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Dr. Bharti
Scientist, Krishi Vigyan Kendra,
Dhanbad under Birsa
agricultural University, Ranchi,
Jharkhand, India

Introducing organic farming in lieu of traditional agriculture in tribal villages: A case study from Jharkhand

Dr. Bharti

Abstract

Nowadays, farmers as well as common people, especially urban people are showing increased interests in organic farming because of its high nutritive values and absence of toxic chemicals. It has been observed that more organic and natural the produce, the safer and healthier it is for mankind and the environment in larger context. In developed world, organic farming has become the sine qua non of the diversification and modernization of the field of agricultural system. Organic farming has some intrinsic advantages over traditional agricultural practice, e.g., 'healthy crops with high nutritional properties', 'involvement of less initial investment', 'optimal usability of locally available fertilizers', 'less use of highly mechanized agricultural equipment' and above economic viability and profitability'. Middle income countries like India can be a potential place for this type of farming. Now days a large segment of population of this country is turning back to age-old traditional means of livelihood, including food and agricultural products. People are now giving preference to locally grown agricultural products, which are generally free of synthetic fertilizers. Synthetic fertilizers have numerous harmful impacts on human body and crops grown with those synthetic chemicals used can cause significant long-term health problems to the consumers. So organic farming can be a good option to prevent those health hazards and at the same time it can motivate people to use locally available resources for agriculture. Because of commercial viability, organic farming can be a good option for amplification of income for socio-economically weak people living in remote areas. This Case Study was carried out to see the viability of organic farming in some remote villages which mainly inhabited by Tribal People.

Keywords: Organic farming, food security, rain-fed agriculture, climate change, gravity flow irrigation, and farmers led approach

Introduction

Earlier, securing food for two times a day was a major struggle for most of the farmers in these villages. Systematic and integrated approach in pursuing farming has helped the farming communities in ensuring food and nutritional security of their families. Farmers learned about various organic inputs for agriculture which helped them to reduce the dependency on external inputs in agriculture.

Location of the Study

This case study had been conducted in five small hamlets belonging to Purbi Tundi Block of the Dhanbad District of the State of Jharkhand. The selected hamlets were Lachhuraidih, Phuljhar, Barwatand, Mohalitola, and Pipratand. Main inhabitants of those small villages are ethnic tribal people who mainly rely on traditional once in a year agricultural practice. However, some of them are engaged in animal husbandry besides agriculture, but that neither scientifically supervised nor commercially managed. Therefore, they never come out of perennial poverty coupled with plethora of health problems and ardent malnutrition. These villages are surrounded by dense forest, rain fed natural streams and rivulets and undulating rugged topography. In these villages about 104 marginalised tribal families live and they mainly depend on the pre-dominant once in a year paddy cultivation and majority of them prefer to (nearly 60%) migrate to nearby cities and urban conglomerations for the search better livelihood. This Case Study was done on these people to know their understanding, acceptance and application of the measures of organic farming.

Physical and Socio-economic Characteristics of the Selected Villages

The Purbi Tundi block is one of the 9 administrative blocks of Dhanbad district of the state of Jharkhand, India. The Dhanbad district is famous for its colliery and coal based ancillary legal as well as illegal industries. The decade-old state of Jharkhand geographically comes under the

Correspondence

Dr. Bharti
Scientist, Krishi Vigyan Kendra,
Dhanbad under Birsa
agricultural University, Ranchi
Jharkhand, India

Chhotanagpur Plateau. This village is surrounded by forest areas, small rivulets and rugged topographical condition. It is one of the remotest tribal dominated blocks where agriculture is the main occupation of people. Majority of the farmers depend exclusively on monsoon for farming. Rice cultivation is the mainstay of their livelihood and they keep their produced crops for own consumptions. A negligible amount of the crop is kept for selling in the local market. They grow mainly their single Paddy Crop and remaining part of the year people stay unemployed. Because of this reason, inland migration rate is found to be very high in this block. More than 60% of the people have to go elsewhere for seasonal employments like daily wages agricultural labour, coal loader and industrial laborer. Nearly 70% of the target community is ethnic tribal and come under the poverty line (average food availability is four to six months in a year) at some stage of the year. More than 90% of the community is dependent on primitive form of agriculture. 372 Farm holdings are marginal, small and fragmented with high soil erosion and high runoff rate and variability of rainfall resulted in the low-input, low-yield subsistence agriculture.

