Ecovillages – A Silent Development Revolution in South Odisha

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In recent years, the importance of sustainability has been recognized in the sectors of agriculture and development with the UN, emphasizing on the same and prescribing the inclusion of sustainable development goals into any development initiative. The perils of climate change hangs precariously on these ecologically sensitive zones and the irregularity of climatic events has already become observable. Some of the climatic variabilities include high intensity rainfall during a short period, extreme temperature variabilities during the day and night, hailstones, flash floods, cyclones etc.

South Odisha is a region with undulating topography with poor red soils. Local tribal communities practice shifting agriculture, mainly for subsistence, which is solely dependent on the monsoon rains. Cultivation of crops remains a challenge with little top soil and accelerated run off during the rainy season. Most of the lands in the villages remain fallow with limited cultivation, solely dependent on the monsoon rains with little assured irrigation facilities. The farmers in this region are highly vulnerable to climatic change, poverty, hunger, and subject to epidemics. They live on marginal hilly lands characterised by adverse conditions. To mitigate the effects to the maximum level possible, several agro-ecological interventions have been formulated and implemented in the region by Agragamee. Many useful strategies have been designed and concrete steps have been taken to make use of the climatic and topological characteristics of the region to amalgamate the concept of ecovillages, without disrupting the traditional way of living using Indigenous Knowledge Systems, which have stood the test of time across many generations and centuries. It is an outcome of such efforts where the balance between natural elements and modern technologies has been achieved to create sustainable sources of livelihoods for small and marginal tribal land holders as well as creating models of social co-operation. While this may be a new concept, the organization Agragamee, has already been implementing the concepts to develop the villages and commons in the hinterlands of South Odisha. The local people are now involved in redesigning their village environments to avail the benefits of the concepts of Sustainable Development Goals (SDGs). Eco-village development concept was piloted in 25 tribal villages in Kashipur, Thuamul Rampur and Tentulikhunti blocks of Odisha during the period 2009-2019 by Agragamee. The development initiative was aimed at meeting the challenges of poverty alienation among the marginalized and landless families from these poorest districts. A total of 2395 hectares in the region was developed through various land based and community mobilization initiatives by the local tribal communities.

Significant interventions and innovations in the Eco-villages

Modification of soil and farming practices – Improving the top soil: Soil composition plays an important role in the number of crops and type of crops that can be cultivated. Thus focus was laid on amending the soil to make it suitable for additional cropping. Ecological farming methods are promoted by Agragamee including Zero tillage method with local tribal farmers in the operational villages. It was implemented in many villages in Kashipur like Gadiyaguda, Maligaon, Dasmantpur block including Chaulokanti, Bhitarabagiri and in ten villages of Nawarangapur district. To improve the soil and conserve the rain water, the local Communities have constructed stone bunds across the hill slopes along village boundaries. This has resulted in preventing accelerated soil erosion. These structures have been successful for soil and water conservation. Cashew and plantations of native forest species have been undertaken in the village through support from Agragamee at the higher reaches on the hills. This has resulted in arresting accelerated soil erosion and conserving the soil and moisture for a longer duration. Over the last eight years these plantations have come up well. The community have harvested the Cashew nuts and have sold them to traders at INR 100 to INR 120. The availability of cashew kernels for processing factories in the nearby town of Jeypore also helps to create a perennial source of income for the farmers while helping sustaining the industry by providing raw materials. Significant improvements in soil and water content have resulted in increased green cover in the area. This has

helped the local communities to cultivate vegetable crops like brinjal, chillies, onion, tomato, cauliflower etc., minor millets like Ragi, Suan, Kodo, millets etc, and horticultural crops like Cashew, Mango and Litchi, forest species like Cassia siamea, Simaruba glauca and different types of Paddy and Maize. Compared to yesterday years before the concept of eco-village, farmers are now able to undertake three crops during the year in Kharif, Rabi and Summer months. Increasing the organic content: Apart from the moisture content, the organic matter present in the soil is very important in determining the crop production. It not only helps in pH maintenance and moisture retention but also acts as a buffer system for many micronutrients as well as is an important source of nitrogen and carbon for crop plants. Several innovative steps have been taken to use locally available material for production of organic matter for addition to the soil. Farmers are now producing organic manure like Jeevambruta, Cow dung manure and urine, Panchakavya etc and utilizing it in their fields. The leaf litter from the agro-forestry plantations (Sesbania, Cassia, Leucaena and other leguminous tree crops known for nitrogen fixing in the soil) also improve the humus content of the soil. The increased organic content perhaps has helped promote local microflora and fauna and has led to reduced pest infestation. The use organic pest control methods have also helped to improve the soil tilth and soil structure and not destroy the organic composition of the soil. *Modified cropping systems and utilization of new farming equipments:* Maximum utilization of the available resources during a cropping season is an important goal of any sustainable system to utilize added nutrients as well as prevent their loss into riverine systems and act as a pollutant. The method of crop intensification is one such approach where the soil nutrients as well as moisture are efficiently used by the crops resulting in better productivity and production. Based on the success of crop intensification in the state and elsewhere, Farmers have shifted to improved planting methods like System of Millet Intensification (SMI), Line planting and undertaking intercultural applications like mechanical weeding using simple mechanical equipments etc. This has resulted in enhanced productions with limited use of agri-inputs. Mango plantations have been taken up in the lower reaches of the hills. Popular varieties with commercial potential like Dusseheri, Amrapalli and Mallicka have been planted and there has been successful establishment of mango plantations in the private lands. The community have sold these mangoes to traders from Mother Diary, New Delhi in 2019. They have also sold the produce to local traders in Odisha and Visakhapatnam. The cost for 1 Kg of Mango was sold at INR 18-20. The average sale proceeds from mango for a household ranged between INR 30000-70000. The possibility of taking advantage of the growing demand of fruits and the availability of a good transportation system of course needs some support from the government and its regulatory boards to ensure a fair share of the profits to the farmers. Ragi, Kangu, Suan and other minor millets are cultivated by farmers through SMI and Line sowing methods promoted under the Millet Mission project, implemented by Agragamee. The farmers have now adopted these scientific practices and have reported increased yields per acre, which has almost doubled as compared to the traditional method of broadcasting of millets. Farmers have also constructed bio-fences around their individual plots. This is a good practice, which prevents the livestock from grazing on the standing crops. The community participation and ownership in the entire above project is high. Project staff have contributed significantly in close collaboration with the local communities, especially women farmers for the success of the above project interventions in the region resulting in acceptability of the introduced techniques which is not viewed as being incompatible with existing farming system.

