Study No. 166

## EXECUTIVE SUMMARY

# IMPACT STUDY OF THE NATIONAL HORTICULTURE MISSION SCHEME IN WEST BENGAL


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**2011**

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**Introduction:**

From its traditional identity, over the years the scope of horticulture has been expanded in dimensions and has become the science of growing and management of fruits, vegetables including tubers, ornamental, medicinal and aromatic crops, spices, plantation crops as well as their processing, value addition and marketing. At present, facing a decelerating rate of growth of agriculture, the horticulture sector assumes ever more importance to achieve and sustain targeted growth in agriculture at large.

At such a crucial juncture, the Government of India has initiated several programmes and missions to check the downward trend in agricultural production and to find sustainable solutions. Among these the National Horticulture Mission (NHM), the single largest program within the Ministry of Agriculture, has been implemented in 2005-06 to promote holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushroom, spices, flowers, aromatic plants, cashew and cocoa ensuring forward and backward linkages with the active participation of all the stake holders. The mission acquires a unique position as it adopts a cluster-based approach to promote specific commodities in specific regions with comparative advantage.

Now, horticultural cultivation is an age-old practice in West Bengal as the state is traditionally among one of the pioneering horticultural states in the country. In fact, West Bengal's six agro-climatic zones offer an extensive and diversified variety of environs for the development of temperate, sub-tropical and tropical horticulture produce to cater to the horticultural market round the year. The state is the leading producer of a wide range of horticulture items, including pineapple, while it has significant contribution in the national production of mandarin oranges.

It is here that the present study attempts to evaluate the impact of the National Horticulture Mission scheme in West Bengal in terms of increase in area, production and productivity of selected horticultural crops. At the same time, the study makes an attempt to assess the impact of the mission on employment generation and increase in income to suggest proper implementation strategies for the scheme.

**Objectives of the study:**

As the prime objective of the National Horticulture Mission is to promote holistic growth of the horticulture sector through area based regionally differentiated cluster approach for development of horticulture crops having comparative advantage, the particular ***objectives*** of the present study include –

1. *to assess the impact in terms of increase in area, production and productivity of indentified horticulture crops covered under National Horticulture Mission, keeping 2004-05 as the base year in the state in general and for the indentified crops (Pineapple and Mandarin Orange) in particular;*
2. *to examine the extent to which the scheme has helped in creating employment opportunities and enhancement of income of the farmers;*
3. *to suggesting measures in improving the implementation strategy.*

**Database, Methodology and Study Area:**

Among the various horticulatural crops produced in the state, two fruit crops, viz. pineapple and mandarin orange, were selected for the present study. The study is essentially based on both primary and secondary data. The primary data for the study has been collected by conducting an intensive sample survey through participatory discussion and canvassing of structured questionnaire among sample beneficiaries of the NHM scheme in selected districts of West Bengal. With the suggestions received from the State Horticulture Board of West Bengal, two

districts namely Jalpaiguri and Darjeeling are selected for evaluating the crops pineapple and mandarin oranges respectively.

For each of the 2 selected crops (i.e. pineapple and mandarin orange), 50 beneficiary farmers have been selected from over 2 administrative blocks (25 beneficiary from each of the blocks), thereby making a sample-size of 100 beneficiaries in total (2 crops * 2 blocks * 25 beneficiaries). The beneficiary farmers have been selected by purposive random sampling technique (without replacement) for the present study. While selecting the beneficiary farmers, special attention was given so that the sample pool represents all sections of the society viz. small and marginal farmers, SC/ST, OBC farmers and women folk to the extent possible.

In case of secondary data, the study used a number of published databases from authentic sources like Directorate of Agriculture, Govt. of West Bengal, State Horticulture Board, National Horticulture Board, etc. At the same time, data from sources like CMIE has also been used in case of time-series data on area, production and productivity of selected fruit crops.