Needs of the focus group for which the innovation was designed

Water accessibility for domestic and agriculture in these villages is a major problem. Natural water bodies like streams and rivulets are mainly seasonal or rainfed in nature and the irrigation systems is not developed. Villagers rely mainly on few hand operated tube wells and ponds for their domestic and agriculture uses. Transportation system of these hamlets is also not developed. People have to scale more than 5-6 kilometres to reach at the nearby bus-stops for going to cities and suburban areas. Villagers do not have many options left for escalating their standard of life. Therefore, aiding them with the various aspects of organic farming could be a good option for them. Now marketability of organic crops is very high in domestic as well as international markets. In the above context, it is important to address the issues in a comprehensive manner to bring development in the area as well as to change the people's perceptions. It is clear that accelerated agriculture development holds the key to poverty alleviation and livelihood opportunities in the target area. The prime focus would be the smallholder farmers and intervene to improve their existing livelihoods activities (farming and increase the capacity and skills). Nearly 80% of farmers do not have knowledge of low cost and modern farming technology and rely on outdated farming techniques.

With an integrated development approach, the community came together at village level to improve the quality of their arable land and how to use and conserve water while doing farming. In this programme 146 families were given the access to drinking water and 240 farmers' got improved access to irrigation facilities covering an area of 432 acres. With these initiatives the village community could bring 223 acres land for farming during the Rabi season. They also learned various environment friendly adaptive farming cultivation techniques by using organic inputs and they have started following an organic way of life. Through a gradual up-scaling, 146 farmers have started cultivating organic system of rice intensification (SRI), cultivation of seasonal organic vegetables and fruits. Paddy cultivation using organic method and SRI practices have helped the farmers to increase their income almost twice more than the previous years (i.e. 20 quintals per acre now) as it was 10-12 quintals in rain-fed condition from each acre of production whereas, 96 farmers

have also started growing fruit and vegetables in Rabi season. 146 marginalised tribal families have increased nutritional intake up to 29% over the period by adding 11 additional vegetables and fruits to their daily food basket by practicing nutritional kitchen garden and due to improved access to water resources. This improvised process had also helped these 146 farmers to take up second crop in the forms of pulses, vegetables and Maize. This addition came as a boon for these farmers as that helped them to increase their income as well as diversification in food intake. Many farmers in the area have started large scale vegetable cultivation and fetching good profit by using local inputs. Some women farmers have shown their increased interest to come together collectively to break the gender discrimination and they have mastered the organic way of lifestyle to lead a life with dignity, justice and pride.

Nature and Strategy of the Program

The programme aimed to bring the community together and building their capacities to plan for their own development. This programme also aimed to devise and plan the targets, formulation of planning procedure compatible to the physical and socio-economic condition of the village, preparation and implementation of the plan for improving the living standard of the people. Major focus of this programme was to develop and maintain the democratic situation in this village and helping the villagers to develop a village development plan as per their felt needs, resources and other relevant parameters (i.e., irrigation system, physical condition, climate, agricultural marketing system, daily consumption of agricultural products, etc.). The villagers were actively involved in the programme implementation through various village level committees and provide feedback about the proposed work and the quality of development work. During the implementation phase some Community based organizations were formed (like farmers club, village committee, water management committee, women self-help groups etc.) with the help of the KVK. Participatory Rural Appraisal (PRA) was done to keep the track with the targeted people and their views and fund of information they could get while interacting with the professionals. In the PRA, people cited water crisis and paucity of water resources for their daily use and irrigation as the most striking problem. People cited 'low ground water level', 'lack of perennial natural water bodies and flowing of water due to rugged undulating terrain of the village' as innate problems associated with water. People vigorously pointed out the paucity safe potable water resources like tube well and other resources in the village and very high rate of soil erosion during the monsoon. People were given adequate knowledge about using their locally available existing physical and human resources, minimizing the wasting of water, rain water harvesting, using locally available manure and bio-degradable materials as fertilizers, how to make their exiting arable lands suitable for organic farming, how to magnify the production of agricultural products for daily use and ways to produce nutritious crops which can be grown easily in their kitchen gardens.

