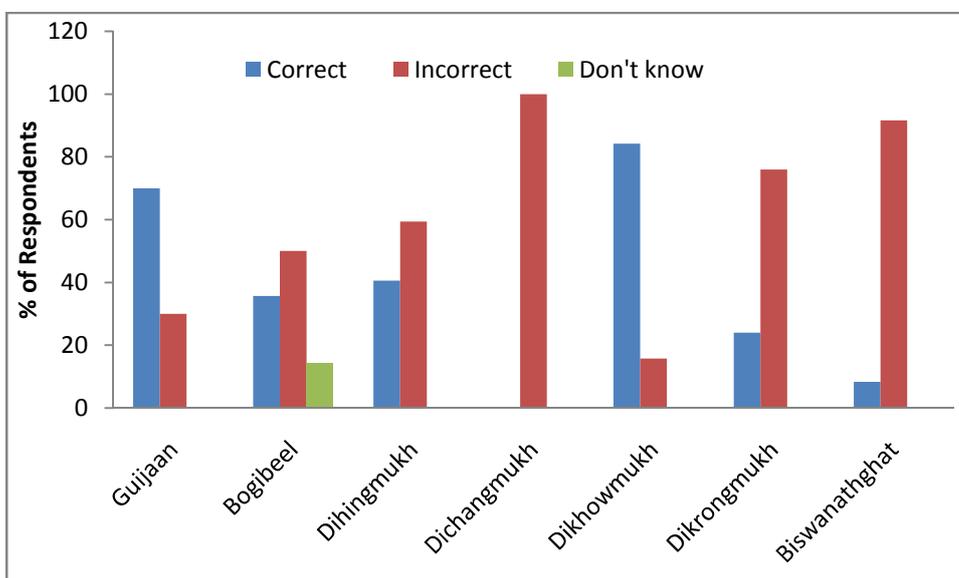


Fig. 14 Correct and incorrect answers in the post- lecture questionnaire survey to the question to the question of minimum *bana* size allowed according to Assam Fishery rule for fishing from 1<sup>st</sup> May to 15<sup>th</sup> July.

9. Mosquito net mesh size banned for all season is

a. <1cm bar/ 2cm pahi

b. <2cm bar/ 3cm pahi

The correct answer to the question was <1cm bar/ 2cm pahi. We observed during the questionnaire survey that all the DCN sites except Goalpara, have given more correct answers in the second round comparison to the first round. The highest correct answers in the second round was given by Pahumara and Jogighopa (100%) where the pre- lecture percentage of correct answer was 77.77% and 33.33% respectively (Fig. 15).

To this question, we have observed more correct answer in the second round of questionnaire survey than the first round, however the difference was not significant ( $Z = -1.54$ ,  $sig. = 0.12$ ).

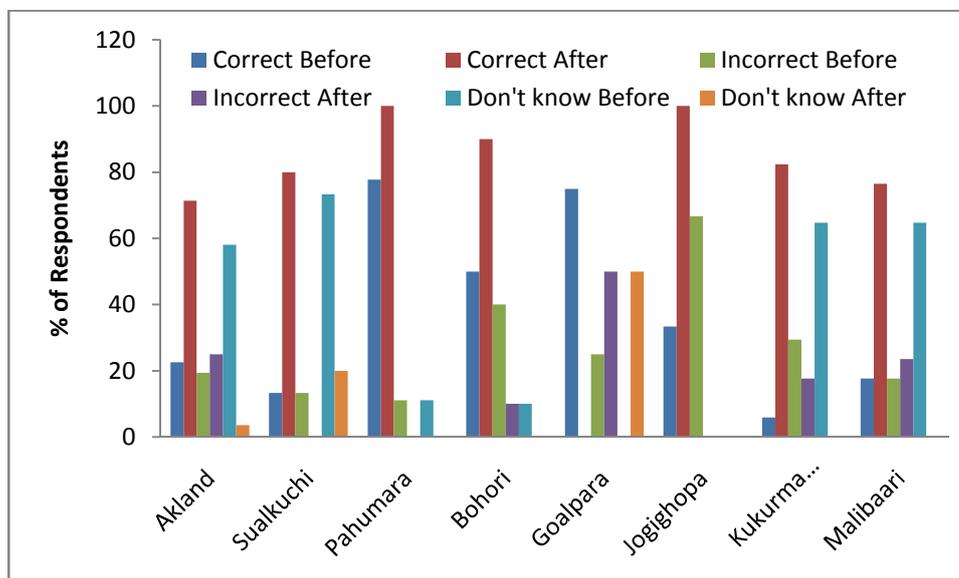


Fig. 15 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of minimum mosquito net mesh size banned for all seasons under Assam Fishery rule for fishing.