**Area, Production and Productivity of horticulture in West Bengal:**

Available secondary information on area, production and productivity of horticulture in West Bengal reveals that though the percentage share of cultivable area to total geographical area marginally declined over the period from TE 2004-05 to TE 2007-08, the glimmer of hope is that the area under horticultural crops exhibited an increase of about 5.75 percent over the concerned period, which in turn establishes the growing importance of horticulture in the state. In particular, there has been a tremendous growth at an average of 9.61 percent per annum in area under vegetable crops during the period 2004-05 to 2009-10, while that for fruits and flowers comes out to be 4.63 percent and 7.57 percent per annum respectively.

**Growth rate in Area and Yield Rate of Horticultural Crops in the State (%)**

| Period | Fruits | | Vegetables | | Commercial Flowers | | | Spices | | Plantation | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area | Yield | Area | Yield | Area | Yield (Loose) | Yield (Cut) | Area | Yield | Area | Yield | Area | Yield |
| 1980-81 to 1990-91* | 6.36 (5.21) | 0.00 | 14.31 (3.96) | 0.00 | 0.00 | 0.00 | 0.00 | 9.76 (9.78) | 12.80 (8.27) | 0.00 | 0.00 | 12.48 (5.16) | 12.80 (8.27) |
| 1990-91 to 2000-01* | 0.58 (0.80) | 5.63 (3.94) | 5.05 (2.50) | 14.04 (4.70) | 0.00 | 0.00 | 0.00 | 3.11 (9.45) | 3.99 (8.34) | 0.00 | 0.00 | 4.32 (2.79) | 12.47 (5.08) |
| 2000-01 to 2009-10* | 4.93 (25.07) | 6.45 (10.19) | 6.84 (5.66) | 11.62 (6.99) | 6.32 (4.61) | 9.26 (12.04) | 14.89 (6.35) | -0.06 (-0.06) | 5.57 (3.25) | 0.00 | 0.00 | 6.56 (6.83) | 11.07 (7.74) |
| 2000-01-2004-05** | 5.64 | 7.06 | 1.30 | 2.22 | 5.74 | 15.95 | 9.00 | 0.74 | 5.84 | 0.00 | 0.00 | 2.79 | 3.44 |
| 2004-05-2005-06** | 3.85 | 8.15 | 43.28 | 71.97 | 5.55 | -3.27 | 6.74 | 2.24 | 3.39 | 5.43 | -3.07 | 32.63 | 59.27 |
| 2004-05-2006-07** | 6.10 | 11.44 | 24.35 | 31.04 | 4.76 | 0.03 | 22.72 | -7.85 | -6.87 | 3.62 | 3.28 | 18.41 | 26.20 |
| 2004-05-2007-08** | 5.36 | 9.21 | 16.27 | 31.04 | 18.94 | 3.61 | 32.41 | -5.23 | -4.55 | 4.26 | 1.06 | 12.68 | 26.48 |
| 2004-05-2008-09** | 5.16 | 6.99 | 12.40 | 23.55 | 8.43 | 4.57 | 26.28 | 1.41 | 12.76 | 4.97 | 0.81 | 10.01 | 20.20 |
| 2004-05-2009-10** | 4.63 | 6.16 | 9.61 | 18.14 | 7.57 | 4.87 | 21.91 | 1.13 | 10.21 | 3.98 | 0.57 | 7.83 | 15.62 |

*Note:*
** The growth rates for the decennial period are based on semi log time trend and the figures in parentheses are respective 't' values.*
*** Growth rates are bases on annual averages.*
*Source: Calculated from Govt. of West Bengal and CMIE*

In case of pineapple however, available data suggest that there has been a sharp decline in the area under pineapple in West Bengal at an annual average rate of – 6.32 percent over the period 2004-05 to 2008-09, though yield rate of pineapple registered an increase at around 2.16 percent per annum over the period. In contrast, in case of mandarin oranges, the annual average rate of growth of area and yield rate of mandarin oranges stand to be 1.56 percent and 1.58 percent respectively.

