

# Impact of National Food Security Mission on Farmers Livelihood in Tamil Nadu

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## ABSTRACT

In order to combat the challenge of deficit in food availability, the Government of India launched National Food Security Mission (NFSM) in 2007-08. The main objective is to achieve self-sufficiency in foodgrains production to improve livelihood of the people. Rice, wheat and pulses are given high priority in the process of production by the Union and State Governments. In Tamil Nadu, only 25 per cent of the districts (8 districts) where rice cultivation is predominant have implemented the scheme. After the implementation of the NFSM scheme, there has been significant improvement in the farmer's life. NFSM beneficiaries are in a better position with improved performance in terms of input use, production, productivity in comparison with that of the Non-NFSM farmers. Further, many of the selected villages in the study area are yet to satisfy the existing coverage norms. The farmers are not well equipped with adequate farm materials like cono weeder, multiple planters, power weeder, pump sets, sprayers and power tillers as they have not been provided with them under the scheme. They have been given only a limited support like the provision of seeds and inputs. Besides, there is widespread intra-district disparity in terms of subsidy and benefits distributed.

**Keywords:** NFSM, rice, wheat, pulses, cono weeder, intra-district

India has achieved self-sufficiency in foodgrain production in the last six decades. The foodgrain production had increased from 50.1 million tonnes in 1950-51 to 264.4 million tonnes in 2013-14. This implies a nearly five-fold increase over the period. Out of that, rice, wheat and pulse production had very eminent position in the Indian agriculture. The vast majority of the India people consume rice and wheat. In this context, both the food items would be in great demand for the future generation. The area and production under rice had recorded 43.9 million ha. and 106.3 million tonnes during 2013-14 (Annual Report (2013-14), National Agricultural Bank for Rural Development, New Delhi).

## Current Issues

The prevalence of hunger is one of the biggest challenges to the Indian economy. In India, the per cent share of hunger had declined by 8.5 per

cent from 25.5 per cent in 1990-92 to 17 per cent in 2012-14 (FAO, 2014). The majority of the states were facing that problem in the current situation. The calorie and protein intake of the poor had declined consistently during 1983-84 to 2004-05. The Eleventh Five Year Plan (2007-12) stated that the absolute weight and height of the people had not improved over the three decades in India. Rural calorie consumption per day had fallen from 2221 calories in 1983-84 to 2047 calories in 2004-05; it had declined to 8 per cent. But in urban areas, calories consumption had fallen by 3.3 per cent from 2080 to 2020 calories in the same period. In rural areas, about 81 per cent of the people do not consume the recommended levels of food and for urban areas as the figure is 57 per cent. The share of food consumption in total expenditure had fallen during the three decades (India Today, 2011). To solve the problem in India, the Government of India has been implementing National Food Security Mission.

### National Food Security Mission in India

The NFSM target was to enhance farm profitability so that the farming community retains its confidence in farming activity, and with these strategies and goals, NFSM was implemented in 561 districts in 27 states in the country (Government of India, 2013). Along with the NFSM, RKVY programme was also launched during the same period. In addition, there were several other state and centrally sponsored programmes running parallel to NFSM programme.

The NFSM schemes are extended to area development during the Twelfth Plan period. The target of the mission is enhancing and increasing production of rice, wheat and pulses. The target of foodgrains production is to increase 25 million tonnes, including 10 MT of rice, 10 MT of wheat and 3 MT of pulses and 2 MT of millets. In addition to that, it aims to expand food production to meet the demand of green and dry foodgrains. The target is 30 MT including the production of coarse cereals of 7 MT. The focus of the scheme is on increasing the cropping pattern system and small and marginal farmer’s development, creating value chain and market linkages (National Food Security Mission: <http://nfsm.gov.in/>, Government of India).

Tamil Nadu has been successfully implementing the NFSM scheme for the past seven years. The state has already had a Universal Public Distribution system in place. The area and production coverage under the NFSM scheme for the years from 2007-08 to 2012-13 are given in Table 1.

The area under the NFSM districts has increased from 5.95 lakh ha in 2007-08 to 6.62 lakh ha in 2011-12 and after that it has declined to 5.24 lakh ha in 2012-13. The major decline in area has occurred in Nagapattinam, Tiruvarur and Ramanathapuram

districts; the cause of the decline is the impact of Neelam cyclone. The percentage share of the area under paddy cultivation in the NFSM districts has changed only marginally; it has increased from 33.3 per cent in 2007-08 to 35.1 per cent in 2012-13. But, the production of the NFSM districts has increased three fold from 8.69 lakh tonnes in 2007-08 to 24.50 lakh tonnes in 2011-12. The year 2012-13, however has witnessed a considerable fall in the area as well as yield due to natural calamity. The yield rate of the NFSM districts had been very low than that of the state as whole. However, since the implementation of the scheme, the yield rate has increased from 1461 kg/ha (2007-08) to 3702 kg/ka in 2011-12.

District-wise area and production under NFSM scheme in Tamil Nadu from 2007-08 to 2012-13 are given in Table 2. Nagapattinam, Thiruvarur and Ramanathapuram districts have recorded the highest area under the NFSM coverage for all the seven years up to 2012-13. These three districts have cultivated 72 per cent of total area under the NFSM coverage in Tamil Nadu during 2007-08 and the rest is covered by the Sivagangai and Pudukkottai districts. In 2012-13, the percentage share of the area cultivated in the three districts (Nagapattinam, Thiruvarur and Ramanathapuram) is 80 per cent. The remaining 20 per cent of the area comes in the other two districts, Sivagangai and Pudukkottai.

