FISH VALUE CHAIN NEWSLETTER

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CLIMATE-RESILIENT PADDY CUM FISH INTEGRATED FARMING

In rice-fish farming, rice is the primary crop and fish culture is secondary or complementary. The paddy cum fish integrated farming is an innovative farming system where rice is the main enterprise and fish fingerlings are taken as additional means to secure extra income. Perhaps this is due to the well-established technology for rice, and also the fact, that it is the rice grower who has taken to fish culture. Paddy cum fish culture is not only reducing income poverty of the farmers but also improves the yield of paddy, create employment opportunities.

The production of a fish crop between the rice crops gives the farmer an off-season occupation which increases the income without increasing expenses. Apart from the additional income available from rice-pisciculture, the combined culture leads to a reduction in labour in weeding and an increase in the yield of paddy by 5 to 15% the increase in rice production is ascribed to various factors, namely:

Climate Resilient paddy fish integrated farming

- Increase in organic fertilization by fish excreta and remains of artificial feed.
- Better tillering of the rice seedlings due to the activity of the fish.
- Reduction in the number of harmful insects, such as paddy stems borers, whose larvae are eaten by fish.
- Reduction in rat population due to the increase in the water level.
- Increased mineralization of the organic matter and increased aeration of the soil resulting from the puddling of mud by benthic feeders.
- Control of algae and weeds (by phytophagous fish) which compete with rice for light and nutrients.

Paddy Cum fish culture under APART

The beneficial effect of fish on paddy production is a sort of mutual symbiosis that takes place, in which each of the two components is not damaged but rather favoured, up-to a certain point, by the presence of the other.

APART is supporting sustainable intensification and promotion of Paddy-cum-Fish integrated farming demonstrations as a climate-resilient technology. This activity is taken up to achieve a fish production of 1 to 1.5 tonnes/ha from paddy-fish integrated

systems without compromising paddy yields.
However, the disadvantages of the rice field for fish are the low depth and the stagnant water. The low depth water is to an extent compensated, as explained earlier, by the provision of trenches and swamps for refuge and also by the increased light penetration and consequent high production of phytoplankton and algae in the shallow depth. Compensation for stagnant water can be made possible, only to an extent, by addition and retention of fertilizers that are applied and in the case of fishes by the adoption of polyculture technique (by the right choice of species). This is done to see that the recycling of nutrients is ensured.

BEEL FISHERIES DEVELOPMENT IN ASSAM

Beel fisheries development is planned to increase the productivity and sustainability of the beels, without any environmental impact. Beel fisheries development under APART is planned in the 15 Project Districts. The major approaches for beel fisheries development include stock enhancement, stock improvement, conservation of natural resources, nutritional security of local communities and better governance mechanism.

During 2019-20, a total of 16 beels covering an area of 304.85 ha have been selected in Kamrup, Dhubri, Golaghat, Lakhimpur, Kokrajhar, Jorhat & Majuli, Sivasagar, Nalbari and Goalpara districts following the APART selection criteria with the approval of the District Level Coordination Committees (DLCC) and the work on these beels are in progress. For the year 2020-21, the selection of beels is in progress and so far 20 beels, covering an area of 311.70 ha, have been identified and have got approved by DLCC for implementation.

To sustainably increase the fish productivity and production, APART have taken the initiative of including more area under beel fisheries. Therefore, as per the initiation, and proposals were invited from all the 16 districts under APART districts. Awareness and dissemination of the initiative were done through the print as well as social media for wider dissemination of the message. So far, 38 proposals, covering an area of 710.7 ha have been received from 13 districts. These beels will be developed with the support of APART and is expected to sustainably increase the fish production and productivity, and also conserve the indigenous fish species through better governance to provide nutritional security for the local communities in the years to come.

Print and Social Media advertisement inviting proposals for setting up beel fisheries

QUALITY CARP SEED PRODUCTION AT UPGRADED HATCHERIES

The hatcheries of the Fisheries Department namely, Joysagar Fish Farm, Sivsagar, Ulubari Fish Farm, Kamrup and Islamabad Fish Seed Farm, Cachar have been upgraded through the World Bank-funded project "Assam Agri-Business and Rural Transformation Project (APART)". These hatcheries have started with quality fish seed production to help the fish farmers of the state. It is to mention that the quality fish seed is the main input for fish farming practices which determines the overall production of fish. The progress of inland fishery, particularly the culture sector is attributed to the success of the induced

Quality fish seed production in the Govt hatcheries under APART

breeding technique. The existing fish seed production hatcheries as well Brood Bank, Nursery and rearing tank were upgraded through the financial support of APART, to fulfil the demand of quality fish seed in the respective districts.

