

# **Impact Evaluation Study of National Horticulture Mission (NHM) and Horticulture Mission for North East and Himalayan States (HMNEH)**



## **ROLE OF NATIONAL LEVEL AGENCIES**

November 2017



Agricultural Development and Rural Transformation Centre  
INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE  
Bengaluru - 560 072

## PROJECT TEAM

### Principal Investigator

Dr. A.V. Manjunatha, Assistant Professor, ISEC

### Co-Principal Investigators

Dr. K.B. Ramappa, Associate Professor, ISEC

Dr. I. Maruthi, Associate Professor, ISEC

Dr. Parmod Kumar, Professor, ISEC

### Experts

Prof. R. S. Deshpande, Director, Bengaluru Dr. B. R. Ambedkar School of Economics

Dr. G.K.Vasantha Kumar, Former Special Secretary & Director of Horticulture, GoK

Dr. P. Thippaiah, Former Associate Professor & ICSSR Senior Research Fellow

Prof. P.G. Chengappa, Former Vice Chancellor to UAS, Bangalore & ICAR National Professor

Dr. Mahabaligiri Bhat, Former Chief General Manager to Karnataka State Agril. Mktg.Board

Prof. M.G. Chandrakanth, Director, ISEC

### Senior Consultants

Mr.Keshav Murthy, Dr.Vikram Patil, Ms.N.C.Mamatha, Dr.Vilas Jadhav,

Dr.C.M. Devika, Dr.Pesala Peter and Mr.Y.N. Manjunath

### Research Team

Ms.D.T.Preethika, Mr.Akash Katiyar, Ms.Shivani Dechamma, Ms.Kavitha S Naik,

Mr.Manikanta, Ms.K.M. Prema Kumari, Ms.Jeevitha, Ms.K.L.Tejaswini,

Dr. M.S.Yogesh and Mr. Narasimha Murthy

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### *This report is submitted to*

Department of Agriculture, Cooperation & Farmers Welfare

(Horticulture Division-MIDH), Ministry of Agriculture & Farmers Welfare, Government of India.

### **Contact Details:**

Dr. A.V. Manjunatha, Assistant Professor, ISEC

Mobile: +91 9448402848; Email: [manjublore@gmail.com](mailto:manjublore@gmail.com)

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## I. ACKNOWLEDGEMENT

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The study enables to understand the effectiveness of the NHM/HMNEH interventions taken-up by 6 National Level Agencies (NLAs) in meeting the objectives for which the scheme was conceptualized. The NLAs included in the study are (1) Directorate of Cashew & Cocoa Development (DCCD), Kochi; (2) Directorate of Arecanut & Spices Development (DASD), Calicut; (3) National Horticultural Research and Development Foundation (NHRDF), New Delhi; (4) National Seeds Corporation (NSC), New Delhi; (5) Spices Board, Kochi; and (6) Small Farmers Agri-business Consortium (SFAC), New Delhi. The results and policy suggestions provides insights in policy fine tuning and bringing in improvements in the ongoing components of NHM and HMNEH. For this purpose, data was collected from 6 NLAs and beneficiaries pertaining to the period 2012-13 to 2015-16.

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**A.V. Manjunatha**

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## 1. Background

Government of India had set up various agencies to implement programmes for the development of horticulture. Two of these programmes are National Horticulture Mission (NHM) and Horticulture Mission for North Eastern Region including Himalayan States (HMNEH), (now called as MIDH). In order to achieve this, the Ministry of Agriculture, Cooperation and Farmers' Welfare, Government of India, has identified several agencies. As per the NHM guidelines, there are 21 National Level Agencies (NLAs) involved in development of horticulture. Apart from this 5 more agencies were roped into the development of horticulture. Altogether, 26 agencies are currently involved in horticulture development in the country. Out of these, 18 NLAs are actively involved in the overall development of horticulture (in addition to the NHM/HMNEH) apart from state and union territories horticulture departments. Above all, there is one agency - DAC & FW that provides Technical Support at the national level, relating to NHM/HMNEH components.

