

RESEARCH PAPER

Impact of the National Horticulture Mission (NHM) scheme on horticulture development in Vijayapura district Karnataka

■ BHEEMANAGOUDA O. PATIL AND S.B. HOSAMANI

Received : 25.05.2017; Revised : 17.08.2017; Accepted : 01.09.2017

ABSTRACT

National Horticulture Mission (NHM) is a programme formulated for the overall development of Horticulture sector in the country. The Karnataka state has implemented the developmental activities under the mission in the 30 districts, covering 16 important horticultural crops and the scheme has been in function successfully from 2005-06 to till. Vijayapura district is purposively selected for the study in which NHM scheme is been functioning since from 2005-06 to till. With this background the present study was undertaken to analyze the impact of NHM on area, production and productivity of Horticultural crops in Vijayapura district. The study is completely based on secondary data source. During post NHM period the trend turned reverse in all the crop groups except pulse crops, which gained its positive growth (5.09%) and instability reduced during same period. Production of horticultural crops showed decreasing trend at the rate of -9 per cent per year during pre-NHM period and it turned to significant increasing trend at the rate of 9.99 per cent per annum in post-NHM period and similar trend was seen in case of productivity between the pre and post NHM periods. The instability in production and productivity were significantly reduced from 31.58 per cent to 37.93 per cent and from 9.38 per cent to 2.75 per cent, respectively during pre-NHM and post-NHM periods. During post-NHM period highest growth in area and production was observed for fruits (about 13.2% and 15.9%, respectively) followed by vegetables (about 7.3% and 4.5%, respectively). The instability in area and production were also significantly reduced during the same period. In Vijayapura district, fruits and vegetables crops are getting popular among farmers with the Government support under the NHM. Still there is scope to increase the area, production and productivity in horticultural crops by covering more area under the NHM scheme.

KEY WORDS : NHM, Compound annual growth rates, Instability index, Pre and post NHM

How to cite this paper : Patil, Bheemanagouda O. and Hosamani, S.B. (2017). Impact of the National Horticulture Mission (NHM) scheme on horticulture development in Vijayapura district Karnataka. *Internat. J. Com. & Bus. Manage*, 10(2) : 121-128, DOI: 10.15740/HAS/IJCBM/10.2/121-128.

MEMBERS OF THE RESEARCH FORUM

Correspondence to:

BHEEMANAGOUDA O. PATIL, Department of Agricultural Economics, College of Agriculture, University of Agricultural Sciences, DHARWAD (KARNATAKA) INDIA
Email: bheemagriecon@gmail.com

Authors' affiliations:

S.B. HOSAMANI, Rani Channamma University, BELAGAVI (KARNATAKA) INDIA

National Horticulture Mission (NHM) is a programme formulated for the overall development of Horticulture sector in the country. The main objective of NHM is to improve the production and productivity of horticultural crops. It is holistic approach covering all aspects of production, post harvest technology and marketing activities. The Karnataka state has implemented the developmental

activities under the mission in the 30 districts, covering 16 important horticultural crops. The main crops covered under NHM are fruits (Mango, Grapes, Pomegranate, Banana and Pineapple etc.), flowers, medicinal and aromatic plants. The scheme has been in function successfully from 2005-06 to 2013-14. Farmers are getting financial assistances like subsidies, planting materials and plant protection materials. Vijayapura district is purposively selected for the study in which NHM scheme is been functioning since 2005-06 to till and is one of the major producer of horticultural crops in Karnataka. Agriculture being the main occupation in Vijayapura district, more than 75 per cent of the work force is engaged in agriculture. The cropping pattern in the district reveals that food crops like sorghum, maize, bajra and wheat among cereals, red gram, bengal gram and green gram among Pulses are major crops cultivated in the district. The major oilseed crops are sunflower, groundnut and safflower. Horticulture crops like grapes, pomegranate, ber, guava, sapota and lime are major crops grown. The net sown area in Bijapur district was 839213 hectares. Recent trend showed that there is a high shift towards horticulture crops which occupied an area of 4,6,066 hectares (Anonymous, 2013-14). Out of which, fruits and vegetables accounted for 44 and 49 per cent of the total horticultural area in the district, respectively (Fig. A) (Anonymous, 2014a). With this background the present study was undertaken to analyse the impact of NHM on area, production and productivity of Horticultural crops in Vijayapura district.