Measures Adopted

Gravity Flow Irrigation System

Krishi Vigyan Kendra has contributed immensely in the programme through its transfer of technology. Targeted village people were given the understanding about the imminent water resources and their optimal usage during the PRA. The water was blocked at the starting point, which was

constructed at a distance of 410 metres from the centre of the village by the efforts of the villagers. The villagers were thoroughly informed about the procedure. They discussed this in Gram Sabha and contributed in digging of channel, construction of check dam for water storage, laying the pipes and fixing syntax tanks to preserve water. They were enthusiastic to contribute their share in realizing the Gravity flow irrigation system. The uniqueness of this irrigation system is that, water from a perennial stream has drawn through an inlet pipe to the village with the help of gravitational force. In this process operative forces like mechanical power and fuel energy are not required. A natural filtering system has been installed for purifying the flowing water. Regular water testing and maintenance was done by the village committee. The joy of villagers knew no bounds once the flow irrigation system opened. Now they have 24x7 hrs water for 10-11 months taking three crops in a year. The maintenance of the system is being maintained by the village committee since inception.

Farmers Led Approach:

The measures used in the programme were 'introducing small scale system of rice and wheat cultivation and how to increase the production of these two crops at small agricultural land pieces', 'crop diversification and rotation', 'mixed cropping', 'introducing structured soil health management through various locally available cost-effective organic approaches like – using vermi compost bed, azolla, vermi wash, green manuring etc. Overall empowerment of community based institutions was also a focus of this programme. The motto of the programme was 'minimum input and maximum output'. This process enabled the targeted farmers to increase their agricultural practice keeping in the view of local challenges. It also enabled them to understand the vulnerabilities and challenges in agriculture and identify effective solutions (local and conventional) collectively. The farmers led approaches are purely farmer centric and enables them to take apt decisions considering the internal and external environment of their own. The collective action is a strength which promotes collective initiatives and consensus building processes. Farmers learn from each other and become a moral strength to overcome challenges.

Impact of Initiative

The gravity flow irrigation has assured safe drinking water to

all these marginalized families as well as water required for farming. The area under Agriculture has increased from 80 acres to 250 acres. Farmers are now able to magnify their production capacity from one in a year pattern to thrice in a year pattern. At the same time these people could add more crops in addition to traditional rice cultivation. Crops with high marketability and commercial viability like organic vegetables and fruits opened a new vista for them. Practicing three crops in a year as they were isolated to pre-dominant single paddy crop has increased their quality of life and life standard. The yield is increased almost 3 times for paddy (i.e. 22 quintals for acres now) as it was 8-10 quintals in rain-fed condition. Due to the assure irrigation, farmers have added more crops and vegetables to their food basket and it motivated them to stay back in the community by which seasonal migration has completely reduced. People are now enjoying their life with dignity.

Improvement of the Capacity to Cope with Severe Climatic Condition Prevailing in the Villages:

- The cope up capacity of target group from severe climate events like drought and sudden heavy rainfall has increased. At village level, the community has prepared the disaster mitigation strategy. Seed banks have been established and running by farmers groups in the community to cope up with immediate response through community Institutions.
- Six Farmers' groups have formed to link with various government schemes to access credit facilities where 104 marginal farming families are linked with many agricultural schemes on subsidized rate.
- Forty Tribal farmers have prioritized their major issues and presented the same to influence the regional research stations and policy makers in smallholder consultation and multi-stakeholder interface meeting.

Facts And Figures of Program

Basic Data

S no.	Area/Factor	No.
1	Total number of Hamlets	5
2	Total number of Hamlets has Hamlet-wise Development Plans	5
3	Total number of Farmer's Club	10
4	Total number of Water User Associations	6