In DCN sites with only post- lecture questionnaire survey reveals that only Guijaan (95%) and Bogibeel (57%) have shown higher percentage of correct answers than incorrect answers among all the other sites (Fig. 16). Dichangmukh have given 100% incorrect answers and Bishwanath ghat has given 83.33% incorrect answer and 16.67% couldn't answer (Fig. 16).

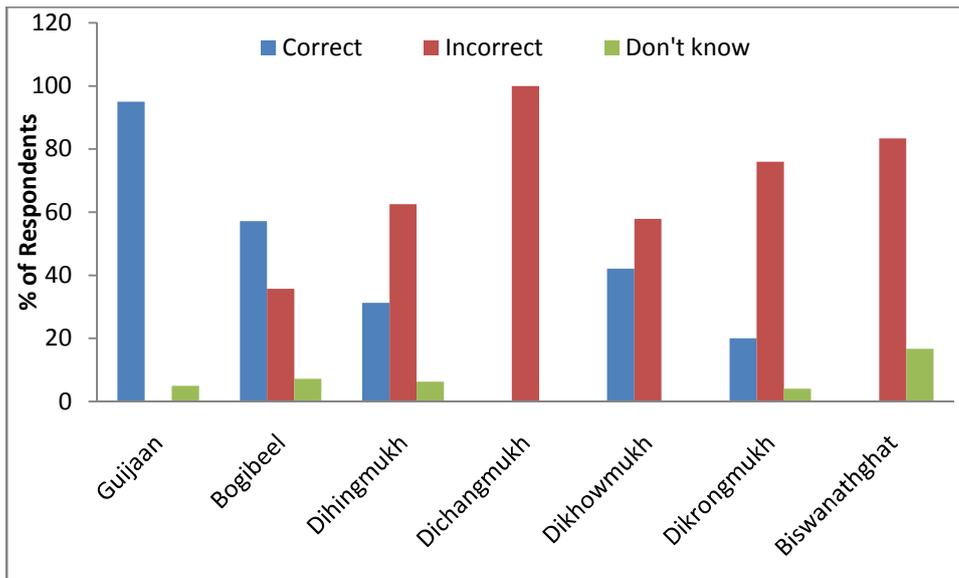


Fig. 16 Correct, incorrect and unknown answers in the post- lecture to the question of minimum mosquito net mesh size banned for all seasons under Assam Fishery rule for fishing.

10. The minimum mesh size of fishing nets that can be used for fishing from 1<sup>st</sup> April to 15<sup>th</sup> July is:
- 5 cm *bar*/ 10 cm *pahi*
  - 6 cm *bar*/ 12 cm *pahi*
  - 7 cm *bar*/ 14 cm *pahi*

The correct answer to the question was 7 cm *bar*/ 14 cm *pahi*. We observed a higher number of correct answers in the second round in comparison to the first round and also estimated a significant result for the same ( $Z = -2.53$ ,  $sig. = 0.01$ ). The highest correct answer in the post- lecture was given by Jogighopa (100%) followed by Bohori (90%) where the pre- lecture correct answer percentage was 56% and 50% respectively (Fig. 17).

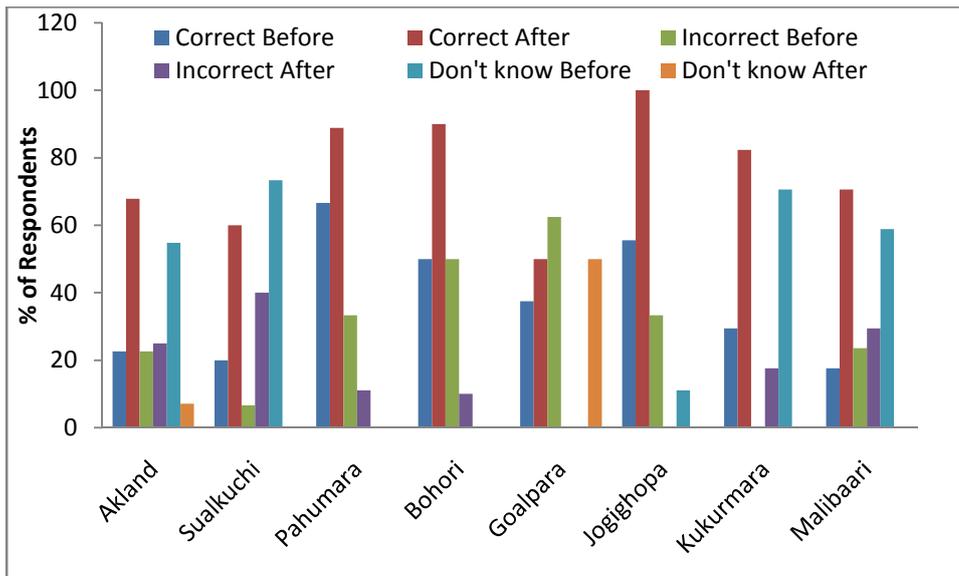


Fig. 17 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of minimum fishing net mesh size which can be used for fishing from 1<sup>st</sup> Apr to 15<sup>th</sup> Jul under Assam Fishery rule.

