



Perception of Adoption of Pulse Cultivation Practices by NFSM Programme Beneficiaries in Thoothukudi District of Tamil Nadu, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The present study analyzes the adoption of improved technologies under the NFSM pulses program by the beneficiaries and to assessing the farmers' perception regarding the NFSM program in the Thoothukudi district of Tamil Nadu. Thoothukudi district was selected based on the largest area covered under NFSM pulses. Five blocks in Thoothukudi district namely Kovilpatti, Gayathar, Ottaipidaram Villathikulam, and Pudhur were purposively selected. Random sampling was used to collect primary data from 25 beneficiaries in each block and to make total sample is 120. Descriptive statistics and adoption index methods were used to analyze the beneficiaries' perception regarding NFSM programme. Results revealed that the agricultural department was the major source of knowledge on the NFSM program followed by Friends/Neighbors. It shows that this department has actively participated in spreading the benefits of the NFSM programme to the farmers. About 53.33 percent of NFSM beneficiaries fall under medium adoption level. Concerning constraints on the adoption of the NFSM programme, the beneficiaries agreed that there is a lack of technical knowledge (55%), inability to understand all the information given in the NFSM

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programme (56.67%), lack of training (65%), longer time taken sanction of contingent amount (92.50%) and availability of subsidy for one hectare (100%). The beneficiaries disagreed with the availability of fertilizers on time (57.50%) and received seed after sowing (75%).

Keywords: Pulse cultivation; nfsm programme; cultivation practices; beneficiaries programme.

1. INTRODUCTION

In the Indian economy, half of the country's populations were working in agriculture, where the supply of food grain fell short of demand for consumption, mainly due to the rising population. Pulses share to the total food grain production was around 9–10 percent in the country. Pulses are produced all over the states in India, which plays a significant role in both productions as well as consumption. Though India is the leading producer of pulses, it still imports a large number of pulses a large amount of pulses to meet the growing domestic needs. Dev and Sharma [1], indicated that 1/3rd of the population faced extreme poverty. They further noted that half of the Indian children were malnourished. By increasing the investments and technological breakthroughs, the availability of pulse is improved. However, it may not necessarily translate into increased accessibility and absorption of food [2]. There exists a shortage of pulse production as against the estimated demand of 23-24 million tonnes in India. Per capita availability of pulses also showed a declining trend from 37.2 gm per day during 2010 to increased by 47.2 gm per day in 2016 (Tiwari and Shivhare, 2016).

Hence, recognizing the stagnation of food grain production and steady rise in the consumption of food grains by the growing population, GOI has launched a massive program "National Food Security Mission" in 2007-08 at the beginning of 11th five-year plan to increase the food grain production in the country. The NFSM Programme targeted to escalate the production of paddy, wheat, and pulses by 10, 8, and 2 million tonnes, respectively by the end of the Eleventh Five Year Plan. The mission adopted a two-fold strategy to bridge the demand-supply gap. The First strategy was to expand the area, and the second was to bridge the productivity gap between the potential and existing yield of food crops. In Tamil Nadu, the NFSM scheme has been successfully implemented from 2007-08 and also it covered almost all the districts. Around 80 percent of pulses area was covered by Thoothukudi, Villupuram, Namakkal, Thiruvannamalai, and Virudhunagar during 2018 under NFSM. The

major components for pulses production under NFSM include the provision of 20 kg of seed, *Trichoderma Viridi* 2.5 kg, MN mixture 5 kg, liquid biofertilizer (*Phosphobacteria+Rhizobium*) 1000 ml, Pusa hydrogel 250 grams, foliar spray of nutrient 25 kg and also Rs. 1500 cash for hiring charge in sowing, and plant protection chemical per ha of land.

Farmers need to improve their production techniques to address the shortage of pulse production. The Perception of a farmer is one of the important key factors that influence the adoption of new technology [3],[4]. The adoption of technology is often driven by perceived profitability, technology costs, and clarity at which the new knowledge and information are communicated in a recipient population [5]. Since an assessing the farmers' perception is an essential to determine their level of adoption of NFSM programme. From the foregoing the present assessed the perception of the beneficiaries of NFSM programme on adoption of pulses cultivation practices in this study area. The specific objectives of the study are to find out awareness level and perception of farmers regarding NFSM pulses programme and to analyze the level adoption index.