With the introduction of the concept of quality fish seed production and cluster development for fish seed growers, under APART, it is aimed to improve the fish seed production system in an organized manner. This initiative will replace the poor quality seed with new high yielding varieties, thus increasing the quantity of fish seed production to meet the local demand, timely supply with reasonable cost and self-reliance of quality fish seed at the compact area. It will also unite the farmers of the village for a common cause, enhance confidence in marketing and understanding the concept of quality fish seed among the farmers as per norms laid down under Assam Fish Seed Rule, 2010. Another advantage of the fish seed cluster development is that the programme on genetic awareness and introduction of new fish variety campaign can be launched in a massive way to educate the fish seed producers and growers on a planned breeding programme.

Quality fish seed production in the Govt hatcheries under APART

Out of the five up-graded hatcheries of the Fishery Department, the seed production was done in three hatcheries as mentioned above and Joysagar Fish farm, Sivasagar was started in April 2020 amid the pandemic situation following all the advisories of COVID-19. Till date, a total of 25 lakh Catla and Rohu spawns have been produced in Sivasagar district, 50 lakh Catla, Rohu and Mrigal spawn in Cachar District breeding after starting its operations from June 2020 and 30 lakh Catla, Rohu and Mrigal spawns were produced in Ulubari Fish Farm.

TRAINING PROGRAMME ON INTRODUCTION TO GIS AND GPS

To create awareness and hands-on practice on Geographical Information System (GIS) mobile application, Global Positioning System (GPS) machine for field data collection, a one-day training programme on " Introduction to Geographical Information System (GIS), Global Positioning System (GPS) and field data collection" was conducted on 1st September 2020 at SIPC Conference Hall, by the Assam Agricultural University/ International Rice Research Institute (IRRI) in collaboration with WorldFish, ARIAS and Department of Fisheries, Govt. of Assam. A total of 15 participants participated i.e. 8 TEFs, 6 ECFs and One project associate from different project districts and College of Fisheries, AAU, Raha. Dr Kanwar Singh, Resident Consultant, IRRI gave the welcome address and

Participants during the GIS and GPS training for data collection

brief discussion on programs objectives. Dr Sanjay Sarma, Fishery Project Coordinator, ARIAS briefly described the concept of paddy cum fish integrated farming as climate-resilient fish farming technology. Miss Kausturi Goswami briefly described the paddy cultivation system and different varieties of rice that can be culture with fish farming. Miss Suranjana Borah, GIS expert described on GIS and GPS and gave a demonstration on field data collection using GPS and mobile apps. At the end of the program on hands field data collection through GPS machine and Mobile apps demonstration was also given by IRRI, AAU GIS team.

VISIT OF STATE PROJECT DIRECTOR, ARIAS SOCIETY TO COLLEGE OF FISHERIES, AAU, RAHA

Laya Madduri, SPD, ARIAS visited the College of Fisheries, AAU, Raha on 12th August 2020 and interacted with officials on value addition in fish and promotion of value-added products. During the interaction, SPD, ARIAS showed her interest and willingness to promote value addition in fisheries and asked for the creation of more awareness among

SPD ARIAS Society visit to College of Fisheries, Raha

the fish farmers through various training programs, demonstrations, etc. SPD, ARIAS also visited the disease diagnosis laboratory facilities at the College.

The College of Fisheries, AAU, Raha is the partner institute for capacity building of the selected beneficiaries under Fisheries sub-component of APART.

TRAINING ON CARP POLYCULTURE

To create awareness and increase the capacity among the farmers for adoption of management practices on Carp Polyculture Farmer Producer Group (FPG) level day-long training programmes were conducted in different districts by the College of fisheries, AAU, Raha in collaboration with Department of Fisheries, Government of Assam and WorldFish under APART. So far, a total 4 (four) training programmes were

conducted in three districts viz. on 21st August 2020 at Borchala and 24th August 2020 at Sottea, Sonitpur, a 4th September 2020 at Goalpara and on 7th September 2020 at Nalbari which included 80 nos of beneficiaries of APART. All precautionary measures and social distancing norms of COVID 19 were maintained while conducting the training programme. All technical aspects of Management Practices for carp Polyculture, like carp polyculture technology, water quality parameters, carp polyculture with other species viz. Mola, Jayanti Raha, Amur carp etc, were discussed. Besides, supplementary fish feed and preparation method, fish disease and their control measure were taken up. The programme was interactive and participants were informed on the advantages

Training on Crap Polyculture and field demonstrations

for carp polyculture, and how by following the management practices will increase production, provide sustainability and environmental safety besides nutritional security of the local communities.

