IMPACT OF MGNREGS ON POND ECOSYSTEM IN SAPAR MOUZA, BURDWAN- I C.D. BLOCK, BARDDHAMAN, WEST BENGAL

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Abstract

In India, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), implementation of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2006 is a scheme for alleviating of poverty and minimizing unemployment through providing minimum 100 days of job through unskilled manual labour. To provide employment and to generate resource, renovation of ponds, canal, creation of minor irrigation system, reconstruction of river embankment is being done under supervision of gram panchayet. In this study, impact of MGNREGS on pond has been studied in Sapar mouza, Burdwan-I C.D. Block as renovation of dilapidated ponds has been taken under the scheme. In the mouza, first renovation has been made in November, 2007 and 13 ponds have been renewed till now. Beside of opportunity of employment, renovation of ponds has some other effects like revival of pond ecosystem, recharge of ground water, creation of plantation, orchard farming, production of fish, supply of pond water based resources and microclimatic effect on rural livelihood. So, renovation of ponds under this scheme is not only beneficial for rural economy but it also helps to improve rural allied sector.

Keywords: MGNREGS, Dilapidated Ponds, Pond Ecosystem, Ground Water, and Rural Economy

INTRODUCTION

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), is an initiative of Government of India for alleviating of poverty and minimizing unemployment through providing at least 100 days of employment in a financial year for unskilled manual labourer in rural areas. The programme, first, was launched on 2nd February, 2006 from Anantapur district of Andhra Pradesh. The MGNREGS has

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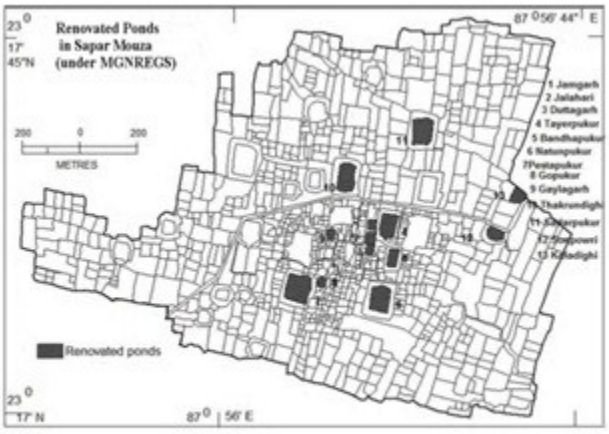
been designed to create permanent assets like water conservation as well as harvesting, drought proofing, micro and minor irrigation works, renovation of traditional water bodies, land development, flood control, drainage and rural connectivity in rural areas. It ensures time bound employment guarantee along with 33% women participation and wage payment within 15 days through accounts in bank or post office as per wage rate (Prasad, 2009). This scheme includes renovation of traditional water bodies like pond, *dighi* which have lot of beneficial effects on rural economy as well as its environment.

A pond as a whole serves a fresh water ecosystem. Abiotic components of pond ecosystem are heat, light, p^H value of water, and the basic inorganic components, such as water itself, carbon di-oxide gas, oxygen, calcium, nitrogen, phosphates, amino acids, humic acids etc. Producers of pond ecosystem are autotrophic, phytoplankton, green plants and photosynthetic bacteria, microphytes, and phytoplanktons are the base or producer in pond ecosystem. Zooplanktons and benthos are primary consumers (herbivores). Secondary consumers are mainly fish and insects. Large fish are tertiary consumers in pond ecosystem. Decomposers are mainly bacteria, actinomycetes and fungi (Sharma, 1975; Odum and Barrett, 2005). In pond ecosystem, food chains are ended with human, occupying primary consumers or herbivores, secondary as well as tertiary consumers. Pond is also beneficial for recharging of ground water and storage of large volume of water for drinking and irrigation purpose in dry season. Ground water is the permanent storage of water below the surface (Mayhew, 2007). Ground water receives water through percolation and infiltration of rain water by pore spaces of soil joint, crack of rock (Strahler and Strahler, 1998). Availability of ground water depends on soil granules and pore spaces in between grains (Todd, 1980). Pond as a water body containing large volume of water throughout the year and percolation is a continuous process of downward movement of water recharging the ground water.



Map No. 1: Renovated Ponds in Sapar Mouza, March 2013

In this research work, cause and effect of renovated ponds under MGNREGS has been studied in Sapar mouza, Burdwan-I C.D. block, West Bengal where 13 ponds closer to the settled area have been renovated since 2007.