**Growth Rate in Area and Yield Rate of Selected Horticultural Crops in the State**

| Period | Pineapple | | Mandarin Orange | |
|---|---|---|---|---|
| | Area | Yield | Area | Yield |
| 2000-01 to 2008-09* | 0.99<br>(-0.45) | 1.01<br>(1.90) | 1.01<br>(1.55) | 1.00<br>(1.22) |
| 2000-01-2004-05** | 4.83 | 0.17 | 0.00 | -0.56 |
| 2004-05-2005-06** | 4.12 | 4.08 | 0.85 | -0.11 |
| 2004-05-2006-07** | 2.14 | 1.00 | 3.13 | 3.14 |
| 2004-05-2007-08** | -8.61 | 3.05 | 2.08 | 2.10 |
| 2004-05-2008-09** | -6.32 | 2.16 | 1.56 | 1.58 |

*Note: *The growth rate for the decennial period are based on semi log time trend and the figures in parentheses are respective 't' values*
*** Growth rates are bases on annual averages.*
*Source: Calculated from Govt. of West Bengal*

**Household Characteristics, Cropping Pattern and Production Structure:**

An enquiry into the household characteristics, cropping pattern and production structure of the sample beneficiary farmers reveal that the study area represents a highly marginalized farming economy with agriculture as the single major primary occupation for the workforce. The land holding pattern reveals that while the net operated area for the marginal farmers is much smaller than their larger counterparts, but the intensity of cropping remains comparative higher for the marginal farmers to compensate for the smallness of size.

The socio-economic profile of the sample beneficiary farmers reveal that the sample farmers are heavily indebted from institutional as well as non-institutional (informal) credit sources like commission agents, traders/merchants, etc. The need for formal agricultural credit is reflected in the fact that a major part of these formal

and informal borrowings have been taken as crop loans / production loans in both the districts. Only the marginal farms, owing to severe financial constraints, opt for consumption loand from non-institutional sources of credit. In case of ownership of productive assets by the farmer households, it has been observed that livestocks occupy the prime position among all animate and inanimate farm assets, while modern implements like tractor, trolly, tiller, plank, combine harvester, etc. have not been found among the sample farmer households.

In case of technological adoptions, it has been observed that the use of HYV is extremely low in case of mandarin orange cultivation as compared to the pineapple cultivation. However, while the mandarin orange cultivators follow a purely traditional cultivation practice with the use of organic manure only, in sharp contrast, pineapple cultivation is completely covered by HYV technology with heavy use of chemical fertilizers. Nevertheless, the cropping pattern of the sample farmer households reveals that the horticultural crops, mainly pineapple and mandarin oranges, dominate the cropping pattern in the study region covering nearly about half of the gross cropped area.

**Production Structure and Resource-Use:**

In the context of the present study, an analysis of production structure and resource use provides us with deeper insights into the economics of cultivation of the selected horticultural crops. In particular, it comes out that in pineapple cultivation the total revenue accrued per acre of land is quite high, as also the cost of production - thereby making the net returns from pineapple at comparatively higher than mandarin oranges. In sharp contrast, total revenue accrued per acre of land from mandarin orange cultivation comes out to be much lower than pineapple cultivation, as also the costs of production – thereby bringing down the net returns per acre of land to less than half of the net returns per acre from pineapple. Nevertheless, it has been observed that for both the selected horticultural crops, net return per unit of land remains much higher than the net returns from kharif crops like paddy.

**Net Returns (Gross Value of Output - Total Cost) from Horticultural and Non Horticultural Crops (Crop- wise Rs per acre)**

| Name of the crop | Marginal | Small | Medium | Total |
|---|---|---|---|---|
| Kharif crops during 2008 | | | | |
| Maize | 4454.10 | 7612.99 | 0.00 | 4813.06 |
| Millet | 4338.15 | 0.00 | 0.00 | 4338.15 |
| Paddy | 7040.30 | 6022.36 | 5861.31 | 6780.06 |
| Rabi crops during 2008 | | | | |
| Chillie | 9018.78 | 8950.00 | 0.00 | 9001.58 |
| Ginger | 8533.46 | 7672.00 | 0.00 | 8512.94 |
| Potato | 5989.04 | 6065.00 | 0.00 | 5990.76 |
| Turmeric | 5462.73 | 0.00 | 0.00 | 5462.73 |
| Horticultural crops during 2008-09 | | | | |
| Pineapple | 25902.62 | 25858.83 | 17819.41 | 25406.24 |
| Mandarin Orange | 8189.93 | 8161.37 | 0.00 | 8189.36 |
| Broom Stick | 3828.65 | 0.00 | 0.00 | 3828.65 |
| Tea | 15399.77 | 20748.94 | 21986.45 | 18229.05 |

