

## THE IMPACT ANALYSIS OF THE NHM-SCHEME IN CASE OF THE VEGETABLE PRODUCTION ECONOMY OF WEST BENGAL

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**ABSTRACT:** *The paper analyses the impact of the National Horticultural Mission (NHM) Scheme on the West Bengal economy in terms of the nature and patterns of horticulture crops. The study is focused on vegetables as the vegetable is the most important horticultural crop of West Bengal. Here, we have discussed the impact of NHM on vegetable production over the years using dummy variable regression analysis. We have also shown the trend of the gross area under production, total production and land productivity in the case of different selected vegetables during 2001-02 to 2014-15. An analysis of the study reveals that there is a keen success of NHM in the West Bengal vegetable production economy. Further, using a suitable methodology of  $\beta$ -convergence, we have observed that there is convergence in land productivity of vegetables across districts of West Bengal and such convergence is found to be high during the period of NHM. This could also be argued as a success story of NHM for the West Bengal vegetable economy.*

**Key Words:** *NHM-Scheme, Vegetables Production, Land Productivity,  $\beta$ -convergence.*

**I. Introduction:** The National Horticultural Mission (NHM) is a big enhancement scheme for the diversified cultivation in West Bengal but the initial expenditure to releases under NHM scheme was very low in West Bengal at the beginning of the mission at 2005-06 (Only 0.02 % as per the report of the Andhra Pradesh Productivity Council). The allocation of fund (only 2.7 % of total allocation during 2012-13 to 2016-17) under the National Horticulture Mission (NHM) to West Bengal and the percentage of the release of such allocated fund to the state (only 46.2 percent during the same period) are also very low. Regarding state-wise performance evaluation by the Council, it was reported that under the area expansion programme, the quality of planting material is not considered satisfactory by the beneficiaries in West Bengal. Agro-economic research centre (2011), Visva-Bharati has made a positive impact study of NHM on pineapple and mandarin oranges only in two districts of West Bengal. There has been a gradual increase in the coverage of certified inputs in place of traditional inputs. The positive impact of NHM on horticultural crops in other states like Karnataka, Rajasthan, Andhra Pradesh, and Kerala is also significant (Patil and Hosamani, 2017; Mritunjay, Manishkant and Shreekant, 2017; Sivagnanam, 2013). It is a very much common fact that horticulture is a major source of diversified cultivation. In this regard, the West Bengal farmers get just an opportunity to upgrade the cultivation practices after the introduction of the scheme NHM. Among all horticultural crops, vegetables occupy a prime position in regard to production in case of West Bengal (1<sup>st</sup> in India). The vast requirement of labour in vegetable production has been supported by the labour surplus nature of rural West Bengal. Again, the regional convergence/divergence perspective of an impact evaluation study of NHM on horticultural crops is an important area of research. In this perspective in view, the present study is trying to measure the real impact of NHM on the most important horticultural crops (vegetables) of West Bengal.

**II. Methodology:** We have considered the area and production of some selected vegetables/vegetable groups like brinjal, cabbage, cauliflower, tomato, radish, lady's finger, cucurbits, onion, peas, and the group of 'other vegetables' and 'total vegetables' during 2001-02 to 2014-15 in West Bengal for the analysis of the study. These time series data are collected from Government sources (NHB, GOI and Bureau of Applied Economics and Statistics, Govt. of West Bengal) to infer the results of the study. To measure the impact of NHM, we have used the dummy variable regression analysis on the production of vegetables (Y) as follows: Regression Model:  $Y = \gamma_0 + \gamma_1 \text{ year} + \gamma_2 \text{ NHM} + u$ , where, NHM is a dummy variable defined as: NHM=0 for the period 2001-02 to 2005-06, and NHM =1 for the period 2006-07 to 2014-15. The positive co-

efficient of dummy NHM ( $\gamma_2$ ) implies a significantly good impact of NHM on the production of vegetables. Further, as an impact of NHM whether all districts are performing well simultaneously or not, we have used the model of  $\beta$ -convergence. To examine convergence/divergence in yield of vegetables across different districts of West Bengal we have considered the regression model:  $X_i = \alpha + \beta X_{0i} + u_i$  (unconditional  $\beta$ -convergence), where  $X_i$ = growth rate of yield of vegetables during 2003-04 to 2014-15 and  $X_0$ = initial yield (triennium crop year ending 2005-06), and  $u$  is stochastic disturbance term. The significantly negative value of  $\beta$  coefficient indicates convergence in yield (productivity of vegetables) and the positive value of  $\beta$  indicates divergence in yield across districts in West Bengal.