OBJECTIVES OF THE STUDY

The objectives of the study are-

1. to find out the status of ponds before and after renovation according to the perception of local people,
2. to study the impact of renovated ponds on ground water recharge, plantation and horticulture,
3. to find out its impact on *rabi* cultivation and crop combination, duck-fish farming and
4. to find out the benefit of pond based resources and microclimatic comfort.

DATA AND METHODS

The study has been done on the basis of primary survey conducted in Sapar mouza, March, 2013. The 13 owner of the pond and 34 associated people who are living on that pond's embankment have been surveyed in detail.

Prior to field visit, literature survey, selection of the study area, collection of mouza map and preparation of questionnaires have been done. Field survey includes survey of pond owners, associated people and use of GPS for collection of ground control point (GCP) for registration of mouza map. Analysis of collected data and interpretation of the findings through maps, diagrams have been prepared with the help of Map Info 9.0 and MS-excel software.

RESULTS AND DISCUSSION

Status of the Pond before and after Renovation in Sapar Mouza

Ponds have been renovated under MGNREG scheme by Rayan II gram panchayet. The dilapidated ponds have been selected for renovation nearer to settled area. In most cases, the depth of the ponds was less than two meter and odour pollution was one of the problems of the ponds. Before renovation, 23.08 per cent pond had fresh water and 19 per cent and 76.6 per cent people have informed for fresh water and odour pollution respectively (Fig. No.1&3). After renovation, problems are not properly solved as 23.41 per cent and 21.28 per cent people have reported for bad water condition and odour pollution respectively (Fig. No.2&4). The renovated ponds have been filled with rain water within 2-3 months. But the quality of water of those

two ponds (*Duttagarh* and *Goyalagarh*) has deteriorated within short duration due to eutrophication through mixing of untreated domestic waste.

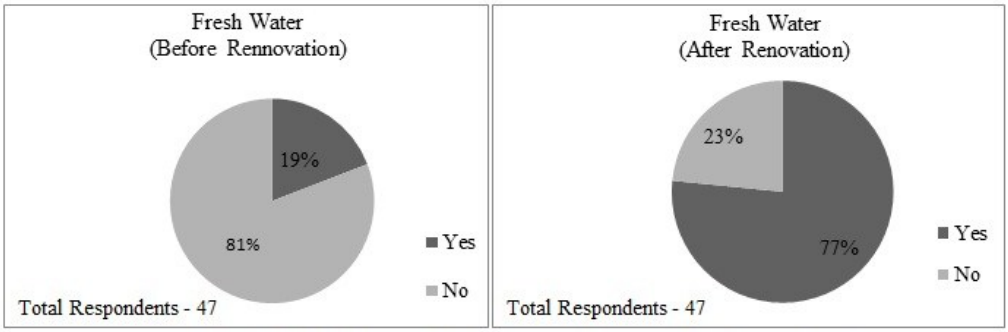


Fig. No. 1 & 2: Status of Fresh Water (Before and After Renovation)

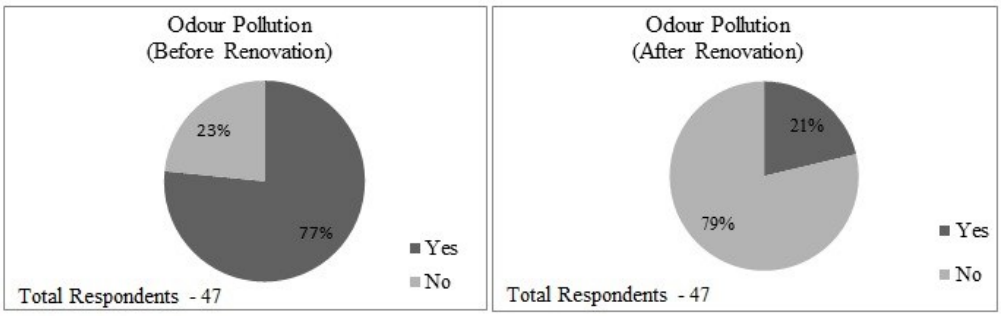


Fig. No. 3 & 4: Odour Pollution (Before and After Renovation)

Renovation of Pond and Ground Water Recharge

The ponds were shallow and hold less amount of water during summer. Ground water table declines during summer and people face trouble for unavailability or less availability of water in tube well due to low amount of recharge in ground water storage. As the renovation work of the pond has been started in last 4-5 years, ground water recharge may not as such level to perceive by ordinary country man.

