

Organic Farming

An initiative for tribal farmers

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India has traditionally been a country of organic agriculture, but the growth of modern scientific, input intensive agriculture has pushed it to wall. With the increasing awareness about the safety and quality of foods, long term sustainability of the system and accumulating evidences of being equally productive, the organic farming has emerged as an alternative system of farming which not only addresses the quality and sustainability concerns, but also ensures a debt free, profitable livelihood option for the most vulnerable section of Indian farming community particularly schedule tribes.

Key words: Awareness programme, KVK, Organic farming

THE growth of organic agriculture in India has three dimensions and is being adopted by farmers for different reasons. First category of organic farmers are those which are situated in no-input or low-input use zones, for them organic is a way of life and they are doing it as a tradition (may be under compulsion in the absence of resources needed for conventional high input intensive agriculture). Second category of farmers are those which have recently adopted the organic in the wake of ill effects of conventional agriculture, may be in the form of reduced soil fertility, food toxicity or increasing cost and diminishing returns. The third category comprised farmers and enterprises which have systematically adopted the commercial organic agriculture to capture emerging market opportunities and premium prices. While majority of farmers in the first category are traditional (or by default) organic, they are not certified, second category farmers comprised both certified and un-certified but majority of third category farmers are certified. These are the third category commercial

farmers which are attracting most attention. The entire data available on organic agriculture today, relate to these commercial organic farmers.

Organic farming is practiced in 178 countries of the world (Year 2016). The global organic area is 57.8 million ha under conversion (Year 2016) with 1,003 certification bodies (year 2017). Globally, 1.2% of farmland is organic. The world organic market is now 89.8 billion US\$ (year 2016). India has brought more than 3.6 million ha area under organic certification process along with 12 accredited certifying agencies. India has maximum organic producers (1,093,288) in the world. India produces 1,703,111 tonnes organic products and exports 458,339.017 tonnes organic produce.

Area under organic farming certification process in Jharkhand has been registered to 51,187.934 ha during 2017-18 out of which organic produce in 17,387.934 ha cultivated land and within organic cultivable land 5,713.135 ha is certified organic land which produces only 2.395 MT products and 11,674.799, ha farmland is under conversion. In Jharkhand, 10,245 farmers and 36

bodies of Internal certification system are involved in organic farming where negligible chemicals are used. Looking this view there is enough scope of biodynamic preparation, vermin-compost etc. in this state.

Background role of Krishi Vigyan Kendra

With the expansion of market and owing to the natural resources available in Jharkhand, particularly tribal areas, there is a huge scope of socio-economic upliftment of tribal, farmers through organic farming. Keeping this in view KVK Ranchi has made efforts for promotion of organic farming in its area of operation and surroundings.

As majority of tribal farmers fall in category of small and marginal farmers, their socio-economic condition does not encourage them to adopt new production technology. Thus, local resource based organic farming proved economically viable in tribal villages of Ranchi and surroundings. To buildup confidence among farmers, Divyayan KVK demonstration farm has been fully transformed into an organic farm by adopting scientific technology in combination with traditional organic

Geographical and social condition support organic farming in area

- Unique topography of the villages is such that the villages are mostly surrounded by mountain and forest tree that naturally create isolation from the surrounding and check invasion of foreign particles i.e. chemical pesticide and fertilizers.
- Sufficient population of animal resources to support organic farming.
- Area receives good rainfall hence water harvesting and management made most of land irrigated throughout the year.
- Social unit, devotion and loyal nature of Tribals.

farming practices during 2015-16. With the successful adaption of organic farming large numbers of training programmes on low cost local resource based organic farming have been organized by KVK. More than 1,200 farmers have been trained under series of training programmes. For the last 3 years, KVK has been organizing Regional and Central *Kisan Mela* in tribal areas on the theme of low cost and climate resilient organic farming for popularization and dissemination of technologies. Participatory research programmes are also conducted to evaluate and disseminate these technologies at farmer's field by KVK through On Farm Trials and Front Line Demonstrations. Initially one village Dhurleta, under Angara block of Ranchi district was selected to be developed as fully certified organic village during 2014, which later fetched financial help for basic infrastructure development from NABARD and KVK-Tribal Sub Plan in 2016, along with 2 neighboring villages, Budhakocha and Pipraber, selected under Organic Cluster development Programme. Hence, the cluster of 150 acre cultivated organic farm was established and certified under Participatory Guarantee

System (PGS). Two more adjoining villages, Simratoli and Gundlitolli too joined the cluster with 115 acre cultivated land. All together 114 tribal farm families brought their total 265 acre cultivated land under organic farming.

