Study No. 180

Impact of National Food Security Mission (NFSM) on Input use, Production, Yield and Income in West Bengal

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Preface

The present study entitled "*Impact of National Food Security Mission (NFSM) on Input use, Production, Productivity and Income in India*" has been undertaken at the instance of the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. The study has been coordinated by the Agricultural Development and Rural Transformation Centre (ADRTC), Institute for Social and Economic Change (ISEC), Bangalore, Karnataka.

The basic purpose of this study is to assess the impact of NFSM on input use, production and income among the beneficiary farmers by collecting data on area, production and yield of rice under NFSM programme. The other objectives of this study are to identify factors influencing the adoption of major interventions (improved technologies) under NFSM and to identify the constraints hindering the performance of the programme.

It is found that cultivation of rice under unirrigated and irrigated condition was predominant during kharif and summer season respectively in West Bengal. Despite lower interest in pulses cultivation, oilseeds were grown by most of the selected farmers in the study area. No wheat being cultivated in the area under consideration. The fibre crop jute, various vegetables including potato and the horticulture crops like banana and flower were also grown by almost all the selected farmers across the study area.

To identify the factors influencing the decision of farmers regarding participation in the NFSM programme, a logit regression analysis was carried out, taking participation in NFSM scheme as the dependent variable, while treating a number of relevant socio economic variables as independent variables (which might have impact on the decision making process of farmers regarding participation in NFSM). The findings strongly indicate that there might be other factors at work, not included in the logit model, which influences one's decision regarding participation in the NFSM scheme in the study region.

In respect of constraints hindering the performance of NFSM pointed out that there exist a huge information gap between the farmer households and the implementing authority of NFSM regarding proper knowledge of the scheme, eligibility criteria, etc.

It was found that suggestions in all levels centred on making an arrangement for timely distribution of inputs under the scheme, marketing support for hybrid paddy, mass-campaigning about the scheme among the farming community.

The study has been carried out under the leadership of Mr. Debanshu Majumder and Dr. Ranjan Kumar Biswas. The field survey was organized by Mr. Debanshu Majumder in collaboration with Dr. Ranjan Kumar Biswas and Mr. Somenath Ghosh. The entire responsibility of preparation of tables, analysis of data and drafting of the report has been shouldered by Mr. Debanshu Majumder, Dr. Ranjan Kumar Biswas, Dr. Debajit Roy and Mr. Somenath Ghosh. The secretarial assistance has been received from D. Mondal, N. Maji, M. A. Khaleque, D. S. Das and A.Patra. The cover was designed by D. S. Das

On behalf of the centre, the undersigned likes to express sincere thanks and gratitude to Prof. P. Kumar and Dr. A. V. Manjunatha, Agricultural Development and Rural Transformation Centre (ADRTC), Institute for Social and Economic Change (ISEC), Bangalore, Karnataka for their coordination and suggestions at various stages of the study. Special thanks are also due to the Director of Agriculture, Deputy Directors of Agriculture and Assistant Directors of Agriculture in Block, District and State level, Ministry of Agriculture, Government of West Bengal for their kind cooperation during the survey. Last but not the least, I wish to place my highest regards to the diligent growers/farmers in West Bengal who have spared their valuable time to share their precious information with our enumerators without which the present study would have not been completed.

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Contents

List of Tables

List of Tables

List of Flowchart

List of Diagrams

EXECUTIVE SUMMARY

CHAPTER 1

INTRODUCTION

During 1970s, the Green Revolution of Indian agriculture paved the way for food security in India with high growth in agricultural production and productivity. However, the programme had not succeeded in making India totally and permanently self-sufficient in food. In such a situation, the Government of India, Ministry of Agriculture has launched the National Food Security Mission (NFSM) since 2007- 08 in some selected areas of the country for increasing the production and productivity of rice, wheat and pulses only. The strategy for expansion of cultivated area was considered mainly for pulses and wheat, and productivity enhancement strategy was targeted mainly for rice.

It is in this context it becomes essential to evaluate and measure the extent to which the programme has been successful in achieving the desired goals. Hence, the specific objectives of the present study are:

1. To analyze the trends in area, production, productivity of rice in the NFSM districts in the West Bengal;
2. To analyze the socio-economic profile of NFSM vis-à-vis Non-NFSM beneficiary farmers of rice;
3. To assess the impact of NFSM on input use, production and income among the beneficiary farmers;
4. To identify factors influencing the adoption of major interventions (improved technologies) under NFSM; and
5. To identify the constraints hindering the performance of the programme.