In this study, 34.04% person has perceived the betterment of availability of water in tube well during summer season, but 36% could not comprehend anything about ground water recharge and 30 per cent has not experienced such kind of change in ground water table (Fig. No.5).

Impact on Plantation

Embankment of pond is suitable for social forestry or afforestation. Plant roots can hold up soil and receive available water throughout the year. Residue of plant falls in the pond and become a part of pond ecosystem. Though pond embankment is potential for afforestation, there is only 30.76% embankment of pond where plantation of eucalyptus (Eucalyptus globules) and sonajhuri (Acacia auriculiformis) has been found in this study (Fig. No. 6; Plate No. 1). People want to plant these species for supplying of firewood and wood for furniture within short span of time.

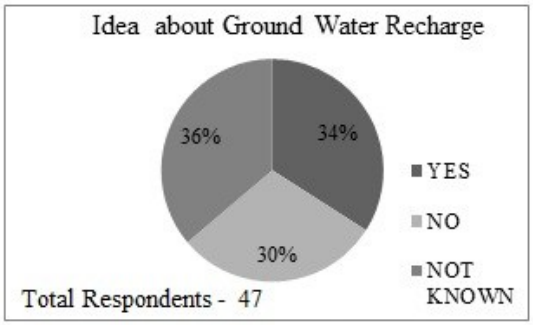


Fig. No. 5: Idea about Ground Water Recharge

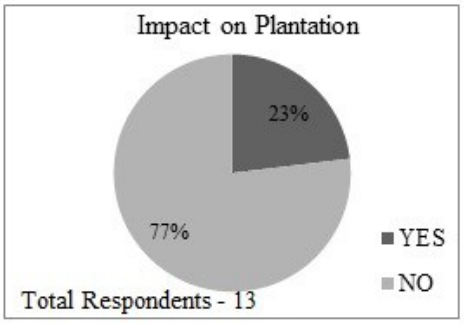


Fig. No. 6: Impact on Plantation

Impact on Vegetable and Orchard Farming

Pond embankment is also suitable for vegetable and orchard farming in rural areas. Pond water is available for irrigation in winter and summer season. According to local people, black bog soil is so fertile that horticulture and orchard farming can be started after one year of renovation.

Vegetables and orchard farming is being practiced on 38.46% and 53.84% of embankment of the pond and remaining embankments of pond which are not being used are also highly potential for vegetables and orchard farming (Plate No.3). After renovation, 34 and 25 per cent local people have planted orchard and vegetable on pond embankment respectively. People cultivate vegetable for mainly their domestic use (Fig. No. 7 & 8) (Plate No. 6 & 8).

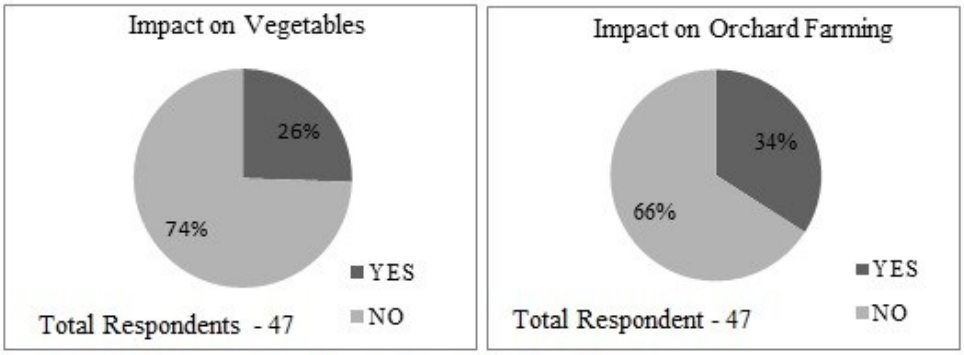


Fig. No. 7 & 8: Impact on Vegetable and Orchard Farming

Change in the Production of Fish

Pond is an aquatic ecosystem in which fish is the tertiary consumer. Pond is an important producer and supplier of fish in the rural areas. Production of fish depends on different factors, like status of water, dissolved oxygen level or eutrophication, and supply of food etc.