The sites with only post- questionnaire data reveals comparatively higher correct answers than incorrect answers in all the sites except for Gujjaan (60%) and Dihingmukh (84.37%) where we have seen higher percentage of incorrect answer (Fig. 18).

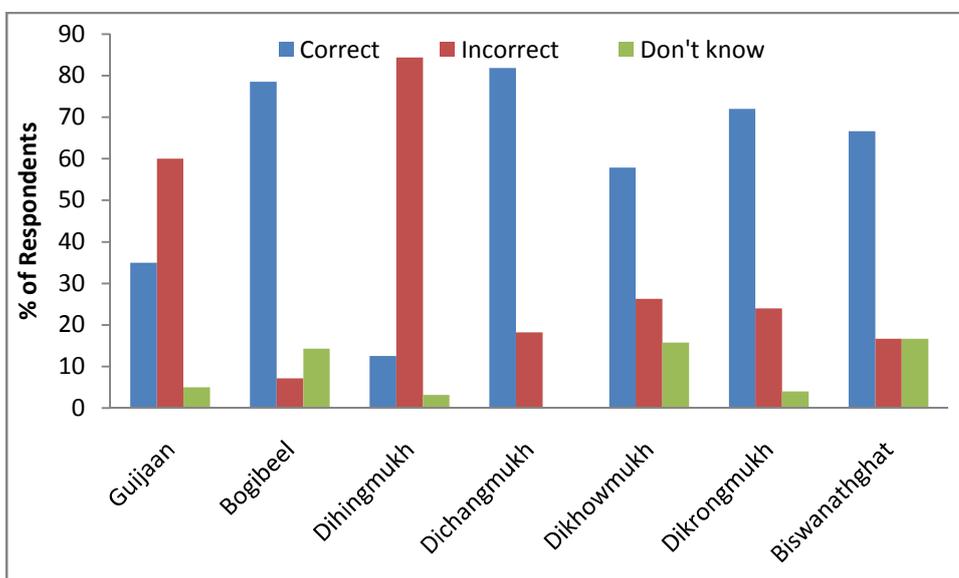


Fig. 18 Correct, incorrect and unknown answers in the post- lecture to the question of minimum fishing net mesh size which can be used for fishing from 1<sup>st</sup> Apr to 15<sup>th</sup> Jul under Assam Fishery rule.

11. The time period in which the fishes with eggs (Rohu, Bahu, Mirika, Mali, Chital, Kharia, Pithia, Gharia, Kudhi) can't be fished out from leased fisheries:

- a. 1<sup>st</sup> Jan to 30<sup>th</sup> Apr,
- b. 1<sup>st</sup> May to 15<sup>th</sup> Jul,
- c. 1<sup>st</sup> Jul to 30<sup>th</sup> Oct.

The correct answers to the question was 1<sup>st</sup> May to 15<sup>th</sup> Jul. We estimated a significant difference in the percentage of correct answers given by the interviewers in the second round in comparison to the first round ( $Z = -2.31$ ,  $sig. = 0.02$ ). Highest correct answers in the post-lecture questionnaire session was observed for Pohumara (88.88%) followed by Sualkuchi (80%) where the percentage of correct answers in pre-lecture questionnaire sessions was 66.66% and 20% respectively (Fig. 19).

