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Natural Farm Products and Diversified Farming through Natural Farming

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Shri Rajendra Mahto, a 52-year-old progressive farmer from the village Raghunandan Bigha, Block Halsi, District Lakhisarai, Bihar has restored faith of many fellow farmers in non-chemical methods of farming especially Natural farming. He has total one acre of farming land where field crop namely paddy, chick pea etc., are being cultivated on 0.5 acre while remaining 0.5 acre was meant for cultivating various horticultural crops viz., Okra, Bottle gourd, Sponge gourd, Turmeric etc. As Rajendra Mahto is very much concern to environment and believes in conserving traditional method of farming. In addition to this, high cost and poor availability of fertilizers, pesticides perplexed him to find an alternative of chemical farming. Earlier he adopted some efforts with organic farming using bioagents like *Azolla sp., Azotobacter, Rhizobium sp, Trichoderma sp, Pseudomonas sp.*, etc. He was somewhat satisfied with organic farming but scarce availability along with poor quality parameters of bioagents turning his organic farming practice cumbersome. In the meantime, he came in contact with Krishi Vigyan Kendra, Halsi Lakhisarai. In Krishi Vigyan Kendra (KVK) Halsi Lakhisarai under various training programme he realized the importance of soil health through various topics like how chemical farming is deteriorating soil health, organic content of soil, importance of beneficial soil micro-flora etc. KVK Halsi scientists (Dr. Nishant Prakash nodal officer of Natural farming and Dr. Sudhir Chandra Choudhary Head KVK Halsi) introduced natural farming to Rajendra Mahto and encouraged him to adopt natural farming on his farm. KVK scientist provide his regular guidance and support to Rajendra Mahto in adopting natural farming in his regular farming practice under 'Outscaling of Natural Farming Project".

Identification of entrepreneurial competencies

KVK scientist encouraged Mr. Rajendra Mahto for to take this Natural Farming venture on entrepreneurial scale. As Rajendra Mahto didn't have any other mode of earning and he was having strong commitment for non-chemical method of farming, so he was bound to move his natural farming venture on commercial scale. KVK scientists invited Rajendra Mahto in Natural Farming awareness program. Further, he was trained in various natural farming methods under natural farming training program. In order to demonstrate the performance of natural farming methodologies on farmers field, KVK scientist conducted various demonstration in paddy, chick pea and horticultural crops on Rajendra mahto's farm. Effect of different natural farming methodologies didn't enhance yield much but when it was assessed in terms of benefit-cost ratio it was almost at par with chemical farming methods.

This rooted faith of Rajendra Mahto in natural farming. In addition to this, these demonstrations also enhanced the practical skills of natural farming in Rajendra Mahto.

Systemic Capacity Building

During the Natural Farming training program, Rajendra Mahto learnt how to prepare Jeevamrit, Ghanjeevamrit, Neemastra, Dasparni etc. He was taught how jeevamrit and ghanjeevamrit enhance soil micro flora and fauna and can be an effective alternative for chemical fertilizers Urea, DAP, Potash etc. Neemastra, Dasparni, aagneyastra can replace various toxic pesticides like organophosphate, organochlorine, pyrethrum, demethylation inhibitors etc. Hence applications Neemastra, Dasparni, and aagneyastra play key role in order to manage various insect pest and diseases. He was also encouraged to adopt a diversified farming system. A Diverisified farming system involves recycling of organic waste, which reduces the load of chemical fertilizers in the horticultural farm of Rajendra Mahto. Krishi Vigyan Kendra Halsi Lakhisarai enhanced natural farming skills in Rajendra Mahto by sending him to the State Level Natural Farming Workshop at Motihari, Bihar. State-level natural farming workshop at Motihari was a congregation of natural farming experts and natural farming practicing farmers all across the state of Bihar. In the workshop, minute details of Natural Farming were discussed by experts. Different Natural farming practicing farmers also shared their opinions and details regarding the benefits, while addressing the constraints. The workshop increased the enthusiasm for translating Natural farming practices on his agricultural farm.