The present study on NFSM-Rice was conducted on the basis of survey data collected from sample farmers in selected NFSM districts, viz. West Medinipur (district having highest total production of rice) and Howrah (district having lowest total production of rice) of West Bengal. Not only the primary data, but the secondary data of this specific programme have also been used in this study. The secondary data have been collected from the State Directorate of Agriculture. At the second stage, two Community Development blocks (CD

blocks) have been selected from each district, drawing one Community Development block from the close vicinity (< 5 kms.) of district headquarters and the second at a distance of 15-20 kilometres from the district headquarter. Subsequently, at the third stage, 75 beneficiary farmers and 25 non beneficiary farmers have been selected randomly from each Community Development block with proportional allocation in respect of their operational size-classes and other socio-economic, ethnic and gender characteristics, totaling to a sample size of 300 beneficiary households and 100 non beneficiary households in the West Bengal.

In order to fulfill the first objective, secondary data on area, production and productivity of rice for 9^{th}, 10^{th} and 11^{th} FYP have been used. Compound growth rates, correlation and diagrammatic analysis have been applied using this secondary information.

For fulfilling the requirement of the second objective, third objective and fifth objective descriptive statistics with tabular presentation have been applied.

In order to fulfill the fourth objective a logistic regression model was fitted.

CHAPTER 2

IMPACT OF NFSM ON FOODGRAINS PRODUCTION IN THE STATE – A TIME SERIES ANALYSIS

This chapter focuses on the performance of NFSM program in West Bengal over the plan periods. District wise secondary data on area, production and yield of rice, wheat and pulses have been taken into account for the purpose. Time series analysis was done to perceive the pattern of changes in this respect and to assess the impact of the programme on the said indicators. The major observations of the present chapter are as follows:

- The use of fertilizers in West Bengal showed an increasing trend over the years. The irrigated area has increased during the 9th plan and constant after that. Both the net sown and the gross cropped area remained same over the years and the cropping intensity which seems to be relatively constant around 180 over the year.
- The production and productivity of rice and wheat in the 11th plan has shown a higher trend than the previous two plans and this might have been partially due to the incorporation of the NFSM program from 2007-08. Besides, pulses had shown fluctuations in productivity over the plan. This may indicate somehow the program was failed to bring impact on the productivity of pulses.
- At the disaggregate level, the mean growth rates of productivity of rice were higher in NFSM districts than non NFSM districts during the 11th plan. In case of Wheat, the mean growth rates of its productivity in NFSM districts have increased over the plans. But the mean growth rates of pulses productivity for NFSM districts have declined during the 11th plan from the previous plans (i.e. 9th and 10th plan period). The program might have positive influence in increasing the productivity of rice and wheat
- It is observed that over the years from 2007-08 to 2010-11, the proportion of financial achievement has increased registering 80.41 per cent in 2010-11 (Table 2.7). After that in the year 2011-12 the percentage of achievement has declined. The highest expenditure and outlay for the program has been incurred in the year 2012-2013. But the target and expenditure of funds have declined in the year 2010-11 and 2011-12 with respect to 2009-10.

- It is observed in five years the highest outlay of funds and expenditure has been incurred in the third year of NFSM (2009-10) in most of the districts. After that, in most districts outlay and expenditure of funds were reduced. However the percentage of achievements was increased in most of the districts. This might have indicates allotted funds were utilized more with respect to the time.
- In an analysis of the financial targets and achievements with respect to the component categories of the NFSM programme, it comes out that higher funds were allocated for Demonstrations, distribution, production subsidy, IPM, demonstrations, Micro Nutrients, Plant Protection Chemicals, Soil Amendments and water management than other categories. All these categories are falling under the broad category of **'Crop Demonstration'** and the percentage of allocation for **'crop demonstration'** was increased over the years out of the total allocation. Likewise the allocation higher expenditure of fund was incurred for the **'Crop Demonstration'**. Around 80% of the total expenditure was incurred for 'crop demonstration' in all the years except the year 2008-09.
- Lastly, the percentage change of NFSM expenditure has shown no significant relation with the percentage change in net irrigated areas, percentage change in the use of fertilizer, percentage change in area and production of rice, wheat and pulses.