2. DATA AND METHODOLOGY

NFSM Pulses programme operating is being in Tamil Nadu since 2007. The district-wise area covered under NFSM pulses were collected from the office of the Directorate of Agriculture, Chennai. Purposive sampling technique was followed for selection of study district and blocks based on the largest area covered under NFSM programme. Thoothukudi district was selected based on the largest area covered under NFSM pulses. Five blocks in Thoothukudi district namely Kovilpatti, Gayathar, Ottaipidaram Villathikulam, and Pudhur were purposively selected. Black gram and green gram together accounted for about 76 percent of the total area under pulses in Thoothukudi and hence black gram and green were purposively chosen for the present study. Random sampling was used to collect primary data from 25 beneficiaries in each block and to make total sample is 120.

2.1 Descriptive Analysis

Descriptive statistics and percentage analysis were used to examine the perception of sample beneficiaries regarding the NFSM programme.

2.2 Selection of Recommended Pulses Cultivation Practices

The study examined the level of adoption of innovative technology and packages of pulse cultivation practices by the farmers. These technologies were prepared by the scientists of Agricultural University and research stations based on research and experimental data. A total number of 11 common recommended practices were selected based on the judgment of the specialists. The list of the package of practices and technology that were included for testing the adoption level of the farmers as follows.

1. Selection of seed variety
2. Seed rate
3. Seed treatment
4. Application of FYM
5. Sowing method/ Spacing
6. Time of sowing
7. Fertilizer application
8. Nutrient management
9. Insect and pest management
10. Weed management
11. Post-harvest technology

To measure the extent of adoption of technology and package of practices, the adoption index was estimated using the following formula

$$\text{Adoption index} = \frac{\text{Total score obtainable by beneficiaries}}{\text{Maximum attainable score}} * 100$$

Note: The score was given 1 if the package of practices was adopted by NFSM beneficiaries and 0 if otherwise.

The formula was applied for all practices, which helped in calculating the adoption index.

The mean and standard deviation of all the beneficiaries' adoption scores were computed for classifying the adoption into different categories. Based on the mean adoption score and standard deviation, the farmers were categorized into three, namely low, medium, and high adopters as follows:

Low adopter	=	A Score below (mean – SD)
Medium adopter	=	Score from (mean - SD) to (mean + SD)
High adopter	=	Score above (mean + SD)

2.3 Perception of the Beneficiaries about NFSM Programme on Adoption of Pulses Cultivation Practices

Perception about the NFSM programme on adoption of pulses cultivation practices by the sample beneficiaries was operationalized for the present study. The scoring procedure developed by Usha Tuteja [6], was used with some modifications relevant to the study to measure the perception of beneficiaries on the NFSM programme. After addition/deletion or modification, considering the experts' opinion, the schedule consists mainly of six numbers of perceived attributes namely production, programme features, income, benefit of the programme, constraints, and suggestions which includes thirty-three statements. The response on each statement was recorded on three points continuum scale namely Agree, Disagree and Undecided with scores 3, 2, and 1, assigned respectively in the case of positive statements, and the scoring was reversed for the negative statements.

2.3.1 Production

Perception of NFSM beneficiaries regarding pulses production was considered. This was measuring using six statements such as (i) provision of seed, (ii) provision of fertilizers and plant protection chemicals (iii) capacity building (iv) provision of processing facilities and (v) provision of procurement facility.

2.3.2 Programme features

Perception of the beneficiaries towards features of NFSM programme includes four statements such as (i) subsidy provision, (ii) financial assistance (iii) building infrastructure, and (iv) capacity building (awareness camps/training, etc).

2.3.3 Income

Perception of the beneficiaries on outcome of adoption of NFSM pulses programme on their income was operationalised using four statements such as (i) increase in income less than 20 % (ii) up to 20 to 40 %, (iii) above 40 % and (iv) No change.