METHODOLOGY

The present study is based entirely on secondary sources. The secondary data regarding area, production and productivity of cereals, pulses, oilseeds, commercial crops and horticultural crops for the period from 1998-99 to 2013-14 were collected from National Horticulture Board database, Department of Horticulture, GOK and DES, GOK and other published sources. Parameters considered for analyzing the impact of NHM on horticultural development in Vijayapura district are as follows

Compound annual growth rate (CAGR) :

Compound annual rate of growth is computed using the following relation:

$$Y_t = Y_0 (1+r)^t$$

where,

Y_t = Value of the variable (area, production, productivity) in final year t

Y_0 = Value of the variable (area, production, productivity) in initial year 0

t = Number of years

r = Compound annual growth rate

To estimate the equation and the growth rate r, the equation is transformed in log terms

$$\ln Y_t = \ln Y_0 + t \ln (1+r) + \ln u$$

This equation may be written as, $Z = \alpha + t \beta + e$

where,

$$Z = \ln Y_t$$

$$\alpha = \ln Y_0$$

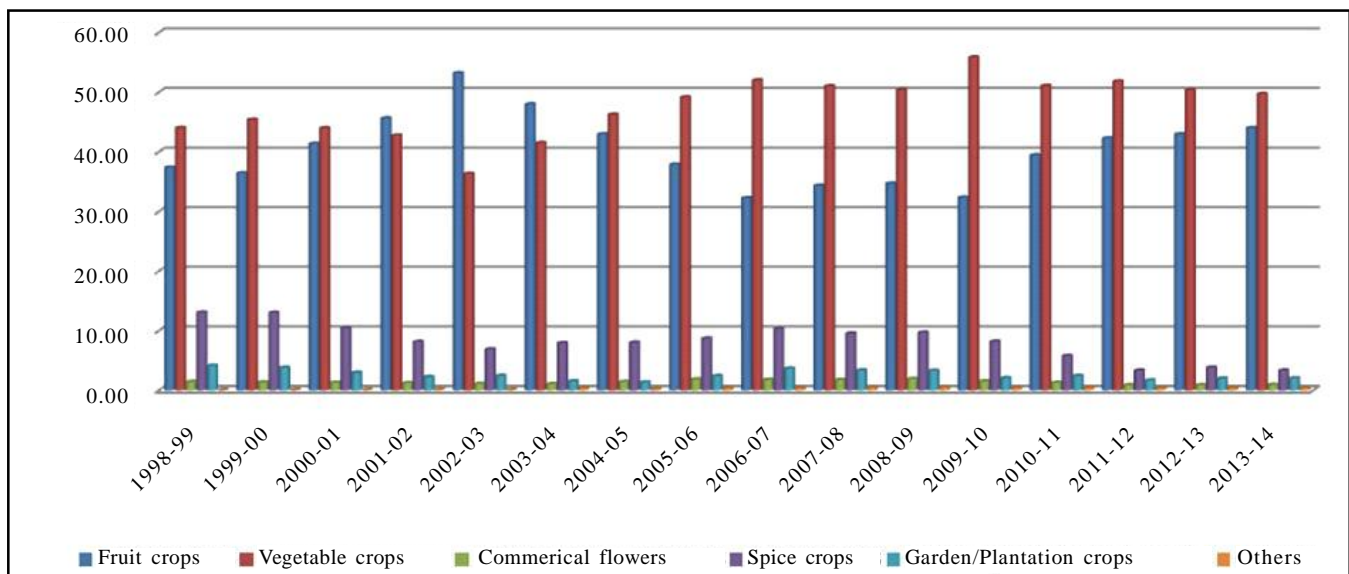


Fig. A : Per cent share of area under horticultural sub-sectors in total horticultural area in Vijayapura district (%)