*Sample Size = 100*
*Source: Field Survey*

The resource-use patter for the pineapple and mandarin orange also appear different in nature altogether. In fact the resource use in pineapple cultivation appears comparatively capital-intensive as total material investments (variable + fixed) accounts for almost three-quarters of total costs per unit of land. In contrast, in case of mandarin orange production, the variable labour costs claims more than half of the total costs and thus appears to be comparatively more labour-intensive. In absolute terms however, human labour application in mandarin orange cultivation per acre of land is merely one-thirds of that in case of pineapple cultivation. In comparison to traditional field crops like paddy, it has been observed that the requirement of human labour (including family labour) remains much higher in pineapple cultivation, while that remains much lower in case of mandarin orange cultivation.

In case of marketing of output, it is extremely unfortunate to find that there has been a complete absence of formal marketing channels like government agencies or cooperative bodies to the relief of the beneficiary pineapple and mandarin orange growers in the study region. Most of the output is sold at the wholesale markets or to the intermediaries at the farm-gates. Again, though there are ample opportunities

for processing activities for both the crops, it has been found that none of the sample beneficiary farmers are involved in on-farm processing activities of any kind.

**Impact of NHM on Expansion of Horticultural Crops:**

An analysis of the impact of NHM on the expansion of horticultural crops and the subjective perceptions of the farmer households brings out important revelations relating to the performance of the National Horticulture Mission.

On the one hand, it has been observed that during the period 2004-05 to 2009-10, both area and yield rate of mandarin oranges have increased significantly, though there has been a marginal increase in area and yield rate of pineapple.

**Impact of NHM on Area and Yield Rate of Pineapple**

| Year | Area cultivated in acres per household | | | | Yield rate obtained quintals per acre* | | | |
|---|---|---|---|---|---|---|---|---|
| | Marginal | Small | Medium | Total | Marginal | Small | Medium | Total |
| 2004-05 | 0.55 | 0.89 | 2.61 | 0.76 | 105.11 | 105.66 | 103.87 | 105.18 |
| 2005-06 | 0.54 | 0.89 | 2.61 | 0.76 | 105.39 | 107.35 | 105.24 | 105.89 |
| 2006-07 | 0.54 | 0.89 | 2.61 | 0.75 | 104.31 | 106.58 | 103.65 | 104.86 |
| 2007-08 | 0.54 | 0.89 | 2.61 | 0.75 | 104.83 | 104.96 | 105.79 | 104.92 |
| 2008-09 | 0.54 | 0.89 | 2.61 | 0.75 | 105.56 | 105.27 | 104.08 | 105.40 |
| 2009-10 | 0.58 | 0.91 | 2.64 | 0.79 | 107.06 | 107.42 | 107.16 | 107.16 |
| Average | 0.55 | 0.89 | 2.62 | 0.76 | 105.38 | 106.21 | 104.97 | 105.57 |