### III. Results and Discussion

**3.1 Impact of NHM on the production of vegetables:** Table 1 depicts the dummy variable (NHM) regression results regarding the impact of NHM scheme on the production of selected vegetables based on time series data (2001-02 to 2014-15). An analysis of the data reveals that there is a significantly positive impact of NHM on the total production of vegetables in West Bengal. Allowing normal growth (trend) of production, the coefficient of dummy variable is found to be positive in cases of radish, lady's finger, cucurbits, tomato, cabbage, and the group other vegetables, while it is negative but insignificant in case of cauliflower, brinjal, and peas production. So, except for very few of the cases, the impact of NHM is significantly good almost in all of the cases. It is interesting to note that after allowing the effect of NHM, there is a significantly increasing trend in the production of each vegetable under consideration in West Bengal. Now, to visualize the discussed impact of NHM on each of the individual vegetable and groups of vegetables, we have shown the trends of area, production, and land productivity of the respective vegetables in the following figures.

Table 1 Impact of NHM scheme on the production of vegetables in West Bengal.

Dep. Variable	Regression Coefficient of			Adj. R <sup>2</sup>	F(2,11)
	Constant	Year	NHM		
<b>Tomato</b>	-75179.52	37.87	69.75	<b>0.957</b>	145.0
p-value	0.000	0.000	0.110		
<b>Cabbage</b>	-57296.73	29.54	0.39	<b>0.920</b>	75.5
p-value	0.000	0.000	0.992		
<b>cauliflower</b>	-47832.23	24.71	-72.40	<b>0.771</b>	22.8
p-value	0.000	0.000	0.104		
<b>Peas</b>	-5074.68	2.59	-1.82	<b>0.677</b>	14.6
p-value	0.009	0.008	0.792		
<b>Brinjal</b>	-90972.65	46.70	-78.58	<b>0.920</b>	75.5
p-value	0.000	0.000	0.133		
<b>Onion</b>	-31599.93	15.86	10.09	<b>0.977</b>	280.3
p-value	0.000	0.000	0.370		
<b>cucurbits</b>	-70894.00	36.20	207.05	<b>0.958</b>	148.4
p-value	0.000	0.000	0.002		
<b>ladysfinger</b>	-28186.53	14.40	82.86	<b>0.970</b>	213.1
p-value	0.000	0.000	0.001		
<b>Radish</b>	-18865.53	9.59	56.67	<b>0.975</b>	255.7
p-value	0.000	0.000	0.000		
<b>othersvegetables</b>	-113072.90	56.94	225.91	<b>0.952</b>	128.5
p-value	0.000	0.000	0.013		
<b>totalvegetables</b>	-538974.70	274.38	499.91	<b>0.995</b>	1380.6
p-value	0.000	0.000	0.000		

Source: estimated from the data of Bureau of Applied Economics and Statistics, Govt. of West Bengal

Figure 1, Trends in area, production, and productivity of **Brinjal** in West Bengal.

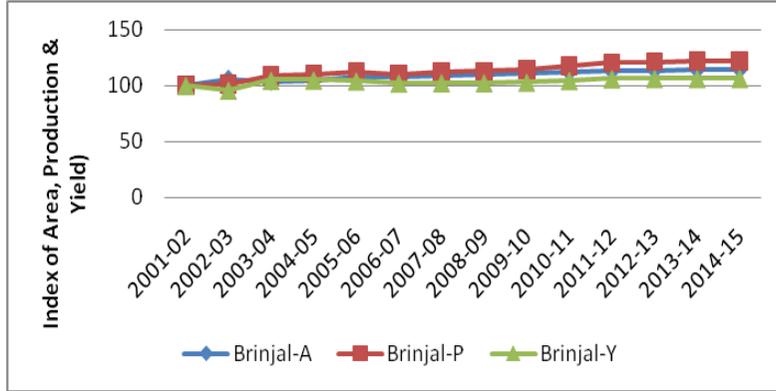


Figure 2, Trends in area, production, and productivity of **Tomato** in West Bengal.