CHAPTER 3

HOUSEHOLD CHARACTERISTICS, CROPPING PATTERN AND PRODUCTION STRUCTURE

This chapter attempts to analyze the household characteristics, cropping patter and production structure of the selected sample survey households for the study. It tries to draw an economic profile of farm-economy of West Bengal. The main observations of this chapter are as follows:

- The average size of the selected household is 5.0 and 5.4 for beneficiary and non-beneficiary respectively. The average percentage of members engaged in farming in both beneficiary and non-beneficiary farm family is 32.98 and 32.53 respectively. It has been found that 92% of the sample farmers are male and 8% female in the beneficiary farmer category and 99% male and 1% female in the non-beneficiary farmer category. The percentage of male and female of above 15 years old and the children of below 15 years old are almost same for beneficiary and non-beneficiary households. In respect of educational status, about half of the members of the selected households are either illiterate or obtain primary level education. Around 30% of the members (35.33% from beneficiary group and 31.00% from non-beneficiary group) have obtained middle level education. Only 8% and 9% members have obtained matriculation degree and 4.00% and 5.00% members have got their higher secondary degree from beneficiary and non-beneficiary families respectively. Graduation or diploma level of education has been obtained by 2.00 and 3.00 percent members of the selected households and only 0.67% members of the beneficiary families have acquired above graduation/degree level of education. According to caste category information, 53.33% and 60.00% are general category, followed by 40.67% and 34.00% farmers from schedule caste (SC) category, 5.33% and 6.00% from OBC and 0.67% and 0.00% from ST category in the beneficiary and non-beneficiary sample households respectively, across the study area. The overall average annual family income from all sources of the sample households is Rs. 31730.59 for beneficiary farmers, whereas it is Rs. 32538.93 for non-beneficiary farmers in the study area. Thus, there is a higher annual family income of Rs. 808.34 for non-beneficiary farm family over beneficiary farm family. However, agriculture is the earning source of

almost 70 % and 74.33 % of the average annual family income for beneficiary and non-beneficiary sample households respectively. So, we conclude that all the sample households in the study area are primarily farmers by profession. There are 77.6% of the operated area occupied by marginal farmers, followed by medium farmers (14.4% area) & small farmers (8.0% area) of the beneficiary group and 72.5% operated area are under the control of marginal farmers followed by 22.5% area under small farmers and 5.0% area under medium farmers for the non-beneficiary group. No large farm exists in both beneficiary and non-beneficiary group of farmers.

- The total cultivated own land of the sample beneficiary farmers are 250.44 acres. There are 55.56 acres leased-in and 2.50 acres leased-out land for beneficiary farmers. Thus, net operated area is 303.50 acres (cultivated own-250.45 plus leased-in 55.56 minus leased-out2.50), which resulted 1.01 acres net operated area per beneficiary household across the study area. On the other hand, the sample non-beneficiaries have total net operated area of 119.08 acres resulting 1.19 acres net operated area per household across the study area. Another estimates point out that the cropping intensity (194.22%) in the sample beneficiary farms is higher than the cropping intensity (192.73%) in the sample non-beneficiary farms and the irrigation intensity is 196.43% and 198.72% for beneficiary and non-beneficiary farms respectively. So, it may conclude that intensive crop cultivation under assured irrigation facility has been done by the sample farmers across the study area.

- Only tube-well is the main source of irrigation of the beneficiary farmers as it covers 45.31% of the net operated area followed by only canal covering 39.22% of the net operated area. The non-beneficiary farmers use canal water and tube-well water for irrigating 47.27% & 42.80% of their net operated area respectively. However, almost the entire study area has assured irrigation potentiality, as 97% and 94% of the net operated area of beneficiary and non-beneficiary farms respectively has facility for obtaining irrigation. So, we may conclude that the study area is suitable for growing paddy since the supply of water in required amount is important during panicle initiation to flowering stage of the paddy crop.

- Among the beneficiary farmers those were cultivating in leased-in and leased-out land, 40.21% and 28.00% farmers maintain the condition of share cropping for leased-in and leased-out land respectively. Under another terms & conditions prevails in the study area, 55.80% farmers pay fixed rent in cash of Rs.8612.12 per acre for

leased-in land and 72.00% farmers receive fixed rent in cash of Rs.3825.00 per acre for their leased-out land. Again 4.00% farmers pay for leased-in land by kinds @ 8.04 qtls. per acre as fixed rent. Among the non-beneficiary farmers, 29.53% farmers for cultivating leased-in land and 19.32% farmers for cultivating leased-out land exchange a portion of their production with their counterpart. Apart from this system, 63.48% farmers pay fixed rent in cash of Rs. 8835.29 per acre for leased-in land and 80.68% farmers receive fixed rent in cash of Rs.3500.00 per acre for leased-out land. Side by side, 7.00% farmers pay fixed rent by kinds @ 8.53 qtls. per acre.

