International J. of Ext. Educ. Vol. XX (1) Special Issue : 13-17, 2024 ISSN : 2319-7188

Unveiling the Ecological and Economic Dimensions of Natural Farming in Central India

S.R.K. Singh, A. A. Raut Harish M. N. and Varsha Shrivastava
ICAR-Agricultural Technology Application Research Institute, Madhya Pradesh-482 004, India
Corresponding author's email: srksingh.icar@gmail.com

ABSTRACT

Natural farming represents an ecological approach where farming system collaborates with natural biodiversity. It focuses on fostering the soil biological activity and managing the complexity of living organisms to co-exist harmoniously with the food production systems. Recognizing the significance of Natural farming, ICAR has initiated a nationwide project entitled "Out-scaling of Natural Farming through KVKs". Within this initiative, the crucial components include capacity building for farmers and demonstrations on natural farming practices. The project is being implemented across 48 KVKs in Madhya Pradesh and Chhattisgarh. During 2022-23, a total of 381 demonstrations covering 149.24 ha in cereals, pulses, millets and vegetables were conducted. A pre and post-demonstration analysis of soil samples revealed encouraging changes. The soil pH and EC were decreased by 1.22 and 9.09 per cent, respectively. Simultaneously, organic carbon content is increased by 7.14 per cent. Moreover, major soil nutrients exhibited positive changes with available nitrogen increased by 1.05 per cent, phosphorus by 4.02 percent and potassium by 0.11 per cent. Despite 21.72 percent yield decline under natural farming as compared to conventional practices, the cost of cultivation experienced a significant reduction of 16.53 percent. However, slightly higher B: C ratio under natural farming emphasizes its cost-effectiveness. This suggests that the potential higher yield in conventional practices can be offset by reduced cost of cultivation in natural farming during initial years, when there is a decline in yield. The transformative potential of natural farming not only in improving soil health and ecological resilience but also in establishing a viable economic model for farmers. The trade-off between reduced yield and lower cultivation costs as indicated by the higher B: C ratio, underscores the long-term sustainability and profitability. As these initiatives continue to evolve, the integration of natural farming into mainstream agricultural practices holds promise for a more resilient, environmentally conscious and economically sustainable future for Indian agriculture.

INTRODUCTION

The accelerated use of chemicals and synthetic fertilizers has led to a rapid deterioration of soil fertility, posing a significant threat to long-term food security. Recognizing this challenge, the adoption of sustainable farming practices becomes not only essential but also imperative. While traditional agricultural practices have been the backbone of crop cultivation in many parts of the country for generations, the contemporary challenges posed by soil degradation and unpredictable climatic conditions are necessitating a shift towards sustainable farming. The limitations of conventional agriculture in sustaining soil productivity have raised concerns regarding the country's farming policies. Natural farming, an ecological approach deeply rooted in collaboration between farming systems and natural biodiversity, emerges as a promising paradigm shift in agriculture. Natural Farming practices and techniques avoid use of agro-chemicals, synthetic products and transgenics. It emphasizes diversity and reduced water usage, urging farmers to avoid out-of-pocket expenses for inputs driven by profit motives. Additionally, it seeks to revive traditional seed diversity and conservation of the germplasm. With anticipated reductions in costs, enhanced productivity and better price realization by marketing the produce as grown under natural farming has potential to enhance farmers income and uplift their livelihood. The promotion of Natural Farming is embodied in the Bharatiya Prakritik Krishi Paddhati Programme (BPKP), operating under the centrally sponsored scheme, Paramparagat Krishi Vikas Yojana (PKVY), initiated

by the Government of India. BPKP aims to encourage traditional indigenous practices that minimize dependence on externally purchased inputs. This approach revolves around on-farm biomass recycling, emphasizing biomass mulching, utilizing on-farm cow dung-urine formulations, ensuring periodic soil aeration and eliminating synthetic chemical inputs. States such as Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh and Tamil Nadu are actively practicing natural farming. Currently more than 6.5 lakh hectares in India is covered under natural farming to reduce dependency on purchased inputs.

Natural farming is founded on the principle of fostering the soil biological activity and managing the complexity of living organisms to coexist harmoniously with the food production systems. Unlike conventional practices reliant on synthetic inputs, natural farming emphasizes sustainability, biodiversity and ecological resilience. By working with nature, this approach seeks to create a balanced ecosystem that supports both the environment and agricultural productivity. Hence, there is an urgency to reorient farming practices in harmony with nature. For in-depth understanding of the advantages and disadvantages of Natural Farming, particularly in major crops and farming systems there is a crucial need for documentation of adopted practices and their outcomes. It is feasible to quantify the effects of natural farming relative to current cultivation systems, such as conventional and organic methods, in order to refine policies.

Out-scaling of Natural Farming through KVKs

Recognizing the significance of natural farming, the ICAR has undertaken a nationwide project on "Out-scaling of Natural Farming through Krishi Vigyan Kendras" covering 425 districts in India. This chemical free farming system is deeply rooted in Indian tradition and enriched with a modern understanding of ecology, resource recycling and on-farm resource optimization. It integrates crops, trees and livestock with functional biodiversity, emphasizing on-farm biomass recycling, mulching and the use of cow dung-urine formulations while excluding synthetic chemical inputs.

