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Study on perception and extent of adoption of natural farming practices in Vizianagaram district of Andhra Pradesh, India

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Abstract

The study investigated farmers' perception and extent of adoption of Subhas Palekar Natural Farming (SPNF) in Vizianagaram District of Andhra Pradesh with the specific objectives of assessing over all farmers' perception, the determinants of their adoption, constraints in practicing SPNF, cost of cultivation, yield and economics differences and suggestions for sustainable SPNF adoption. The study is based on extensive field survey and interactions with adopted and non-adopted farmers across the Vizianagaram district in Andhra Pradesh during 2019-20. About thirty SPNF practicing farmers from across the clusters identified randomly selected for the purpose. Simultaneously 30 conventional farmers were also selected from the same villages for comparison, thus making the final sample size 60. The data were collected by using well developed schedule by personal interview method. The responses were scored, quantified, categorized and tabulated using mean, standard deviation, correlation coefficient, frequencies and percentages. Majority of the farmers agreed that, relative advantage over chemical farming (56.67%), SPNF feasible to adopt present day farming situation (53.33%), soil is enriched with SPNF (83.33%), there is increase in micro organisms and earth worms in soil (96.67%), SPNF facilitates natural enemies population (76.67%), quality production is possible (100%) and SPNF is practicing to produce for his own family consumption (76.67%) besides that farmers expressed the difficulties regarding difficult to practice (46.67), purchasing and maintaining traditional cows is difficult (53.33) and they thought that weed management is also difficult (96.67%). Further, farmers also still in doldrums regarding reduces cost of cultivation (76.67), getting more returns (76.67). Majority (63.33%) of the farmers were undecided about getting sustainable yields through SPNF. More than half of the famers disagreed that adoption of SPNF on large scale is possible (55.00%). Almost all the farmers (100%) felt that, weed management is difficult, 96.67% farmers expressed that, intensive labour requirement in SPNF and 100% farmers observed low yields in initial years. Intensive labour requirement was another threat hindering farmers to adopt SPNF on large scale. The cost of cultivation is increased 22.58% in case of SPNF (Rs.47991ha⁻¹) with comparison with conventional farming(Rs.39149 ha⁻¹), might be due to intensive labour involvement. The yields were recorded 4835 kgha⁻¹ in SPNF which is 18.41% lower than conventional farming (5925 kgha⁻¹). The major constraints expressed were non availability of SPNF inputs, lack of information on preparation and use of astras, intensive labour requirement, weed management and finally low yields in initial years. The farmers who are having animals, irrigation facilities, machinery and undergone more trainings on SPNF, the farmers had gained good knowledge on SPNF, skills in preparation of astras and overcoming practical difficulties in SPNF and significantly positive relation with extent of adoption of SPNF practices. Hence efforts are needed to facilitate farmers with continuous support through series of trainings on technical knowhow to increase the extent of adoption of SPNF.

Keywords: natural farming, SPNF, Beejamruthum, Jeevamrutham, rice, yield

Introduction

The industrialization of the agricultural sector has increased the chemical burden on natural ecosystems. Per hectare real value of output increased for most of the crops in recent years, but the rise in input cost was much higher (Businessline, 2019), resulting into reduced farm income. Moreover, green revolution technology is now contemplated to be degrading the agro-ecosystem and diminishing the economic returns for the farmers (Rahman, 2015) ^[10]. Several studies have shown that chemical fertilizers and pesticides affect soil health by killing millions of microbes present in the soil which are important for sustaining plant life (Jayashree and Vasudevan, 2007) ^[2]. Decreasing trend in crop yield growth has been observed due to injudicious/overuse of inputs like synthetic fertilizers and pesticides (Pingali, 2012) ^[9].

Alternative low-input farming practices have emerged in India and across the world likely to reduce input costs and higher yields for farmers, chemical-free food for consumers and improved soil fertility. Natural Farming (NF) is one such low-input, climate-resilient farming that inspires farmers to use low-cost and locally-sourced and available inputs, eliminating the use of artificial/chemical fertilisers and industrial pesticides (Palekar, 2005; 2006) [7, 8].

Highlighting the predominance of smallholder farmers (68.5 per cent marginal and 17.7 per cent small farmers) in India, The Economic Survey (2019) emphasized the importance of Natural Farming as one of the alternative farming practices for improving the farmers' income, in the backdrop of declining fertilizer response and farm income.

