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RESEARCH PAPER

A study on influencing factors and constraints for natural farming in Belagavi District

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Abstract: The present study was conducted to determine the factors influencing adoption and non-adoption of natural farming and constraints in practicing natural farming in the study area**.** The study was conducted during the agricultural year 2023-24. The multi-stage purposive random sampling technique was adopted to select natural farming farmers in the study district. The study was purely based on primary data related to both factors influencing adoption, non-adoption and production constraints in natural farming, were identified based on the opinion survey from 60 sample respondents. For determination of factors descriptive statistics, was used in this method farmers were asked to rank them based on the frequency of occurrence and Garett's ranking technique was used to evaluate the problems encountered by respondents in the study area. In this method, the farmers were asked to rank the given constraint according to the magnitude of the problem. In Belagavi district, in adoption of natural farming low cost, improved yields, increase in soil fertility, assured premium price, small holdings, benefits from government schemes and less credit requirement were the major factors and high labour requirement, initial low yields, no assured market, laborious and costly certification process, lack of awareness, no standardized procedure for preparation of inputs and pest and disease control were difficult were the major non-adoption factors. The major production constraints in practicing natural farming were non-availability of specialized market followed by labour intensive, non-remunerative prices for produce, low yields in initial level, lack of adequate information, difficulty in control of pest and diseases and limited and irregular power supply.

Key words: Adoption, Constraints, Natural farming, Non-adoption

Introduction

Agriculture is a fundamental pillar of India's economy, providing sustenance and livelihood to a significant portion of the population. As of Fiscal Year, 2022, agriculture and its allied sectors contributed a Gross Value Added (GVA) of approximately ₹ 22,228.17 billion, representing 18.3 per cent of India's Gross Domestic Product (GDP). In Karnataka, agriculture constitutes 15.08 per cent of the Gross State Domestic Product, with a GVA of ₹ 961.71 billion for the same period (Anon, 2022).

Historically, agriculture in India has faced numerous challenges, particularly in the wake of the Green Revolution in the late 1960's. This period saw a shift towards high-yielding varieties, chemical fertilizers and pesticides, which initially boosted food production and helped achieve self-sufficiency. However, the reliance on chemical inputs led to several issues, including diminishing returns, increased farmer indebtedness and environmental degradation. Excessive use of chemicals has altered soil properties, contaminated water sourcesand posed serious health risks. Furthermore, the environmental impact of chemical production has contributed to climate change and pollution.

In response to these challenges, there is a growing interest in alternative agricultural practices that promise sustainability. Natural farming has emerged as a viable alternative, advocating for farming methods that avoid chemical inputs and focus on natural processes to enhance soil health and biodiversity. Natural farming is based on the principles articulated by Masanobu Fukuoka in his book "The One-Straw Revolution" and emphasizes minimal monetary investment in inputs. This approach promotes self-reliance among farmers and seeks to reduce their dependence on expensive external resources.Shri Subhash Palekar developed Zero Budget Natural Farming (ZBNF) as a comprehensive method that includes four main components:

Beejamritha: A seed treatment made from cow dung and urine that supports plant growth from the outset.

Jeevamrita: A mixture of cow dung, urine, pulse flour, jaggery, soil and water designed to boost microbial activity and soil health.

Acchadana: A mulching technique using straw, soil, or live vegetation to retain soil moisture and enhance soil fertility.

Whapasa: The optimal condition where water and air molecules co-exist in the soil, promoting healthy root development.

Natural farming gained traction in Karnataka through the efforts of the Karnataka Rajya Raita Sangha (KRRS), which advocated for this practice as an alternative to conventional agriculture. In the year 2018, Government of Karnataka officially endorsed natural farming and launched the "Zero Budget Natural Farming Project" to demonstrate its effectiveness in improving soil health, reducing input costsand increasing yields. Later the "Chief Minister's Natural Farming Scheme" was introduced in 2022-23 to advance natural farming practices in Karnataka. This initiative, implemented through agricultural and horticultural universities, involved participatory research on 2000 hectares in each AEZ across five universities. The aim was to integrate best practices from previous natural and

organic farming experiments and develop a comprehensive protocol for sustainable agriculture.