The mandate for these agencies cover area expansion, rejuvenation, production of seeds and planting materials infrastructure building, capacity building infrastructure building and undertaking of innovative projects in the area of horticulture development, post-harvest management, processing and marketing. The focus of this chapter is to assess the role of NLAs as supporting institutions to MIDH. In addition, the activities covered and impacts of these activities through these six national level agencies are also covered. Of the 6 agencies, 5 come under the Jurisdiction of the Ministry of Agriculture & Farmer Welfare and one under the Ministry of Commerce. Five of these agencies were selected based on the highest cumulative expenditure under NHM/HMNEH from 2012-13 to 2015-16. Another agency namely, the SFAC was selected as it plays a major role in the formation of Farmers Producers' Organisations. A detailed questionnaire was prepared and administered among these agencies to elicit information on various components implemented with NHM funds from 2012-13 to 2015-16. A few beneficiaries of these agencies were also interviewed to assess the impact of the components.

Institutions and governance are two integral parts of state intervention. The institutions specifically create a conduit for better implementation and achieving the desired results. Similarly, the institutions also act as a much needed catalytic agent to connect technology and the beneficiary besides advising the beneficiary on problems confronted if any. Analysing the role of NLAs therefore, needs observations on five important counts. First, theoretically the need and placement of the NLAs in the entire chain of horticultural development. Second, the mandate given to the NLAs becomes a critical milestone. The mandate actually determines the effectiveness of operations of the NLAs. Third, the tools and methodology provided to NLAs decide the effectiveness that they can operate with. Fourth, the expertise and the persons operating the NLAs matter the most. Last, the funds provided and their timely utilisation. The following sections on NLAs are analyzed based on these five perspectives.

### 1.1. Need, Placement and Tasks of NLAS

The NLAs were established at different points of time keeping in view the need and points of intervention. They are basically commodity specific organisations. They are implementing the programmes relating to their own mandate as well as coordinating and monitoring the programmes implemented by the state horticulture development ([Table 1](#)). Prior to the implementation of the NHM and HMNEH, they were funded by different sources specifically, by their ministries for implementation of their activities. After implementation of NHM, the funds were given from the NHM scheme. These

funds were to be used under the mandate of scheme in the form of subsidies to draw farmers to horticulture farming which otherwise has been viewed as less profitable cultivation. In addition to this, they received funds from their respective ministries for non-plan expenditure. Six National Level Agencies are selected for the purpose of analysis.

**Table 1: The Selected National Level Agencies**

Sl.No.	National Level Agency	Tasks
1	Directorate of Cashew and Cocoa Development (DCCD), Kochi, Kerala	The responsibility of the agency is coordinating and monitoring the activities relating to plantation crops excluding coconut and arecanut as well as organizing National level training programmes, seminars & workshops on cashew and cocoa at regular intervals.
2	Directorate of Arecanut and Spices Development (DASD), Calicut, Kerala	The responsibility of the agency is coordinating and monitoring the activities on development of arecanut, spices, and aromatic plants. They will also be responsible for organizing National level training programmes, seminars and workshops on spices and medicinal & aromatic plants at regular intervals.
3	National Horticulture Research & Development Foundation (NHRDF), New Delhi	The NHRDF is responsible for monitoring programmes relating to development of vegetables and vegetable seeds
4	National Seeds Corporation, New Delhi	National Seeds Corporation (NSC) is responsible for taking up programmes for production and supply of good quality seed and planting material
5	Spice Board, Kochi, Kerala	The responsibility of the Board is to look after the overall development of cardamom in terms of improving production, productivity and quality and also implementing post-harvest improvement programmes in other spices.
6	Small Farmers Agri-Business Consortium (SFAC), New Delhi	Small Farmers Agri-business Consortium (SFAC) is responsible for providing necessary handholding with regard to the NE and Himalayan States. It is the lead agency for the formation of Farmers' Associations/ Groups and their tie-up with financial institutions and market aggregators. It will also house the TSG for HMNEH, CIH and VIUC schemes.

Source: Based on the documents collected from NLAs

## 1.2. Roles of NLAs under NHM

One of the mandates of the NLAs is to not only implement their own programmes for the horticulture development but also to give guidance and monitor similar programmes implemented by the state governments. Discussion with sample NLAs reveals that most states are implementing their programmes without consulting these agencies. As a member of the Joint inspection team, some of the agencies visited 4-5 states wherever their own programmes of NHM have been implemented and offered their



suggestions for better working of the programmes (Table 2). It was noted during the field visits that these agencies have broadly stuck to the mandates given.