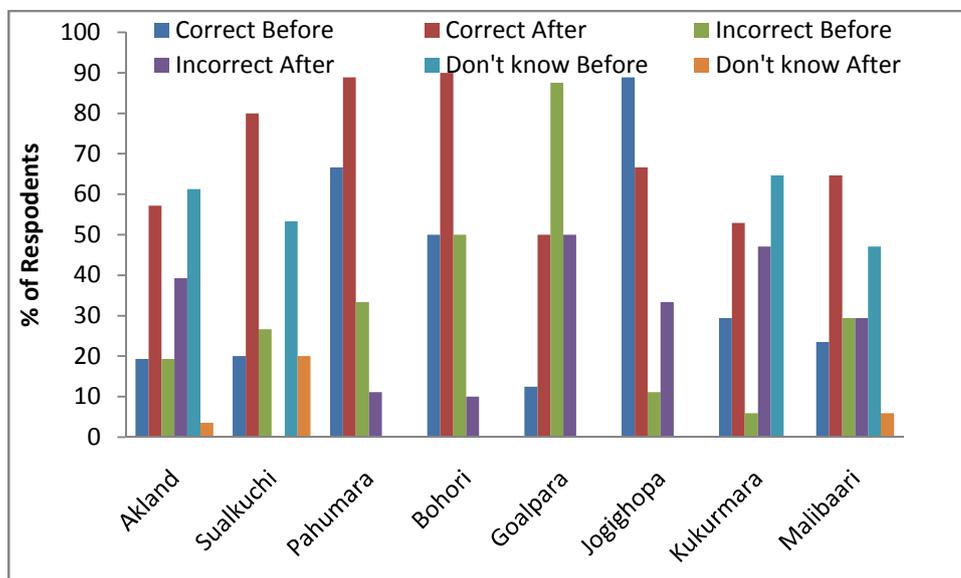


Fig. 19 A comparative display of the percentage of correct, incorrect and unknown answers in the pre and post-lecture to the question of the time period in which the fishes with eggs (Rohu, Bahu, Mirika, Mali, Chital, Kharia, Pithia, Gharia, Kudhi) can't be fished out from leased fisheries under Assam Fishery rule.

The sites with only post-questionnaire data reveals significantly higher percentage of correct answers than incorrect answers in all the sites with highest in Dichangmukh (100%), followed by Dihingmukh (96.88%) and lowest in Bogibeel (57.14%) (Fig. 20).

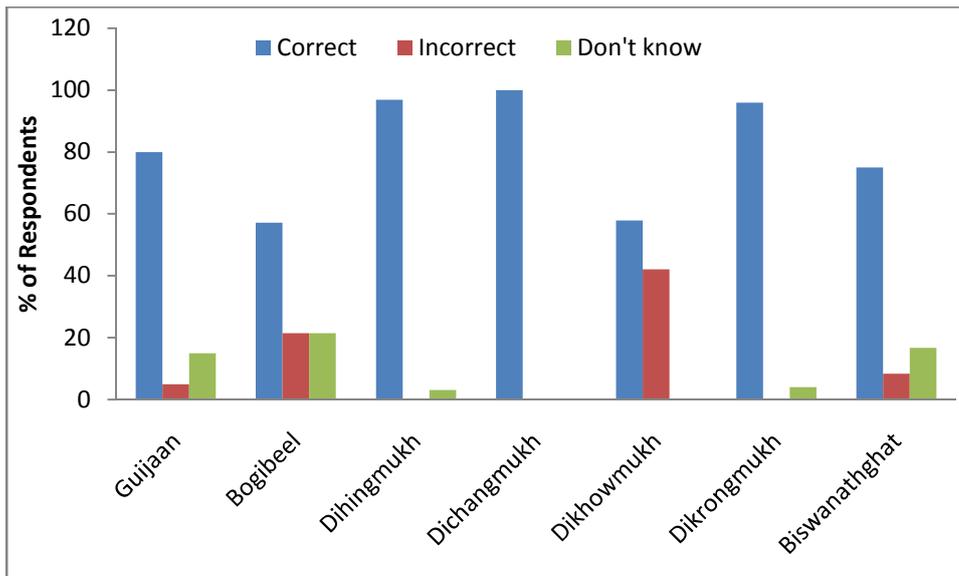


Fig. 20 Correct, incorrect and unknown answers in the post- lecture to the question of the time period in which the fishes with eggs (Rohu, Bahu, Mirika, Mali, Chital, Kharia, Pithia, Gharia, Kudhi) can't be fished out from leased fisheries under Assam Fishery rule.

12. Time period in which 7sq cm *bana* is banned for fishing in any leased fishery
  - a. 1<sup>st</sup> May to 15<sup>th</sup> Jul,
  - b. 1<sup>st</sup> Aug to 30<sup>th</sup> Sept,
  - c. 1<sup>st</sup> Nov to 31<sup>st</sup> Dec.

The correct answer to the question was 1<sup>st</sup> May to 15<sup>th</sup> July. We have observed a high percentage of correct answers in the questionnaires after the lecture in comparison to before the lecture, however the difference between them is not significantly higher ( $Z=-1.86$ ,  $\text{sig.}= 0.06$ ). The highest percentage of correct answer to the question was given by the participants of Bohori (70%) followed by Jogighopa (66.67%) where the percentage of correct answers prior to lecture was 20% and 44.44% respectively (Fig. 21). The scene of Pahumara and Kukurmara was different since the percentage of correct answers prior to lecture was more (77.78% and 35.29% respectively) than post- lecture (66.67% and 29.41% respectively).