$$\beta = \ln(1+r)$$

When we regress $\ln Y_t$ with $\ln Y_{t-1}$ we get the co-efficient

β

Equating β value with $\ln(1+r)$,

$$\ln(1+r) = \beta$$

where,

$$1+r = \text{Antiln } \beta$$

$$r = (\text{Antiln } \beta - 1) * 100$$

Cuddy-Della valle index :

Cuddy-Della valle index (corrected co-efficient of variation) was used, which takes in to consideration the long term trend in economic variables. Therefore in order to examine the extent of risk involved in horticultural crop production, the instability in the horticultural crops area, production and productivity was estimated using Cuddy-Della valle index.

$$I = CV \times (1 - R^2)^{0.5}$$

where

I = Instability index (%)

CV = Co-efficient of variation (%)

R² = Adjusted co-efficient of determination

Compound Annual Growth Rate (CAGR) and Instability Index (II) in area and production and productivity of selected crops were computed using 16 years time series data. For better interpretation, the time series data was classified broadly into pre-NHM (1998-99 to 2005-06) and Post NHM periods (2006-07 to 2013-14).

ANALYSIS AND DISCUSSION

Impact of NHM on horticultural area was noticeably evident from long term growth trends. Compared to cereals (5%), pulses (1.38%) and oilseeds (13.67%), the area under horticultural and commercial crops were showed negative growth of -9.07 per cent and -13.09 per cent with higher instability of 19.55 per cent and 32.01 per cent, respectively during pre-NHM period and similar trend was seen in case of productivity during the same period. During post NHM period the trend turned reverse in all the crop groups except pulse crops, which gained its positive growth (5.09%) and instability reduced during same period. Production of horticultural crops showed decreasing trend at the rate of -9 per cent per

Particulars	Before NHM (1998-99 to 2005-06)				After NHM (2006-07 to 2013-14)			
	Average	C.V. (%)	II	CAGR (%)	Average	C.V. (%)	II	CAGR (%)
Cereals								
Area (ha)	3,37,499	53.08	52.82	5.00	3,97,726	8.93	7.19	-2.06
Production (t)	2,57,137	54.48	54.33	3.51	4,50,085	16.55	15.84	2.00
Yield (t/ha)	0.76	17.56	17.30	-1.30	1.13	15.89	12.85	4.22
Pulses								
Area (ha)	1,23,555	17.65	17.37	1.38	2,82,931	22.70	19.39	5.09
Production (t)	50,153	26.06	24.45	-4.46	1,33,854	35.72	33.10	5.66
Yield (t/ha)	0.41	25.78	22.62	-5.78	0.47	18.47	18.46	-0.18
Oilseeds								
Area (ha)	2,76,862	37.12	20.36	13.67**	1,93,176	37.31	17.51	-12.04**
Production (t)	1,02,597	36.51	21.59	11.41*	67,318	32.10	19.73	-10.43**
Yield (t/ha)	0.37	22.20	21.76	-1.98	0.35	17.51	16.97	1.82
Commercial crops								
Area (ha)	20,834	45.07	32.01	-13.09*	38,712	30.35	19.36	10.20*
Production (t)	1,18,6778	43.74	26.81	-15.13*	22,55,268	38.69	25.90	13.23*
Yield (t/ha)	56.96	34.48	34.33	-1.28	58.26	10.40	8.37	2.62
Horticulture crops								
Area (ha)	37,041	30.03	19.55	-9.07*	39,613	20.11	8.83	8.54**
Production (t)	5,31,895	40.41	31.58	-9.00	7,32,660	23.22	9.38	9.99**
Yield (t/ha)	14.36	38.89	37.93	-2.78	18.50	3.13	2.75	0.75