Karnataka's promotion of natural farming through government schemes reflects its commitment to sustainable agricultural practices. The state has conducted impact studies, such as in Belagavi district, to provide evidence-based insights beneficial to policymakers, researchers and practitioners. With this background the following objective was framed:

To determine the factors influencing adoption and non-adoption of Natural farming and constraints in practicing natural farming in the study area

Material and methods

The study was conducted in Belagavi district of Karnataka during the year 2023-24.The multi-stage purposive random sampling technique was employed to select the natural farming farmers in the study area. In first phase, Belagavi district was chosen purposively due to its high concentration of natural farming practitioners as identified by experts in the field. In the second stage, within Belagavi district, Belagavi and Hukkeri taluks were selected purposively based on highest number of natural farming farmers. In the third stage, two villages were selected from each taluk: Mutnal and Hirebagevadi from Belagavi taluk and Bellad Bagevadi and Hitni from Hukkeri taluk. At village level, natural farming farmers were selected purposivelyby employing random sampling technique. Thus, total sample size comprising of 60 natural farming farmers were selected.

In the study area, for determination of factors influencing adoption and non-adoption of natural farming, the factors were divided into significant, moderate and insignificant factors and farmers were asked to rank them based on the frequency of occurrence and descriptive statistics was used to evaluate the factors influencing adoption and non-adoption of natural farming in the study area. The production constraints were identified based on the opinion survey from sample respondents. Garett's ranking technique was used to evaluate the problems encountered by respondents of natural farming farmers. In this method, the farmers were asked to rank the given constraint according to the magnitude of the problem. The orders of merit given by respondents were converted into ranks by using the following formula,

Percentage position = $100 (R_{ij}-0.5) \div N_j$

Where,

R_{ij} = Rank given for i^{th} item by j^{th} individual

N_j = Number of items ranked by j^{th} individual

By referring to the table given by the Garrett and Woodworth (1969), the percentage position of each obtained rank was converted into scores. Then for each factor, the scores of individual respondents were added together and divided by total number of respondents for whom the scores were added. These mean scores of all the factors were arranged in the order of their ranks and inferences were drawn out of it.

Results and discussion

Factors influencing adoption of Natural farming in the study area

Table 1. depicts that, adoption of natural farming was influenced by several factors. Low cost was considered a significant factor by 52 respondents (86.66%) making it a highly influencing factor for the majority. In contrast, improved yields were seen as significant by only 12 respondents (20%) while 21 respondents (35%) found it moderate and 26 respondents (43.33%) viewed it as an insignificant factor. An increase in soil fertility was regarded as a significant factor by 48 respondents (80%) , while 11 respondents (18.33%) saw it as moderate factor and a single respondent (1.66%) considered it as an insignificant factor.

Assured premium prices were deemed as a significant factor by 17 respondents (28.33%), moderate factor by 19 respondents (31.66%) and insignificant by 24 respondents (40%) for adoption of natural farming. Small holdings were perceived as significant by 9 respondents (15%) with 23 respondents (38.33%) considering it moderate and 28 respondents (46.66%) rating it as insignificant. Benefits from government schemes were considered significant by 13 respondents (21.66%), moderate by 15 respondents (25%) and insignificant by the majority of 32 respondents (53.33%). Less credit requirement was viewed as significant by only 2 respondents (3.33%), with 43 respondents (71.66%) rating it as moderate and 15 respondents (25%) seeing it as an insignificant factor for adoption of natural farming.