**Table 2: Role of NLAs**

Sl.No.	NLA	Support (Mandate)
1	NHB	NHM & NBM
2	SFAC	FPOs
3	NCCD	Post-harvest management and cold chain projects of NHM & HMNEH
4	DAC	Advise TSGs on all issues relating to planting material, area expansion, rejuvenation, canopy management, INM/PM and organic farming.
5	TSG	Providing technical guidance in implementation of programmes
6	NBB	Supports in bee keeping

### 1.3. Activities of NLAs under NHM/HMNEH

There is no uniformity of programmes carried out by the NLAs under the NHM/HMNEH (MIDH). This is quite obvious as the mandate of each NLA is different. The Table 3 would provide some idea about the components covered by them during the 12<sup>th</sup> plan period under MIDH.

**Table 3: MIDH Activities of National Level Agencies**

Sl. No.	Names of the NLA	MIDH activities (Mandate)
1	Directorate of Cashew and Cocoa Development (DCCD)	<ul style="list-style-type: none"> <li>• New plantation development for Cashew and Cocoa</li> <li>• Establishment of new plantations by replacement of senile plantations and replanting with high yielding varieties.</li> <li>• Rejuvenation/ replacement of senile cashew plantation and canopy management.</li> <li>• Technology dissemination- front line technology demonstration (FLTD)</li> <li>• Production of planting materials</li> <li>• Production forecast for cashew</li> <li>• Publicity of crop promotion of cashew and cocoa through technology dissemination including NE states</li> <li>• HRD in cashew and Cocoa</li> <li>• Maintain close liaison with SHMs, central and state institute of research and development.</li> <li>• Function as a feedback agency between development and research departments/ institutes.</li> <li>• Function as an advisory organization on administrative, financial and technical aspects involved in the promotion of these crops.</li> </ul>

*Contd.....*

Table 3 Contd....

2	Directorate of Arecanut and Spices Development (DASD)	<ul style="list-style-type: none"> <li>• Production and distribution of Quality planting materials.</li> <li>• Production of nucleus planting materials of spices.</li> <li>• Production of planting materials of aromatic plants.</li> <li>• Establishment of seed storage and infrastructure</li> <li>• Small nursery for spices/ aromatic plants</li> <li>• Technology dissemination through frontline demonstration</li> </ul>
3	National Horticulture Research and development foundation (NHRDF)	<ul style="list-style-type: none"> <li>• Breeder seed production of onion and garlic</li> <li>• Vegetable seed production</li> <li>• Seed multiplication of onion and garlic</li> <li>• Make available the quality seed for vegetable production to the vegetable growers in different parts of the country</li> <li>• Technology dissemination through demonstration on IPM &amp; INM.</li> <li>• Organisation of field days to see the impact of technology at field level</li> <li>• Farmers training and group visit</li> <li>• Arranging of seminars, conference, workshops, exhibition, Kisan Mela and festivals</li> <li>• Standardization of technology for assessment of onion area using remote sensing and field survey techniques.</li> <li>• Establishment of quality control laboratory for pesticide residue analysis for export for farmers, exporters and entrepreneurs.</li> <li>• Establishment of Bio-pesticide laboratory where production of trichoderma and SNPV taken for distribution to the farmers.</li> </ul>
4	Spice Board	<ul style="list-style-type: none"> <li>• Support for vermi-compost units</li> <li>• Organic cultivation of spices</li> <li>• Transfer of technical know-how to growers on production of spices.</li> <li>• Production development of pepper</li> <li>• Adoption of pest management and bridging the technology gap by implementing programmes like certified nurseries.</li> <li>• Production of planting materials</li> <li>• Replanting/ rejuvenation of senile plantations</li> <li>• Promoting production of organic inputs</li> </ul>
5	National Seeds Corporation (NSC)	<ul style="list-style-type: none"> <li>• Technical support to the seed producing agencies</li> <li>• Imparting training in the production of seeds</li> <li>• Seed production of vegetables</li> <li>• Establishment of seed processing plants</li> <li>• Establishment of storage godowns own/hired</li> <li>• Establishment of poly houses.</li> </ul>
6	Small Farmers Agribusiness Consortium (SFAC)	<ul style="list-style-type: none"> <li>• Conducting commodity surveys</li> <li>• Maintenance of Potato cold storages</li> <li>• Formation of FIGs and FPOs</li> <li>• Promote marketing through farmers groups such as Onion flakes marketing</li> <li>• Forecasting of crops, productivity and production</li> </ul>