Source: (Anonymous, 2014a) and (Anonymous, 2014b)

Note: 1.CV-co-efficient of variation (%), II-Instability Index (%), Compound Annual Growth Rate (%)

2. ** and * indicate significance of values at P=0.01 and 0.05 probability level, respectively

year during pre-NHM period and it turned to significant increasing trend at the rate of 9.99 per cent per annum in post-NHM period and similar trend was seen in case of productivity, it was decreasing at the rate of -2.78 per cent per year during pre-NHM period and turned to positive growth at 0.75 per cent during post- NHM period (Table 1). Increase in production was mainly due to increase area under horticulture crops under area expansion programme of NHM. The results obtained in the present study were on par with the study conducted by Acharya *et al.* (2013) and Ramachandra *et al.* (2013). The instability in production and productivity were significantly reduced from 31.58 per cent to 37.93 per cent and from 9.38 per cent to 2.75 per cent, respectively during pre-NHM and post-NHM periods (Table 1). The positive growth and low instability in horticultural crops during post-NHM period was mainly due to an additional area was brought under horticultural crops through area

expansion component, rejuvenation of old trees with new cultivars, better technologies like integrated nutrient management and integrated pest management activities under the assistance of NHM. Similar results were found in the study conducted by

A perusal of Table 2 depicts that pre-NHM growth rate of area under fruits crops was -8.63 per cent per annum with instability of 23.14 per cent and during post-NHM period the area expanded at 13.23 per cent per annum with instability of 8.48 per cent. Production of fruits crops were decreasing at the rate of -9.83 per cent per annum with instability of 21.88 per cent during pre-NHM period and production increased at 15.9 per cent per annum with instability of 11.05 per cent during post-NHM period. The similar trend has been seen in case of productivity during pre and post NHM periods. The significant growth rates in fruit production are mainly the result of area expansion and contribution of

Table 2 : Growth and instability in area, production and yield of major horticultural sub-sectors in Vijayapura district of Karnataka								
	Before NHM (1998-99 to 2005-06)				After NHM (2006-07 to 2013-14)			
	Average	C.V. (%)	II	CAGR (%)	Average	C.V. (%)	II	CAGR (%)
Fruit crops								
Area (ha)	16,035	31.35	23.14	-8.63	15,420	28.80	8.48	13.23**
Production (t)	2,85,672	32.36	21.88	-9.83*	2,88,172	34.31	11.05	15.90**
Yield (t/ha)	17.76	4.60	3.22	-1.32*	18.42	8.41	6.07	2.36*
Vegetables								
Area (ha)	16,354	30.34	18.03	-9.70*	20,734	20.53	12.81	7.35*
Production (t)	1,75,618	48.97	47.85	5.36	4,32,854	19.56	16.20	4.59
Yield (t/ha)	11.44	52.10	43.13	16.67	21.01	7.61	4.23	-2.57**
Commercial flowers								
Area (ha)	498	28.84	20.53	-8.70	527	22.13	18.68	-4.65
Production (t)	3,423	36.15	25.84	-10.71	3,288	17.57	17.47	-0.74
Yield (t/ha)	6.77	14.42	13.32	-2.20	6.33	12.47	7.53	4.10**
Spices								
Area (ha)	3,692	46.01	16.85	-16.68**	2545	34.37	21.55	-10.90*
Production (t)	16,205	45.67	31.42	-11.48*	1,2301	34.42	17.79	-12.30**
Yield (t/ha)	4.61	25.43	21.08	6.24	4.85	11.73	10.96	-1.57
Garden / Plantation crops								
Area (ha)	1,044	55.31	25.64	-21.23**	979	12.59	10.68	-2.72
Production (t)	499	20.30	17.03	-5.21	412	75.99	31.92	-36.49**
Yield (t/ha)	0.53	72.53	72.49	2.25	0.40	76.75	30.97	-34.71**
Others								
Area (ha)	57	52.59	33.50	18.42*	163	18.14	13.66	6.07**
Production (t)	148	103.26	49.29	34.49**	1172	26.23	13.78	12.07**
Yield (t/ha)	2.33	62.87	51.23	13.28	7.03	15.35	5.31	6.15