- The crops those are grown in the study area fall in the four major categories, namely, cereals, pulses, Oilseeds and others. Rice is the only and main crop from cereals cultivated widely across the study area by occupying 83.05% and 90.77% to the gross cropped area in beneficiary and non-beneficiary farms respectively. Only 0.10% and 0.07% area of the total gross cropped area have been allotted for growing lentil and moong in NFSM beneficiary farms and only black gram has been cultivated in a little piece of non-beneficiary lands. In beneficiary farms, three oilseeds crops, namely, groundnut, mustard and sesame have been grown in 0.74%, 0.68% and 3.76% area respectively to the total gross cropped area and in non-beneficiary farms, groundnut, mustard and sesame have been grown in areas of 0.21, 1.18 and 2.98 acres respectively. Others cultivated crops of the study area include jute, vegetables, banana, flower and potato. Among these crops, banana has only been cultivated in beneficiary farms in a small piece (total 1.17 acres only) of land. Remaining four crops have been cultivated in both beneficiary and non-beneficiary farms. Despite higher acreages allotment under cultivation of jute, vegetables, flower and potato in beneficiary farms (total 67.29 acres in beneficiary farms and total 16.61 acres in non-beneficiary farms), the percentage of cultivated area to total gross cropped area is lower for vegetables in beneficiary farms (1.73%) than non-beneficiary farms (4.13%). However, it is clear that area is predominant by rice cultivation. So the selection of this area for NFSM Rice Programme is appropriate.
- The overall average annual family income of the sample households is Rs. 31730.59 for beneficiary farms, whereas it is Rs. 32538.93 for non-beneficiary farms in the study area. But net income from per acre land cultivation of beneficiary and non-beneficiary farms was Rs. 21910.47 and Rs. 20303.69 respectively. The estimation indicates higher earning of beneficiary farms by Rs. 1606.78 over the non-beneficiary

farms from per acre land cultivation. However, the income from non-farm sources is higher (Rs. 9564.50) in beneficiary families than income from non-farm sources (Rs. 8361.30) of non-beneficiary families. It is evident from the estimation of comparative economics of crop cultivation between beneficiary and non-beneficiary farms that gross as well as net farm incomes for all the crops in beneficiary farms are not same, except paddy, than their non-beneficiary counterpart. The gross and net return of paddy in beneficiary and non-beneficiary field are Rs.26130.53, Rs. 26180.24 and Rs. 7887.35, Rs.7955.84 respectively. It is similar in case of mustard and sesame too. But groundnut, however, depicts different picture. Despite higher cost of cultivation, the calculated gross as well as net income from groundnut cultivation is higher for beneficiary farms than non-beneficiary farms. In case of jute cultivation, non-beneficiary farmers go to the higher expense for per acre cultivation and they get higher gross as well as net return than beneficiary farmers. But in the vegetable field, despite higher expenses incurred, lower net return has been received by beneficiary farmers than non-beneficiary farmers. Again flower and potato cultivation provide a higher net return for non-beneficiary famers, though they spent comparatively lower amount of rupees for these crop cultivation than beneficiary farmers.

- Only 5.33% and 3.33% beneficiary farmers and only 5% non-beneficiary farmers have costly implement namely, Tractor and Electric Pumpset respectively and only 2% beneficiary farmers have another costly implement Power Tiller. Among the medium cost implement, only 27% beneficiary farmers and 18% non-beneficiary farmers have Diesel Pumpset. Among the sample farmers, 82.33% beneficiary and 87% non-beneficiary farmers have low cost implement like Knapsack Sprayers. Again, 71.67% beneficiary and 71% non-beneficiary farmers is the owner of another low cost implement Paddy Thresher. There are no other remarkable farm implements with the sample farmers, except some Spade, Sickle, etc.
- Only the Commercial Bank and Primary Agricultural Credit Society (PACS) have played more or less significant role for sanctioning loan to the sample farmers. There are 24.7% and 19% beneficiary and non-beneficiary farmers respectively who have got loan from Commercial Bank. The Primary Agricultural Credit Society (PACS) has sanctioned loan for 14% beneficiary farmers and 6% non-beneficiary farmers. Other sources like, Government Agencies, Intermediaries, Self Help Group (SHG),

Non-Government Organization (NGO), etc do not play remarkable role for sanctioning loan to the selected sample farmers.