FIELD DAY ON CARP MOLA DEMONSTRATION UNDER APART

Currently, in Assam, carp culture in the pond is the major fish culture practice and polyculture is one of the suitable techniques through which maximum output can be obtained as well as higher production can be ensured due to full utilization of the pond. Assam is a biological hotspot with abundant resources of small indigenous fish species (SIS) and which is rich in micronutrients such as vit-A, calcium, iron, zinc etc.

Field day on carp mola demonstration at Nankabhaira Village

Among the small indigenous fish species, Amblypharyngodon mola (locally mowa or moah) is nutrient-dense fish and it is recorded that 100 gm edible part of it contains Vit-A 2680 RAE, Iron 5.7mg, Zinc 3.2 mg and Calcium 776 mg; which is highly demanding for pregnant and lactating women as well as minor children. Considering all these aspects, a field day was organized at Nankabhaira Village of APART cluster Pub-Nalbari Development Block of Nalbari District on 7th August 2020.

It may be mentioned that Carp-Mola has been introduced under APART through the technical support of WorldFish. Training on mola stocking and mola establishment in the stocked pond was conducted and best management practice (BMP) also provide a BMP manual on mola production with carps. Addressing to the gathering of the Field Day, Dr D.J. Sharma, Nodal Officer, APART explained that Mola and other SIS

can be cultured with carps in polyculture pond without hampering the target species, which also provide additional production and regular consumption, lead to eradicate the malnutrition challenge and provide nutritional security for the local communities. Generally, farmers grow fish as a cash crop and sell all their produce in the market, this tendency could be changed by producing Small Indigenous Fish species (SIS) and mola along with carps in pond polyculture.

Dr Sanjay Sarma, Fishery Co-ordinator, ARIAS Society explained that in case of mola and SIS production, there is no need to provide extra feed as the feed given for carps is sufficient as they are herbivore fish and mainly depend on small algae. Again, in case of mola and SIS repeated stocking is not required as the mola and SIS are highly fecund and self-recruiting fish species and they can breed naturally in ponds unlike carps and can be harvest after 2-3 months of stock. Hence, carp-mola-SIS polyculture is a viable technology in pond polyculture.

Amongst other, Sri Trailokya Saloi, District Nodal Officer, Nalbari, Gunajit Talukdar, Technical Expert Fisheries, Nalbari interacted with the Fish Farmers and all are agreed that carp-mola is a viable polyculture system in the agro-climatic condition of Assam and the non-beneficiaries are also agree to adapt this Technology.

RITURAJ BHAGAWATI'S STORY OF SUCCESS

Background

Rituraj Bhagawati, son of Dhaneshwar Bhagabati of Balipota village, Darrang district, a graduate and a qualified laboratory technician was until recently working as a Medical Representative in a private pharmaceutical company. He quit his job to take up full-time fish farming.

Rituraj with his harvested fishes

Intervention

Rituraj's father, who is almost 80 years of age now, owned two numbers of ponds and was practising fish farming in a traditional method. During the year 2019-20, after his return to the village, Rituraj joined his father

Rituraj with Department officials in his fishery ponds

in faish farming and was later was selected as a beneficiary for polyculture demonstration under World Bank finance project Assam Agri-Business and Rural Transformation Project (APART). From the APART scheme, he got the inputs like fish seed, fish feed, lime, and fertilizer; as well as he also got technical support for fish farming. After getting inputs and technical support he started scientifically practicing fish culture and flourishing of his pond with a stock of fishes. During the COVID-19 pandemic situation due to high demand for local fishes he partially sold around 600 kg of fish and earned Rs. 1, 20,000.00 from his pond sponsored under APART. Further, during final harvesting, he sold 500 kg of table fish and earned Rs. 1, 00,000.00 from the same pond. Looking for a way to increase his earnings, he invested in the construction of two more tanks of 0.2 ha and 0.10 ha in his parental land through proper guidance from officers of District Fishery Office, Darrang, Magaldai, and started fish seed farming in these new tanks.

Support and Encouragement

In his words, Rituraj says "The World Band aided APART scheme is a turning point in my life, through this scheme and encouragement and guidance from officials of fisheries department I am fully involved in scientific fish farming, and now I have resigned from my job to devote myself fully in the fish farming business,". On being selected as a beneficiary under APART scheme, he started to develop his inclination towards involving himself in the commercial fish farming business. His father who had constructed two tanks earlier could not carry out the scientific farming practice due to old age and ill-health. Realizing the profit from fish farming and encouragement, Rituraj is happy to have resigned from his private company job now, as he engages himself as a full-time fish farmer. Now he is employing three part time labours from the locality in his farms, thereby creating job avenues in his village.

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