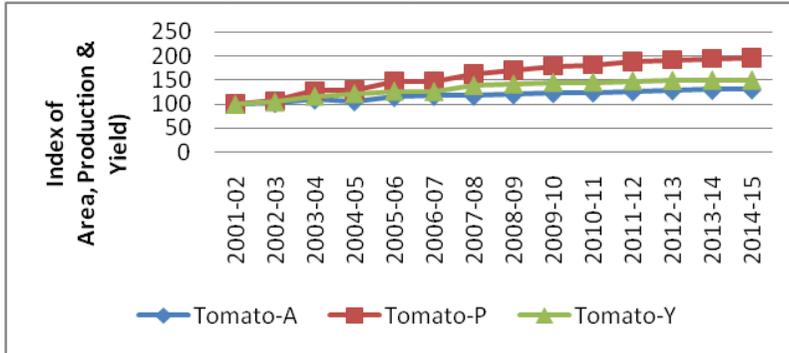


Figure 3, Trends in area, production, and productivity of **Cabbage** in West Bengal.

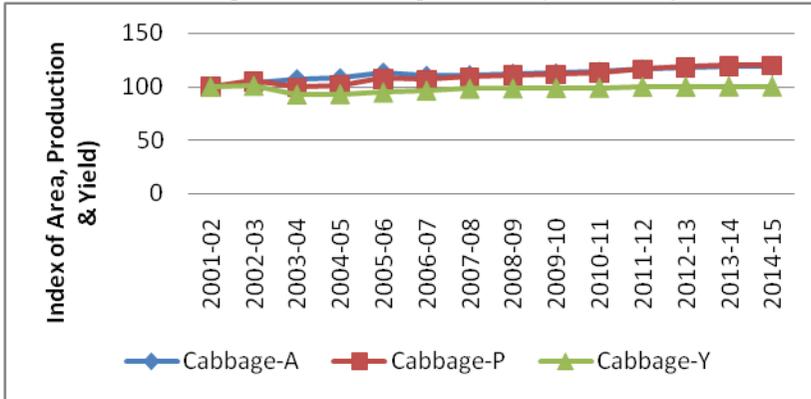


Figure 4, Trends in area, production, and productivity of **Cauliflower** in West Bengal.

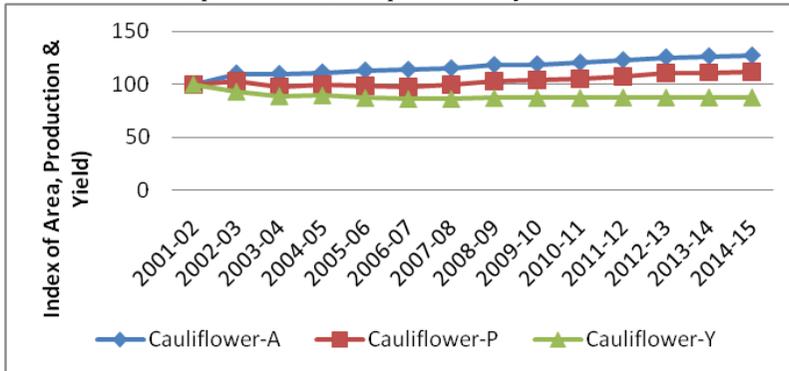


Figure 5, Trends in area, production, and productivity of **Peas** in West Bengal.