Source: Based on the information collected during field visits and from records

#### 1.4. Outlays, Releases and Expenditure of NLAs

Under the NHM, the centre had provided 100 per cent grant to the NLAs. The allocation made during the 4 years of the 12<sup>th</sup> plan was Rs.431.39 Crore to 19 NLAs (Table 4). As against this, an amount of Rs.360.12 Crore was released which account for only 69.54 per cent of the approved outlay, while the expenditure incurred was Rs.300 cr. This amount is for just 4.41 per cent of the total expenditure of the NHM scheme and 83.31% of the release amount. This is low as compared to the state and union territories expenditure percentage of 95.59. The shortfall in expenditure is on account of delay in release of funds to the NLAs and releases from NLAs to implementing agencies and the season for the component implementation was over by that time of release. When we look at the expenditure pattern before and after MIDH, it was found that the expenditure had decreased from Rs.182.82 Crore during the two years of the 12<sup>th</sup> plan to Rs.116.18 Crore during the subsequent two years which is MIDH period. This means a decline of Rs. 66.64 Crore. When we look at the utilization of funds for 6 sample NLAs, it was found that they had utilized about Rs. 193.23 Crore which accounts for 64.08 per cent of all NLAS from 2012-13 to 2015-16. Over the years, some of the NLAs were able to receive more funds from the centre and incurred more expenditure. Among those NLAs, the DCCD was able to perform well with additional funds incurring expenditure right from 2012-13 to 2015-16. Similarly, the DASD has had a good performance except during the year 2015-16 incurring less expenditure. In the case of NSC and NHRDF, there has been wide fluctuation in allocation, releases and expenditure. Particularly, Spice Board and SFAC are unable to obtain more funds and this is clear from the decline in expenditure. The expenditure declined from Rs.10.22 Crore in 2012-13 to Rs.3.87 Crore in 2015-16. Similarly, the SFAC expenditure has come down from Rs.1.25 Crore in 2013-14 to 0.75 Crore in 2015-16. Out of the total expenditure of Rs. 193.23 Crore, the expenditure of the DCCD and DASD accounted for 53 per cent and the least was SFAC (1.81 per cent) (Table 5, Fig 1 and Fig 2). The expenditure of the NLAs against the releases was more than 99 per cent which is better than the states which stood at 95.59 per cent of the releases.

The Spice Board was not able to achieve the targets. This is because in most cases the funds were released before the commencement of the harvesting season. This has been considered as a failure on the part of the agency, as such the release of second installment was delayed and there were cuts in funds by the centre for not achieving the targets. According to the Board, not achieving the targets in the case of Farm processing component should not be considered as grounds for withholding the release. They are of the view that if the funds would have been released in such cases, they would have compensated the shortage in the first instalment and achieved 100 per cent.

The Spice Board indicates that the allocations and releases are decreasing although the agency has been able to achieve 100 per cent with small variations. The Centre has not indicated the reason for the decrease in the allocation of funds. This is affecting the achievement of 100 per cent as well as hindering objectives of the NHM through the NLAs. In addition, there is a reduction in subsidy from 55 per cent to 35 per cent. The Board strongly holds that this will lead to a negative impact in achieving the growth of spices sector.

Table 4: Allocation, Releases and Expenditure of NLAs from 2012-13 to 2015-16

(Rs. in lakh)

Sl. No.	Name of the NLA	Place	Allocation	Releases	Expenditure
1	Directorate of Areca nut and Spices Development (DASD)	Calicut (Kerala)	43	40.52	37.4
2	Directorate of Cashew and Cocoa Development (DCCD)	Kochi (Kerala)	88.73	61.39	56.33
3	National Horticulture Research and Development Foundation (NHRDF)	New Delhi	28.99	33.39	32.52
4	National Research Centre for Citrus (NRC)	Nagpur (Maharashtra)	39.18	16.57	17.95
5	National Seeds Corporation (NSC)	New Delhi	40.66	28.45	22.98
6	National Bee Board ( NBB)	New Delhi	38.38	9.14	3.39
7	National Centre for Cold Chain Development (NCCD)	New Delhi	11	5.5	1.75
8	Mahalanobis National Crop Forecast Centre (MNCFC)	New Delhi	6.88	3.94	2.77
9	State Farms Corporation	New Delhi	12	11.76	10.56
10	Spices Board	Cochin (Kerala)	25	24	20.43
11	Precision Farming Development Centres in India (PFDCs)	New Delhi	41.95	26.26	11.65
12	Fresh & Healthy Enterprises Ltd. (FHEL)	New Delhi	18	0.20	0.14
13	Hindustan Insecticides Ltd. (HIL)	New Delhi	8.15	4.08	1.75
14	SFAC	New Delhi	5.75	3.5	3.00
15	National Horticulture Board (NHB)	Gurgaon (Haryana)	0	80.3	67.8
16	National Institute of Food Technology Entrepreneurship and Management (NIFTEM)	Sonipet (Haryana)	2.55	1.05	0.5
17	Indian Agricultural Statistics Research Institute (IASRI)	New Delhi	5.17	3.13	2.79
18	National Committee on Plasticulture Application in Horticulture (NCPAH)	New Delhi	1	0.5	0.05
19	National Horticulture Board, Technical Support Group and Head Quarters	New Delhi	15	6.43	6.24
	<b>Total</b>		<b>431.39</b>	<b>360.12</b>	<b>300.00</b>