Initially, a Japanese farmer, Masanobu Fukuoka proposed natural farming, which is based on the philosophy of working with natural cycles and processes of the natural world (Fukuoka, 1987). The movement of promoting natural farming in India has been championed by Shri Subhash Palekar has resulted into widespread adoption at varying levels in many states, especially, Andhra Pradesh, Karnataka, Maharashtra, Himachal Pradesh (Khadse *et al.*, 2017; Mishra, 2018; Niyogi, 2018; Government of India, 2019) [3, 4, 5].

In Andhra Pradesh (GoAP), Department of Agriculture (DoA) is implementing Natural Farming Programme, through the Rythu Sadhikara Samathi (RySS), a non-profit organization established by GoAP. The programme has been initiated in 2015 -16 with multiple objectives of enhancing farmers' welfare, consumer welfare and for conservation of environment. SPNF practices are built on four core principles, as explained below:

1. Beejamrutham, a microbial coating/ treatment of seeds using cow dung and urine-based preparations;
2. Jeevamrutham, an application of mixture of cow dung, cow urine, jaggery, pulse flour, water and soil for multiplication of soil microbes;
3. Mulching, a layer/bed of organic material to the soil surface in to prevent/reduce water evaporation; and
4. Waaphasa, soil aeration through a favourable microclimate in the soil.

In all the districts of Andhra Pradesh SPNF programme invests heavily in building the capacities of farmers and their continuous handholding. The state government is adopting through crucial innovation of farmer-to-farmer knowledge dissemination strategy. The trainers are the best practicing SPNF farmers, called Community Resource Persons (CRPs). They are highly motivated and strongly committed to SPNF as their own lives have been transformed by their practicing SPNF in their own fields. It is their dedicated work that has resulted in new farmers in the programme villages switching over to SPNF. In Vizianagaram district the SPNF programme started implementation since 2016-17 to till date and implementing through cluster approach through CRPs and about 174 villages were covered and implementing in 37036 farmers fields as indicated in Table 1.

However, in recent times, a section of scientific community and critics vehemently oppose this natural farming and condemning it is being not based on scientific evidences, promoting certain beliefs system, particularly indigenous cows, a backward-looking and chauvinistic idiom (Shotwell, 2016; Saldanha, 2018) [11, 12]. After having exhaustive study of the movement, Munster (2018) believes that the prevalent ambivalence makes natural farming a valuable case for the

political ecology of agriculture. Moreover, most of these studies lack field level or experimental evidences to support their arguments.

In this context, the present study is attempted, to study the perception and extent of adoption of the farmers with the following objectives:

1. To study the extent of adoption of practices by the farmers and their perception on SPNF.
2. To assess the relationship between profile characteristics of farmers and their adoption of SPNF practices.
3. To study the implication on cost of cultivation, yield and farmers income for rice crop in the study area.
4. To elicit constraints and offer suggestions for higher adoption of SPNF

Data and Methodology

The study is based on extensive field survey and interactions with adopted and non-adopted farmers across the Vizianagaram district in Andhra Pradesh during 2019-20. About thirty SPNF practicing farmers from across the clusters identified randomly selected for the purpose. Simultaneously 30 conventional farmers were also selected from the same villages for comparison, thus making the final sample size 60. To study the extent of adoption of the farmers on SBNF, a schedule was constructed with 15 statements on three point continuum *i.e.*, Agree, Undecided and Disagree and scores of 3, 2 and 1 were assigned to the responses accordingly for positive statements and for negative statements 1, 2 and 3 scores were given. Correlation analysis was carried out to assess the relationship between profile characteristics of farmers and their adoption on SPNF. Each SPNF practicing farmer was also interviewed by posing open ended questions so as to unearth sources of information, constraints he/she has experienced and suggestions for sustainable SPNF adoption. The data were collected by using well developed schedule by personal interview method. The responses were scored, quantified, categorized and tabulated using mean, standard deviation, correlation coefficient, frequencies and percentages.

Results and Discussion

Perception of farmers on SPNF practices

The perception of the farmers on major practices of Subhas Palekar Natural Farming (SPNF) was analyzed and presented in Table 2.