- It is evident from enquiry that maximum amount has been borrowed for housing purpose (Rs. 135000/-) followed by business (Rs. 24000/-) and agriculture (Rs. 20704.31) purposes by the beneficiary farmers. On the other hand, the non-beneficiary farmers have borrowed only for agriculture purpose by the amount of Rs. 30592.59.

CHAPTER 4

NFSM INTERVENTIONS AND ITS IMPACT ON FARMING

In this chapter, we have made an attempt to analyze the state and nature of intervention under NFSM in West Bengal and its impact on farming, specifically crop productivity. The main observations of the present chapter are presented below as follows:

- In course of the primary survey it was found that the farmers in general were aware about the NFSM programme. The Department of Agriculture and the Panchayat carried out local level awareness meetings and programmes in all the blocks. However, only 22 per cent of non-beneficiary farmers in West Medinipur and 34 per cent in Howrah reported lack of awareness about the project. In both the districts 8 per cent of the beneficiary respondents were women. It is revealed from the data that the state department of agriculture has been instrumental in imparting awareness among the farmers regarding NFSM in three CD blocks out of the four. In one block, however, fellow farmers and friends played an important role in this connection. Enhancements of awareness through print and electronic media have had little impact in the areas under consideration. The progressive farmers of Howrah district, however, played a significant role in course of increasing awareness among the farmers.
- Amount of subsidy on seeds distributed to the beneficiary farmers in aggregate accounted for 92 per cent of the total cost on seed. Costs on PPC, INM and IPM per beneficiary households accounted for 86.1 per cent, 60.81 per cent and 24.67 per cent of respective costs. Apart from distribution of HYV/Hybrid seeds (ARIZE 6444 – Hybrid variety and MTU 7029, MTU 1010 – HYV) the distribution of Plant Protection Chemicals (PPC) and measures regarding Integrated Nutrient Management (INM) were undertaken at a significant scale.
- None of the beneficiary had been provided with farm equipments under the scheme. This might have been due to the fact that NFSM is being implemented in the survey areas for the first time in 2013-14. On the whole it can be said that implementation of NFSM programme in the areas under consideration had centered primarily around block demonstrations of rice.

- As regards to the impact of the programme to increase the productivity, most of the farmers were of the opinion that the new and improved variety has been effective in increasing the productivity of rice. Out of 300 beneficiary farmers, 46.7 per cent opined that the increase was less than 5 per cent while 34. 7 per cent agreed upon that the increase to be between 5 to 10 per cent and 7.3 per cent was of the impression that the increase in productivity was between 10 to 15 per cent**.** No substantial differences between the responses across the blocks or districts were visible as to demonstration benefits. In course of the survey the farmers seemed to be quite happy with the productivity response of the supplied seed.
- In terms of productivity of the crop (paddy), the NFSM farmers seem to reap the benefit of improved variety particularly in the summer season. Hence, in aggregate gross and net return from crop enterprise is gainful for the ones having NFSM benefits. Moreover, if one deducts the subsidy amount from the total cost, the net income of the beneficiary households increase substantially. Given the subsidy in respect of seeds, micro nutrients and plant protection chemicals, the beneficiary farmers exhibit better net return from crop enterprise than their non-beneficiary counterpart. Turning to the cost components, it is revealed that NFSM beneficiaries employ more family labour than the non-beneficiaries. So, in a sense the NFSM technology with its provision for subsidies has had its impact in increasing productivity and income of the beneficiary farmers.
- It is evident from the primary data that over 80 per cent of the total output of Paddy, barring summer crop by NFSM beneficiaries, is being sold out by all categories of farmers. Among the beneficiary farmers cultivating summer rice, leaving Debra aside, the sale of output is around 70 per cent of the gross output. Retention of the Summer produce by the beneficiaries of this block is strikingly high. It should be remembered that hybrid seeds were distribute in this region for crop demonstration. The coarse grain from hybrid paddy posed hindrance in marketing the output. At the same time, the local traders remained disinterested in purchasing the hybrid produce as the rice millers did not accept such a meagre quantity. The respondents seemed to be quite satisfied with its productivity response but at the same time they were unhappy as regards to its market prospects. Hence, it ended up with a forced retention of 82.4 per cent of total output.