Thiruvarur and Nagapattinam districts had the having highest production of 3.11 lakh tonnes and 2.89 lakh tonnes during 2007-08. The districts maintained very high production of 7.9 lakh tonnes and 5.8 lakh tonnes during 2011-12. As these two districts are having adequate water resources, they have more production. On the other hand, Pudukkottai district is not having adequate irrigation

**Table 1:** Area and Production under NFSM Scheme in Tamil Nadu

| Year    | NFSM Districts        |                           |                         | Tamil Nadu            |                           |                         |
|---------|-----------------------|---------------------------|-------------------------|-----------------------|---------------------------|-------------------------|
|         | Area<br>(in 000' ha.) | Production<br>(in 000 MT) | Productivity<br>(kg/ha) | Area<br>(in 000' ha.) | Production<br>(in 000 MT) | Productivity<br>(kg/ha) |
| 2007-08 | 595                   | 869                       | 1461                    | 1789                  | 5040                      | 2817                    |
| 2008-09 | 655                   | 947                       | 1446                    | 1953                  | 5183                      | 2654                    |
| 2009-10 | 631                   | 1477                      | 2341                    | 1846                  | 5665                      | 3070                    |
| 2010-11 | 625                   | 1258                      | 2015                    | 1906                  | 5792                      | 3040                    |
| 2011-12 | 662                   | 2450                      | 3702                    | 1904                  | 7459                      | 3918                    |
| 2012-13 | 524                   | 744                       | 1419                    | 1493                  | 4050                      | 2712                    |

Source: Directorate of Economics and Statistics, Government of Tamil Nadu, Chennai.

**Table 2:** District-wise Area and Production under NFSM Scheme in Tamil Nadu (*Area in 000' ha; Production in 000'MT; Productivity Kg/Ha*)

| Name of the NFSM Districts | 2007-08 |       |      | 2008-09 |       |      | 2009-10 |       |      |
|----------------------------|---------|-------|------|---------|-------|------|---------|-------|------|
|                            | Area    | Prod. | Pty  | Area    | Prod. | Pty. | Area    | Prod. | Pty  |
| Pudukkottai                | 89      | 160   | 1799 | 96      | 180   | 1865 | 95      | 188   | 1977 |
| Thiruvarur                 | 152     | 311   | 2053 | 178     | 207   | 1160 | 166     | 483   | 2906 |
| Nagapattinam               | 154     | 289   | 1878 | 171     | 225   | 1318 | 158     | 432   | 2737 |
| Ramnad                     | 124     | 30    | 241  | 129     | 203   | 1576 | 134     | 235   | 1754 |
| Sivagangai                 | 77      | 79    | 1029 | 81      | 132   | 1635 | 77      | 138   | 1786 |
| Tamil Nadu                 | 1789    | 5040  | 2817 | 1953    | 5183  | 2654 | 1846    | 5665  | 3070 |
|                            | 2010-11 |       |      | 2011-12 |       |      | 2012-13 |       |      |
| Pudukkottai                | 93      | 209   | 2249 | 93      | 334   | 3610 | 84      | 240   | 2876 |
| Thiruvarur                 | 160     | 286   | 1782 | 186     | 790   | 4240 | 159     | 193   | 1214 |
| Nagapattinam               | 156     | 322   | 2060 | 170     | 577   | 3393 | 142     | 202   | 1417 |
| Ramnad                     | 131     | 254   | 1933 | 129     | 438   | 3398 | 117     | 69    | 588  |
| Sivagangai                 | 84      | 188   | 2245 | 84      | 310   | 3702 | 23      | 40    | 1761 |
| Tamil Nadu                 | 1906    | 5792  | 3040 | 1904    | 7459  | 3918 | 1493    | 4050  | 2712 |

*Source:* Directorate of Economics and Statistics, Government of Tamil Nadu, Chennai.

*Note:* Area coverage, Prod. - Production and Pty. - Productivity.

is that gets reflected in its low level of production. Besides adequate irrigation, Nagapattinam and Thiruvarur and Ramanathapuram districts have received greater attention from the government officials and therefore the scheme has been more successful in these districts. Pudukkottai and Sivagangai districts mostly depend on rain water; however, they have also implemented this scheme more successfully.

### Empirical Studies

The Government of India in its Agricultural Annual Report (2010-11) stated that through new farm practices under NFSM, nearly 50 per cent of the rice districts (70 out of 143), 33 per cent of the wheat districts (41 out of 138) and around 50 per cent of pulses districts (74 out of 159) had recorded more than 10 to 20 per cent increase in productivity compared to the base year of 2006-07.

NABARD consultancy Services (NY) conducted a concurrent evaluation of NFSM by comparing NFSM and non-NFSM districts in Rajasthan considering current year and base year (2006-07). It was found from the study that there was an excellent growth in NFSM pulses districts with 57, 134 and 49 per cent growth in total sown area, production and productivity, respectively. In non-NFSM pulse districts, all three measures *viz.*, area,

production and productivity had decreased by 20, 101 and 68 per cent, respectively. Even though the non-NFSM districts have better irrigation sources than the NFSM districts, the yield in NFSM districts was generally higher.

Agricultural Finance Corporation Limited [AFCL] (2012) conducted mid-term evaluation of NFSM by selecting 17 states, 136 districts and 232 blocks common for all the 3 components i.e., rice, wheat and pulses. The study concluded that NFSM-Rice districts recorded yield gain of about two times and five times more than the non-NFSM districts during 2007-08 and 2008-09, respectively. The productivity of wheat in non-NFSM districts was reflected in better yield gain of 3.91 per cent in 2007-08 as compared to the 3 per cent increase in NFSM districts. The productivity of wheat in NFSM districts improved by 7.91 per cent and 12.87 per cent during 2008-09 and 2009-10, while the corresponding figures were 7.09 per cent and zero per cent in non-NFSM districts, respectively. In the year 2007-08, the non-NFSM pulse districts had recorded better yield by 1.14 per cent over the base year of 2006-07 compared to an increase of 0.99 per cent in NFSM districts. In the consecutive year 2008-09, NFSM districts showed improved performance by registering yield gain of 8.26 per cent as against the corresponding figure of 6.99 per cent in non-NFSM districts.

The study intends to achieve the objectives to analyze the trends in area, production, productivity of rice in the NFSM and non-NFSM districts in Tamil Nadu. The second objective is to assess the impact of NFSM on input use, production and income among the beneficiary farmers.

### **Limitations and Scope of the Study**

The NFSM is extended to the Twelfth Five Year Plan due to its success in achieving the targeted goal of production enhancement. It is essential to evaluate and measure the extent to which the programme and approach has stood up to the expectations. The results of the study are providing useful information on trends in area, production and productivity during the recent planned period. The study will help the policymakers to incorporate necessary corrective measures to make the programme more effective and successful during the 12<sup>th</sup> Five Year Plan. The results provide useful insights on the impact of the NFSM on farming communities and can suggest policy recommendations for improving the efficacy of the program. The study is covering only Tamil Nadu State. It deals with NFSM Scheme in Tamil Nadu.