** Calculated on a yearly basis; Sample Size = 50*
***Source: Field Survey***

**Impact of NHM on Area and Yield Rate of Mandarin Oranges**

| Year | Area cultivated in acres per household | | | | Yield rate obtained quintals per acre | | | |
|---|---|---|---|---|---|---|---|---|
| | Marginal | Small | Medium | Total | Marginal | Small | Medium | Total |
| 2004-05 | .69 | 1.50 | 0.00 | .71 | 9.80 | 9.55 | 0.00 | 9.79 |
| 2005-06 | .69 | 1.50 | 0.00 | .71 | 9.95 | 9.61 | 0.00 | 9.94 |
| 2006-07 | .70 | 1.80 | 0.00 | .72 | 10.08 | 9.61 | 0.00 | 10.07 |
| 2007-08 | .71 | 1.80 | 0.00 | .74 | 10.43 | 9.56 | 0.00 | 10.41 |
| 2008-09 | .83 | 2.50 | 0.00 | .86 | 9.59 | 9.60 | 0.00 | 9.59 |
| 2009-10 | .84 | 2.50 | 0.00 | .87 | 9.83 | 9.60 | 0.00 | 9.83 |
| Average | 0.74 | 1.93 | 0.00 | 0.77 | 9.95 | 9.59 | 0.00 | 9.94 |

* Calculated on a yearly basis; Sample Size = 50
**Source: Field Survey**

At the same time, there has been a gradual increase in the coverage under certified inputs, which indicates a gradual shift of production technology with certified inputs in place of traditional inputs. The positive impact of the National Horticulture Mission can also be witnessed in case of area expansion by rejuvenation and protection, as the area per household per crop increased (though marginally) for both pineapple and mandarin orange cultivation, resulting into increase in production and productivity for the respective crops. However, in case of sources of procurement of resources for pineapple and mandarin orange cultivation, informal sources like private nurseries and fellow farmers continue to play an important role.

However, the survey reveals the subsidy provided under the NHM forms only a negligible amount of the total investment required. Furthermore, the extension activities provided by the district horticulture and agriculture officials under NHM make only a sorry figure, as very little has been done in case of dissemination of technologies through training and capacity building activities. At the same time, there has been a complete absence post-harvest management facilities like packhouse, storage units, and mobile processing units formed under the NHM in the study regions of both of the districts.

Nevertheless, with due respect to the subjective responses made by the beneficiary farmer households, it can be said that the NHM performed well by providing financial assistance to the farmers to boost up and motivate them towards diversification of cropping pattern in favour of horticultural crops. It should be noted however that there has been an aspiration for enhancement of subsidy among the beneficiary farmers, while at the same time they appeal for development of proper marketing facilities, enhancement of institutional credit and improvement of extension and capacity-building services under NHM.

**Perception of Households about the NHM (% of Households)**

| Details of training | Marginal | Small | Medium | Total |
|---|---|---|---|---|
| How NHM has helped you to increase your area under horticultural crops | | | | |
| By providing seedling/nursery | 44.00 | 0.00 | 0.00 | 44.00 |
| By providing material inputs | 0.00 | 0.00 | 0.00 | 0.00 |
| By capacity building (providing training) | 17.00 | 1.00 | 0.00 | 18.00 |
| By providing processing facilities | 0.00 | 0.00 | 0.00 | 0.00 |
| By providing market for our end product | 0.00 | 0.00 | 0.00 | 0.00 |
| By providing procurement facility | 0.00 | 0.00 | 0.00 | 0.00 |
| What are the good points in the policy towards NHM | | | | |
| Financial assistance | 53.00 | 11.00 | 1.00 | 65.00 |
| Building infrastructure | 0.00 | 0.00 | 0.00 | 0.00 |
| Capacity Building (awareness camps / training etc) | 0.00 | 0.00 | 0.00 | 0.00 |
| Subsidy provision | 71.00 | 12.00 | 2.00 | 85.00 |
| Any other | 6.00 | 3.00 | 1.00 | 10.00 |
| Do you think NHM has increased employment opportunities for the farmers and agricultural labourers, How? | | | | |
| By increasing area under horticultural crops that are manually operated | 9.00 | 6.00 | 1.00 | 16.00 |
| By establishing horticultural processing units in the local areas | 0.00 | 0.00 | 0.00 | 0.00 |
| By providing subsidy to those who have diversified their crops from field to horticultural crops | 12.00 | 2.00 | 1.00 | 15.00 |
| No NHM has not increased employment in any way | 65.00 | 8.00 | 1.00 | 74.00 |
| Do you think your income has grown up after adopting horticultural crops with the help of NHM. If yes how much? | | | | |
| less than 20 % | 15.00 | 6.00 | 1.00 | 22.00 |
| 20 to 40 % | 7.00 | 1.00 | 1.00 | 9.00 |
| 40 to 60 % | 4.00 | 0.00 | 0.00 | 4.00 |
| 60 to 100 % | 0.00 | 0.00 | 0.00 | 0.00 |
| No increase at all | 57.00 | 7.00 | 1.00 | 65.00 |
| Are farmers in your village aware about the National Horticulture Mission, How? | | | | |
| They have actively benefited from the subsidies provided by the NHM | 58.00 | 8.00 | 2.00 | 68.00 |
| They actively participate in the training programmes provided by the NHM | 36.00 | 9.00 | 2.00 | 47.00 |
| They have benefited from the infrastructural building up being done by the NHM | 0.00 | 0.00 | 0.00 | 0.00 |
| They have been able to raise their area under horticultural crops with the help of NHM | 28.00 | 7.00 | 2.00 | 37.00 |
| No they stand aloof and completely unaware about the activities of NHM | 27.00 | 2.00 | 0.00 | 29.00 |
| What changes do you suggest to make NHM more effective – mention | | | | |
| Make formal/institutional credit available | 17.00 | 3.00 | 1.00 | 21.00 |
| Develop effective marketing facilities | 22.00 | 2.00 | 1.00 | 25.00 |
| Improve extension, capacity building & infrastructure | 14.00 | 3.00 | 1.00 | 18.00 |
| Increase amount of subsidy | 30.00 | 6.00 | 0.00 | 36.00 |