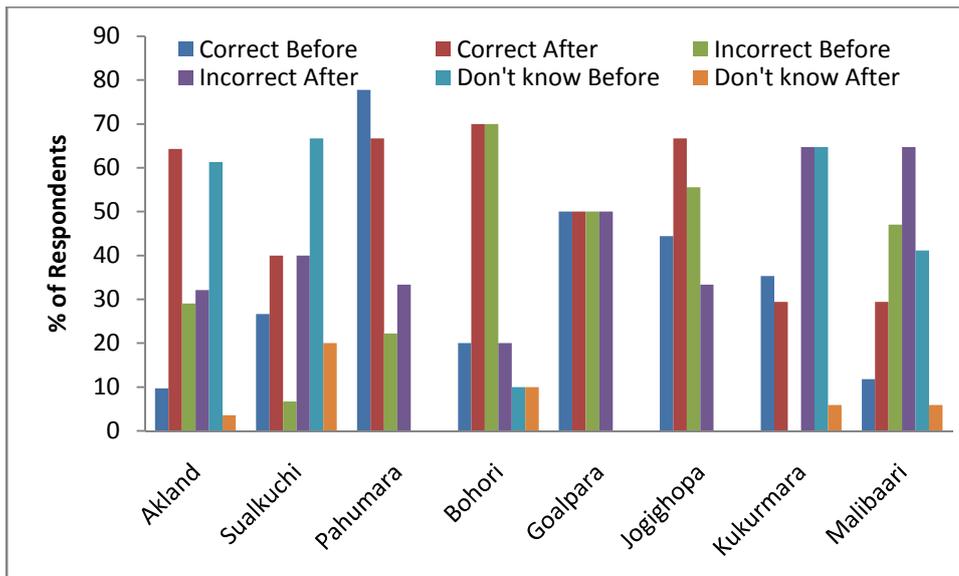


Fig. 21 Comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture questionnaire survey to the question of time period in which 7sq cm *bana* is banned for fishing in any leased fisheries under Assam Fishery rule.

We found a comparatively higher percentage of correct answers in the sites where only one round of questionnaires was done after the demonstration of fishery rule. We have observed that participants of Dichangmukh (100%) has given highest correct answers followed by Dikrongmukh (88%) (Fig. 22).

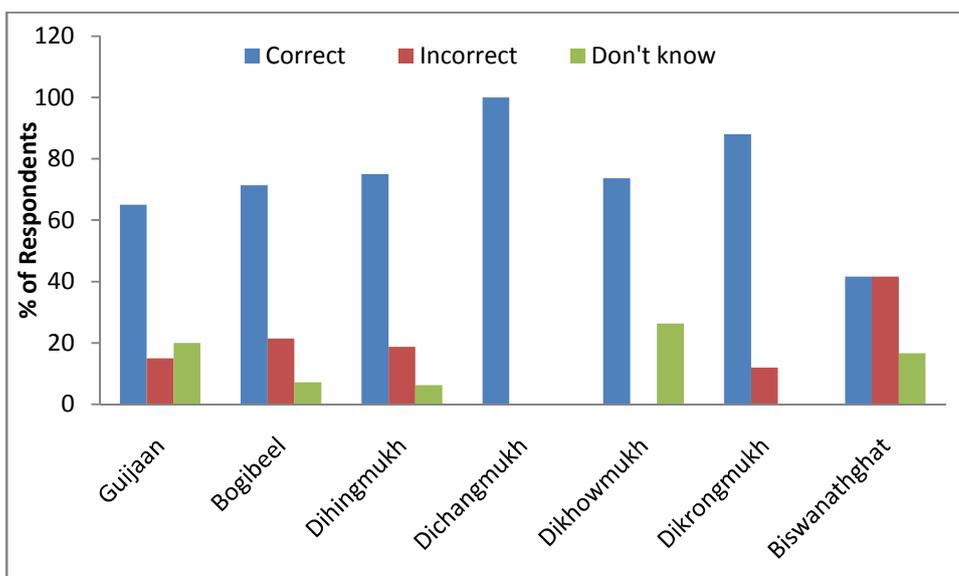


Fig. 22 Correct, incorrect and unknown answers in the post- lecture questionnaire survey to the question of time period in which 7sq cm *bana* is banned for fishing in any leased fisheries under Assam Fishery rule.

13. *Penalties for breaking fishery rules:*
- Rs. 1000- 5000 fine
  - Fishing gears can be confiscated
  - Cancel lease registration
  - All of the above options.

The correct answer is “all of the above options” given under the question. We estimated a significantly higher percentage of correct answers in the second round than the first round of questionnaire survey ( $Z=-2.37$ ,  $sig.=0.02$ ). A 100% correct answer was observed for Bohori and Goalpara where the percentage of correct answer was 30% and 0% respectively. Other than these sites Malibaari also showed 94% of correct answers in the post- lecture survey where the percentage of correct answer was 23.53% in the pre- lecture survey (Fig. 23).