Awareness programmes and trainings

KVK conducted 2 awareness programme in each village to motivate farmers towards certified organic agriculture, which brought villagers together to join hands in formation of organic cluster. A five day training programme at KVK campus was conducted for technical boost up, capacity building and to adopt organic practices. Thereafter three periodical trainings in each season were conducted at village level for technical handholding support at farm point. These farmers also worked as resource person for expansion of area in nearby villages.

Basic infrastructure development

Permanent basic structures for efficient collection, decomposition and management of animal by products as well crop residue for sustainable organic farming (Fig. 1) were constructed in selected villages with the financial outlay of KVK-

TSP and NABARD. 95 units of NADEP compost, 101 vermi compost units and 91 cemented cow floor for efficient collection of cow urine and cow dung were constructed for all the beneficiaries enabling them to produce sufficient manure for organic farming. Plastic drums (910) were distributed among all the beneficiaries for preparation of liquid organic manure and botanicals. Development of permanent structure facilitated on-farm input production to minimize cost of production.

Soil health management

For protecting long term soil fertility to practice sustainable organic farming major emphasis was given to enrich soil organic carbon pool as it improves physical (improves soil structure and aggregate stability, water retention, soil porosity, aeration and water infiltration, reduce soil loss, bulk density, buffers soil temperature etc.), chemical (buffers pH, complexes cations, immobilizes pollutants, binds heavy metals and pesticides, reservoir of nutrients) and biological properties (energy for biological processes, large stores of nutrients, improves soil resilience, crop health and vigor, suppress disease organisms) of soil. Soil organic carbon was improved through three main ways by enhancing plant residues and root inputs to soils, increasing the quantity of organic matter inputs such as manure and compost to the soil (from on/off farm) and by reducing decomposition losses through minimizing disturbance of soil. To improve and maintain soil organic carbon conservation tillage, cover crops, crop residue management, crop rotation, green manuring and agroforestry were promoted in villages.

NADEP compost, vermicompost incorporated (Fig. 1) to the soil and zero tillage technique was used to improve soil organic carbon. About 3,000 plants of Neem, Karanj, Taprosia, Glyricidia, Subabool, etc., were also planted for development of agro forestry model in selected villages. Sesbania as green manuring crop was cultivated before the main

Highlights of KVK Interventions

- Awareness, motivation and capacity building.
- Backward and forward linkage established for infrastructure and marketing.
- Efficient management of natural resources available in the village.
- Increasing income of the farmer through producing safe and varied food and/or reducing cost of cultivation.
- Making farmers self- dependent in most of farming inputs.
- Minimizing health hazard by injudicious use of inorganic pesticide and fertilizers.

Table 1. Changes in cropping pattern after adaption of organic farming

Cropping season	Crop	Area distribution (in %)	
		Organic farming	Conventional farming
Kharif	Paddy	50	70
	Vegetables	30	00
	Pulses & others	20	25
Rabi	Vegetables	40	20
	Pulses	20	-
	Oilseeds	10	10
	Wheat	5	-
Zaid	Vegetables	20	-
	Paddy	30	20
Cropping intensity (%)		225	145
% Increase in cropping intensity		55.17	

crop for improving soil health. Microbial seeding of soil with beneficial microbes was also done to enhance microbial activities in soil (Table. 1).

Preparation and application of liquid organic manures

In organic production system foliar fertilization, growth promoting hormones and immunity boosters can be replaced through liquid organic manures (Fig. 2), to maximise the efficiency of cultivated crops and co-ordinate the process leading to sustained higher productivity. Villagers were trained for preparation and planned application of many such manures for which raw material were available in their village such as *Panchagavya*, *Shasyagavya*, *Jivamruth*, *Sanjeevani*, *Kunapajala* and biogas digested slurry to safe guard plants and soil micro-organisms.