### **Research Methodology**

The study is based on primary and secondary sources in Tamil Nadu. The secondary data obtained from Government of Tamil Nadu publications relating to area, production and productivity of rice. Primary data has been collected from two districts namely Thiruvavur and Sivagangai of Tamil Nadu. The two districts are chosen for the present study within the group of National Food Security Mission districts in Tamil Nadu. In each of the districts of Thiruvavur and Sivagangai, two representative blocks namely Mannarkudi, Valangaiman, Kalayarkovil and Sivagangai are taken respectively and within each block two villages are selected. In each district, 150 beneficiaries from the list of NFSM rice growing cultivators are drawn at random from household farmers. In addition to the, 50 non-beneficiaries from rice growers have been selected randomly.

The present study is divided into four sections. The first section is of introductory nature; it contains objectives, data base and methodology. The second section describes the growth trends of rice production in Tamil Nadu. The third section

examines the impact of NFSM scheme on input use, production of the beneficiary farmers (paddy) in the study area of Tamil Nadu and the last chapter provides concluding remarks and policy suggestions.

### **NFSM Interventions and their Impact on Farming**

In the study area, the scheme is effectively implemented and subsidies are offered to certified seeds (seed mini kits of high yielding varieties/ hybrid rice), incentives for micro nutrients, machinery/tools, cono weeder, zero till seed drills, multi-crop planters, seed drills, rotavators, pump sets, power weeder, sprinkler, plant protection chemicals, Integrated Nutrient Management and Integrated Pest Management.

Table 3 provides the particulars of benefits availed by the sample beneficiaries during 2007-08 to 2013-14. HYV/ Hybrid seeds are being used by the majority of the farmers in the study area. About 89 per cent of NFSM beneficiaries have availed of the HYV seeds. The average benefit as per household is ₹ 1, 250. About 11 per cent of NFSM beneficiaries used the hybrid seeds and the average cost is computed to be ₹ 2, 733. Sprayers account for the highest utilization by the farmers. About 48 per cent of NFSM beneficiaries utilized the sprayers for their own use. The average cost benefit is ₹ 2,211.

Plant protection is one of the important activities in the farm sector. About 46 per cent of beneficiaries have used it and the average cost is ₹ 485. Incentive for micro nutrients is another benefit. About 33 per cent of NFSM beneficiaries have availed the benefit and the cost benefit is ₹ 719. Integrated Nutrient Management (INM) and Integrated Pest Management (IBM) are important sources for the farmers under the NFSM scheme. Nearly, 30 and 29 per cent of beneficiaries have enjoyed benefits of INM and IPM schemes respectively and the average benefit is estimated to be ₹ 475 and 500, respectively for both the schemes.

About 8 per cent of the sample farmers availed the benefits of pumpsets in the study area under the NFSM scheme. The average cost is ₹ 22,920. Power weeder was utilized by 5 per cent of beneficiaries and 4.3 per cent of the farmers availed the benefits of rotavators. The average cost is ₹ 27,321 and 97,680, respectively.



**Table 3:** Particulars of Benefit Availed (2007-08 up to 2013-14)

| Name of the Benefit Item         | Percentage of Beneficiaries to the Total Sample | Average Total Cost (₹ per HH benefited) | Subsidy ₹     | Subsidy as a percent of Total Cost |
|----------------------------------|---|---|---------------|------------------------------------|
| Production of Certified seed     | —   | —                                       | —             | —                                  |
| HYV seeds                        | 89  | 1,250                                   | 246           | 20                                 |
| Hybrid Rice seeds                | 11  | 2,733                                   | 2733          | 100                                |
| Incentive for micro nutrients    | 33  | 719                                     | 689           | 96                                 |
| Incentive for lime in acid soils | —   | —                                       | —             | —                                  |
| Machineries/Tools                | —   | —                                       | —             | —                                  |
| Cono weeder                      | 21  | 3,000                                   | 3000          | 100                                |
| Zero till seed drills            | —   | —                                       | —             | —                                  |
| Multi-crop planters              | —   | —                                       | —             | —                                  |
| Seed Drills                      | —   | —                                       | —             | —                                  |
| Rotavators                       | 4.3   | 97,680                                  | 30000         | 31                                 |
| Pump sets                        | 8.0   | 22,920                                  | 10000         | 44                                 |
| Power Weeder                     | 5.0   | 27,321                                  | 13929         | 51                                 |
| Sprayers                         | 48  | 2,211                                   | 1125          | 51                                 |
| Sprinkler                        | —   | —                                       | —             | —                                  |
| Plant Protection Chemicals       | 46  | 485                                     | 485           | 100                                |
| Integrated Nutrient Management   | 30  | 475                                     | 475           | 100                                |
| Integrated Pest Management       | 29  | 500                                     | 500           | 100                                |
| Training                         | 27  | 390                                     | 390           | 100                                |
| Others                           | —   | —                                       | —             | —                                  |
| <b>Total</b>                     | —   | <b>1,59,685</b>                         | <b>63,572</b> | <b>39.81</b>                       |

Source: Field Survey Data, AERC University of Madras, Chennai.

Under the NFSM scheme, 19 items are provided at subsidized rates. In Tamil Nadu, especially, the sample farmers have reported that they are getting subsidies for only 6 items namely seeds, sprayers, micro nutrients, IPM, INM and cono weeder. The remaining 13 materials are not available to all the farmers in the study area. Timely availability of material is very essential. Farm materials like seeds, sprayers, micro nutrients, INM, IPM and cono weeder are not available to all NFSM farmers. The Government officials could not distribute the same to all those farmers in the study area. There is shortage of farm materials in the study area and that is the main problem. Equipments like pump sets, rotavators, power weeder or tiller are not distributed to all the NFSM beneficiaries in the study area. The distribution of NFSM farm material is a major challenging task in the area of study. Only a few farm equipments are distributed to the farmers by the government.

