

Augmentation of alternative livelihoods in Sundarban through Natural Resource Management

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Abstract:

A worldwide temperature alteration, riding on spiraling discharges, has been realizing unalterable changes in the atmosphere and ecological frameworks around the world. For natives of the world, particularly for the poor and ruined who rely upon common assets for their lives and jobs, insignificant survival now implies consulting through significant extra weights and difficulties. The Coastal territories of India are inclined to various sorts of disaster. Nearly the entire of India has a high or outrageous level of affectability to environmental change, because of intense populace weight and an important strain on characteristic assets. The Sundarban, a seaside, immature zone, is a standout amongst the most noticeable casualties of the assaults of environmental change in India. The quantity of individuals in danger has been developing every year and the dominant parts are in creating nations with high neediness levels making them more defenceless against disasters. The economy of the Sunderbans zones depended on farming, angling and gathering of non-timber woodland create (NTFP), all normal asset based exercises. Farming offers job to around 60% of the population, comprising of both cultivators and additionally day by day wage workers. About 17% were engaged in fishing, which includes those who own their boats and nets and those who work as daily labourers in the fishing trawlers. The other composed and sloppy segments – which incorporate individuals with general business, for example, negligible occupations with the administration, workers and the independently employed (like craftsman and sellers) – make up 22.3% of the workforce. A number of Sustainable Development Goals (SDGs) should be addressed through inclusive and integrated approach of livelihood augmentation, i.e. ending poverty and hunger, ensuring food security and

nutrition, promoting sustainable agriculture, ensuring healthy lives and combating climate change impacts. Natural and locally available resources should be properly utilized to increase both availability and options of livelihood throughout the year while conserving these natural resources through enhancement of their quality and quantity. Administration of characteristic assets requires synergistic works from different partners as the utilization and un-utilization of common assets rely on various variables including verifiable, political, financial, and social. Through the considerable comprehensive approach and solid system for strategy research could be conceptualized, arranged and actualized.

The economy of the study areas was based on agriculture, fishing and collection of non-timber forest produce (NTFP), all natural resource-based activities. Agriculture offers livelihood to about 60.32 per cent of the population, consisting of both cultivators as well as daily wage labourers. About 17 per cent were engaged in fishing, which includes those who own their boats and nets and those who work as daily labourers in the fishing trawlers. The other organized and unorganized sectors – which include people with regular employment such as petty jobs with the government, labourers and the self-employed (like artisans and hawkers) – make up 22.3 per cent of the workforce. Of this, just about 9 per cent on an average work in the organized sector, such as at petty government jobs with the public distribution system or the post office. About 6 per cent hold regular jobs in the unorganized sector, such as in cottage industries (Centre for Science and Environment, 2012).

Fisheries in rivers and sea are the second major occupation of the respondents in the study area. Close proximity to the sea and regular tidal waves bring good fishing opportunity to the people and provide gainful employment all the year round. Saline water gushed in through breaches in the river dykes and inundated pond and sea. Due to cyclone, about 2196 ha shrimp had destroyed.

Agricultural production system was totally hampered after disaster due to high salinity and PH condition of soil. Paddy, Wheat, Sugarcane, Chilli and Pulses production was highly destroyed. Mainly two type of paddy were cultivated in this region. One is Aman paddy which cultivated in monsoon season and another is Boro paddy which is cultivated in winter season. Before disaster Average production of Boro Paddy was 34671 kg/ hectare in

2008-09, which reduced to 20833 kg/hectare in 2012-13 and Aman paddy production reduced from 28004kg/ hectare in 2008-09 to 14525kg/hectare in 2012-13 (Debnath, 2013).

Aquaculture as a viable livelihood option for stakeholders in Study areas.