- In the scenario of marketing, one would find that the local merchants play the key role. Being a small producer it is difficult for them to take the advantage of retail selling by their own effort. This remains true for beneficiary as well as non-beneficiary farmers with the exception of hybrid cultivators in Debra, where they had to shoulder the main burden of marketing the produce.

CHAPTER 5

PARTICIPATION DECISION, CONSTRAINTS AND SUGGESTIONS FOR IMPROVEMENT OF NFSM

This chapter, broadly speaking, aims at analyzing the factors influencing the decision making process of farmers regarding participation in NFSM programme. At the same time, this chapter tries to identify the constraints faced by the beneficiary farmers while availing benefits from the scheme. It also takes account of suggestions made by the beneficiary as also non-beneficiary farmers regarding further improvements in performance and reach of the scheme. The major observations from this chapter are:

- First, as farmers are often hesitant or reluctant in adopting something new or participating in a new government programme, it is important to identify the factors influencing the decision of farmers regarding participation in the NFSM programme. For this, we have carried out a logit regression analysis, taking participation in NFSM scheme as the dependent variable, while treating a number relevant of socio economic variables as independent variables (which might have impact on the decision making process of farmers regarding participation in NFSM). However, the result of our logit regression model fails to fit to our data, while a correlation coefficient matrix ascertains the results by ruling out the possibilities of multicollinearity problem that might affect the outcome of our regression model. The findings thus strongly indicate that there might be other factors at work, not included in our logit model, which influences one's decision regarding participation in the NFSM scheme in the study region.
- Second, in case of constraints in availing benefits under the NFSM scheme, it comes out that the performance of the scheme relating aspects like promptness in availing subsidy amount in relation to actual purchase of subsidized inputs, quality of inputs distributed, paper works for enrolling into the scheme, procedure for availing benefits, etc. remained satisfactory on the whole. The problems faced regarding the above mentioned aspects were reported only in specific areas for specific issues. Supportive measures like institutional financing and technical guidance was satisfactory also, as has been reported by the beneficiary farmers of the NFSM scheme. It, however, must be noticed here that there exists a huge information gap between the farmer

households and the implementing authority of NFSM regarding proper knowledge of the scheme, eligibility criteria, etc. Concerned authorities may please note this and take proper steps to narrow down the prevalent information gap.

- Third, in case of suggestions for improvement by the beneficiary farms, it is extremely important to note that about a half of the beneficiaries complained about timely distribution of inputs under the scheme, which needs to be addresses properly by the implementing authorities. Apart from this, there has been a strong suggestion for arranging marketing support for paddy by more than one-fourths of the beneficiary farmers, as marketing of hybrid varieties of paddy posed a major challenge to the farmers growing hybrid rice. The problem of marketability of paddy, especially the hybrid variety, has also been widely reported also by the non-beneficiary farmers. This strongly suggests that there has been an acute need for marketing support to be extended towards the farming community in general and towards the hybrid paddy growers in particular.
- Lastly, though it is often quite challenging for the authorities to take farmers into confidence regarding participation in government programmes, it was time and again suggested by the non-beneficiary farmers that lack of knowledge regarding the scheme was one the leading factors behind non-participation in NFSM. This again calls for greater thrust on mass-campaigning about the scheme among the farming community. It may also be noted here that political interference has also been held responsible for non-participation in government programmes like NFSM, which needs to be neutralized for achieving greater participation of farmers in general.

CHAPTER 6

CONCLUDING REMARKS AND POLICY SUGGESTION

The National Food Security Mission programme was launched to enhance the productivity of rice, wheat and pulses to bridge the demand supply gap and ensure food security to the people. Since inception in 2007-08 (initial years of 11th plan) the programme has taken the shape of crop demonstration of improved verities of seeds associated with other components like making provisions for INM, IPM, improved farm implements etc. The NFSM programme called for implementation of cropping system centric interventions in a cluster approach in the agrarian sector through participation of farmers vis-à-vis the agricultural experts.

For a public sector scheme review of its performance is as important an aspect as the scheme itself. Hence, an evaluation study was carried out on the basis of primary survey in two districts of West Bengal to assess the impact of NFSM. The present study had some specific objectives of which we had discussed at length in our introductory chapter. In view of these objectives we shall now attempt to assess its impact among the beneficiaries of NFSM vis-à-vis the farmers who could not avail the NFSM benefits (i.e. the non-beneficiaries).