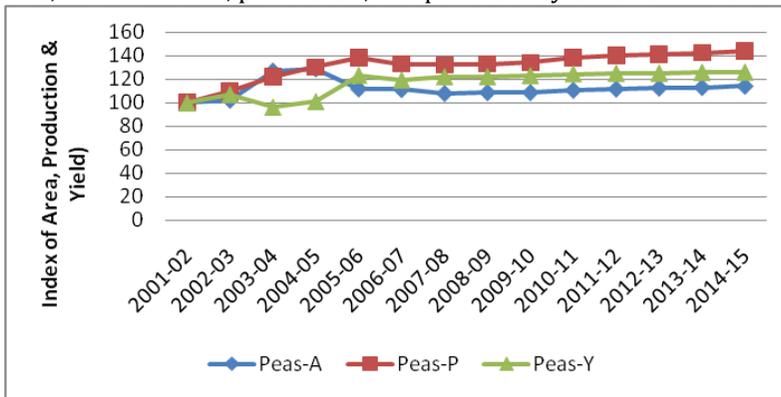


Figure 6, Trends in area, production, and productivity of **Onion** in West Bengal.

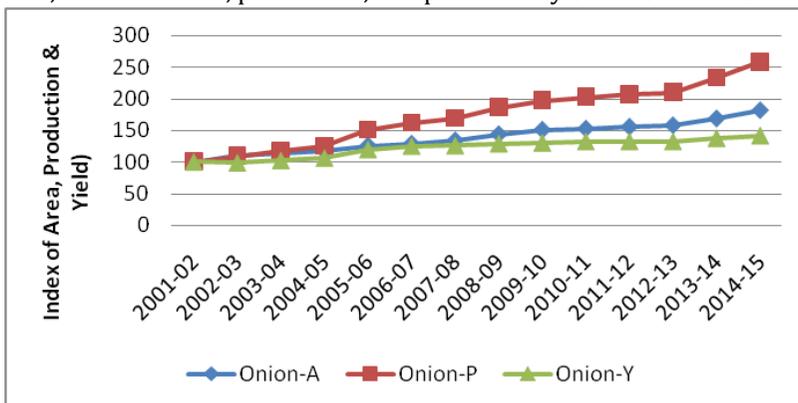


Figure 7, Trends in area, production, and productivity of **Cucurbits** in West Bengal.

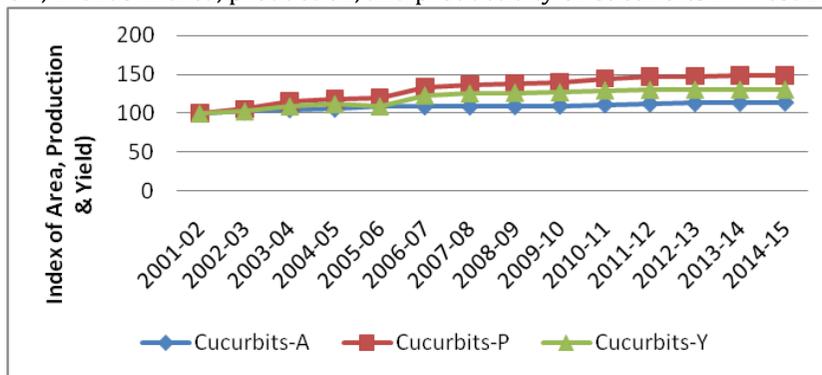


Figure 8, Trends in area, production, and productivity of **Lady's finger** in West Bengal.

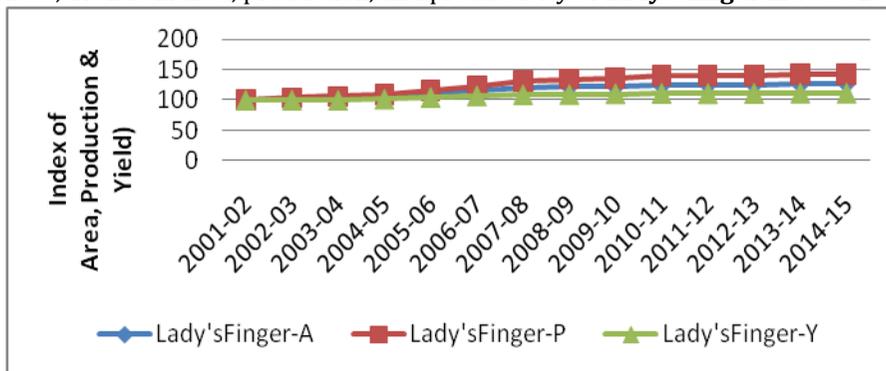


Figure 9, Trends in area, production, and productivity of **Radish** in West Bengal.

