

Farmers' feedback on technological interventions in East Champaran, Bihar

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Under Farmer FIRST Project supported by Agriculture Extension Division, Indian Council of Agricultural Research, an effort was made to enhance income of the rural people living in selected blocks of East Champaran District of Bihar through technology led innovation systems. Very often emphasis on one component in rural areas, particularly among those people whose livelihood is threatened cannot lead to overall livelihood improvement of a household. Accordingly, interventions in crop-livestock-enterprise module were planned and demonstrated, keeping in view the overall need of the area, available technological options, market accessibility both for input and produce etc.

Key words: Borer, Fruits, Litchi, Variety, Vegetables, Zero budget natural farming

UNTIL recently, the choice of technologies available to farmers was largely determined by the need to increase production, profits and productivity. The main constraints were the availability of capital, knowledge of how to use the technology and market risks (i.e. risks that many policies were shielded by government policies). Farmers have always looked to new technologies as a way to reduce costs. In addition, higher incomes, greater knowledge and improved channels of communication are leading consumers to demand low-cost food of higher quality increasingly produced through organic methods in northern Bihar also, with more variety, consistency and year-round availability. Historically, the main focus of research and advice under Farmer FIRST (*Farm Innovation Resources Science and Technology*) project was to increase production, productivity and profits, whereas now [in the fag end] the emphasis is on achieving those aims in a sustainable way, which often implies changing farm practices and using different technologies.

Although research is increasingly “problem based” rather than seen as exogenous, it is not always clear which technologies are profitable for farming in East Champaran District of Bihar and to develop which farm practices will contribute to sustainable farming systems in the long-term. Therefore, the research was often directed at solving technical problems; now it is also aimed at defining research priorities

and best technology to address current and future demands by agrarian society. Those priorities include enriching biodiversity of orchard and farm land, reducing early plant mortality, biological pest control, precision farming, integrated and organic farming systems. Other issues, however, related to the training system, institutions and the relative role of public and private research efforts are also important



Intercropping of turmeric in litchi orchard

involving farmers. Moreover, some sustainability issues are not necessarily best addressed through technological options, through community experiment (involving farmers to do experiment themselves in their field) which have been

conducted in five villages of East Champaran district of Bihar namely Chintamanpur, Ramgarhwa, Khairwa-mahuawa of Chakia Block and Ujhilpur, Damodarpur and Bakhari Nazir of Mehsi Block with objective of refinement of technology

for all categories of farmers (including large, small, marginal and landless farmers) for improving their livelihood security. Some of the technological inventions and their performance with farmer's feedback are depicted in Table 1.