The average total cost per household in the study area is ₹ 1, 59,685 during 2007-08 to 2013-14. Out of that, the average subsidy distributed to the NFSM beneficiaries is ₹ 63,572 per household. In

terms of percentage, it is 39.8 per cent. It is found that about 60 per cent of the cost is spent by the farmers and remaining 40 per cent is distributed by way of subsidy. It is observed that the government distributed the subsidy for the development of paddy crop.

We have already noted that the percentage share of subsidy to the total cost is 39.81 per cent. Power weeders and sprayers account for a subsidy of 51 per cent respectively. About 31 per cent of the subsidy is availed for using the rotavators purchase. Pump sets occupy the third largest share (44 per cent) in the total subsidy of NFSM scheme. On the other hand, Hybrid rice seeds, plant protection, training, nutrients and pest management got the full subsidy under the scheme. About 96 per cent of subsidy was availed for micro nutrient purchase, plant protection followed by training.

Some of the costly farm materials are being distributed only to the larger farmers but not for marginal and small farmers under the scheme. The main reason behind this is borrowing capacity of the marginal and small farmers to buy costly farm equipments are rather low. Some of the materials

like seeds, micro-nutrients, pest and nutrient management, cono weeder are available easily; and the subsidy amount is also very low. It is distributed to all the beneficiaries randomly. It is found in the study, under the NFSM scheme, the farm materials are distributed based on availability and not for according to need at the appropriate time.

### Annual Usage of Farm Equipments and their Benefits

The Government of Tamil Nadu provides the selected farm equipments to the NFSM beneficiaries. The selected farm equipments are cono weeder, rotavators, pump sets, power tiller and sprayers. The objectives of offering the farm equipments are to improve farm activities, modernisation of agricultural sector, compensating the labour shortage and to reduce the cost of cultivation. In recent years, a majority of the rural agricultural labour has shifted from farming to non-farm activities. So, farm equipment is very essential for solving that problem.

The details regarding the annual usage of farm equipments availed under the NFSM scheme in Tamil Nadu are given in Table 4. According to NFSM guidelines, 10 farm equipments should be made available to farmers, but only five farm equipments are available in the Government stock and they are distributed to NFSM beneficiaries. Pump sets are distributed to the farmers at subsidized price. Their area coverage is 6.84 acres. The individual benefit is worth of ₹ 4,902. Rotavators are used for 15 days and each farmer benefits to the extent of ₹ 9,300. About 14 days in a year are used for power tillers by the benefited farmers and their value is

₹ 12,779. The sprayer is used for 14 days and the benefit is ₹ 6,773.

In reality, a majority of the farm equipments are not available to all the NFSM beneficiaries. There are shortages of farm equipments in the agricultural department. Some equipment like pump sets, power tillers, rotavators are being distributed to beneficiaries according to the background of land holding, community influence and political support. Some equipment like cono weeder and sprayers are distributed to all due to easy availability and lower cost. It is noted that the majority of NFSM beneficiaries have not availed all farm material. It is found that the farm equipments offered under the NFSM scheme have not been distributed to all the needy marginal and small farmers according to their real conditions. Therefore, the real farmer for whom the scheme is designed is out of focus.

Farm equipments give benefits like good plant growth, timely operations, solve labour shortage, and help in weed control, saves water, reduce drudgery, help in transportation, reduce the cost of cultivation, increase the cropping intensity and reduce the post-harvest losses.

Benefits derived from farm equipments in the study area are given in Table 5. Out of various farm equipments, cono weeder is one of the important farm equipments used by the NFSM farmers. About 41 per cent of the NFSM farmers reported that the weeds were controlled due to the usage of cono weeder. About 39 per cent of the beneficiaries reported that cono weeder replaced labour. Rotavator is another instrument used by the NFSM farmers. About 78 per cent of the NFSM farmers have reported that it reduced the cost of cultivation.

**Table 4:** Annual Usage of Farm Equipments Availed under NFSM (Per Annum)

| Name of the implement | No. of days used per benefited HH | Area covered per benefited HH (acres) | Imputed value own use (₹/ benefited HH) | Rented value (Rs/ benefited HH) |
|-----------------------|-----------------------------------|---------------------------------------|---|---------------------------------|
| Conoweeder            | 7.66                              | 4.56                                  | 3,711.86                                | 352.54                          |
| Rotavators            | 15.00                             | 6.50                                  | 9,300.00                                | —                               |
| Pump sets             | 17.46                             | 6.84                                  | 4,902.27                                | 1,363.64                        |
| Power Tillers         | 14.22                             | 11.57                                 | 12,778.57                               | —                               |
| Sprayers              | 14.00                             | 6.68                                  | 6,772.99                                | —                               |
| <b>Total</b>          | <b>68.34</b>                      | <b>29.47</b>                          | <b>37,465.69</b>                        | <b>1,716.18</b>                 |

Source: Field Survey Data, AERC University of Madras, Chennai.

\*Use one manday=8 hrs for estimating No. of days used per implement per annum

**Table 5:** Benefits derived from Farm Equipments (Percent of Benefited HH)

| Sl. No.      | Benefit derived/Name of the implement | Cono weeder  | Rotavator    | Pump Sets    | Power Tillers | Sprayers     |
|--------------|---------------------------------------|--------------|--------------|--------------|---------------|--------------|
| 1            | Solved labour shortage                | 39.0         | —            | —            | 7.1           | 14.2         |
| 2            | Timely operations                     | 20.3         | —            | —            | —             | 1.0          |
| 3            | Saved water                           | —            | —            | 86.4         | —             | —            |
| 4            | Weed control                          | 40.7         | —            | 13.6         | —             | 28.4         |
| 5            | Good plant growth                     | —            | —            | —            | —             | 37.3         |
| 6            | Reduced drudgery                      | —            | 22.2         | —            | —             | —            |
| 7            | Helped in transportation              | —            | —            | —            | —             | —            |
| 8            | Reduced cost of cultivation           | —            | 77.8         | —            | 50.0          | —            |
| 9            | Increased cropping intensity          | —            | —            | —            | —             | 19.4         |
| 10           | Reduced post harvest losses           | —            | —            | —            | 42.9          | —            |
| <b>Total</b> |                                       | <b>100.0</b> | <b>100.0</b> | <b>100.0</b> | <b>100.0</b>  | <b>100.0</b> |

Source: Field Survey Data, AERC University of Madras, Chennai.