Low cost was considered a significant factor by 52 respondents (86.66%), making it a major influencing factor among majority of the farmers and this was because, natural farming often required fewer inputs, such as beejamrutha, jeevamutha, ganajeevamrutha and astras (herbal concoctions) which reduced overall expenses. Farmers operating on tight budgets were particularly sensitive to cost savings, which made this a critical factor in their decision-making. An increase in soil fertility was regarded as a significant factor with 48 respondents (80%) as farmers valued long-term soil health and fertility highly recognizing its importance for sustainable farming and productivity over time. Natural farming practices which often focused on enhancing soil health through organic methods aligned well with this priority, making soil fertility a significant factor for many farmers. However, benefits from government

Table 1. Factors influencing adoption of natural farming in the study area (n=60)

Reasons	Significant	Moderate	Insignificant
Low cost	52(86.66)	8(13.33)	-
Improved yields	12(20.00)	21(35.00)	26(43.33)
Increase in soil fertility	48(80.00)	11(18.33)	1(1.66)
Assured premium price	17(28.33)	19(31.66)	24(40.00)
Small holdings	9(15.00)	23(38.33)	28(46.66)
Benefits from Government schemes	13(21.66)	15(25.00)	32(53.33)
Less credit requirement	2(3.33)	43(71.66)	15(25.00)

Note: Figure in parentheses indicate per cent of total farmers

schemes were not considered a significant factor by the majority of 32 respondents (53.33%) due to difficulties they faced in accessing those schemes.

The results of the present study corroborate with the findings of Ratana and Ajchamon (2021), who have reported low cost of production, small holdings, farm experience and productivity were the factors influencing adoption of organic farming.

Factors influencing non-adoption of Natural farming in the study area

The data from Table 2 provides a comprehensive overview of the factors influencing the non-adoption of natural farming practices among 60 farmers. The most critical barriers included the laborious and costly certification process and difficulties with pest and disease control. Specifically, 47 farmers (78.33%) regarded the certification process as a significant barrier and an equal number of 47 farmers (78.33%) also found pest and disease control to be a severe issue. Initial low yields were another significant concern with 24 farmers (40.00%) considering this a severe issue, while 32 farmers (53.33%) opined it as moderate and only 4 farmers (6.66%) opined it as insignificant. The lack of an assured market was perceived as a significant issue by 31 farmers (51.66%), a moderate issue by 23 farmers (38.33%) and insignificant by 6 farmers (10.00%).

The absence of standardized procedures for preparing inputs was also a challenge with 25 farmers (41.66%) viewing it as significant, an equal number of 25 farmers (41.66%) considering it moderate and 10 farmers (16.66%) seeing it as insignificant. In contrast, the lack of awareness about natural farming was less critical with only 12 farmers (20.00%) viewing it as significant, 25 farmers (41.66%) seeing it as moderate and 23 farmers (38.33%) not considering it as a significant factor for non-adoption of natural farming.

Overall, the findings highlighted that, the most pressing obstacles in adopting natural farming were the complexities and costs associated with certification and the difficulties in managing pests and diseases. Issues related to initial yields and market assurance were also significant but were perceived as somewhat less severe by the farmers.

The most critical barriers included the laborious and costly certification process and difficulties with pest and disease control. Specifically, 47 farmers (78.33%) regarded the certification process as a significant barrier and an equal number of 47 farmers (78.33%) also found pest and disease control to be a significant issue for non-adoption. Farmers faced challenges in meeting the stringent requirements of the certification process which included detailed record-keeping, regular inspections and compliance with various standards. This complexity and cost deterred farmers from pursuing certification, particularly those lacking financial resources or administrative support. Additionally, natural farming methods often relied on non-chemical approaches towards pest and disease management which proved less predictable and effective compared to conventional methods. Farmers struggled with managing these issues without synthetic pesticides and herbicides which leading to potential crop losses and reduced productivity.

Table 2. Factors influencing non-adoption of natural farming in the study area (n=60)

Reasons	Significant	Moderate	Insignificant
High labour requirement	22(36.66)	29(48.33)	9(15.00)
Initial low yields	24(40.00)	32(53.33)	4(6.66)
No assured market	31(51.66)	23(38.33)	6(10.00)
Laborious and costly certification process	47(78.33)	12(20.00)	1(1.66)
Lack of awareness	12(20.00)	25(41.66)	23(38.33)
No standardized procedure for preparation of inputs	25(41.66)	25(41.66)	10(16.66)
Difficulty in pest and disease control	47(78.33)	11(18.33)	2(3.33)

Note: Figure in parentheses indicate per cent of total farmers

Transitioning to natural farming also resulted in lower yields in the initial years as the soil ecosystem adjusted and new practices took effect. This drops in productivity was a significant concern for farmers who depended on consistent yields for their livelihood. Furthermore, the lack of a guaranteed market for their products made farmers reluctant to invest in natural farming due to uncertainties about selling their crops. The absence of established supply chains or demand for natural products hindered the adoption of natural farming. Addressing these barriers required targeted support, including financial assistance, education and the development of reliable market channels for natural farming products in the study area.