In this study, before renovation, ponds were shallow with polluted water what was responsible for low production of fish. After renovation, deep and fresh water

became helpful for production of fish. Except one pond (*Goylagarh*), production of fish has been increased in other 12 renovated ponds at three to four times (Fig No. 9).

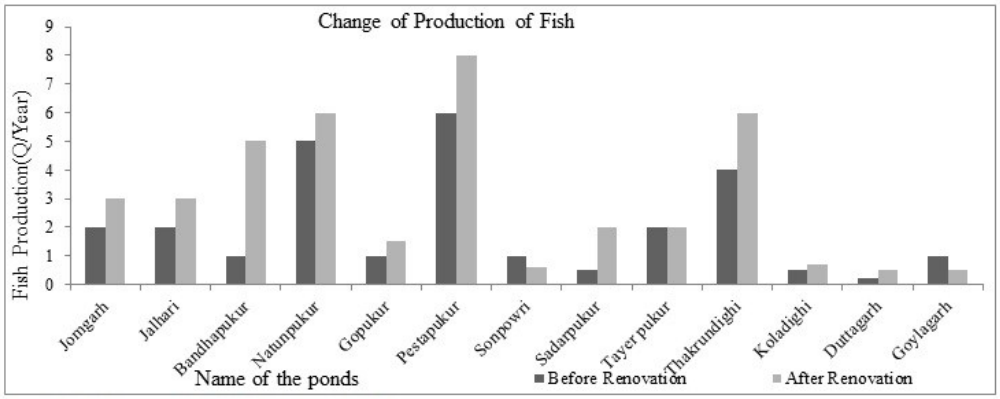


Fig. No. 9: Change in the Production of Fish

Increasing Consumption of Fish among Associate People

Production and availability of fish has been increased after renovation of ponds in Sapar mouza. Pond owner has direct sharing of production of fish but the associated people, inhabiting on the embankments of the ponds have no sharing of the production of fish. But they can buy fish from village market. So, after renovation of ponds, 82 per cent associated people have benifited from increased production and consumption level has also been increased (Fig. No. 10).

Duck Farming

Duck farming is also related with pond. It is another way of supply of protein to rural people. Almost 80% of ponds are engaged in duck farming in Sapar mouza (Fig. No.11; Plate No. 7). Duck farming has been practiced in 10 ponds (76%) and rest of three are quite away from locality.

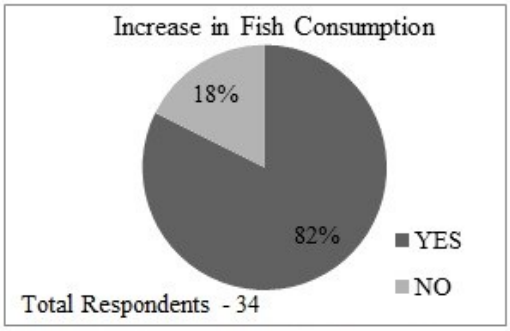


Fig No. 10: Increase in Fish Consumption

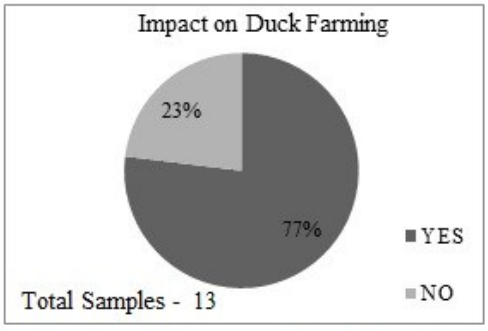


Fig. No. 11: Impact on Duck Farming

Relationship between Duck-Fish Farming

There is a positive relationship between duck farming with fish. Fish farming is increased with duck farming as the body movement exercised by the duck is helpful in creating vibration within the water in which fish exists. 70 per cent of people have no concept about relationship between duck and fish farming. Only 19 per cent of people know the benefit of duck in fish farming (Fig. No.12).