Source: Collected from the individual NLAs and websites

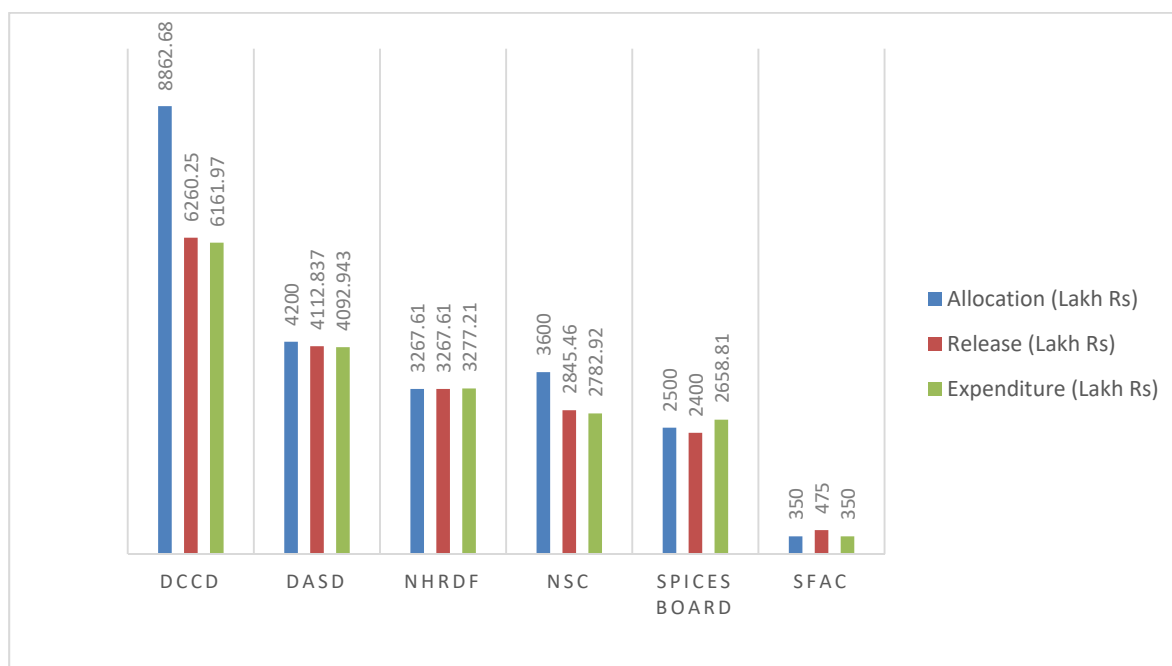


Fig 1: Allocation, Releases and Expenditure of NLAs during the 12<sup>th</sup> Plan (2012-13 to 2015-16)