**Table 6:** Impact of the Benefit Availed under NFSM Scheme (Percent)

| Benefit availed /Name of the implement                               | Cono weeder | Rotavator | Pump Sets | Power Tillers |
|--|-------------|-----------|-----------|---------------|
| Percentage increase in productivity                                  | 61.0        | 9.7       | 45.0      | 15.0          |
| Percentage fall in material cost                                     | —           | —         | —         | —             |
| Percentage fall in water use   | —           | —         | 2.0       | —             |
| Percentage fall in labour cost                                       | 33.6        | 60.7      | 2.7       | 61.0          |
| Percentage reduction in losses after intervention                    | 18.3        | 7.3       | —         | 0.7           |
| Percentage increase in price of the output because of better quality | 27.7        | 11.0      | 10.7      | 0.7           |
| Improvement in soil health   | —           | —         | —         | —             |
| Improvement in human health  | —           | —         | —         | —             |

Source: Field Survey Data, AERC University of Madras, Chennai.

Pumpset is distributed to the NFSM beneficiaries at subsidized price. About 86.4 per cent reported that they can use water efficiently to using pump sets. It is found that a majority of the farmers have effectively controlled water wastages. It is noted that only a few NFSM beneficiaries have availed the costly equipments.

Power tiller is very useful farm equipment in the farm sector. About 50 per cent of beneficiaries reported that cost of cultivation has continuously declined by using power tillers. 43 per cent of farmers reported that it reduced post-harvest losses also. A majority of NFSM farmers have informed that the lower cost of cultivation and reduction in post-harvest losses are due to the use of power tillers.

Sprayer is one of the farm equipments distributed to NFSM farmers at subsidized price. About 37.3 per cent of the NFSM farmers viewed that the good plant growth is due to the use of sprayers

in the farm. About 28.4 per cent reported that the weed could be controlled through this equipment. A majority of the NFSM farmers noted that the sprayer is used in the farm.

Various benefits are derived from the farm equipment through the impact of NFSM scheme. Main benefits are derived from cono weeder, rotavators, pump sets, power tiller and sprayers. The benefits derived include solving labour shortage, weed control, good plant growth, reduction as cost of cultivation and post-harvest losses. This farm equipments supplied at a subsidized rates under the NFSM scheme helped the farmers in improving their livelihood by reducing the cost of cultivation and by increasing production.

Impact of the benefits availed under NFSM scheme in Tamil Nadu is presented in Table 6. About 61 per cent of the NFSM farmers reported that the improving production is due to the use of the cono weeder. About 33.6 per cent noted that the fall in

labour cost is due to its utilization in the farm field. About 28 per cent of farmers felt that there was increase in price of the output because of better quality.

About 61 per cent of the farmers viewed that there was fall in labour cost because of the use of rotavators in the field. It is found that the rotavators reduce the labour cost. It implies that the limited supply of labour has forced them to use machinery, as a labour saving device. Impact of rotavators is in terms reduction of labour cost and increase in the profit of the NFSM farmers.

About 45 per cent of farmers reported that the increase in production is due to utilization of pump sets. NFSM farmers have benefited much due to use of pump sets in the study area. About 61 per cent reported that the fall in labour cost is due to the use of power tillers. A power tiller is very useful at the time of harvesting when there is scarcity of agricultural workers and high labour cost.

Owing to the use of modern farm equipment, they are getting benefits in terms of increase in production and output and fall in labour cost. The impact of NFSM scheme on farmer's life is observed in increase in production, output price and fall in labour cost. A majority of the NFSM farmers have reported that the increase in production and output price and fall in labour cost are the results of using cono weeder, rotavators, pump sets and power tillers through NFSM scheme.

### **Cost and Return of Paddy Crop in *Kharif* Season (2012-13)**

The cost and return is one of the measurements used in agricultural production analysis. Both concepts are main determinants in the agricultural production. Whenever there is increase in cost of production, it leads to low returns. After the economic reform period, cost of cultivation has increased sizably. Especially, cost of fertilizers, pesticides have increased due to change in international market prices and import from foreign countries. The Government had to intervene in price fixation of fertilizers and pesticides. Otherwise, it will affect the farmer's livelihood. Due to increasing cost of cultivation, farmers changed their occupation from farming to non-agriculture sector. Therefore, Government should focus on controlling the price of fertilizers and pesticides.

At the village level, input dealers, private suppliers are involved in the determination of the price of fertilizers and pesticides. They fix high price to reap abnormal profits. There is no institutional control of input dealers and private suppliers in the system. This is the major problem faced by the farmers during the cultivation of a crop.

The cost and return of paddy crop during *kharif* season (2012-13) are given in Table 7. The cost of cultivation per acre is ₹ 18,937 and ₹ 19,618 for NFSM beneficiaries and Non-NFSM farmers, respectively. When we compare to the two groups of farmers, NFSM beneficiaries have incurred less cost than the Non-NFSM farmers. It is observed that the subsidy is distributed to the NFSM beneficiaries; therefore the cost of cultivation is reduced.

Of various cost components, cost of hired labour accounts for the highest share in the total cost. The percentage share in the total cost is more or less the same imputed for both groups (₹ 6,902) and ₹ 6,920. Family labour occupies the next highest share. Its value is ₹ 4,017 and ₹ 4,027 for the NFSM and Non-NFSM farmers respectively. The cost of hired and family labour occupies the highest share of 56.5 per cent and 55.8 per cent for NFSM and Non-NFSM farmers respectively. The cost of labour is nearly half of the total cost of cultivation because of the limited supply of labour for cultivation.

Harvesting and threshing costs account for 13.03 per cent (₹ 2,518) and 13.27 per cent (₹ 2,603) respectively for the two groups of farmers. NFSM beneficiaries have spent lesser amounts on harvesting and threshing compared to Non-NFSM farmers. Fertiliser accounts for 10.17 per cent (₹ 1,926) and 10.28 per cent (₹ 2,015). We find that the cost of fertilisers is more or less the same with marginal difference for both categories of cultivators.

Seed is one of the important components for paddy crop. The cost of seed accounts for 5.57 per cent (₹ 1,076) and 6.31 per cent (₹ 1,237) for NFSM and Non-NFSM farmer, respectively. NFSM beneficiaries have received ₹ 150 per acre as subsidy for seeds.