Farmer's Natural Farming schedule

Under the "Outscaling of Natural Farming project" KVK scientists conducted an On-farm demonstration at Rajendra Mahto's field. In the kharif season, the paddy seeds were treated with Beejamrit. Later paddy field was incorporated with Ghanjeevamrit (dose @ 100kg per acre) during field preparation. After transplanting of paddy seedlings, Jeevamrit (dose @100L per acre) was applied in the paddy field at 30 days after transplanting (DAT) and 60 DAT. In the rabi season, chick pea seeds were treated with Beejamrit. Chickpea field was treated with Ghanjeevamrit (dose @ 100kg per acre) during field preparation, while Jeevamrit (dose @100L per acre) was applied in the Chickpea field at 30 days after sowing (DAS) and 60 DAS. In order to manage insect pests and disease, two sprays of Neemastra and one spray of Dasparni was performed by Rajendra Mahto under the guidance of KVK scientists. The composition Beejamrit Ghanjeevamrit, Jeevamrit, Neemastra and Dasparni is mentioned in table 1.

Table 1: Composition Beejamrit Ghanjeevamrit, Jeevamrit, Neemastra and Dasparni

S.No.	Detail of inputs	Quantity
Beejamrit		
1	Cowdung	5 kg
2	Cow urine	5 Litre
3	Lime	50 gram
4	Water	20 Litre
Ghanjeevamrit		
1	Cowdung	100 kg
2	Cow urine	10 Litre
3	Jaggery	2 kg
4	Pulse flour	2 kg
Jeevamrit		
1	Cowdung	10 kg
2	Cow urine	10 Litre
3	Jaggery	2 kg
4	Pulse flour	2 kg
5	Water	200 Litre
Neemastra		
1	Neem leaves	5 kg
2	Cowdung	1 kg
3	Cow urine	5 Litre
4	Water	100 Litre
Agniastra		
1	Neem leaves	5 kg
2	Green chilli	0.5 kg
3	Garlic	0.5 kg
4	Cow urine	20 Litre

In horticulture garden, ghanjeevamrit was incorporated in soil. Vegetable seed were treated with beejamrit before sowing. Jeevamrit was sprayed twice and thrice at fortnight interval.

Marketing Strategy of Production

Rajendra Mahto sold his produce in local market. In addition to this, he also demonstrated his produce in different Kisan mela at Lakhisarai district organised by District Agriculture Department Government of Bihar and Krishi Vigyan Kendra Halsi Lakhisarai.

Yield and economics of Natural farming

It was found that all along the three years i.e. 2022 to 2024, yield was lower both in paddy and chick pea crop in the Natural farming plot (38, 36.4 and 38.6 q/ha) as compared to the farmers plot (42, 39.5 and 42.6 q/ha) where chemical fertilizers and pesticides were treated (Table 2). But when it was compared in terms of the economics of total farm income, it was apparent discernible that the natural farming plot has a higher net income in both the paddy and chickpea crop as compared to the farmer's chemical treated plot. In addition to this Benefit cost ratio is also higher in the Natural farming plot as compared to the farmer's plot (Table 3).

Table 2: Yield of Paddy and Chick pea in Natural farming demo plot and Farmer's practice plot

S.No.	Crop	Yield (q/ha)					
		2022		2023		2024	
		Demo	Farmer's practice	Demo	Farmer's practice	Demo	Farmer's practice
1	Paddy	38	42	36.4	39.5	38.6	42.6
2	Chickpea	8.4	10.2	7.5	9.5	8.2	10.4

Table 3: Net return and Benefit and cost ratio of Paddy and Chick pea in Natural farming demo plot and Farmer's practice plot

S.No.	Crop	Net return						Benefit cost ratio					
		2022		2023		2024		2022		2023		2024	
		Demo	Farmer's practice	Demo	Farmer's practice	Demo	Farmer's practice	Demo	Farmer's practice	Demo	Farmer's practice	Demo	Farmer's practice
1	Paddy	49340	41768.4	46000	36400	49600	42350	2.85	1.99	2.72	1.85	2.80	1.99
2	Chickpea	25410	28411	20300	24100	23780	27650	2.27	2.07	2.00	1.89	2.16	2.03