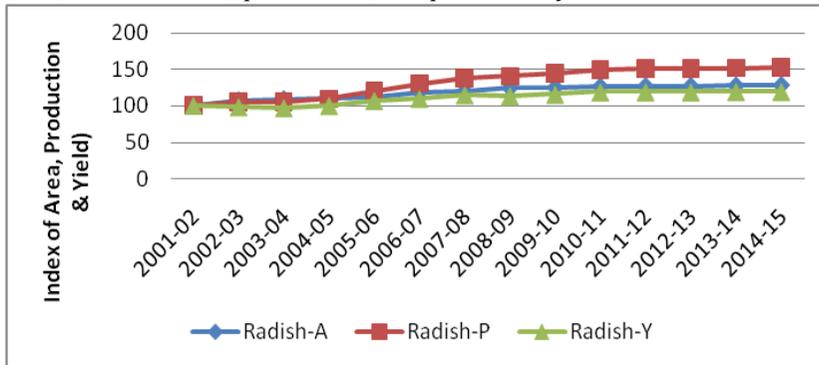


Figure 10, Trends in area, production, and productivity of **Other vegetables** in West Bengal.

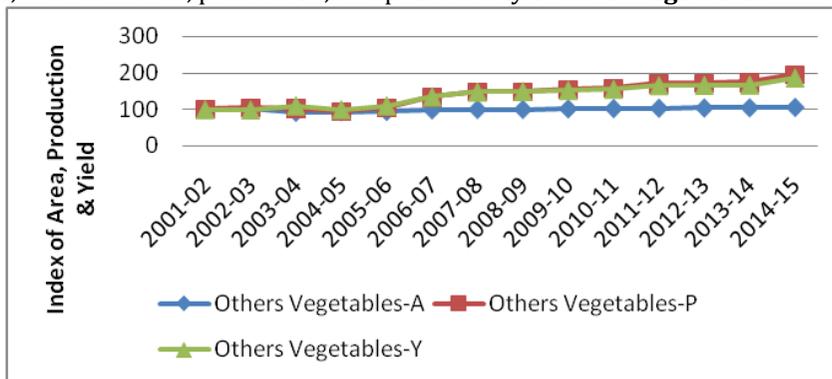
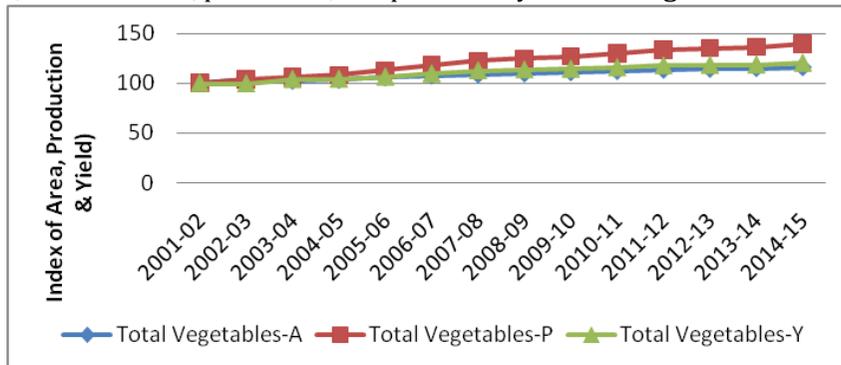


Figure 11, Trends in area, production, and productivity of **Total vegetables** in West Bengal.



An analysis of these figures indicates that there is a visible increasing trend in cases of the area, production and land productivity of vegetables since the implementation year of NHM (2005-06). Hence, it is very clear that the impact of NHM is very significant in West Bengal.