Source: (Anonymous, 2014a)

Note: 1.CV-co-efficient of variation (%), II-Instability Index (%), Compound Annual Growth Rate (%)

2. ** and * indicate significance of values at P=0.01 and 0.05 probability level, respectively

productivity has also been significant in increased production of fruits in the study area. The results were on par with the results obtained in the study conducted by Singh and Rani (2013). The Table 2 also depicted the growth rate in area and instability index of vegetable crops. The area was decreasing at the rate of -9.70 per cent during pre-NHM and which has increased to 7.35 per cent per annum during post-NHM period. The instability has reduced from 18.03 to 12.81 per cent during pre and post-NHM period. Similarly, production has increased at the rate of 5.35 per cent and 4.59 per cent per annum during pre and post-NHM period, respectively. The instability has reduced from 47.85 to 16.20 per cent between pre and post NHM period. The reduction in growth of vegetables production was mainly due to reduction in productivity from 16.67 per cent per annum to -2.57 per cent during pre-NHM and post-NHM periods, respectively but instability was reduced after NHM implementation (Sameer and Kulkarni, 2014).

Growth in area under commercial flower crops was showed decreasing trend during pre-NHM and post-NHM periods *i.e.*, -8.70 per cent and -4.65 per cent per annum, respectively with instability reduced from 20.53 per cent to 18.68 per cent. Growth in flower crops production was showed similar decreasing trend during pre-NHM and post-NHM periods with instability reduction from 25.84 per cent to 17.47 per cent in pre and post-NHM period, respectively. The productivity of commercial flowers showed an increasing trend during post-NHM period (4.10 %) when compared to pre-NHM period (-2.20 %). Reduction in instability in commercial flowers is mainly due to introduction of protected cultivation of cut flowers on commercial scale in the district and numbers of floriculture units have become exporters of cut flowers to other countries and there is lot of scope for increasing area and production of flowers in the study area. The results obtained were on par with the results obtained by Karuthapandi and Bagavathi (2014).

Growth in area of spices and plantation crops was showed negative trend during pre-NHM and post-NHM period (Table 2) and instability in area has reduced in post-NHM period as compared to the pre-NHM period. Production of spices and plantation crops has shown negative growth during both the periods. During post-NHM period with instability was reduced in case of spices but that has increased in case of plantation crops

during post-NHM period.

The growth and variability in area, production and productivity of major horticultural sub-sectors in the district are presented in the Table 2. The growth in area of all sub-sectors during the pre-NHM period was negative, such as fruits (-9%), vegetables (-10%), commercial crops (-9%) and plantation crops (-21) but positive growth was observed in case of others (medicinal and aromatic crops) and the instability also high for these crops in the same period. During post-NHM period highest growth in area and production was observed for fruits (about 13.2% and 15.9%, respectively) followed by vegetables (about 7.3% and 4.5%, respectively). The instability in area and production were also significantly reduced during the same period. During post-NHM period, all horticultural sub-sectors showed negative growth in area and production except fruits and vegetables. The main factors responsible for significant growth in area under fruits and vegetables include higher return relative to other crop groups, higher demand for fruits and vegetables, big push from the government through the National Horticulture Mission in Vijayapura district. Due to shift in demand pattern towards high valued crops, farmers also responding to market signals and are gradually shifting production –mix to meet growing demand for high value commodities. The results obtained in the present study were on par with the study conducted by Anand and Pandurang (2016) and Usha (2011).