2.3.4 Benefit of the programme

Perception of the beneficiaries towards the benefits of NFSM pulses programme includes was considered on three statements such as (i) benefited from the subsidies (ii) benefitted through the training programme and (iii) increased the area under pulses.

2.3.5 Constraints

Constraints faced by beneficiaries on the adoption NFSM programme were measured in respect of seven statements such as (i) recommended fertilizers not available in time, (ii) lack of technical knowledge (iii) received seeds after sowing (iv) inability to understand the feature of NFSM programme (v) lack of training (vi) longer time to take sanction of the contingent amount and (vii) subsidy provided for only one hectare of land.

2.3.6 Suggestions

Suggestions for promotion of NFSM programme in future which included that five statements are (i) increase the pulses procurement through the regulated market, (ii) provide more subsidy (both cash and kind), (iii) timely provision of training (iv) establishment of small scale processing unit at village level by the Government and (v) provide timely supply of input material.

3. RESULTS AND DISCUSSION

3.1 Personal Characteristics of NFSM Beneficiaries

The personal characteristics of the NFSM beneficiaries including age, educational status, family size, farming experience and landholding were analyzed and the results are presented in Table 1.

It revealed that more than half of the beneficiaries (68.33 percent) were under the middle age group between 43 to 62 years. About 50.83 percent of the beneficiaries had a secondary level of education, 65 percent of the beneficiaries had 4 to 5 person per family, 71 percent of the beneficiaries had between 19 to 43 years of farming experience, and 38 percent of the beneficiaries were medium farmers (2 to 4 hectare).

3.2 Sources of Awareness about NFSM Programme

The Government of India has introduced National Food Security Mission (NFSM) programme for

farmers to increase their welfare. The programme is offered to major crops like paddy, pulses, coarse cereals, etc in Tamil Nadu. In the study area, the programme mostly concentrated on pulses crops. There are several sources that played a significant role in making the farmers aware of the NFSM programme. Table 2 shows the source of awareness about the NFSM programme among the sample beneficiaries in the study area.

It was found that 55 percent of the beneficiaries were aware of the programme through Agriculture departments, 30 percent of the beneficiaries were aware of the programme through friends/ neighbours, 10 percent of beneficiaries had received information from agriculture institutions and the remaining 4.17 percent of beneficiaries aware about the programme through social media like newspaper/ Radio, Television, etc. It is concluded that the agricultural department was the major source of knowledge on NFSM programme followed by Friends / Neighbours. It shows that this department has actively participated in spreading the benefits of the NFSM programme to the farmers' similar result also found in jothi [7].

3.3 Perception of Beneficiaries about NFSM Programme on Adoption of Pulses Cultivation Practices

The distribution of the perceived attributes of adoption of pulse cultivation by NFSM beneficiaries is presented in Table 3

3.3.1 Production

Concerning to increase in production, majority of beneficiaries agreed with the statements such as provision of seed (82.50%) and provision of input fertilizer and plant protection chemicals (84.17%), which means that providing basic input items for the cultivation has motivated the farmers to further follow the practices. And the results have showed that, about the statements like provision of processing facilities (79.17%) and provision of procurement facility (67.50%) the farmers had an uncertainty in their opinion. This may be due to the lack of better knowledge about the benefits of processing and opportunities for better marketing options. The disagreement of 35 percent of the beneficiaries about the effectiveness of capacity building through training under NFSM program shows the need of improvement in the extension activities

and training practices. From above these statements, it showed that the development of a need- based capacity building extension system is needed for the existing programme. Through these activities, the motivation for the farmers to adopt cultivation related practices and thereby could increase the impact on pulse production.

3.3.2 Programme feature

The major program features of the NFSM were financial assistance and subsidiary provision. And the results showed that the majority of the beneficiaries are really satisfied with the features such as subsidy provision (84.17%) and financial assistance (74.17%). These two features can decrease the financial distress of a farmer especially at initial stage of embarking production. This will make the farmers get all inputs for the production at the proper time. Only less than half (41.67%) of the beneficiaries were agreed upon the capacity building feature of the programme. As we said above these feature of the programme. needs further improvement to make a positive impact among the beneficiaries.