Majority of the farmers agreed that, relative advantage over chemical farming (56.67%), SPNF feasible to adopt present day farming situation (53.33%), soil is enriched with SPNF (83.33%), there is increase in micro organisms and earth worms in soil (96.67%), SPNF facilitates natural enemies population (76.67%), quality production is possible (100%) and SPNF is practicing to produce for his own family consumption (76.67%) besides that farmers expressed the difficulties regarding difficult to practice (46.67), purchasing and maintaining traditional cows is difficult (53.33) and they thought that weed management is also difficult (96.67%).

Further, farmers also still in doldrums regarding reduces cost of cultivation (76.67), getting more returns (76.67). Majority (63.33%) of the farmers were undecided about getting sustainable yields through SPNF. More than half of the farmers disagreed that adoption of SPNF on large scale is possible (55.00%) and purchasing and maintaining traditional cows is difficult (51.67%). Similar results were reported by Dipeolu *et al.* (2006) [1], Tratnik *et al.* (2009) [14], Oyesola *et*

al. (2011) [6] and Suresh and Himansu (2015) [13] with respect to farmers perception on organic farming. The farmer's opinion on SPNF clearly indicated that even though there were lot many advantages of SPNF, few aspects like preparation of SPNF inputs, weed management and inability to practice on large scale need to be addressed to facilitate its large scale adoption.

Extent of adoption of SPNF Practices

The results from the Table 3 indicates that most of the farmers 76.67% passed the medium level of extent of adoption followed by low level (13.33%) and high level(10%). This indicated that farmers are adopting the SPNF practices partially.

Relationship between profile characteristics of SPNF farmers and their perception

The results from the Table 4 revealed that No.of animals, source of irrigation, farm machinery, cropping intensity, source of information and knowledge acquisition were found to have significant positive relation with extent of adoption at 0.05% level, whereas family size, education and farm size had positive relation but not significant.

The reason behind this trend may be that, the farmers who are having animals, irrigation facilities, machinery and undergone more trainings on SPNF, the farmers had gained good knowledge on SPNF, skills in preparation of astras and overcoming practical difficulties in SPNF.

Constraints expressed by SPNF farmers

From Table 5, it could be observed that majority (56.67%) of farmers expressed that preparation of amruthas and astras are difficult and this may be constraint hindering them to extend SPNF on a large scale.

About 23.33% of the farmers felt that, lack of non availability of SPNF inputs and lack of skills in preparation of amruthas and astras. Even though farmers were theoretically trained on SPNF, they were lacking practical experience in preparation of astras.

Almost all the farmers (100%) felt that, weed management is difficult, 96.67% farmers expressed that, intensive labour

requirement in SPNF and 100% farmers observed low yields in initial years. Intensive labour requirement was another threat hindering farmers to adopt SPNF on large scale.

Differences of Cost of cultivation, Yields and Benefit cost ratio of SPNF with conventional farming

The economics and yield differences of SPNF and conventional farming were depicted in Table 6. The cost of cultivation is increased 22.58% in case of SPNF(Rs.47991ha⁻¹)with comparison with conventional farming(Rs.39149 ha⁻¹), might be due to intensive labour involvement. The yields were recorded 4835 kg ha⁻¹ in SPNF which is 18.41% lower than conventional farming (5925 kg ha⁻¹). The gross returns in SPNF (Rs.81331 ha⁻¹) were reduced to 6.09% with comparison with conventional farming(Rs.86613). The benefit cost ratio is recorded 23.42% low in SPNF (1.70) in comparison with conventional farming (2.22)

Suggestions of SPNF farmers

Suggestions of the farmers for sustainable adoption of SPNF were presented in Table 7. It could be inferred from the table that creating awareness among farmers (86.67%), making local cows made available (93.33%), making SPNF inputs available locally (80.00%), providing market support for SPNF produce (100%) and giving wide publicity on the benefits of SPNF (100%) would facilitate the farmers to adopt SPNF continuously.

Based on the findings of the study, it can be concluded that the majority of the farmers had medium perception on SPNF. The farmers had access to information on SPNF through trainings, community resource persons, departmental officers, practicing farmers and through ICTs. Trainings undergone, SPNF experience, education and extension contact were found to have significant and positive relation with their adoption on SPNF. The major constraints expressed were non availability of SPNF inputs, lack of information on preparation and use of astras, intensive labour requirement, weed management and finally low yields in initial years. Hence efforts are needed to facilitate farmers with continuous support through series of trainings on technical knowhow to increase the extent of adoption of SPNF.