Impact on *Rabi* Crop and Species Varieties

Rabi crops are cultivated during winter with minimum irrigation to supply different types of food for domestic purpose. Embankment of pond is one of the potential lands for *rabi* with irrigation from pond water. Earlier, *rabi* crops were practiced in only two embankments of pond (*Pestapukur* and *Thakrundighi*). But after renovation, *rabi* crops have been practiced in seven embankments of pond at large scale (Fig. No.13). Most interesting fact is that cultivation of different varieties of crops has also been increased with the increase of cultivation of *rabi* crop. After renovation, cultivation of different types of vegetables has been increased to 13 from two in the embankment of *Sadarpukur* in the mouza (Fig. No. 14; Plate No.4)

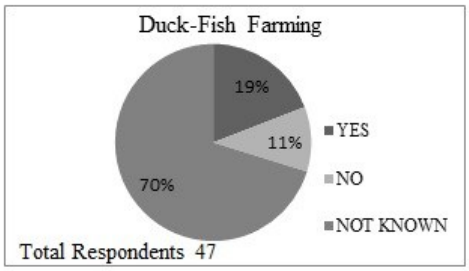


Fig. No. 12: Perception about Duck-Fish Relationship

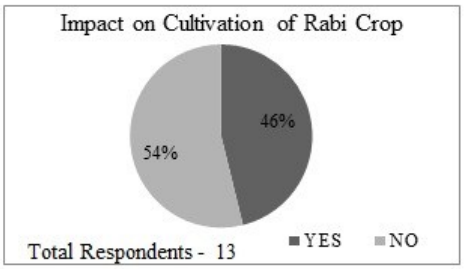


Fig. No. 13: Impact on *Rabi* Crop Cultivation

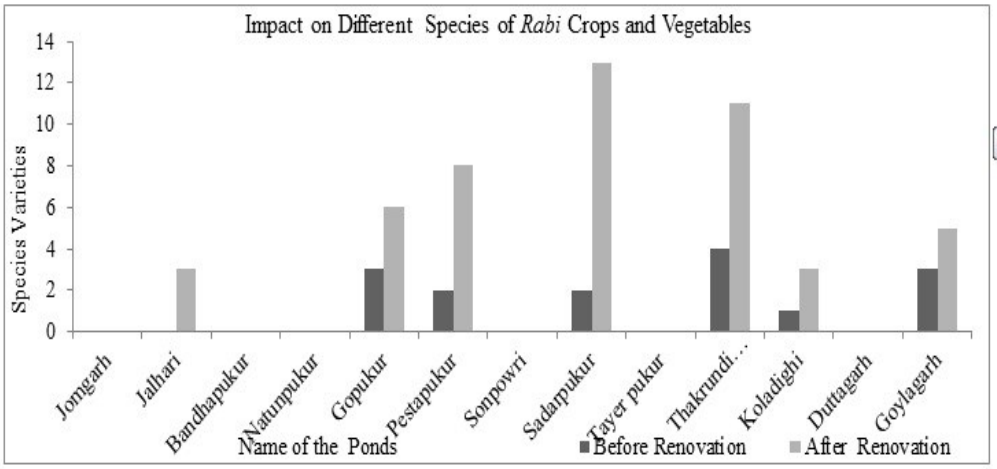


Fig. No. 14: Impact on Different Species of *Rabi* Crops and Vegetables

Other Resources

Pond itself is a resource for utilization of its components, such as utility of water and supply of nutrients in different ways. Pond is an ecosystem which holds producers (hydrophytes) at the base of food chain. Different hydrophytes locally called '*shaak*' are one of the main products of pond. People can easily collect these *shaak* like *Kalmi* (*Ipomoea reptans, I. Aquatic), Hencha, Kulakhara* (*Hygrophila spinosa* and *Asteracantha longifolia)* and *Thankuni* (*Centella asiatica)*. Not only owner of the pond, but associate people can also collect these resources from pond. They also collect animal protein from pond like as water snail, oyster shell, and crab etc. (Fig. No.15; Plate No. 2).

i) Water snail, locally called '*gugli*', contains lipo protein, mainly very low density lipo protein (VLDL). Lipo protein increases BMR (Basal Metabolic Rate), and calorie concentration.

ii) Oyster shells (*Acatina fulica*) are excellent source of zinc, iron, calcium and selenium and vitamin A, vitamin $B_{12.}$ Oysters are low in food energy. It contains calcium which prevents Austiomalasia and Rickets.

iii) Crab (*Scylla serrata*) meat is important source of lean protein, very low in fat, ranging from one to two grams of fat in a crab. Crabs are a rich source of omega-3 fatty acids which reduce cardiovascular disease and lowering of blood pressure. Being an animal product, crab meat is free of carbohydrates, but it contains plenty of protein up to five grams.

iv) *Kalmi shaak* or water spinach (*Ipomoea reptans, I. aquatic)* is an indigenous green leafy vegetables and aquatic or semi aquatic plant. *Kalmi* can be used for anti-bacterial activities against spoilage and pathogenic bacteria. It contains Fe, Ca and cellulose but does not contain protein or fat (Shekhar, 2011).

v) Water cress or marsh herb, locally called '*helencha*' is used in ascites, dropsy and anasarca. It is cooked with fish curry and taken to revive appetite after long weakness due to fever or typhoid. It is useful for skin, nervous system, and the liver. Plant is rich in protein and is a good source of β-carotene.