3.3.3 Income

The financial sustainability of a farmer is depended upon the increase in his income from farming. Nearly three fourth of the beneficiaries agreed that there is an increase in income by less than 20 percent. Even though the percentage of increases is less, it is clearly evident that majority of the beneficiaries were getting financial benefits from the programme. There is the need for further improvement in the programme to increase the profit margin of the beneficiaries.

3.3.4 Benefits of the programme

Result revealed that about 83 percent of beneficiaries agreed that they were benefited out of subsidy obtained from NFSM programme. Most of the times, the farmers are forced to buy fewer quality inputs because of the financial pressures. So when the programme could initiate a subsidy system, this marked beneficial for the farmers. And these increased economic benefits could have developed a positive attitude among the beneficiaries and thereby increased the acceptance rate among the farmers.

3.3.5 Constraints

With respect to constraints on the adoption of NFSM programme, the beneficiaries agreed that

there is lack of technical knowledge (55%), inability to understand the feature of NFSM programme (56.67%), lack of training (65%), longer time taken sanction of contingent amount (92.50%) and availability of subsidy for one hectare (100%). The beneficiaries disagreed with the availability of fertilizers on time (57.50%) and received seed after sowing (75%).

3.3.6 Suggestion

Even though the beneficiaries were getting benefits out of the subsidies and financial assistance, they raised it as a constraint as they are not getting it on time. So, all the beneficiaries were suggested that they need a timely supply of inputs and subsidies. This will reduce their stress about starting the cultivation practices and also they can manage the financial setup. And most of the beneficiaries (95%) were demanded an increase in subsidy for pulse cultivation to make it into a profit level. As they are experiencing lack of training as a constraint, a majority (85%) of the beneficiaries were suggested better training in pulse cultivation. The lack of training will affect the farmers to update their knowledge in cultivation practices, better marketing opportunities and other related information. So by developing enough capacity building and extension system can improve not only technical knowledge but also their practical skill to improve their production. Apart from that, a well-developed extension system could develop a positive assertiveness to the farmers and thereby a spirit of achievement motivation to them to become more competitive in the field. All these will help to reduce the withdrawal from farming among them.

3.4 Level of Adoption of Pulses Cultivation Practices

To know the level of adoption of recommended improved practices in pulse production at the farm level by the sample farmers, the ratio of the total number of technologies recommended and the number of technologies adopted by sample farmers was calculated and presented in Table 4 the results revealed that 53.33 percent of NFSM beneficiaries fall under medium adoption level followed by 31.67 percent of beneficiaries under low adoption level and remaining 15 percent of beneficiaries were under high adoption level (adopted complete technology in pulse cultivation).

Table. 1 personal characteristics of NFSM beneficiaries

S. No.	Parameter	NFSM beneficiaries	Percent
I	Age		
a.	Less than 42	21	17.50
b.	43 to 62	82	68.33
c.	63 and above	17	14.17
	Average	51.78	
II	Education		
a.	Illiterate	6	5.00
b.	Primary	25	20.83
c.	Secondary	61	50.83
d.	Higher Secondary	17	14.17
e.	Graduates	11	9.17
III	Family size		
a.	0 to 3	23	19.17
b.	4 to 5	78	65.00
c.	6 and above	19	15.83
	Average	4.25	
IV	Farming Experience		
a.	0 to 18	19	15.83
b.	19 to 43	85	70.83
c.	44 and above	16	13.33
	Average	31	
V	Landholding		
a.	Marginal (< 1 ha)	5	4.17
b.	Small (1 to2 ha)	15	12.50
c.	Medium (2 to 4 ha)	45	37.50
d.	Semi medium (4 to 6)	25	20.83
e.	Large farmer (above 6)	30	25.00
	Average	4.65	

Table 2. Source of awareness about NFSM programme

Sl. No	Sources	NFSM Beneficiaries	Percent
1	Agriculture departments	67	55.83
2	Friends / Neighbours	36	30.00
3	Agriculture institution (state universities, KVKs etc)	12	10.00
4	Social media	5	4.17
	Total	120	100.00