Management of disease and pest

Diseases and pests are generally not a significant problem in organic systems, since healthy plants living in good soil with balanced nutrition are better to resist pest/disease attack. Pest/disease problems can be particularly severe in large holdings, where several ha of a single crop species may be grown. Pest/disease control strategies in organic farming systems are mainly preventative rather than curative. The balance and management of cropped and uncropped areas, crop species and variety choice and the temporal and spatial pattern of the crop rotations used all aim to maintain a diverse population of beneficial organisms

including competitors, parasites and predators of pests. Damaging populations of pests and pathogens are less likely to establish in soils that sustain high levels of beneficial organisms.

Need base periodical spray of Neem, Karanj oil, NSKE and Dhashaparni (herbal extract) were

done as preventive measures for management of disease and pests (Fig. 3.a). Villagers were trained for preparation and application of these products. Soil application of neem/ pongamia cake were used along with *Trichoderma*, *Pseudomonas* helped minimizing incidence of soil born diseases. Herbal extracts were used only as a final remedy only after utilizing and practicing all the other methods like use of resistant varieties, cultural control, mechanical control, physical control and biological control. Locally available weeds or plants with anti-fungal and insect preventive properties are used for making herbal extracts. For self sufficiency, herbal plant resources were developed by raising them as hedges along the fence, in the waste areas like slopes, gullies, and rocky patches and along the path (Fig. 3.b).



Fig. 1. (a) Compost (b) Vermicompost



Fig. 1(a,b). Liquid organic manure



Fig. 3. (a) (b) Management of diseases and pest

Table 2. Effect of scientific organic farming adaptation on yield of important crops

Crops	Yield in conventional farming (q/ha)	Yield in Organic farming (q/ha)	% Increase in yield
Paddy (Improved var. Abhishek, Lalat, Sahbhagi, MTU 1010, IR 64 DRT)	40	45	12.5
Vegetables (OPV)			
Cole crops and solanaceous crop except chilli	25	28	12
Carrot, radish, okra and pumpkin	15	17	14.3
Cucurbits, chilli, pea and cowpea	9	10	12.5
Pulses (Black gram, Gram, Lentil, Pigeon pea)	8	9.50	18.75
Mustard	6.6	8.20	21.1
Average increase in yield (%)	15.9		

Table 3. Comparative benefit cost analysis of major crops

Crops	Cost of cultivation		Gross income		Net income		B:C ratio	
	Conventional farming	Organic farming	Conventional farming	Organic farming	Conventional farming	Organic farming	Conventional farming	Organic farming
Paddy	20,044	17,721	29,400	37,400	9356	20179	1.47	2.11
Cole and solanaceous vegetables (OPV)	31,540	28,945	80,000	1,12,000	48,460	83,055	2.54	3.87
Carrot, radish, okra and pumpkin	26,160	24,660	67,200	1,02,000	41,040	77,340	2.57	4.14
Cucurbits, chilli, pea and cowpea	32,537	31,005	60,000	81,600	27,463	50,595	1.84	2.63
Pulses (Black gram and Red gram)	12,105	11,100	17,920	20,160	5,815	9,060	1.48	1.82
Mustard	11,996	10,540	13,440	15,120	1,444	4,580	1.12	1.43

Other activities undertaken

Green manuring with *Sesbania rostrata*, crop rotation, mixed cropping, intercropping, cover cropping, conservation tillage, biofertilizers application, diversified farming, organic mulching, use of trap and barrier crops were promoted for establishment of ecological sustainable system of organic farming.

Certification and market linkage

After implementation of all activities, the three villages Dhurleta, Budhakocha and Piprabela are now fully 'NCOF-PGS India organic' certified Organic Village. Other two villages i.e. Gundlitol and Simlabera are under conversion phase. KVK established linkage between these producer and organic buyer for their

sustainable growth. Now they are getting premium price for their organic produce which is roughly 10-20% more than local market price (Tables 2, 3). Due to successful linkages with market their produce is directly picked up from the villages.

Major Challenges faced

- Organic vegetables prices are not stable and continue fluctuating from time to time.
- Since the quantity of organic produces is at very low level at present. The produce has very little reach to big markets. As a result farmers are not in a position to bargain handsomely in their favour.
- Although organic farming is getting popular among small farmers it is yet to gain popularity among large and commercial farmers.
- Costly third party certification process forced for PGS does restrict the suitability of export as organic produce.

CONCLUSION

Local resource based organic farming enhances soil fertility and help in balancing the ecosystem. It minimizes the cost of production and

input dependency of farmers'. As a result it increases income of farmers and helps in socio-economic upliftment in sustainable manner for small and marginal tribal farmers.

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