Concluding Remarks

The concluding remarks of the study specific to objectives spelt out earlier are presented here as follows:

- District wise secondary data on area, production and yield of rice, wheat and pulses were analyzed to get an overall picture of the state. It came out that the productivity of rice and wheat has increased over the 11th plan. During the last plan productivity of rice has increased from 25.73 quintal/hectare in 2007-08 to 27.44 quintal/ hectare in 2011-12 and the productivity of wheat has increased from 26.02 quintal/ hectare in 2007-08 to 27.65 quintal/hectare in 2011-12. This may point towards a successful implementation of the program. But in case of pulses, productivity responses seemed to be fluctuating over the years.
- No major change in net sown area and gross cropped area was observed. There was almost no enhancement in the area under cultivation. However, net and gross irrigated area along with fertilizer consumption revealed substantial augmentation.

- Variation in productivity of crops across districts in West Bengal over the years from 2007-08 to 2011-12 was analyzed with district level data. It turned out that the average annual growth rate of rice in the NFSM districts was higher as compared to the same for non-NFSM districts during 11th plan. On the contrary productivity response of wheat in the NFSM districts in general was lower than the non-NFSM ones in the same period. However, the districts covered under wheat programme had a very poor productivity of wheat during 9th and 10th plans. During the 11th plan productivity of the crop in these districts geared up. NFSM pulses programme covered all the districts of the state. But no conclusive judgment can be made as there is wide variation among the districts in terms of productivity of pulses.
- During the 11th plan financial achievement towards NFSM target in West Bengal accounted for over 67 per cent.
- Component specific allocation of funds reveals that crop demonstration and subsidy were given foremost priority. Allocation towards micro nutrients, plant protection chemicals and chemicals for soil amelioration were close followers.

Productivity of rice in particular has responded positively to NFSM programme in West Bengal. Financial achievement was on the better side registering about two-third utilization. Component specific outlay centered around crop demonstration, plant protection and nutrition.

- The average size of household was 5.0 and 5.4 for NFSM and non-NFSM families respectively. Literacy rate among the respondents accounted for around 77 per cent in both the groups of farmers. Out of 300 NFSM farmers over 46 per cent were from scheduled and backward caste families. The similar proportion for non-NFSM households was 40 per cent.
- Both NFSM & non-NFSM respondents were mostly marginal farmers (95% & 91% respectively) where about one third of the total members are engaged in farming activities. Average operational holding size comes out as 1.01 & 1.19 acres for B & NB farmers respectively. There is not much of a difference in irrigation intensity (II) and cropping intensity (CI) between the two groups.

- Crop enterprise among both the groups is dominated by rice where proportion of rice in GCA is 83 per cent among NFSM farmers and 90 per cent among non-NFSM farmers. Yield rate of rice is just over 18 quintals per acre for both the groups. The overall average annual family income from all sources of the sample households is Rs. 31730.59 for beneficiary farmers, whereas it is Rs. 32538.93 for non-beneficiary farmers in the study area.
- Average value of farm assets was to the tune of Rs.8626.57 for NFSM and Rs. 5670.75 for non-NFSM farmers. On the other hand, productive credit per beneficiary household was Rs.20840.50 while it was Rs.30592.59 for non-beneficiaries.

In this study, the beneficiaries of NFSM programme and non-NFSM farmers exhibit similar socio-economic and agricultural profile and hence, results seem comparable between the treatment and control groups.

- It was found that the farmers in general (both NFSM and non-NFSM) were aware about the NFSM programme. It is revealed from the data that the state department of agriculture has been instrumental in imparting awareness among the farmers regarding NFSM. However, fellow farmers and friends along with progressive farmers (in Howrah) played an important role in this connection too. Enhancements of awareness through print and electronic media have had little impact.
- Amount of subsidy on seeds distributed to the beneficiary farmers in aggregate accounted for 92 per cent of the total cost on seed. Costs on PPC, INM and IPM per beneficiary households accounted for 86.1 per cent, 60.81 per cent and 24.67 per cent of respective costs. Distribution of seeds, plant protection chemicals (PPC) and measures regarding integrated nutrient management (INM) were undertaken at a significant scale.
- No improved farm equipments were provided to the NFSM farmers for the fact that the programme was launched in the area for first time in 2013-14.
- Out of 300 beneficiary farmers, 88.7 per cent had the opinion that the new and improved variety has been effective in increasing the productivity of rice. Farmers seemed to be quite happy with the productivity response of the supplied seed.