The similar findings were reported by Ratana and Ajchamon (2021), low education, laborious certification process, farm size were the factors influencing non- adoption of organic farming.

Constraints faced by natural farming sugarcane farmers in the study area.

Table 3 depicts the constraints faced by natural sugarcane farmers in the study area and were ranked based on Garrett's mean scores, reflecting the level of impact on each constraint had on their farming practices. The highest-ranked constraint was the non-availability of specialized markets with a Garrett's mean score of 66.43 and closely followed by labour-intensive with a mean score of 64.93 which highlighted the high amount of manual labour were required in natural farming which posed a significant challenge for farmers who might not have easy access to sufficient labour resources.

Table 3. Constraints faced by Natural farming sugarcane farmers in the study area (n=60)

Particulars	Garrett's mean score	Rank
Non-availability of specialized market	66.43	I
Labour intensive	64.93	II
Non-remunerative prices for produce	60.58	III
Low yields in initial level	51.29	IV
Lack of adequate information	40.28	V
Difficulty in control of pest and diseases	38.63	VI
Limited and irregular power supply	27.83	VII

Non-remunerative prices for produce ranks third with a Garrett's mean of 60.58 where farmers felt that the prices received for their sugarcane did not justify the costs and efforts involved in production impacting the economic viability of natural farming. Low yields in the initial stages were ranked fourth with a mean score of 51.29 as farmers faced challenges in achieving high yields early in the farming cycle which could affect overall productivity and profitability. Lack of adequate information ranked fifth with a score of 40.28, reflecting the difficulties farmers encountered due to insufficient knowledge and information about natural farming practices, which could hinder their ability to manage their crops effectively.

The constraint of difficulty in controlling pests and diseases was ranked sixth with a mean score of 38.63. This challenge underscored the struggles natural farming farmers faced in managing pest and disease issues without relying on synthetic chemicals which could lead to lower crop yields. Limited and irregular power supply was ranked seventh with a score of 27.83 indicating that, unreliable power supply issues affected various aspects of farming operations from irrigation to processing further complicating the farming process.

The highest-ranked constraint was the non-availability of specialized markets with a Garrett's mean score of 66.43. This indicated that, the farmers struggled significantly due tolack of market access tailored specifically for their natural produce, making it difficult for them to sell their products at favourable terms. Hence,development of niche markets by collaborating with FPO's and co-operatives to establish dedicated markets for natural sugarcane. Investment in market research has to be done to identify potential buyers and create a strong brand identity that differentiates natural sugarcane from conventional options.

The study conducted by Jyothirmai and Kishor (2022), who have reported, natural farming is higher labour costs, lack of experience in any of the agroecological techniques, low fertile soils and higher incidence of pests and diseases were in conformity with the results of present study.

Conclusion

Natural farming, popularly known as Zero Budget Natural Farming is an innovative farming approach. It is low input based, climate resilient and low-cost farming system because all the inputs are made-up of natural herbs and locally available inputs, thereby reducing the use of artificial fertilizer and industrial pesticides. In natural farming, farmers operating on tight budgets were particularly sensitive to cost savings, which made this a critical factor in their decision-making. Natural farming having the complexities and costs associated with certification and the difficulties in managing pests and diseases, the tailor-made policies were required for promotion and popularization of ZBNF.The farmers struggled significantly due tolack of market access tailored specifically for their natural produce, making it difficult for them to sell their products at favourable terms. Hence,development of niche markets by collaborating with FPO's and co-operatives to establish dedicated markets for natural sugarcane. Investment in market research has to be done to identify potential buyers and create a strong brand identity that differentiates natural sugarcane from conventional options.

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