The gross income received by NFSM beneficiaries and Non-NFSM farmers are ₹ 30,582 and ₹ 28,627. Among both the categories of farmers, NFSM beneficiaries received more gross income by 6.40 per cent (₹ 1955) than that of Non-NFSM farmers. It indicates that the NFSM farmers have got more



**Table 7:** Cost and Return of Paddy during *Kharif* Season (2012-13) (Per Acre)

| Particulars                              | Unit     | NFSM Beneficiaries |           | Non-NFSM Farmers |           |
|--|----------|--------------------|-----------|------------------|-----------|
|  |          | Quantity           | Value (₹) | Quantity         | Value (₹) |
| Hired labour                             | Man days | 34.15              | 6902.19   | 33.95            | 6920.07   |
| Family Labour                            | Man days | 25.88              | 4016.56   | 27.18            | 4027.05   |
| Bullocks                                 | Pair/day | —                  | —         | —                | —         |
| Tractor/Tiller                           | Hours    | 2.78               | 672.24    | 2.96             | 683.64    |
| Seed                                     | Kgs      | 29.74              | 1076.00   | 31.13            | 1236.85   |
| FYM/Organic/ Bio-fertilizers             | Tonnes   | —                  | —         | —                | —         |
| Fertilizers                              | Kgs      | 154.88             | 1925.88   | 155.72           | 2015.00   |
| Pesticides                               | Kg/lit   | 1.24               | 643.46    | 1.23             | 886.51    |
| Irrigation charges                       | ₹        | —                  | 551.91    | —                | 603.19    |
| Harvesting & Threshing                   | ₹        | —                  | 2517.79   | —                | 2602.94   |
| Bagging, Transportation & marketing cost | ₹        | —                  | 630.62    | —                | 642.27    |
| Total cost                               | ₹        |                    | 18,936.70 |                  | 19,617.52 |
| Main product                             | Qts      | 21.38              | 27,953.20 | 19.56            | 25,941.77 |
| By-product                               | Kgs      | —                  | 2,628.58  | —                | 2,684.85  |
| Gross Income                             | ₹        | —                  | 30,581.78 | —                | 28,626.62 |
| Net Income                               | ₹        | —                  | 11,645.08 | —                | 9,009.10  |
| Cost per quintal                         | ₹        | —                  | 892.19    | —                | 1,002.95  |

*Source:* Field Survey Data, AERC University of Madras, Chennai.

income due to more production (21.38 quintal per acre) and lower cost of cultivation.

The net income received is ₹ 11,645 and ₹ 9,009 for both the categories of farmers. NFSM beneficiaries have received more income by 22.64 per cent (₹ 2, 636) than that of Non-NFSM farmers. It is noted that the NFSM farmers have got more yield per acre (21.38 quintal/acre) than that of Non-NFMS farmers (19.56 quintal/acre).

The cost per quintal for NFSM beneficiaries and Non-NFSM farmers is ₹ 892 and ₹ 1,003 respectively. NFSM beneficiaries incurred 12.41 per cent lower cost (per quintal) than Non-NFSM farmers. It is observed that the cost for NFSM farmers is lower than Non-NFSM farmers and it affects gross and net income of farmers.

### Cost and Return of Paddy in *Rabi* and Summer Season (2012-13)

Cost and return of paddy in *rabi*/ summer season during 2012-13 are given in Table 8. The cost of cultivation is ₹ 18,441 per acre and ₹ 18,512 per acre for the NFSM beneficiaries and Non-NFSM farmers respectively. The Non-NFSM farmers incurred higher cost of cultivation during 2012-13. Of the various components, the percentage share of hired labour in the total cost is accounts for

34.63 per cent (₹ 6,385) and 33.17 per cent (6,139) for the two groups of farmers. NFSM beneficiaries have spent more on hired labour than that of Non-NFSM farmers. The percentage share of the cost of family labour in the total cost is the highest share. It accounts for ₹ 3,917 (21.53 per cent) and ₹ 3,942 (21.29 per cent) for the both categories of farmers. The cost of hired and family labour accounts for half of the total cost of cultivation.

The share of harvesting and threshing cost in the total cost is 12.63 per cent (₹ 2, 329) and 12.61 per cent (₹ 2,334) for the respective farmers. Both categories of farmers spent more or less same amount for harvesting and threshing activities. The percentage share of fertiliser expenses is more or less same at 10.76 per cent and 10.78 per cent respectively.

The percentage share of seed is to 5.94 per cent (₹ 1984) and 6.80 per cent (₹ 1994) for the NFSM and Non-NFSM farmers respectively. NFSM beneficiaries received subsidy at the rate of Rs. 150 per acre during the time of purchase of the seeds. The average quantity of seed purchased by NFSM and Non-NFSM farmers are 31.60 kg and 31.07 kg, respectively. The cost of pesticides is ₹ 560 and Rs.708 for respective farmers. Both the categories of farmers are purchase pesticides at the rate of 1.2 litres per acre.

**Table 8:** Cost and Return of Paddy in *Rabi*/Summer 2012-13 (Per Acre)

| Particulars                              | Unit     | NFSM Beneficiaries |           | Non-NFSM Farmers |           |
|--|----------|--------------------|-----------|------------------|-----------|
|  |          | Quantity           | Value (₹) | Quantity         | Value (₹) |
| Hired labour                             | Man days | 32.64              | 6385      | 31.55            | 6,139     |
| Family Labour                            | Man days | 26.69              | 3971      | 26.73            | 3,942     |
| Bullocks                                 | Pair/day | —                  | —         | —                | —         |
| Tractor/Tiller                           | Hours    | 2.68               | 842       | 2.83             | 850       |
| Seed                                     | Kgs      | 31.60              | 1095.5    | 31.07            | 1,258     |
| FYM/Organic/ Bio-fertilizers             | Tonnes   | —                  | —         | —                | —         |
| Fertilizers                              | Kgs      | 146.11             | 1984      | 142.36           | 1,994     |
| Pesticides                               | Kg/lit   | 1.20               | 560       | 1.24             | 708       |
| Irrigation charges                       | ₹        | —                  | 726       | —                | 743       |
| Harvesting & Threshing                   | ₹        | —                  | 2329      | —                | 2,334     |
| Bagging, Transportation & marketing cost | ₹        | —                  | 549       | —                | 545       |
| Total cost                               | ₹        | —                  | 18,442    | —                | 18,512    |
| Main product                             | Qts      | 21.24              | 28,389    | 19.46            | 25,574    |
| By-product                               | Kgs      | —                  | 2,390     | —                | 2,628     |
| Gross Income                             | ₹        | —                  | 30,779    | —                | 28,202    |
| Net Income                               | ₹        | —                  | 12,337    | —                | 9,690     |
| Cost per quintal                         | ₹        | —                  | 868       | —                | 951       |

Source: Field Survey Data, AERC University of Madras, Chennai.