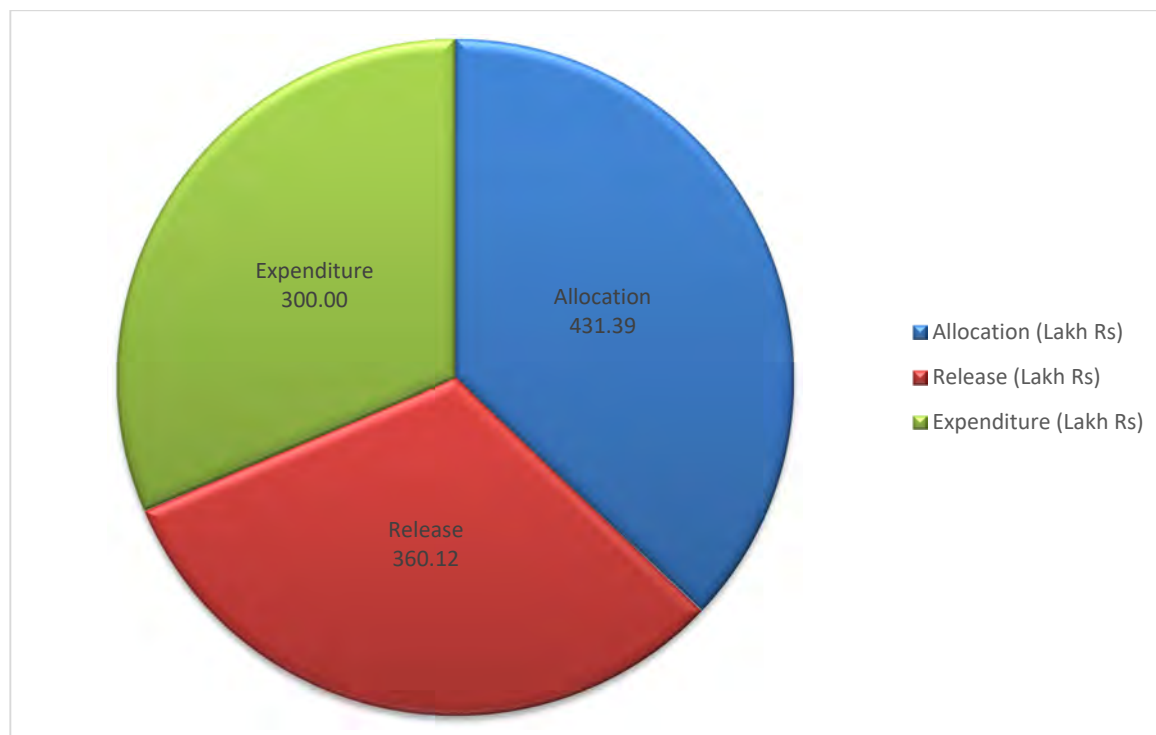


Fig 2: Allocation, Releases and Expenditure of NLAs during the first 4 years of 12<sup>th</sup> Plan (2012-13 to 2015-16) (Rs. in Lakh)

With regard to growth, all NLAs have witnessed a negative growth rate in the expenditure except NSC and DASD. The Spice Board has experienced a negative growth rate of 26.44 per cent between 2012-13 and 2015-16 as against positive growth rates of 12.88 per cent in the case of NSC (Table 5 and Fig 3). One of the major reasons for the negative growth was due to the reduced allocations and releases of funds to the concerned organisations in the later years as compared to the earlier years. The other point that has to be kept in mind is that some of the agencies have reported shortage of funds. However, they failed to utilise the released funds and this is evident from the non-achievement of targets in several sub components. Table 5 highlights these issues, namely the squeeze in funds due to lack of demand.

Table 5: Expenditure during First Four Years of the 12<sup>th</sup> Five year plan

(Rs. in lakh)

Year	National Level Agencies					
	DCCD	DASD	NHRDF	NSC	Spice Board	SAFC
2012-13	1506.43	894.008	779.04	566.87	1022.03	NA
2013-14	1504.39	1048.28	810.47	600	799.06	125
2014-15	1808.02	1067.235	1179.11	833.37	450	150
2015-16	1343.13	1083.42	508.59	782.68	387.72	75
AAGR	-1.88	6.86	-2.44	12.88	-26.44	-15