Table 3. Perception of beneficiaries about NFSM programme on adoption of pulses cultivation practices

S. No	Particulars	Agree	Disagree	Un decided
	Production			
1	Provision of seed	99 (82.50)	16 (13.33)	5 (4.17)
2	Provision of fertilizers and plant protection chemicals	101 (84.17)	11 (9.17)	8 (6.67)

S. No	Particulars	Agree	Disagree	Un decided
3	Capacity building	37 (30.83)	42 (35.00)	41 (34.17)
4	Provision of processing facilities	...	25 (20.83)	95 (79.17)
5	Provision of procurement facility	24 (20.00)	15 (12.50)	81 (67.50)
Programme features				
7	Subsidy provision	101 (84.17)	19 (15.83)	...
8	Financial assistance	89 (74.17)	17 (14.17)	14 (11.67)
9	Building infrastructure	...	8 (6.67)	107 (89.17)
10	Capacity Building (awareness camps / training, etc)	50 (41.67)	41 (34.17)	29 (24.17)
Income				
11	less than 20 %	88 (73.33)	16 (13.33)	16 (13.33)
12	20 to 40 %	12 (10.00)	90 (75.00)	18 (15.00)
13	Above 40 %	...	120 (100.00)	...
14	No change	32 (26.67)	62 (51.67)	26 (21.67)
Benefits of the programme				
15	Benefited from the subsidy provision	100 (83.33)	12 (10.00)	8 (6.67)
16	Benefited through training programmes	32 (26.67)	43 (35.83)	45 (37.50)
17	Increased pulses cultivated area	15 (12.50)	19 (15.83)	86 (71.67)
Constraints				
18	Recommended fertilizers not available in on time	42 (35.00)	69 (57.50)	9 (7.50)
19	Lack of technical knowledge	66 (55.00)	28 (23.33)	26 (21.67)
20	Received seeds after sowing	21 (17.50)	90 (75.00)	9 (7.50)
21	Inability to understand the feature of NFSM programme	68 (56.67)	13 (10.83)	39 (32.50)
22	Lack of training	78 (65.00)	13 (10.83)	29 (24.17)
23	longer time to take sanction of contingent amount	111 (92.50)	3 (2.50)	6 (5.00)
25	Subsidy provided for only one hectare of land	120 (100.00)

S. No	Particulars	Agree	Disagree	Un decided
Suggestions				
26	Increase the pulse procurement through regulated market	90 (75.00)	6 (5.00)	24 (20.00)
27	Provide more subsidy	114 (95.00)	...	6 (5.00)
28	Timely provide training	102 (85.00)	12 (10.00)	6 (5.00)
29	Establishment of small scale processing unit at village level by the Govt.	100 (83.33)	12 (10.00)	8 (6.67)
32	Provide timely supply of input material	120 (100.00)

Table 4. Technology adoption index of sample beneficiaries

SI. No	Adopters	Numbers	Percent
1	Low adopter	38	31.67
2	Medium adopter	64	53.33
3	High adopter	18	15.00
	Total	120	100.00

4. CONCLUSION

Results revealed that the agricultural department was the major source of awareness on the NFSM programme followed by Friends / Neighbours. It shows that this department has actively participated in the spreading benefits of the NFSM programme to the farmers. About 53.33 percent of NFSM beneficiaries fall under medium adoption level followed by 31.67 percent of beneficiaries under low adoption level and the remaining 15 percent of beneficiaries were under high adoption level. The finding regarding perception of beneficiaries about NFSM pulse programme indicates that maximum percentage of respondents were getting benefits out of the subsidies and financial assistance, they raised it as a constraint as they are not getting it on time. So, all the beneficiaries were suggested that they need a timely supply of inputs and subsidies. This will reduce their stress about starting the cultivation practices and also they can manage the financial setup. An understanding of the perception of farmers and description of constraints faced by the respondents may serve as a feedback to the planners, policy makers, extension personnel, scientist and development agencies to make suitable strategy in implementation of the scheme.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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