The gross income of NFSM beneficiaries and Non-NFSM farmers is ₹ 30,779 and ₹ 28, 202 per acre. It is observed that the NFSM farmers got more income by 8.37 per cent (₹ 2,576) than Non-NFSM farmers. It is indicated that the NFSM farmers produce more output (21.24 quintal) than that of Non-NFSM farmers (19.46 quintal). It is observed that the cost of cultivation for NFSM farmers is less than that of Non-NFSM farmers. Therefore, it leads to more gross income to the NFSM beneficiaries. The net income of both types of farmers is estimated at ₹ 12,337 and ₹ 9,690. NFSM beneficiaries get more income by 21.45 per cent (₹ 2,646) than Non-NFSM farmers. It is observed that the NFSM beneficiaries received subsidy and farm equipment for cultivating paddy. Therefore, they earn more income by proper utilisation of farm equipment, seeds, micro nutrients and cono weeder.

The cost of cultivation per quintal is ₹ 868 and ₹ 951 for the two categories of farmers. NFSM beneficiaries spent 9.56 per cent less amount on cost of cultivation per quintal.

From a comparative study of *kharif* and *rabi*/summer season during 2012-13, we find that the NFSM beneficiaries received subsidy to cultivate the paddy crop. Therefore, they earned more income with

lower cost of cultivation from this scheme than that of Non-NFSM farmers. This scheme has created confidence among the farmers for generating more income. A comparative study of tables 4.7 and 4.8 reveals that NFSM beneficiaries who cultivate paddy earn more net income than the non-NFSM farmers during *kharif* as well as *rabi*/ summer seasons. The farmer earn 29 per cent and 27 per cent more net income than the latter during the *kharif* and *rabi*/ summer seasons, respectively. The cost per quintal of paddy is lower by 12.4 per cent and 9.6 per cent for the NFSM beneficiaries and non-NFSM farmers during *kharif* and *rabi*/ summer seasons, respectively.

### Factors Influencing Participation of Farmers in NFSM Scheme

In the case of NFSM scheme in Tamil Nadu, nearly 25 per cent of the districts (8 districts) have implemented the scheme and it is successfully going on. To analyze and understand the role of NFSM scheme in determining factors which influence participation, the study has used logistic regression model. The logistic regression model pertains to examining the impact of farmer’s participation in NFSM schemes in Tamil Nadu. One of the main objectives of the study is to find out the factors

influencing the beneficiaries in NFSM schemes in Tamil Nadu with regard to their livelihood.

$$Y_{ik} = \alpha_{k0} + \beta_{k1}X_{i1} + \beta_{k2}X_{i2} + \beta_{k3}X_{i3} + \dots + \beta_{kj}X_{ij} + \mu$$

Where  $Y_{ik}$  = NFSM beneficiaries 1- Members, 0- Non-NFSM Farmers

$X_{i1}$  = Age (Years)

$X_{i2}$  = Education (Illiterate, Till Secondary, Higher Secondary, Degree/Diploma)

$X_{i3}$  = Operational Holdings (acres)

$X_{i4}$  = Family Size or Number of Family Members dependent on Farming

$X_{i5}$  = Caste (SC/ST, OBC, Others)

$X_{i6}$  = Income from farming

$X_{i7}$  = Ratio of Irrigated land to the Total Operational Area

$X_{i8}$  = Credit Availed (Per acre)

$X_{i9}$  = Farm Asset Value (in Rupees)

We expect all the coefficients to be significant, but  $\beta_3, \beta_4$  and  $\beta_6$  to be negative, whereas  $\beta_1, \beta_2, \beta_5, \beta_7, \beta_8$  and  $\beta_9$  to be positive. For the above regression equation, using the primary data, collected from 400

samples respondents, we fit the above set regression equation and the results are given below.

Table 9 presents the factors influencing participation in NFSM scheme in Tamil Nadu on farmer's livelihood. As expected  $\beta_3, \beta_4$  and  $\beta_6$  have negative sign, and  $\beta_1, \beta_2, \beta_5, \beta_7, \beta_8$  and  $\beta_9$  have positive sign. Therefore the above set regression results clearly show that when ratio of irrigated to the total operational area increases, it will lead to increase in credit availed (per acres) and farm asset value (in rupees) and also other factors such as age, education, caste are also positively influencing the NFSM beneficiaries. But except education (illiterate), caste and farm asset value (in rupees) all others factors are not statistically significant. It means that education, caste and farm assets are not a major factors determining the beneficiaries in NFSM scheme, whereas income from farming, family size or number of family members dependent on farming, operational holding and education (higher secondary) negatively influence the beneficiaries of NFSM scheme. But except family size, all other factors are not statistically significant.