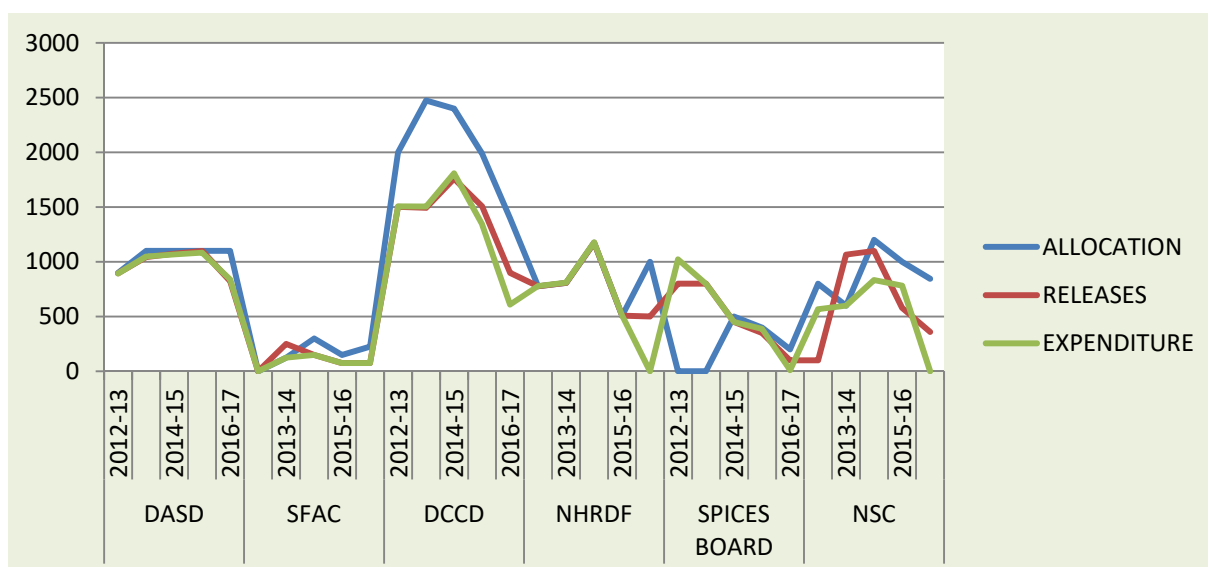


Fig 3: Allocation, Releases and Expenditure of NLAs during the first Four Years of 12<sup>th</sup> Plan (2012-13 to 2015-16) (Rs. in Lakh)



## 2. Component Wise Analysis

### 2.1. Area Expansion/ New Garden: Cocoa

The country was producing 16050 metric tons of cocoa in 2014-15 as against the demand of 30000 MT tonnes. The demand for cocoa-based products is increasing by 10-15 per cent each year and therefore we have been importing this product. To bridge the gap between demand and supply, the DCCD has undertaken area expansion of cocoa with the assistance of NHM. From 2012-13 to 2015-16, the agency distributed a subsidy of Rs.3537.85 lakhs to undertake cocoa cultivation (**Table 6**) which was 72.85 per cent of the financial target. The amount was released in three years installment in the ratio of 60:20:20 depending on the survival rate of plants. Farmers having 0.2 ha of land were eligible beneficiaries under which a subsidy of Rs.17,000 per ha in addition to cocoa samplings was provided. To avail the benefit, the farmers are required to attach their land revenue payment receipt received from the village revenue officials and identity card. On field inputs reveal that many small farmers and the adivasis (Tribes) of Adimaly community in Idukki district of Kerala were provided the subsidy to grow cocoa as intercrop with rubber, coconut and arecanut plantations. The cost of the material was deducted from the subsidy and the rest transferred to the beneficiary's account.

**Table 6: Financial Target and Achievement of NLAs on Area Expansion/ New gardens**

(Rs. in lakh)

Name of the agency	Establishment of new gardens			Rejuvenation			Total		
	Financial			Financial			Financial		
	T	A	%	T	A	%	T	A	%
DCCD	4856.6	3537.85	72.85	1910.6	1651.83	86.46	6767.2	5189.68	76.69
Spices board	-	-	-	1400.0	1417.55	101.25	1400.0	1417.55	101.25
<b>Total</b>	<b>4856.6</b>	<b>3537.85</b>	<b>72.85</b>	<b>3310.6</b>	<b>3069.38</b>	<b>92.71</b>	<b>8167.2</b>	<b>6607.23</b>	<b>80.90</b>

Source: Data Collected from the agency

### 2.2. Rejuvenation and Replanting of Plantation Crops

#### 2.2a. Replanting of Cashew

The National Horticulture Mission has emphasized the rejuvenation of plantation crops including spices. Keeping this in view, the three National Level agencies namely DCCD, Spice Board and DASD have engaged in rejuvenation/ replanting of senile gardens of cashew, cocoa and pepper with high yielding varieties recommended to the location. The DCCD has directly implemented the cashew and cocoa area expansion with 100 per cent subsidy in identified clusters of senile cashew plantation on land owned by the Forest Department, State Farms and Corporations of various states like Tamil Nadu, Karnataka, Odisha etc. and there was no land ceiling for corporations/SAU. In case of an individuals who had come forward for area expansion of cashew and cocoa, they had been given a subsidy of Rs.20,000 per ha (earlier Rs.9000) limited to a maximum of 4 ha that will be released in three instalments (60:20:20) for the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year respectively. However, most farmers have availed the scheme for 0.5 ha to 1 ha and planted 200 to 400 plants. This subsidy was shared by both centre and states in the ratio of 60