A recent grassroots level assessment shows that small farmers who have their own seed, practice chemical free, ecological agriculture and shape fair trade markets are earning 5 times more than their counterparts who dependent on costly corporate seeds, chemicals from the same companies and forced dependence on exploitative commodity markets. These farmers shifted from monocultures to growing diversity crops throughout the year which increased their net incomes two to three fold. Pulses grown with cereals provide free nitrogen to the soil and healthy protein to the small farmers. These small farmers have taken care of the promotion of local food product circles for direct consumer – producer links through farmers' producers' organisation, bypassing the exploitative 'middlemen', like giant corporations which exploit, both, farmers and consumers. These circles have promoted biodiversity on their farms and biodiversity on their plates, which is not only vital for nutrition but also food sovereignty. Thereby, also promoting economic diversity, creating employment and cultivating food democracy.

Major Outcomes/Impacts:

Improved Biodiversity:

- Plantations of native trees and multi-purpose tree species have proved beneficial for the reclamation of degraded soils. There is significant improvement in the soil organic content, texture and tilth. Local Biodiversity has improved considerably with the conscious cultivation of varied minor millets, native forest species, fruit plants etc. Monocultures of Eucalyptus have consciously been avoided by the local communities.
- **Small Soil and water harvesting structures:** Increased soil and moisture conservation, increase in green cover in the operational villages. Most of the village hills were barren or severely degraded before the project interventions. There is increased availability of surface and ground water now due to construction of more farm ponds and small water harvesting structures.
- **Judicious water use:** Local communities have now started harvesting rain water in farm ponds and are also diverting the excess runoff and stream water to their farmlands. Linkages with Government irrigation systems (Canal irrigation) and Lift irrigation schemes, Borewells etc are also under way, with varying degrees of success.
- *Organic Farming:* Local communities have understood the various organic farming methods and have adopted them in their individual farms and village commons. Use of organic manure such as jeevambruta, pot manure, vermicomposting, cow dung manure, leaf littor, dhaincha (mulching) etc., which have proved beneficial for improved crop production, enhanced soil moisture conservation and improved crop yields. Significant reduction in pest infestation has been observed in the farm lands.

• **SMI:** System of Millet Intensification (SMI) method is now being practiced in operational villages for cultivation of minor millets like Ragi and other minor millets, suitable for the local agroecology. These minor millets are also climate resilient. Significant increase in yields (almost double) of Ragi has been recorded per acre. Most of the minor millets cultivated are for subsistence and the excess produce is sold.

• Horticulture: Horticultural crops are preferred and grown by farmers. The fruits are consumed at the household level and also sold in the market. The cultivation of such horticultural crops like Litchi, Mango, Banana etc., have resulted in enhanced incomes of the farmers. An average farmer earns up to INR 30000- 70000 in a season.

Bio-fencing:

• Local tribal farmers have constructed bio-fences around their small farm lands. This has proved to be beneficial for protecting the food crops from grazing by the local cattle and livestock, especially during the summer months.

• Food and Nutrition Security: Local communities are more food and nutrition secure now. Food availability at the household level has improved over the last decade due to various agro and allied based interventions. The issue of malnourishment and household level food and nutritional security, especially of women and children is addressed better now through increased consumption of multiple and diverse foods, vegetables and fruits in the food plate. Household level food and nutritional security is ensured for over 9 months in a year.

• **Fodder for Livestock:** There is increased availability of grasses and fodder for the livestock in the operational villages due to development of village commons and village forests. Small poultry especially country chicken and Goats are now being nurtured by local communities. These are good sources of food and cash, especially during the lean periods of the year and act as insurance for resource poor farmers.

• **School education:** Most of the children of the school going age are attending schools on a regular basis. The emphasis has been for increased enrollment of girl children and to focus on quality education. Reintegration of school drop outs into Government schools is also noteworthy.

• Check distress Migration: There has been significant reduction in seasonal distress out migration for gainful employment opportunities. People now work on their own lands and produce food crops and grow horticultural crops like Mango, Litchi, Cashew. The sale proceeds from these have added up to the household level incomes.

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