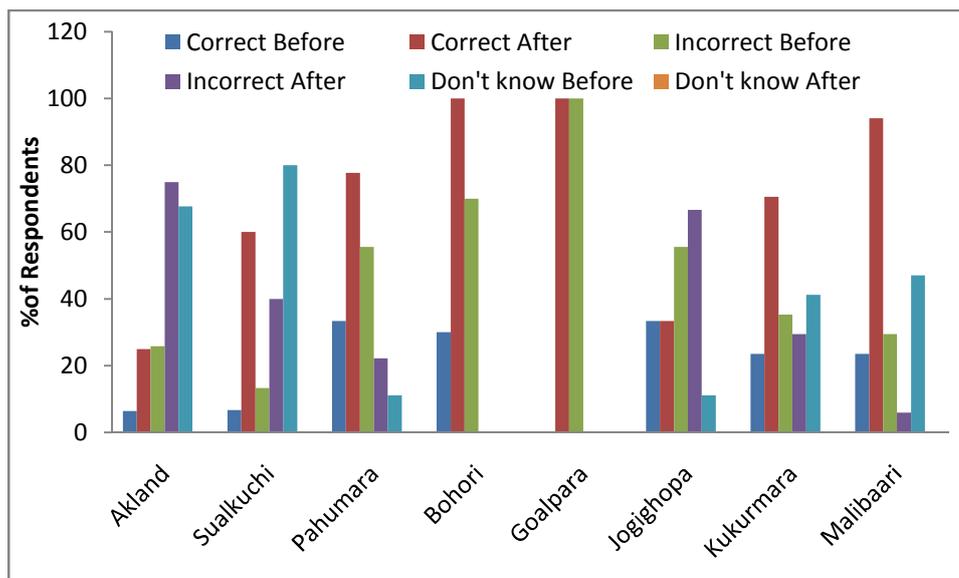


Fig. 23 Comparative display of the percentage of correct, incorrect and unknown answers in the pre and post- lecture to the question of legal punishment under Assam Fishery rule for breaking fishery rules.

In the sites with single questionnaire survey session after lecture, we have seen less percentage correct answers than incorrect answers. Except two sites Bogibeel (78.57% of correct answers) and Dikhowmukh (63.16% of correct answers) rest of the sites showed higher percentage of incorrect answers comparison to correct answers (Fig. 24). Participants of Dihingmukh and Dichangmukh have shown comparatively very poor performance with only 6.25% and 0% correct answers (Fig.24).

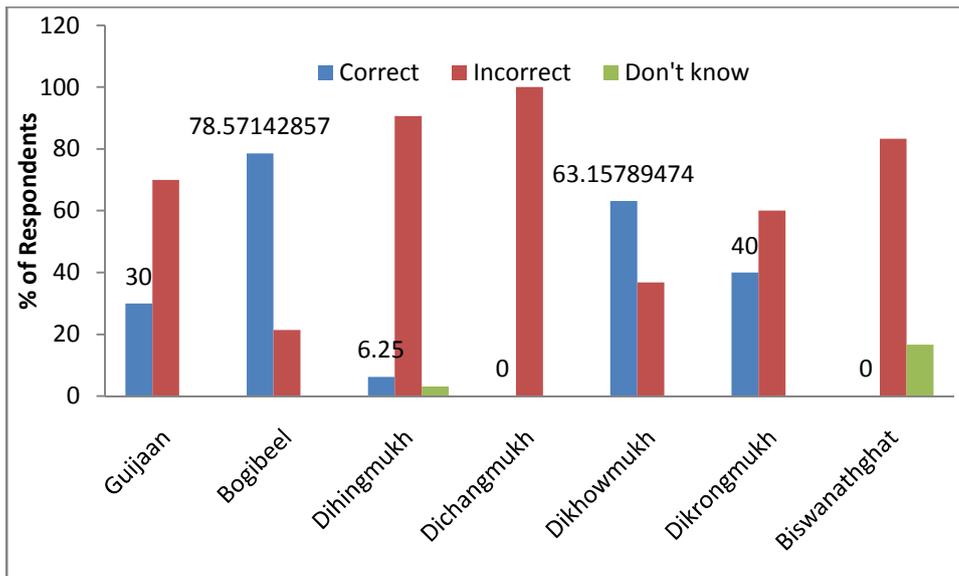


Fig. 24 Percentage of correct, incorrect and unknown answers in the post- lecture questionnaire survey to the question of legal punishments under Assam Fishery rule for breaking fishery rules.