Some important suggestions:

- Generally ponds of 0.02 to 0.1 ha with 1.0-1.5 m depth are used for small-scale fry production while areas up to 0.5 ha can be used for large-scale production of carp. At least 2 crops can be easily harvested from such ponds in one season. Congenial condition of the rearing environment needs to be ensured and adequate natural fish food organisms prior to release of spawn for high survival to achieve stocking density of spawn 3-5 million/ha must be present.
- Carp culture has enough potential of meeting the ever-increasing demand of the domestic sector.
- Management of small ponds for seed rearing to achieve high survival of carp is a profitable proposition. Species diversification can be still more remunerative.
- Fish varieties like metro plus (paira chanda), catfish like shingi, magur, koi, pabda, tangra etc., local fish like parse etc. — in other words those that can survive in both saline & fresh water can be cultivated. Central Institute of Brackish Water Aquaculture (CIBA), Kakdwip Research Centre supply the seeds of these species and varieties.
- Omnivorous, herbivorous fish that can grow in intensive culture method are also suitable.
- Indian major carp can also tolerate salinity if raised during fry to ling stage with controlled salinity.
- Bhetki is also suitable but its feed is very costly. It will be unjustified to suggest rearing of bhetki to the resource poor farmers affected by AILA.
- Pond management with fish-duck-vegetable on the scaffold-azolla is important now.
- Plankton population can be raised in the hollow of bamboos packed with cow dung & oil cakes.
- Seeds should be collected from reliable sources and from healthy brood stock.
- Azolla culture should be encouraged, as it is a nutritious fish feed.

- Ducks can be reared along with fish. Duck dropping which is a slow release nutrient is good for the growth of fish.
- Duckweeds like Lemna, is also a good feed for fish.
- Snails are an excellent feed for catfish.
- The farmers themselves should prepare the feed. Homemade feed is much better than those sold in the market. A 2-day training on feed frequency, feed strategy etc. must be arranged for the farmers.
- In rice-fish cultivation catfish is the ideal component.
- In this period of crisis, fish seed business may be a good livelihood option. Mukhopadhyay (1998).
- After some days when salinity minimizes fodders like Dinanath, Para, Napier can be cultivated.
- After cyclone and flood, the livestock becomes susceptible to various bacterial and viral diseases. In order to combat this, Rafoxamite 10mg/kg (large animal) & 15mg/kg (small animal) can be administered. Herbal dewormer Helmex is also used for this purpose.
- Traditional preventive and curative measures may also be adopted. Water in which betel nuts had been kept soaked for some time, Ghentu leaf juice etc. can be tried as de-wormer, but the dosage must be carefully maintained.
- Selection of new livestock should be need and situation based. Sufficient provision of feeds, fodders and water must be ensured before introducing new livestock. Other essentials for biological substances must be secured. Sufficient care must be taken to restrict introduction of animals from other affected area.
- The sequence of animal introduction in the farm may be as follows. First, poultry or duckery basically for serving the nutritional needs of the family rather than as a supplementary source for income Then, goatery can be tried. Last in the sequence should be the introduction of dairy or draught cattle.

Conclusions:

Agriculture is the primary occupation in each Gram panchayats. Secondary occupation includes fisheries, wild shrimp, seed collection, small business, and service and

transport sectors. Some of the population migrated to different parts of India in search of jobs. Other professionals are van pullers, crab catchers, honey collectors etc. The livelihood dependent on agriculture 70-85 %. About 30-40% of the population in each selected Gram Panchayat migrated for job. Fishery operation and fish catching in rivers and sea are the second major occupation of the inhabitants in the study areas. Close proximity to the sea and tidal rivers bring this opportunity to the people lacking gainful income all the year round. Even the cultivators and agricultural labourers are taking this occupation during lean season of agricultural operation for earning additional income in spite of natural and occupational hazards in this sector. Actually farm is a synergy — a teamwork of different natural resources available in that particular area. What people have in their surroundings must be considered first and managed. In this situation where drainage system is poor, rice cannot be cultivated solely. Some local varieties, which can be cultivated in the coastal areas are Kumargor, Patnai 23, Getu (CSR-2), Damodar (CSR-1), Sadamota, Kalomota, Bhasamanik, Rupsal, Damal (CSR-3), Dudherswar. For rabi (winter) season rainwater must be harvested and stored in ponds. For Boro paddy cultivation short-duration varieties must be selected. Sesbania can be cultivated as relay crop. Sunflower, cotton, watermelon, chili can be grown in Rabi season. For improving the livelihood of the poor people proper livestock management is required. Food (fodder) is very important for rearing livestock. So for supplementary food, saline resistant fodder varieties like Coix commonly known as Kara, Gargara etc. should be cultivated. Low cost technologies must be adopted in a way that does not affect the socio-economic condition of the poor underprivileged people.

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