Table 1: Information on Implementation progress of SPNF in Vizianagaram District

Phase	Year	No. of Mandals	No. of Clusters	No. of Gram Panchayaths	No. of Villages	No. of Targeted Farmers
I	2016-17	9	10	77	100	7578
II	2017-18	12	25	78	125	12680
III	2018-19	13	17	68	17	26509
IV	2019-20	34	62	174	174	37036

Table 2: Perception of farmers on SPNF in Vizianagaram District

S. No	Perception	Disagree		Agree		Undecided	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	SPNF is relatively Advantage over chemical farming	11	36.67	17	56.67	2	6.67
2	SPNF Gives more net returns	23	76.67	7	23.33	0	0.00
3	SPNF Reduces cost of cultivation	23	76.67	7	23.33	0	0.00
4	SPNF is feasible to adopt in present day farming situation	0	0.00	16	53.33	14	46.67
5	SPNF is difficult to practice	16	53.33	14	46.67	0	0.00
6	Purchasing and maintaining traditional cows is difficult	14	46.67	16	53.33	0	0.00
7	Soil is enriched with SPNF	0	0.00	25	83.33	5	16.67
8	SPNF increase micro organisms and earth worms in soil	0	0.00	29	96.67	1	3.33
9	SPNF practice increase natural enemies population	0	0.00	23	76.67	7	23.33
10	Weed management is difficult in SPNF	1	3.33	29	96.67	0	0.00
11	Preparation of Amruthas & Astras is difficult	9	30.00	21	70.00	0	0.00
12	Adoption of SPNF on large scale is possible	12	40.00	8	26.67	10	33.33

13	Quality Product is possible with SPNF	0	0.00	30	100.00	0	0.00
14	SPNF gives sustainable yield	3	10.00	8	26.67	19	63.33
15	SPNF is practicing to produce own family consumption	7	23.33	23	76.67	0	0.00

Table 3: Overall adoption of SPNF practice by the farmers

S No	Adoption category	Frequency	Percentage
1	Low (< Mean -SD)	4	13.33
2	Medium (Mean +/-SD)	23	76.67
3	High (> Mean -SD)	3	10.00

Mean =16.90, SD=1.398

Table 4: Relationship between profile characteristics of farmers and their extent of adoption to SPNF practices

S No	Independent Variable	Correlation coefficient (r)
1	Family size	0.1348(NS)
2	Education	0.2574(NS)
3	Farm size	0.1855(NS)
4	No. of Animals	0.4073*
5	Source of irrigation	0.3768*
6	Farm machinery	0.4277*
7	Cropping intensity	0.4629*
8	Source of information & knowledge acquisition	0.5585*

Table 5: Constraints expressed by SPNF farmers

S No	Constraint	Frequency	Percentage
1	Non Availability of SPNF Inputs	7	23.33
2	Lack of information on Preparation of Amrutha & Astras and their application	0	0.00
3	Preparation of Amruthas & Astras is difficult	17	56.67
4	Lack of skills in preparation of Amruthas & Astras	7	23.33
5	Weed management is difficult in SPNF	30	100.00
6	Intensive labour requirement in SPNF	29	96.67
7	Low yields in initial years due to adoption of SPNF	30	100.00

Table 6: Comparison of cost of cultivation, yield, gross returns and benefit cost ratio of conventional farming with SPNF

S No	Particulars	Conventional Farming	SPNF	Percentage deviation
1	Cost of cultivation (Rs.)	39149	47991	+ 22.58 %
2	Rice yield (kg /ha)	5926	4835	-18.41 %
3	Gross Returns(Rs.)	86613	81331	-6.09 %
4	B C Ratio	2.22	1.70	-23.42 %

Table 7: Suggestions of SPNF farmers

S No	Suggestion	Frequency	Percentage
1	Creating awareness among farmers through training on SPNF	26	86.67
2	Making Local Cows made available	28	93.33
3	Making SPNF Inputs available Locally	24	80.00
4	Providing market support for SPNF produce	30	100.00
5	Give wide publicity on the benefits of SPNF	30	100.00

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