KVKs play a pivotal role in disseminating knowledge and technologies to farmers. The capacity building initiatives for KVKs included organization of National Workshop on Natural Farming, organized at RVSKVV, Gwalior, Madhya Pradesh. KVK scientists and Nodal Officers for Natural farming at 425 KVKs in India. The workshop aimed at sensitization of the KVK scientists and farmers by policiy makers on the implementation of the activities under natural faming at the field level and discuss the potential for implementing natural framing in different agro-climatic regions in the country. The training programme on techical aspects of Natural Farming was organised at State Natural Farming Training Institute at Kurushtra, Haryana for 51 Scientists from KVKs of Madhya pradesh and Chhattisgah. The national workshop was followed by Regional Workshop on Natural Farming organized by KVK, Burhanpur and KVK, Satna with involvemet of 918 farmers.

Natural Farming initiative was implemented across 48 KVKs in Madhya Pradesh and Chhattisgarh focuses on capacity building for farmers and on-field demonstrations of natural farming practices. The project aimed at capacity building of the farmers through awareness programmes, training programmes and Demonstrations on the Natural farming. Training programmes aimed to provide the technical aspects of four pillers of natural farming and methodologies and package of practices to be adopted under the natural farming. The demonstrations were aimed to estimate the yield potential in different agro-climatic situation, effect on soil health and analysis of the cost of cultivation in comparison to conventional farming and to showcase the suitability of the natural farming in the district on the principle of seeing is believing. Capacity building initiativeson Natural farming helped dissemination of developed technologies enabled the farming community to

adopt the technological interventions as per the recommendations.

Awareness Campaign on Natural Farming

The primary objective of the awareness programmes was to create consciousness among farmers and various stakeholders regarding the advantages associated with soil health and sustainable production practices thereby contributing to the overall maintenance of ecological balance. These initiatives sought to disseminate knowledge about the pivotal role that soil health plays in agricultural sustainability and the broader significance of maintaining a harmonious ecological equilibrium.

Awareness programmes were meticulously designed to have broad coverage of all villages in all the blocks of the district to enlighten farmers about the natural farming, soil health and sustainable agricultural practices. By fostering an understanding of the direct correlation between soil well-being and long-term agricultural productivity the awareness campaigns aimed to empower farmers with the knowledge necessary for making informed decisions in their farming endeavors. Emphasis was placed on explaining the far-reaching benefits of adopting practices that not only enhance soil fertility but also contribute to the overall health of the ecosystem. Furthermore, the programmes targeted stakeholders beyond the farming community, recognizing the interconnectedness of various entities in the agricultural landscape. Through these initiatives, the intention was to create a ripple effect fostering a collective responsibility among stakeholders to prioritize practices that not only enhance productivity but also preserve the delicate ecological balance. In essence, the awareness programmes were a strategic effort to cultivate a shared understanding and commitment towards sustainable agriculture, positioning soil health as a cornerstone for the broader goal of ecological resilience and balanced agricultural production.

Table 1:
Awareness programmes on Natural Farming practices

State	No of KVKs	No of programmes	No of farmers	Exposure visits to Natural Farming site of farmers		Exposure Visit to Natural Farming demonstration block at KVK	
				No of visits	No of Farmers	No of visits	No of Farmers
Chhattisgarh	16	460	24043	25	919	73	2779
Madhya Pradesh	32	1071	58565	76	2090	253	8714
Total	48	1531	82608	101	3009	326	11493

The purpose of these awareness programmes is evidently to foster natural farming through a multifaceted approach. The substantial number of programmes conducted, totaling 1,531, to disseminate knowledge and innovative practices among the farming communities. The involvement of over 82,000 farmers, reflects a concerted effort to reach a broad demographic, made aware of the potential and prospects of natural farming. Exposure visits to natural farming demonstration sites on farmers field and demonstrations at KVKs serve as a crucial purpose by providing firsthand experiences to farmers and enabling them to witness and adopt sustainable agricultural techniques. KVKs' played a pivotal role in confidence building about natural farming through learning and innovation among the farming community.

KVK, Alirajpur in Madhya Pradesh taken innovative approach for awareness programme on

natural farming in form of 'Prakrutik Kheti Model Rath', a vehicle equipped with information posters, material for demonstration of jeevamrit preparation and printed literature on natural farming covering 71 villages by organizing 103 awareness programmes involving 4243 farmers in Alirajpur district of Madhya Pradesh.

Training Programmes on Natural Farming

The imperative for training on natural farming within the farming community is underscored by the undeniable need for sustainable and environmentally conscious agricultural practices. The Krishi Vigyan Kendras (KVKs) in Madhya Pradesh and Chhattisgarh addressed the training need on natural farming within the farming community for sustainable and environmentally conscious agricultural practices and conducted 46 training programmes that engaged 2,222 participants from the farming community. These training programmes were meticulously designed with the overarching objective of equipping farmers with both comprehensive knowledge and practical skills pertaining to the fundamental principles and practices of natural farming.