- In terms of quantum of production of rice per acre the NFSM farmers have a clear edge over the non-beneficiaries. Moreover, as subsidy amount is deducted from the total cost net return from rice cultivation of the beneficiary households increase substantially than their non-beneficiary counterpart.
- A substantial part total output of paddy, barring summer crop by NFSM beneficiaries of Debra, is being sold out by all categories of farmers. Retention of the produce by the beneficiaries in Debra is strikingly high. It should be remembered that hybrid seeds (ARIZE 6444) were distribute in this region for crop demonstration. The coarse grain from hybrid paddy posed hindrance in marketing the output. At the same time, the local traders remained disinterested in purchasing the hybrid produce as the rice millers did not accept such a meagre quantity. In the scenario of marketing, the local merchants play the key role.

The NFSM technology with its provision of subsidized improved seeds, INM and IPM measures has had its impact in increasing productivity and income of the beneficiary farmers. The respondents seemed to be quite satisfied with its productivity response but at the same time they were unhappy as regards to the market prospects of hybrid seeds.

- To identify factors influencing the adoption of NFSM we have carried out a logit regression analysis, taking participation in NFSM scheme as the dependent variable. However, the result of our logit regression model fails to fit to our data, while a correlation coefficient matrix ascertains the results by ruling out the possibilities of multicollinearity problem that might affect the outcome of our regression model.

The findings strongly indicate that there might be other factors at work, not included in our logit model, which influences one's decision regarding participation in the NFSM scheme in the study region. We propose further research in this area.

- It comes out that the performance of the scheme relating aspects like quality of inputs, paper works for enrolling into the scheme, procedure for availing benefits, etc.

remained more or less satisfactory on the whole. But there exists a huge information gap between the farmer households and the implementing authority of NFSM regarding proper and comprehensive knowledge of the scheme, eligibility criteria, etc.

- It is extremely important to note that about a half of the beneficiaries complained about timely distribution of inputs under the scheme.
- There has been a strong suggestion for arranging marketing support for paddy by more than one-fourths of the beneficiary farmers, as marketing of hybrid varieties of paddy posed a major challenge to the farmers growing hybrid rice.
- It was time and again suggested by the non-beneficiary farmers that lack of knowledge regarding the scheme was one the leading factors behind non-participation in NFSM.

It appeared that there exists a huge information gap regarding proper and comprehensive knowledge of NFSM. Complains were received about timely distribution of inputs. There was suggestion for arranging marketing support for paddy specially hybrid varieties.

Policy Suggestions

On the basis of the findings of this study and concluding observations, the following recommendations and policy suggestions are proposed:-

- West Bengal has exhibited a high potential for yield enhancement of rice in particular and wheat to a certain extent. Pulses, though fluctuations are observed, might have potential for augmentation of yield. There remains a huge scope to exploit this potential through technology dissemination programme like **NFSM** and hence the **programme should continue with greater effort**.
- Interventions through crop demonstrations coupled with INM and IPM practices have helped the farmers in reaping the benefits in view of increase in productivity and income from crop enterprise. Such **demonstration programmes should be encouraged**.

- An all round effort should be made to **ensure the timeliness of input delivery system** prescribed under the recommended technology.
- It is **very necessary** for further growth **that improved farm implements are distributed** among the beneficiaries. Implements once distributed could be used and taken care of by the farmers' own organizational arrangement on sharing basis. This may boost the attitude of co-operation among the farmers.
- There exists an information gap as to comprehensive knowledge of NFSM. A **widespread knowledge about such programmes is required for developing responsiveness** among farmers.
- **Seed minikits** that are being distributed for crop demonstration **may be in line with the consumption basket of the locality**. For people are generally reluctant to adopt new food habit.
- Marketing of produce seemed to be one of the major problems in the agrarian sector. And private local traders dominate the scenario. **Marketing co-operative societies could be formed by the farmers** themselves in localities. Panchayats may also initiate formation of such societies.
- In course of the study we had the impression that the programme implementation followed a sort of top-down approach. For it was expressed by a large section of non-beneficiaries having no knowledge about the scheme. **Widespread awareness** in the locality (irrespective of whether an intended beneficiary or not) **is necessary and participation at the grass root** may raise the local needs and **create an environment for a bottom-up planning process**.