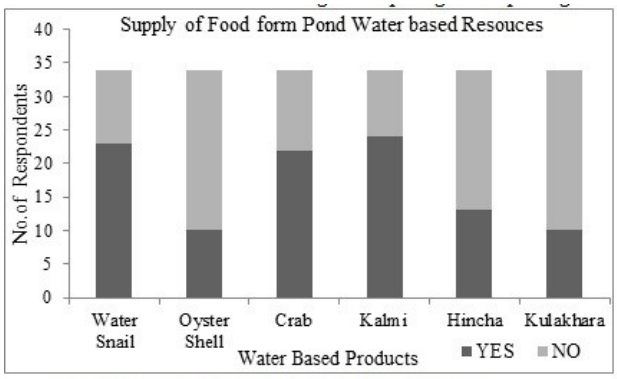


Fig. No. 15: Supply Food form Other Resouces

vi) Starthorn or *kulakhara* (*Hygrophila spinosa* and *Asteracantha longifolia),* is also indigenous plants available to country man in free of cost. Leaves are tonic, aphrodisiac and hypnotic; useful in diarrhoea, dysentery, thirst, urinary calculi. *Kulakhara* has high iron concentration which regulate anaemic tendency.

vii) *Thankuni* (*Centella asiatica)* is a variety of shrub that has a great effect on upset of stomach. It protects dysentery and blood dysentery.

Microclimatic Comfort

Microclimate is the "parts of the lower atmosphere directly and immediately affected by the features of the earth surface. The height of this part of the lower atmosphere varies according to the size of the influencing feature" (Mayhew, 2007) like pond, vegetation cover, building.

Pond creats an environment in its' surrounding areas with reducing heat and makes cold in summer. It also generates a quite warm surrounding during winter. The inhabitants live on embarkments of pond receive fresh and quite cool air in afternoon during summer. Almost 60 per cent people feels comfort and less hot environment due to existence of ponds in summer. Similarly, in winter, 55 per cent of person perceives severe or excessive cool environment due to pond. Again about 10 per cent of people feels relief or quite warm environment in winter.

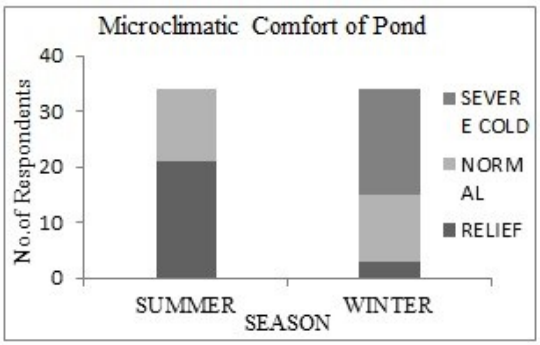


Plate No. 1: *Sonajhuri* Plantation

Plate No. 2: Collection of '*Googli*' by Local People

Plate No. 3: Orchard Farming

Plate No. 4: Irrigation on *Rabi* Crop

Plate No.5: Non-Renovated Pond

Plate No. 6:Vegetable Farming on Embankment

Plate No. 7: Duck Farming

Plate No. 8: Vegetable and *Rabi* Crop for Domistic Use

Conclution

Pond is the valuable resource for sustaining life and livelihood to the local people through production, consumption and trading of different nutritious food in different season. The utilization of pond water in various domestic purposes, irrigation in the agricultural land in dry season, dousing the fire in any accident and enrich the ground water level are integral character of pond in the rural landscape. Alternatively, Pond is attached with different socio-cultural and religious rituals in rural areas. Being an aquatic ecosystem, pond may create a microclimatic condition around the pond and milds the weather extremities. It is required to proper utilization of pond to bring

0economic sustainability in rural areas and honest execution of MGNREGS is vital to revive the sound agriculture based rural livelihood.

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