Table 1. Technical interventions and their performance

Name of Technology	Technology detail and ways of invention	Successful indicator (in brief) of technology	Feedback of the farmers
<i>Increase in area of improved varieties of grain and pulse crops</i>	1) Demonstration of Improved variety of wheat (HD 2967, HD 2733, HD 3118, HD 1563, PBW 154, DBW 39, DBW 14, WR 544)	a) Farmers replaced the wheat varieties grown (UP 262, HUW 234, and PBW 373) earlier with HD 2967 and HD 2985 (up to 70% seed replacement rate) due to increase in yield by 35%.	<ul style="list-style-type: none"> • Farmers are eager to grow HD 2967, BHU 3 but not getting from local vendors. • Govt agency does not supply the seed for long time, so many farmers compelled to grow other varieties which are easily available.
	2) Demonstration of zinc fortified wheat varieties (BHU 3, BHU 25) promoted by Harvestplus, ICRISAT, Hyderabad	b) BHU-3, zinc fortified wheat yields at par with HD 2967 with high tiller percentage.	<ul style="list-style-type: none"> • MTU 7029, Swarna Sub 1 and Rajendra Sweta is very poor yielder and availability of seed of desired variety (rice varieties Rajendra Bhagwati, Sugandha 5 and Lentil var. HUL 57) is not available in local market.
	3) Demonstration of rice varieties (Rajendra Sweta, Rajendra Bhagwati, Sugandha 5, MTU 7029, Swarna Sub 1)	c) This year many farmers are interested to grow 'Rajendra Bhagwati' and 'Sugandha-5' due to high yield and scented quality.	<ul style="list-style-type: none"> • Very poor grain filling in variety of maize (Kanak, Ganga 2 and Kohinoor) is observed.
	4) Demonstration of improved variety of mustard (RH 749)	d) Farmer recorded yield of lentil var. HUL 57 up to 4.50 q/acres against (2.50 q) local variety.	
	5) Demonstration of improved variety of lentil (HUL 57, PL 8), green gram (Pusa Vishal, SML 668, HUM 16, IPM 2-3), maize (Maharaja) and fodder sorghum		
<i>Enriching biodiversity of orchard</i>	1) Distribution of 6 cultivars of mango (Amrapali, Mallika, Dashehari, Jardalu, Langra and Chausa) and two of guava (L-49 and Allahabad Safeda) and one of Kagzi nimboo.	a) More than 90% farmers of selected villages were growing 'Langra' mango and no plants of guava and nimboo was visible in experimental area.	<ul style="list-style-type: none"> • Farmers are fond of 5 years old grafted/budded plants due to grazing problem and they believe that older trees bear fruits earlier with high survival rate.
	2) Demonstration of turmeric variety 'Rajendra Sonia' as intercropping in mango/litchi orchard	b) Now many household had 'Amrapali' mango, guava and nimboo.	<ul style="list-style-type: none"> • Due to high market demand, farmers are only interested to grow Langra (Syn. Malda) mango.
	3) Demonstration of Papaya cv. Red Lady and Pusa Nanha	c) Additional income increased by 30 % due to intercropping of turmeric in litchi/mango orchard. d) Papaya cv. Red Lady is performing well.	<ul style="list-style-type: none"> • Wilting of 'Sipia' mango is very high and private nurseries are selling the propagule with high rate (₹ 300-400 per plant) due to older plants. • Sometimes moisture is not available while sowing in orchard lead to poor yield. High mortality, papaya mosaic and poor establishment of papaya seedling discourage many farmers to go for commercial plantation.
<i>Improved technique for establishment of new litchi/mango orchards</i>	1) Demonstration of consortia comprising cakes (non edible) (1 kg) + vermi-compost (2 kg) + bio-fertilizers containing (<i>Trichoderma</i> + PSB + <i>Pseudomonas</i>) (50 g each) + single super phosphate (500 g) + micronutrient complex (50 g) to 50 orchardists of each villages for high degree of establishment of young trees.	a) The young plant mortality was reduced to 10% in litchi (instead 40%) and 5% (instead 20%) in mango in the first year of planting due to application of plant health consortium (for early establishment of orchard).	<ul style="list-style-type: none"> • The material is not available in the market and farmers are reluctant to prepare the same themselves. • They use only vermi-compost, which is available in the market that too is spurious (mixed with soil).
<i>Varietal diversity in kitchen garden/ commercial vegetable growing</i>	1) Demonstration of improved varieties of garden pea (Azad Matar-3), okra (Kashi Kranti), cow pea (Kashi Kanchan), coriander (Pant Haritima), radish (Kashi Sweta) and palak (Arka Anupama), sponge gourd (Pusa Sneha) and bitter gourd (Palee, a hybrid variety of East	a) Farmers who were growing only private sector variety like Century (sponge gourd), 704 (brinjal), Palee (bitter gourd) are now replacing with public sector variety with seed replacement rate of 25%. b) Yield has been increased by 20% due to replacement of variety (local	<ul style="list-style-type: none"> • Wilt in bitter gourd, asking regular training on GAPs and trial on hybrid variety of cauliflower, bitter gourd, bottle gourd and okra due to high yield. • Public sector varieties are not available at the door of local vendors and local consumers prefer round

Contd.

Table 1. (Concluded)