Table 3 depicted growth and instability in area, production and yield of major horticultural fruit crops in Vijayapura district. The estimated growth rate and instability indices during pre-NHM and post-NHM and was positive and was associated with instability index of 21.17 per cent and 10.73 per cent, respectively in case of area under grape. But in the same period a negative growth (-3.16 % per annum) with instability index of 15.22 per cent was observed for production. The average area, production and productivity of grapes during this period were 3,553 hectares, 59,407 tones and 17.10 tonnes per hectare, respectively. The average of area, production and productivity of grape during the post NHM period were increased to 6,744 hectares, 1, 05,592 tones and 15.65 t/ha, respectively. A significantly positive growth of 13.12 per cent was observed with the instability index of 10.73 per cent in the area of grapes during post-NHM period. Production and productivity of grape during

the period also grew at an impressive rate of 13.35 and 0.20 per cent, respectively. The instability indices for production and productivity were 16.32 and 14.11 per cent, respectively, indicating a stable growth in production as compare to productivity during the period in Vijayapura. The estimated growth rate and instability index during pre-NHM was -9.01 per cent per annum and 39.77 per cent, respectively in case of area under pomegranate. In the same period production and yield of pomegranate showed negative growth of 10.31 per cent and 1.43 per cent per annum, respectively with instability indices of 37.24 per cent and 11.08 per cent. Average area, production and yield of pomegranate was 4,262 hectares, 45,224 tonnes and 10.67 t/ha. The average of area, production and productivity of pomegranate during the post-NHM period were 1,341 hectares, 10,598 tonnes and 7.56 t/ha. A positively significant growth of 7.73 per cent per annum was observed with the instability index of 16.71 per cent in the area of pomegranate during post-NHM period. Production and productivity of pomegranate during the period also grew significantly at the rate of 22.03 and 13.27 per cent per annum, respectively. The instability

indices for production and productivity were 16.62 per cent and 10.45 per cent, respectively, indicating a stable growth in production as compare to productivity during the period in Vijayapura. The results obtained in the present study were on par with the study conducted by Mokashi (2012); Sharma and Kalita (2008); Saraswati *et al.* (2012) and Mohammad (2011).

In case of lemon, average area, production and yield was observed to be 4,446 hectare, 1,05,884 tones and 23.67 t/ha, respectively which were growing at the rate of -5.85 per cent, -2.59 per cent and 3.46 per cent per annum before implementation of NHM. Corresponding instability indices for area, production and yield was observed to be 27.62, 35.07 and 7.53 per cent, respectively during the same period. During the post-NHM period area and production of lemon showed positive growth of 14.05 per cent and 13.06 per cent per annum whereas yield showed negative growth of -0.87 per cent per annum. Average area, production and yield of lemon was observed to be 3,977 hectare, 98,900 tonnes and 23.38 t/ha, respectively. Area under Banana was growing at the rate of -9.96 per cent per annum during pre-NHM and it showed significantly positive growth of

Table 3: Growth and instability in area, production and yield of major horticultural fruit crops in Vijayapura district

	Pre- NHM (1998-99 to 2005-06)				Post- NHM (2006-07 to 2013-14)			
	Average	C.V. (%)	II	CAGR (%)	Average	C.V. (%)	II	CAGR (%)
Grape								
Area (ha)	3,553	21.94	21.17	2.31	6,744	28.96	10.73	13.12**
Production (t)	59,407	17.13	15.22	-3.16	1,05,592	34.72	16.32	13.35**
Yield (t/ha)	17.10	19.93	13.25	-5.35*	15.65	14.12	14.11	0.20
Pomegranate								
Area (ha)	4,262	45.33	39.77	-9.01	1,341	24.32	16.71	7.73**
Production (t)	45,224	44.62	37.24	-10.31	10,598	49.88	16.62	22.03**
Yield (t/ha)	10.67	11.66	11.08	-1.43	7.56	29.86	10.45	13.27**
Lemon								
Area (ha)	4,446	31.35	27.62	-5.85	3,977	56.80	53.72	14.05
Production (t)	1,05,884	35.68	35.07	-2.59	98,900	58.09	56.34	13.06
Yield (t/ha)	23.67	10.60	7.53	3.46	23.38	19.66	19.60	-0.87
Banana								
Area (ha)	1,129	40.48	30.42	-9.96	1179	50.90	24.32	22.13**
Production (t)	31,304	53.20	33.24	-17.62*	25,046	50.18	26.32	20.89**
Yield (t/ha)	26.52	28.82	19.20	-8.52*	21.40	7.38	6.93	-1.02
Sapota								
Area (ha)	395	48.59	20.72	-17.70**	344	34.64	34.63	-0.30
Production (t)	4,343	58.68	29.56	-19.15**	3,829	42.46	42.18	-1.68
Yield (t/ha)	10.64	15.25	14.51	-1.76	10.92	9.27	8.62	-1.39