*Sample Size = 100*
*Source: Field Survey*

**Policy Suggestions:**

Based on the findings of the present survey, the following are the suggested policy measures to mitigate the problems relating to the performance of the National Horticulture Mission. However, it needs to be noted that coordination among the different government and non-government agencies plays a crucial role in bringing about effective implementation of the National Horticulture Mission. The specific policy suggestions may be presented here as follows -

- It remains highly disturbing to observe that though both pineapple and mandarin orange have immense potential in terms of ***processing activities***, none of the sample beneficiary farmers undertake any type of processing activity by themselves. In fact, it has been observed that there has been no initiative either from the government side or from the non-government side to promote processing activities by the farmers in the study region. [*Attention: Ministry of Food Processing, Government of India*]
- Though ***agricultural credit*** has made a tremendous quantitative progress over the decades, non-availability of formal credit still stands to be common phenomena among the resource-poor farmers. It has been observed that owing to non-availability of formal credit, the farmers are often compelled to take loan from various informal credit agencies at exorbitant interest rates. Unless the reach of the formal credit agencies extend even to the marginal farms with very little collateral/mortgage to offer against loans, the dependence on informal agencies will continue to suffice the higher investment requirements for horticultural of crops like pineapple. [*Attention: Ministry of Agriculture, Government of India*]
- There is no denying the fact that ***marketing of outputs*** assumes immense importance especially for the highly perishable crops like pineapple and mandarin oranges. However, the present study does not encounter any marketing support being provided either to the pineapple cultivators or to the orange cultivators. In fact in the absence of proper marketing

infrastructure, it has been observed that the farmers are often compelled to sell their products at lower price to the local traders at the farm-gate or in the local markets. [*Attention: West Bengal Agriculture Marketing Board, Government of West Bengal*]

- It has been observed that the state of ***extension services*** provided under the mission accounts only for sorry state, which is especially true for district Darjeeling under continuous political disturbances. In fact, it appears that there has been a severe lack of initiative from the government officials to extend extension services to the farmers. [*Attention: Directorate of Agriculture, Government of West Bengal*]
- The amount of ***subsidy*** provided under the mission for pineapple accounts only for a very small fraction of the total costs involved. Hence, there is a felt need to revise the amount of subsidy to promote horticulture and to make subsidization more meaningful. [*Attention: State Horticulture Board, Government of West Bengal*]