Name of Technology	Technology detail and ways of invention	Successful indicator (in brief) of Technology	Feedback of the farmers
	West seed International) to 300 farmers.	variety).	type bottle gourd.
<i>Bagging of litchi bunches for better quality fruits</i>	1) Bagging technology for litchi cv. Shahi (more prone to sunburn, cracking, fruit drop and insect infestation) can boost the produce and increase the shelf life fruits and should be used 20-25 days before harvesting and allowed to cover most of the bunches (bag dimension of 510 × 400 mm and cost is ₹ 2.50/ bag) 2) It would not only increase the yield but also increase the shelf life of the fruits thereby increasing the marketability of the fruit	a) The pre-harvest bagging of litchi bunches increased 30% more export quality fruits attributed to minimized damage by sun burn, cracking (8 % against 26 % in un-bagged bunches) and insect pest attack.	<ul style="list-style-type: none"> • Bagging is tedious for old trees, tall and vigorous trees. • Bags of polypropylene (non-woven) are not available at local shops. • Labour cost can further enhance cost of cultivation and pre-harvest contractor does not do it or go for early harvest.
<i>Trichoderma for revival of dying plant/ trees</i>	1) Demonstration of talc based formulation of <i>Trichoderma viride</i> (= <i>Trichoderma asperellum</i>) (i.e. NRCL T-01) for managing tree wilt caused by <i>Fusarium</i> spp. 2) 1 kg formulation are to mixed in 100 kg well rotten FYM and can be applied to 25 trees (average 40 g/ trees); for lone application in large tree, 200 g/tree is recommended.	1) It has controlled mortality of litchi, sheesham, arjuna, and papaya by 100% and also works as an excellent bio-fertilizer promoting plant growth in all farm crops, fruits, vegetables and flowers.2) Many dying plants got revived, poor result if applied in moisture deficit trees.	<ul style="list-style-type: none"> • Litchi tree which was on verge of collapse turns yellow to green with better flowering, Sheesham tree revived due to its application with FYM. • Not available in nearby market, little bit costly (₹ 300/kg)
<i>Capacity building on Zero Budget Natural Farming</i>	1) Demonstration of protocol of Panchgavya, the plant extract (neem, datura, calotropis, guma and garlic), mixed with cow urine as jaiwik keetnashi, Beejamrit for seed treatment, Jeevamrit (comprising cow dung, urine, pulse flour, gur and microbes etc) for plant vigour and highest germination.	a) The expenditure on insecticide spent by farmers (on mango, litchi and rabi vegetables) have been reduced by 80% due to training and its use. b) The produce is fetching 20 percent more price due to less use of insecticides.	<ul style="list-style-type: none"> • Collection of cow urine is cumbersome and cost of coconut water and cow ghee further makes costly affair. • Farmers are reluctant to heed that much time and afraid of long term result.
<i>Management of borer and stink bug in litchi</i>	1) Field training and demonstration of Triazophos 40% EC @1.5 ml L ⁻¹ +lambda-cylothrln @0.5 ml L ⁻¹ + 0.3 ml sticker solution L ⁻¹ for reducing fruit drop and management of pests more precisely.	a) Actually farmers were using Cypermethrin @ 1 ml per L + Monocrotophos @1.5 ml per L which is now replaced with newer molecule. b) Net saving of ₹ 30/tree on expenditure on insecticides and additional saving of ₹ 35 one spray for Fruit borer in Litchi was recorded.	<ul style="list-style-type: none"> • Number of stink bug in litchi panicles was recorded nil against 6-8/panicle. • Recommended pesticides are not available in local market conveniently. • All farmers are not practicing the control measures of stink bug. • Farmers think poultry farm existing beneath litchi orchard favour menace of stink bug.
<i>Preparation of pickle of seasonal vegetables and mango</i>	1) Hands on training, initial kit for small scale pickle making was provided to women participants.2) The cost of 1.00 kg mixed pickles was ₹ 104 and market Price is ₹ 240/kg therefore net profit was ₹ 136 kg.	a) Two groups of women farmers (of Damodarpur and Ujhilpur village) prepared pickles of mixed vegetables and now they are contemplating for commercial production.	<ul style="list-style-type: none"> • Many women are not coming forward due to unawareness about available market and scare about its acceptance. • They need round the year involvement on valorization of fruit and vegetables.

SUMMARY

The small interventions recommended for small and marginal farmers, orchardists, traders, are if adopted there will be definite availability of diverse produce and various varieties of fruits and vegetables can be ascertained with better market facility. Suitable variety

in foodgrain and pulses will enhance yield and income. All farming systems, from intensive conventional farming to organic farming have the potential to be locally sustainable as many old trees which are dying can be revived with the help of *Trichoderma* formulations. Technological advances in the science

of pest control are expected to continue to produce chemical control agents that over time are at least as effective in controlling pests as the ones they replace, but which are also less toxic, less persistent and less mobile through the soil, need to be propagated. Therefore component of Zero Budget Natural Farming can be



Wilt disease in garden pea, component of zero budget natural farming prepared in Ujhilpur village

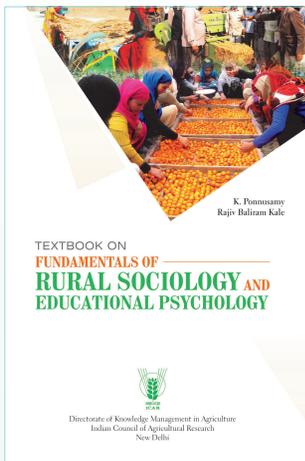
encouraged to have healthy produce with cost cut on input supply. Fruit borer and menace of stink bug in litchi is manageable if farmer use recommended newer molecule on time and dose of its acceptance. Even bagging of fruit bunches of litchi can enhance income by 15-20%, there is

need of introspection on popularity of vegetable varieties among grower over public sector varieties, however farmers are not aware also about its attributes. Farmer FIRST Project has impact on day to day life of farmers and hopes it will now show impeccable results in near future and

bring prosperity to the farmers.

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TECHNICAL SPECIFICATIONS

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