Source: Statistical Wing, Directorate of Horticulture, Lalbagh, Bangalore (2014-15)

Note: *, ** indicate significance of values at P=0.01 and 0.05, respectively

22.13 per cent per annum during post-NHM period. Production also showed similar trend during pre and post-NHM. But yield was showing negative growth of 8.52 per cent and 1.02 per cent per annum during pre and post NHM period, respectively. Instability indices for area (24.32 %), production (26.32 %) and yield (6.93 %) were comparatively less during the post NHM period when compared to pre-NHM period. Sapota was showing negative growth in area, production and yield during pre and post NHM period. Average area under Sapota during pre NHM was 395 hectare which decreased to 344 hectare during post NHM period similarly production was decreased from 4,343 tonnes to 3,829 tonnes during post-NHM period. Yield of Sapota was more stable (8.62 %) compare to area and production during the post NHM period. These results were clearly indicated that fruits and vegetables were the dominant crops in Vijayapura district. It could be due to increased in the area of fruit crops (such as grapes, lemon and some extent of banana as well) and due to promotional activities of NHM had reduced the instability in fruit crops. The results obtained in the present study were on par with the study conducted by Lathika and Ajith Kumar (2005). Similar work related to the present investigation was also carried out by Acharya (2003); Birthal *et al.* (2006 a and b); Kadam *et al.* (2015) and Mahendra and Mathur (2008).

Conclusion :

The focus of the present study is on the role of the National Horticulture Mission (NHM) scheme on the development of horticulture sector in Vijayapura district. Based on the findings of the study we may concluded that, horticultural sector in the district exhibited an impressive growth rate in area, production and productivity, which has been indicated by the growth rate and instability analysis because of high growth rate achieved in especially fruits and vegetables. Greater change has been taken place in the horticulture sector relative to the field crops sector during post-NHM period which implies that the NHM scheme has positive impact on the development of horticulture sector in the district. In Vijayapura district, fruits and vegetables crops are getting popular among farmers with the Government support under the NHM. Still there is scope to increase the area, production and productivity in horticultural crops by covering more area under the NHM scheme. Since, crops are diverting towards horticulture crops resulted

in increase in production and availability of fruits and vegetables. Apart from this mango, pomegranate and lemon are the major fruit crops which are gaining importance in recent past in Vijayapura district. Call for the day is to sustain the production with reduction in post harvest loses and increases the value addition. In view of this, there should ensure holistic development of horticulture by adopting cluster approach and convergence of schemes of other departments. Awareness campaign along with regular monitoring and evaluation of NHM programme is also required to make this programme effective in the state.