**3.2 Convergence in Productivity ( $\beta$ -Convergence):** Using the method of  $\beta$ -convergence, the present section of the study examines whether all the districts are performing well or not simultaneously at the regime of NHM. Now, as per the methodology, if there is a convergence in land productivity of vegetables across districts then we can say that there is a good indication of the positive impact of NHM on vegetables in West Bengal. The regression results of  $\beta$ -convergence are being summarized in Table 2.

Table 2  $\beta$ -convergence in yield of vegetables across districts of West Bengal:

(Regression results)

Crops	Constant	Slope ( $\beta$ )	R <sup>2</sup>	Prob>F	No. of Obs.
Brinjal	27.164	-9.358	0.787	0.000	18
(p-value)	0.000	0.000			

Cabbage	28.875	-8.621	0.916	0.000	18
(p-value)	0.000	0.000			
Cauliflower	22.264	-6.895	0.591	0.000	18
(p-value)	0.000	0.000			
Cucurbits	14.319	-5.233	0.382	0.006	18
(p-value)	0.002	0.006			
Ladies finger	-3.815	1.913	0.018	0.591	18
(p-value)	0.651	0.591			
Onion	21.098	-7.782	0.487	0.001	18
(p-value)	0.000	0.001			
Peas	12.145	-7.139	0.557	0.000	18
(p-value)	0.000	0.000			
Radish	26.451	10.719	0.714	0.000	18
(p-value)	0.000	0.000			
Tomato	21.645	-7.298	0.157	0.104	18
(p-value)	0.082	0.103			
Others-veg	11.377	-4.603	0.308	0.017	18
(p-value)	0.000	0.017			

Source: Same as Table 1

Analysis of the regression results of  $\beta$ -convergence reveals that there is a convergence in yield of all the vegetable crops across districts during 2003-04 to 2014-15 except in the case of ladies finger. The coefficient of  $\beta$  is found to be significantly negative in the case of brinjal, cabbage, cauliflower, tomato, radish, cucurbits, onion, peas, and the group of 'other vegetables'. The  $\beta$ -coefficient is positive in the case of ladies finger but it is statistically insignificant. Hence, all of the districts pursuing good land productivity almost in the case of all individual vegetables and group of vegetables. Again, as all of the districts of West Bengal are converging in the case of land productivity, all the backward districts in regard to vegetable production economy are also doing very well in the regime of NHM.

**IV. Conclusion:** There is a significantly positive impact of the NHM scheme on the expansion of area, production and productivity of vegetables in West Bengal. The degree of the effect of NHM varies across different vegetables and the overall impression is that the role of NHM is very good to promote the vegetable economy of West Bengal. There is an increasing trend of the area under production, total production and land productivity of vegetables since the implementation of the NHM scheme in West Bengal. It is also observed that the districts of West Bengal are converging to each other in regard of land productivity of vegetables. Thus, the effective implementation of NHM scheme is very important for the expansion and sustenance growth of the vegetable production economy of West Bengal.

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#### References:

1. Patil O.B & Hosamani S.B (2017). Impact of National Horticultural Mission (NHM) Scheme on horticulture development in Vijayapura district Karnataka. International Journal of Commerce and Business Management. Vol 10, Issue 2.
2. Mritunjay S., Manishkant O. & Shreekant S. (2017). Role of National Horticulture Mission (NHM) in horticultural development in Rajasthan. Indian Journal of Agricultural Marketing. Vol 29, Issue 2.
3. Sivagnanam KJ (2013). Impact Study of National Horticultural Mission (NHM) Scheme in Kerala (Study No. 150). Agro Economic Research Centre, University of Madras, Chennai.
4. Chattapadhyaya K.S & Roy D. (2011). Impact Study of National Horticulture Mission Scheme in West Bengal (Study No. 166). Agro- Economic Research Centre, Visva - Bharati, Santiniketan.
5. The report of the Andhra Pradesh Productivity Council, "Impact Evaluation Study of National Horticulture Mission: 2005-06 to 2010-11" (<https://midh.gov.in/PDF/Study-Report-NHM2005-11.pdf>)