Changes in Different Parameters after Implementation of the Project

S no.	Before Implementation	After Implementation
1	Farmers involved in organic farming at the start of the programme - 8	Farmers involved in organic farming at the end of the programme - 220
2	Farmers involved in diversified farming system at the start of the programme - 10	Farmers involved in diversified farming system at the start of the programme - 206
3	Farmers involved in SRI at the start of the programme - 4	Farmers involved in SRI at the end of the programme - 220
4	Farmers involved in SWI at the start of the programme - 0	Farmers involved in SWI at the end of the programme - 86
5	No. farmers had soil health cards at the start of the programme - 0	No. farmers had soil health cards at the end of the project - 208
6	Paddy (quantity) – average yield at the start of the programme - 10-12 quintals paddy per acre of land	Paddy (quantity) – average yield at the end of the programme - 18-20 quintals paddy per acre of land
7	Paddy (quality) – seed generation of the plant at the start of the programme - Initially the Rice production was done traditionally with an average yield of 10-15 grains per pinnacle	Paddy (quality) – seed generation of the plant at the end of the programme - Since the farmers adopted SRI system the average grain yield is 30 -40 per pinnacle
8	Farmers producing single crop in a year at the start of the programme - 85	Farmers producing three crops in a year at the end of the programme - 220
9	Farmers are taking vegetables at the start of the programme – Limited vegetable cultivation.	Farmers producing new types of vegetables and grains now - Vegetable (Beans, French Beans, Cow pea, bush type soybean, okra) wheat, Arhar, Maize, Gram, millets, ground nuts etc.

10	Farm families taking three or more meals per day at the start of the programme - 78	Farm families taking three or more meals per day at the end of the programme – 178
11	Food farmers eating at the start of the programme - Rice, sun-dried fish (Sutki), Meat	Food farmers eating at the end of the programme - Rice, Wheat, Dal, Gram, Vegetables, Meat, Fish and Chicken
12	Farmers using organic manure in their field at the start of the programme – 10	Farmers using organic manure in their field at the end of the programme – 200
13	Number of farmers selling organic produces - 0	Number of farmers selling organic produces – 50
14	Land under cultivation using organic farming at the start of the programme – 5 acres	Land under cultivation using organic farming at the end of the programme – 348 acres
15	Land under cultivation using diversified farming system at the start of the programme - 0	Land under cultivation using diversified farming system at the end of the programme - 190 acres
16	Number of women involvement in Agriculture and allied sectors at the start of the programme - 0	Number of women involvement in Agriculture and allied sectors at the end of the programme - 1 group (low cost pollution free Poultry farm)
17	Number of women involvement in agriculture (collective farming initiatives) at the start of the programme - 0	Number of women involvement in agriculture (collective farming initiatives) at the end of the programme - 02 groups
18	Major findings of the soil health testing - Highly acidic due to huge imbalance application of Chemical fertilizers	Action taken to address this issue - Farmers applying chuna (Lime) and 13 quintals of vermi compost per acre

Challenges faced

Challenges identified	Solutions to Manage
Socio-political changes/influence	<ul style="list-style-type: none"> - Not to align with any local/political parties. - Continue to assess the situation and act accordingly. - Gram Ekai& gram Sabha to be strong and united to deal with.
Wild Animals	<ul style="list-style-type: none"> - Formation of watch team - Playing drum and lighting fire at night
Disasters, Prolonged drought and climate change.	<ul style="list-style-type: none"> - Strengthening the capacity of the community to use early warning system - Adoption to climate change through new/improved low cost farming technologies. - Promotion of community based Seed and Grain bank.
Naxalities strike effects the field movement	<ul style="list-style-type: none"> - Develop capacity of the community to carryout negotiation at their level. - Keep low profile and avoid night travelling.

Scale and sustainability of program:

The vision and mission of this programme has given more focus not only on the formation and strengthening of the community based organisations but also on improving the democratic situation in these villages and helping communities to learn and have ownership of their village assets, structures and overall development. The participation of the Gram Sabha is central to sustaining the benefits of the project and will play a key role in planning, implementation and monitoring of the programme. Community leaders/ gram ekai/gram Sabha are the key to enable them to lead and mobilise communities effectively establishing a good professional relation with the relevant institutions for leveraging benefits for their livelihood security and future endeavour.

A similar study has been carried out by Caritas, India in Kurum village, Umra Panchayat situated in Palkot block of Gumla district in Jharkhand and they have also found the similar resu



Channel for inlet pipe



Inlet pipe



The only Village Road cut off duri Channel for inlet pipe



Water Storage Area



Ground water table recharge & SRI Crop A Smallholder using Conoweeders in SRI



A Smallholder showing his first wheat crop Vermi compost used in organic farming



Community Women showing their Organic Produces (Lentils & Seasonal/Perineal vegetables)

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