14. *Do you want the fishery rule to be followed in your locality*

Yes/No/No comments

After the lecture on Fishery rules the participants were finally asked about their opinion for the implementation of fishery rules in their own locality. We have estimated a high percentage of opinion saying “yes” for fishery rules to be followed in their locality in the second round of questionnaire survey in comparison to first round of survey which was done prior to the lecture, however the difference was not significant ( $Z=-1.75$ ,  $sig.=0.08$ ). Almost in all of the sites, 100% of participants have opted for “yes” for the implementation of fishery rules in their localities after listening to the demonstration on Assam fishery rules given by the fishery officials (Fig. 25).

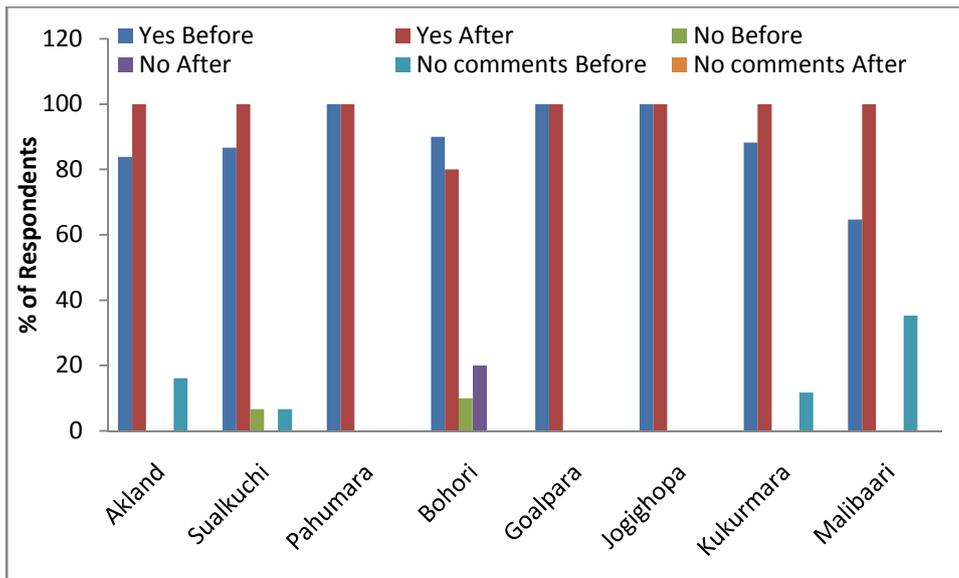


Fig. 25 Percentage of opinions of the participants regarding implementation of fishery rules in their locality before and after listening to the demonstration on Assam fishery rules, 1953, given by the fishery officials.

For sites where the question was put in front of the participants only after listening to the demonstrator, we have observed that out of the seven sites, four sites, viz. Guijaan, Bogibeel, Disangmukh and Dikrongmukh, without any confusion, have opted for “yes” for the implementation of fishery rules in their localities (Fig. 26)

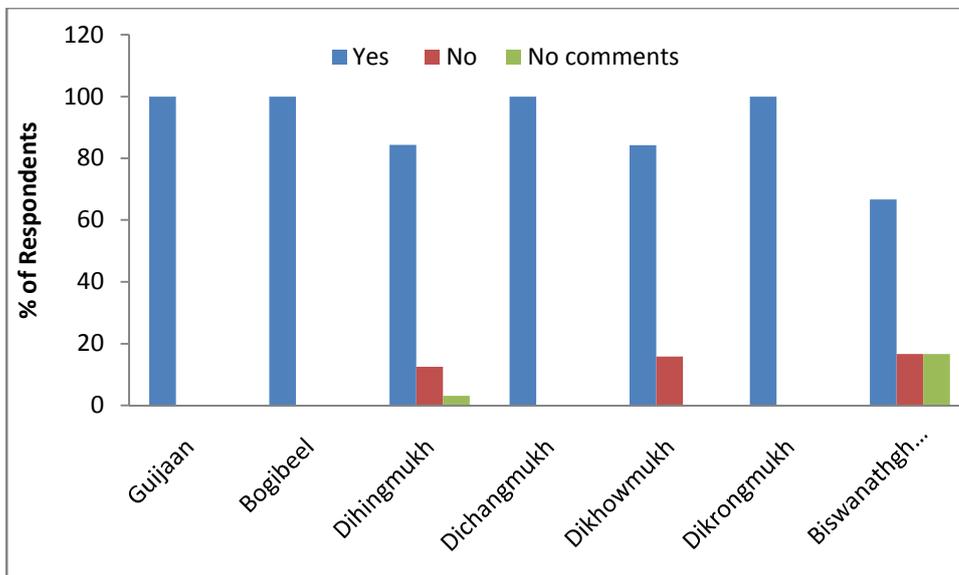


Fig. 26 Percentage of opinions of the participants regarding implementation of fishery rules in their locality after listening to the demonstration on Assam fishery rules, 1953, given by the fishery officials.