So, the above result clearly explains that except education (illiterate), family size, caste (SC/ST) and credit availed (per acre), all other factors are not

**Table 9:** Factors influencing Participation in NFSM Scheme in Tamil Nadu (Dependent Variable: 1 for NFSM Beneficiaries; Otherwise: 0)

| Independent variables                                     | Coefficient (S.E) | P-Value |
|---|-------------------|---------|
| Age (Years)   | 0.043 (0.418)     | 0.473   |
| Education   |                   |         |
| Illiterate  | 1.768 (0.849)     | 0.037** |
| Till Secondary  | 0.349 (0.428)     | 6.415   |
| Higher Secondary  | -0.018 (0.542)    | 0.974   |
| Degree/Diploma  |                   | —       |
| Operational Holdings (acres)                              | -0.014 (0.095)    | 0.571   |
| Family Size or No. of Family Members dependent on Farming | -0.037 (0.092)    | 0.025** |
| Caste   |                   |         |
| SC/ST   | 14.470 (0.623)    | 0.000   |
| OBC   | 15.692 (0.000)    | —       |
| Others  | —                 | —       |
| Income from Farming                                       | -0.028 (0.241)    | 0.490   |
| Ratio of Irrigated to the Total Operational Area          | 0.010 (0.086)     | 0.454   |
| Credit Availed (per acre)                                 | 0.043 (0.533)     | 0.628   |
| Farm Asset value (₹)                                      | 0.127 (0.170)     | 0.000*  |
| Constant  | 0.651 (1.317)     | 0.005** |
| Likelihood Ratio Test Statistic                           | 251.53            | 0.000   |

Source: Field Survey Data, AERC University of Madras, Chennai.

Note: \* refer less than 0.01 percent and \*\* refer less than 0.5 percent.

statistically significant and also education (higher secondary), operational holdings (acres), family size or number of family members dependent on farming, and income from farming negatively influence the beneficiaries in NFSM scheme in Tamil Nadu on farmer's livelihood.

## CONCLUSION

NFSM scheme is one of the flagship schemes for solving food shortage for future generation in India. The implementation of NFSM schemes is a challenging task to the government as well as stakeholders. This scheme has been being implemented since the last one decade. A majority of the States in the country have not implemented the scheme. The Union government is regularly advising State Governments to implement the scheme in a time-bound manner. Even then, only 11 States have properly implemented this programme.

In Tamil Nadu, only 25 per cent of the districts (8 districts) where rice cultivation is predominant have implemented the scheme. It is found that in the few selected villages under the NFSM scheme, the equipments and inputs are being distributed to specific farmers regularly. The real challenge is creating more unawareness about the scheme. A majority of the farmers have reported that they do not know about the scheme.

Through the NFSM scheme, all the farm materials are not offered to the entire households in the village. Only a few selected items such as seeds, micro nutrients, cono weeder are being distributed to the farmers due to easy availability of them. Still, there is heavy shortage of farm inputs in the study area. A majority of the NFSM farmers receive only seeds, micro nutrients alone. The other inputs are not distributed to marginal and small farmers. It is distributed to the large farmers alone because of political support, family background and influence in the village.

Some of the costly farm materials are being distributed only to the larger farmers but not for marginal, small farmers under the scheme. The reason is that the borrowing capacity of the marginal and the small farmer to buy costly farm equipments is rather low. Some of the materials like seeds, micro nutrients, pest and nutrient management, cono weeder are available easily; and the subsidy is also very low. It is distributed to all the beneficiaries

randomly. It is found in the study, under the NFSM scheme, the farm materials are distributed based on availability and not for requirement.

In reality, a many farm equipments are not available to all the NFSM beneficiaries. There are shortages of farm equipments in the agricultural department. Some equipment like pump sets, power tillers, rotavators are being distributed to beneficiaries according to the background of land holding, community influence and political support.

Equipments like cono weeder and sprayers are distributed to all the farmers due to easy availability and lower cost. It is noted that the majority of NFSM beneficiaries have not availed of all farm material. It is found that the farm equipments offered under the NFSM scheme have not been distributed to all the needy marginal and small farmers according to their real conditions. Therefore, the real farmer for whom the scheme is intended is out of focus.

Making the entire farm inputs available to all the farmers under the NFSM scheme is a challenging task for the government. The Government could not distribute all the farm materials to all the selected NFSM farmers at village. There is a shortage of farm equipments; only a few farm equipments are supplied to the farmers. The farmers have mentioned about various other schemes offered by the government to them excluding the NFSM scheme. Most of them do not seem to be fully aware of the NFSM scheme.

The NFSM scheme has impact on the farmer's life mainly by providing farm equipments. The benefits derived include solving labour shortage, weed control, good plant growth, reduction in the cost of cultivation and post-harvest losses. The farm equipments supplied at subsidized rates under the NFSM scheme helped the farmers considerably in improving their livelihood by reducing the cost of cultivation and by increasing production.

The use of all these modern farm equipments has benefited the farmers in terms of increase in production and output and fall in labour cost. Thus, the NFSM scheme has benefited the farmers by increasing production, output price and by fall in labour cost. A majority of the NFSM farmers have reported that the increase in production, output price and fall in labour cost are the results of using cono weeder, rotavators, pump sets and power



tillers with the help of the NFSM scheme in the study area.

The regression results about the factors influencing the participation of farmers in NFSM show that factors such as farm asset value, size of the family, ratio of irrigated land to the total operational area, age, education and caste are having positive influence on the participation of farmers in the NFSM scheme. Though all the above variables have positive sign, only education, caste and farm asset value (in rupees) are significant and all others factors are not statistically significant.

### Policy Implications

The NFSM and Non-NFSM farmers have suffered a lot to avail the benefits of any such scheme. Over a period of time, a number of schemes have been launched by the Union and State Governments in India. However, there is not much improvement in the farmers' level of living.

The findings suggest that after the implementation of the NFSM scheme, there has been significant improvement in the farmer's life in the study area. NFSM beneficiaries are in a better position with improved performance in terms of input use, production, productivity in comparison with that of the Non-NFSM farmers. Further, many of the selected villages in the study area are yet to satisfy the existing coverage norms. The farmers in the study area are not well equipped with adequate farm materials like cono weeder, multiple planters, power weeder, pump sets, sprayers and power tillers as they have not been provided with them under the scheme. They have been given only a limited support like the provision of seeds and inputs. Besides, there is widespread intra-district disparity in terms of subsidy and benefits distributed.

The shortages are not only in farm equipments, but also in seeds, other inputs and farm implements in the study area; but they have not been given for the areas with shortages of such inputs. Sometimes, the Agricultural Officers do not visit the farm field in the village. There is need for monitoring. Even the available farm equipments under the NFSM scheme are not distributed equally to all the beneficiaries; only select materials are provided. The quality of farm material and equipments given to the beneficiaries is yet another concern. However, if the

state government is more proactive to strengthen and expand this scheme in Tamil Nadu, it will certainly help the farmers as well as the economy as whole in increasing the input use, production, productivity and income.

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