The core focus of these training initiatives was on imparting critical techniques integral to natural farming methodologies. Emphasis was placed on the preparation of essential components of natural farming such as jeevamrit, ghanjeevamrit and beejamrit. Additionally, the training modules encompassed key practices like achadan (green mulching), whapasa and plant protection techniques including neemastra, bramastra and agniastra preparation. The comprehensive nature of the training modules aimed not only at conveying theoretical knowledge but also at providing farmers with hands-on experience ensuring that the principles discussed in the training were practically applicable on their farms.

The training methodology adopted by the KVKs reflects a commitment to a holistic approach, acknowledging that effective learning involves a combination of theoretical understanding and practical implementation. Through interactive sessions, method demonstration and field visits, farmers were immersed in a learning experience that went beyond the classroom fostering a deeper understanding of the principles of natural farming.

Table 2
Training Programmes conducted by KVKs under Natural Farming

State	No of KVKs	Participants	Participants adopted NF	Area (in ha)	Crops
Chhattisgarh	15	674	107	28.6	Chickpea, millets, green gram, black gram, groundnut brinjal, okra, tomato, wheat, mustard, onion, field pea, brinjal, paddy
Madhya Pradesh	31	1548	492	322.4	Wheat, chickpea, cucumber, lentil, mustard, groundnut, green gram, cowpea, watermelon, garlic, sugarcane, tomato, onion, chickpea, potato, chilli, brinjal, cucumber, linseed, vegetable pea, niger, sugarcane, guava, cucurbits
Total	46	2222	599	351	

The success of these training programmes is evident in the substantial number of farmers who have initiated natural farming practices at their farm following their participation in the training. A total of 599 farmers who received training have taken the initiative to implement these sustainable practices on their own farms. This outcome reflects the tangible impact of the training programmes demonstrating that the knowledge and skills imparted have translated into real-world application, empowering farmers to make a meaningful shift towards sustainable and

environmentally friendly agricultural practices.

The KVKs' approach to training aligns seamlessly with the broader goal of promoting a widespread adoption of natural farming practices within the agricultural landscape of Madhya Pradesh and Chhattisgarh. By combining theoretical knowledge with practical application these training programmes serve as catalysts for change, developing a cadre of informed and empowered farmers capable of steering agriculture towards sustainability to achieve the broader goal of promoting a widespread shift towards natural farming practices within the agricultural landscape of Madhya Pradesh and Chhattisgarh.

Transformative Potential of Natural Farming and Long-Term Sustainability

During 2022-23, a total of381 demonstrations covering 149.24 hectares were conducted under the project. Pre and post demonstration soil analyses indicated positive changes, with decrease in soil pH and electrical conductivity and an increase in organic carbon content. Major soil nutrients exhibited positive changes, underlining the potential for improved soil health through natural farming practices. Despite a 21.72 per cent decline in yield compared to conventional practices, natural farming showcased significant cost-effectiveness. The cost of cultivation experienced a notable reduction of 16.53 per cent. Importantly, the slightly higher Benefit-Cost ratio under natural farming, emphasizes its economic viability. This suggests that the potential higher yield in conventional practices can be offset by cost savings under natural farming, especially during the initial years.

The transformative potential of natural farming extends beyond improving soil health and ecological resilience. It represents a viable economic model for farmers, as highlighted by the trade-off between reduced yield and lower cultivation costs, as indicated by the higher B: C ratio. This underscores the long-term sustainability and profitability of natural farming. To address the challenges posed by the increasing use of chemicals and fertilizers, it is imperative to transition towards sustainable agriculture. Natural farming, being a sustainable and resilient farming approach, aligns with the principles of ecological balance and biodiversity. In this method, there is no ploughing, no tilling of soil and no use of synthetic fertilizers. Farm-made, natural pesticides are employed to control pests and diseases.

CONCLUSION

Natural Farming holds the promise of a transformative shift towards a more sustainable, environmentally friendly and ecologically sound future for agriculture. ICAR's efforts to scale up natural farming practices through KVKs are instrumental in bringing about this transformation. The trade-off between reduced initial yields and lower cultivation costs highlights the potential for natural farming to enhance ecological resilience and to establish a financially viable model for farmers. Experiences on field level demonstrations at farmers field indicate that even those reporting yield declines have saved more on out-of-pocket expenses than the value of the production decline. Importantly, not everyone has experienced declines, many reported yield improvements ranging from 10 to 20 per cent. As the journey towards sustainable agriculture continues, natural farming is poised to play a central role in shaping the future of Indian agriculture. This holistic approach aligns with global efforts to promote agroecology and sustainable practices, contributing to a more balanced and environmentally conscious approach to food production. In the quest for a farming re-orientation aligned with nature understanding of Natural Farming, particularly in major crops and systems has become imperative. The absence of detailed studies especially in cropping systems highlights the need for comprehensive assessment. Furthermore, there is a pressing necessity for meticulous documentation of practices and outcomes. Quantifying the effects of natural farming compared to existing systems, including both conventional and organic approaches, assumes practical significance in refining policies in this crucial area of agricultural development.