REFERENCES

- Acharya, S.P., Basavaraja, H., Mahajanashetti, S.B. and Bhat, A.R.S. (2013). Growth in area, production and productivity of major crops in Karnataka. *Karnataka J. Agric. Sci.*, **25**(4)
- Acharya, S.S. (2003). Crop diversification in Indian Agriculture. *Agric. Situ. India*, **60**(5) : 239-250.
- Anand, M.C. and Pandurang, M.K. (2016). Impact of National Horticulture Mission on the pomegranate growers of Maharashtra. *Internat. J. Trop. Agric.*, **34** (4): 1083-1086.
- Anonymous (2014a). Area, production and productivity of horticultural crops in Karnataka, Directorate of Horticulture, Lalbaugh, Bengaluru.
- Anonymous (2014b). Karnataka State at Glance, 2014-15, Directorate of Economics and Statistics, Bengaluru.
- Birthal, P.S., Jha, A.K., Joshi, P.K. and Singh, D.K. (2006a). Agricultural diversification in Northeastern Region of India: Implications for Growth and Equity. *Indian J. Agric. Econ.*, **61**(3): 328-340.
- Birthal, P.S., Joshi, L. and Joshi, P.K. (2006b). Diversification and its impact on smallholders: Evidence from a study on vegetable production. *Agric. Econ. Res. Rev.*, **61**(2): 219-236.
- Kadam, M.M., Rathod, V.J. and Phalke, S.H. (2015). Growth and performance of horticulture in India. *Internat. J. Com. & Busi. Mgmt.*, **8** (2): 207-217.
- Karuthapandi, P. and Bagavathi, M. (2014). Growth and performance of area, production and productivity of jasmine flowers in Madurai districts of Tamil Nadu. *Agric. Situ. India*, **71** (4): 5-9.
- Kumawat, R.C. and Meena, P.C. (2005). Growth and instability in area, production and yield of major spice crops in Rajasthan *vis-à-vis* India. *J. Spices & Aromatic*

- Crops*, **14**(2): 102-111.
- Lathika, M. and Ajith Kumar, C.E. (2005). Growth trends in area production and productivity of coconut in India. *Indian J. Agric. Econ.*, **60**(4):686-697.
- Mahendra, S. and Mathur, V. C. (2008). Structural change in horticultural sector in India: retrospect and prospect for XIth five year plan. *Indian J. Agric. Econ.*, **63**(3): 332-348.
- Mankar, D.M., Wankhade, P.P. and Shambharkar (2013). Impact of National Horticulture Mission on its beneficiaries. *Internat. J. Extn. Edu.*, **9**: 72-89.
- Mohammad, P.W. (2011). Trends, growth and variability of major fruit crops in Balochistan-Pakistan: 1989-2009. *ARPJ. Agric. Biol. Sci.*, **6**(12): 27-36.
- Mokashi, P. (2012). An economic analysis of export potential of grapes from northern Karnataka. M.Sc. (Ag.) Thesis, University of Agricultural Sciences, Dharwad, Karnataka (India).
- Ramachandra, V.A., Rajashekhar, B., Renuka, S. and Munji, R. (2013). Growth in area, production and productivity of major crops in Karnataka. *Internat. Res. J. Agric. Econ. Stat.*, **4**(2): 117-123.
- Sameer, L. and Kulkarni, G.N. (2014). Economics production of vegetables in Belgaum district in Karnataka. *Internat. Res. J. Agric. Econ. Stat.*, **5**(2): 139-142.
- Saraswati, P.A., Basavaraja, H., Kunnal, L.B., Mahajanashetti, S.B. and Bhat, A.R.S. (2012). Growth in area, production and productivity of major crops in Karnataka. *Karnataka J. Agric. Sci.*, **25**(4): 431-436.
- Sharma, A. and Kalita, D.C. (2008). Trends of area, production and productivity of major fruit crops in Jammu and Kashmir. *Agric. Situ. India*, **66**(1): 15-17.
- Singh, R.P. and Rani, Nimmy (2013). Growth rate of area, production and productivity of fruit crops in Jharkhand. *J. Econ. Social Dev.*, **9**(1): 52-60.
- Usha, T. (2011). Impact of the National Horticulture Mission (NHM) scheme in Haryana. Agricultural Economics Research Centre, New Delhi, India.



 ★★★★★ 10th Year of Excellence ★★★★★