**Conclusion:**

We, the Gangetic Dolphin Research and Conservation Initiative of Aaranyak have been conducting fishery awareness campaign in collaboration with the State Fishery Department since 2012. However, this was the first time, when instead of direct engagement of our Project Core Team members in the organizing of the fishery awareness campaign, we gave the responsibility to the trained 27 DCN Units with an aim to develop good working relation of these community groups with the management agency. From this effort, we found that out of the trained 27 DCN Units, 20 units were able to organize the meeting successfully in 32 fishermen villages across the Brahmaputra river system. 5 DCN units were unable to organize the meeting due to flood in those areas, whereas 2 other units were unable to arrange the meeting due to organizing problems. This fishery awareness campaign activity helped in building a good repo of these DCN Units with local fishery management authority. We were able to give insurance coverage to 2293 fishermen, which is also helping us in building good community confidence on us.

## References

- Biswas, S. P. & R. G. Michael, 1992. Fishery characteristics and the present status of fisheries of the river Brahmaputra. Proc. Sem-inar on conservation of River Dolphins of Indian Sub-continent. 18–19 August 1992, New Delhi (Abst.).
- Biswas, S.P., S. Boruah. 2000. Fisheries ecology of the northeastern Himalayas with special reference to the Kulsi River, Ecological Engineering 16 (2000) pp.39–50.
- Culik, B. 2003. *Platanista gangetica*, Ganges River dolphin, susu. Convention on Migratory Species, Bonn, Germany.
- Edwards, E.F. (2007). Fishery effects on Dolphins Targeted by Tuna purse seine in the Eastern Tropical Pacific Ocean. International journal of Comparative Psychology, 20, 217-227. Copyright 2007 by the International Society for Comparative Psychology.
- FAO (2005). Report of the Conference of FAO, Thirty- third Session, Rome, 19- 26 November 2005.
- Jefferson, T. A., Leatherwood, S. and Webber, M. A. 1994. Marine Mammal Science: FAO Species Identification Guide. United Nations Environment Programme and Food and Agriculture
- Klinowska, M. 1991. Dolphins, Porpoises and Whales of the World: The IUCN Red Data Book. IUCN - The World Conservation Union, Gland, Switzerland. 429 pp.
- Lachatowich, J. A. ( 1999). Salmon without Rivers: A History of the Pacific Salmon Crisis. Island Press (01-Aug- 1999)- Nature.
- Norman, J. R. and F. C. Fraser (1948): Giant fishes, whales and dolphins. Putman Press, Bath, England. 376 pp.
- Organisation of United Nations, Rome, Italy. ISBN: 92-5-103292-0
- Ramanov, E.V., (2002). Bycatch in tuna purse- seine fisheries of the western Indian Ocean. Fish. Bull. 100(1): 90-105.
- Roma, (2001). Report of the Workshop on Interactions between Dolphins and Fisheries in the Mediterranean Evaluation of Mitigation Alternatives. Edited by R.R. reeves, A.J. Read, and G.N. di Sciara. Presented by Italy to the 53<sup>rd</sup> Meeting of the Scientific Committee of the international Whaling Commission, London, July 2001 (Document SC/53/SM3).
- Shrestha, T. K. (1989): Biology, status and conservation of the Ganges river dolphin *Platanista gangetica* in Nepal. Pp 70-76. In: W.F. Perrin, R.L. Brownell Jr., Zhou kaiya and Liu Jiankang (eds.) Biology and Conservation of the River Dolphins. IUCN Species Survival Commission Occasional Paper No. 3. IUCN, Gland, Switzerland.
- Sinha, R. K., N. K. Das, N. K. Singh, G. Sharma and S. N. Ahsan (1993): Gut content of the Gangetic dolphin, *Platanista gangetica*. Invest. Cetacea, 24: 317-321.
- Turner, S.J. ,S.F. Thrush, J.E. Hewitt, V.J. Cummings, G. Funnell, (1999). Fishing Impacts and the degradation or loss of habitat structure. Fish. Manag. Ecol. 6:401-20.
- Varghese, S.P., S. Varghese, & V.S. Somvanshi ( 2010). Impact of tuna longline fisheries on sea turtles of Indian seas. Current Science, vol.98, No. 10, 1378- 1383.
- Wakid, A. 2010. Initiative to reduce the fishing pressures in and around identified habitats of endangered Gangetic Dolphin in Brahmaputra River system, Assam. Final Technical Report submitted to CEPF. Pp 34.
- Wakid, A., 2005. Conservation of Gangetic dolphin in Kulsi river system, India. Final Technical Report submitted to the BP Conservation Programme and Rufford Small Grant. 80 pp.