and 40. The agency overseeing the programmes had been provided with contingency charge of 5% of total cost. In most cases the NGOs roped in to the scheme had motivated the farmers to undertake cashew cultivation and material were supplied through NGOs. The costs of the planting materials was deducted from the subsidy and the rest transferred to the beneficiaries' account in the form of e-transfer/NEFT (DBT) after field verification and due recommendations of the Expert Committee constituted by the respective implementing agencies. Planting materials were procured either from the Research institutes/ State departments or from the nurseries accredited by the DCCD. The progress made so far in the cashew and cocoa show that from 2005-2006 to 2015-16 about 20,100 hectares was brought under this crop every year. In most of the areas, senile plants have been uprooted and planted with new high yielding varieties. Under New Planting programme, about 4440 beneficiaries were benefited from 2012-13 to 2015-16 as per the list provided by DCCD covering 23364.06 ha that accounts for 63.43 per cent of the targeted area (Table 7).

## 2.2b. Rejuvenation

Large tracts of horticultural plantation have depleted and require a new lease of life and rejuvenation works out cheaper than planting a new area in terms of cost. Under the rejuvenation programme cashew, cocoa and pepper plantation were covered. The objective was to improve the productivity of existing cashew plantations by adopting horticulture and agro technique practices such as mild pruning of branches including de-topping, removal of unproductive shoots/branches, soil and water conservation techniques, application of recommended doses of organic and inorganic manures, mulching, lifesaving irrigation, intercropping and pesticide application etc. The Cashew and cocoa rejuvenation was carried out by DCCD and implemented in farmer's field with maximum area of 2 ha each through research institutes and land owned by corporations.

With respect to cocoa, pruning and shade management are essential practices and this has been initiated by the DCCD, but was dropped as there were no takers.

Considering that production and productivity of pepper had dropped drastically during the last 5-10 years due to aging of pepper vines, India's production dropped roughly by 40 per cent during the period, from 60,000 tonnes to 40,000 tonnes. The Rejuvenation Project on Improving Production and Productivity of Pepper in Idukki district of Kerala was assisted under the NHM. The project was sanctioned for five years from 2008-09 till 2012-13 with a financial assistance of Rs.120 crore and carried out by Spice Board and supplemented by the DASD by encouraging universities and research stations to produce quality pepper material for expanding area under pepper cultivation. A subsidy of Rs.20,000 per ha (50 per cent as per NHM norms) with 540 standards planted with pepper vines (two rooted cuttings/stem cuttings per standard) was paid to the beneficiaries. The Expenditure incurred on these crops by both the agencies was Rs.3069.38 from 2012-13 with a coverage of 15900.46 ha accounting for a high achievement percentage to target (92.41 per cent). The performance of the Spice Board in rejuvenation was better as compared to the DCCD. However, the project was terminated in March 2014. There might be two reasons for dropping the programme, (i) the term of the project was over and (ii) some improvement was witnessed in area and production of pepper. Keeping in mind the fact that intervention efforts of the Government have helped achieve increased area expansion and production and the demand for pepper both in the internal as well as export market is increasing, it is suggested to continue the scheme. The achievement target ratios are above 60 per cent and in a few cases reached up to 90 per cent.

Table 7: Physical Target and Achievement of NLAs on Area Expansion

Name of the agency	Establishment of new gardens			Rejuvenation			Total		
	Physical			Physical			Physical		
	T	A	%	T	A	%	T	A	%
Units	Ha			Ha			Ha		
DCCD	36830.00	23364.06	63.43	10305.00	8809.46	85.48	47135.00	32173.52	68.25
Spices Board	-	-	-	6900.00	7091.00	102.77	6900.00	7091.00	102.77
<b>Total</b>	<b>36830.00</b>	<b>23364.06</b>	<b>63.43</b>	<b>17205.00</b>	<b>15900.46</b>	<b>92.41</b>	<b>54035.00</b>	<b>39264.52</b>	<b>72.66</b>

Source: Data Collected from the agency

### 2.2c. Impact of New Gardens and Rejuvenations

Growing of one crop is not remunerative and does not improve the economic status of the farmers. Keeping this in mind, the NLAs have encouraged certain crops and motivated the farmers to cultivate cocoa in arecanut and coconut plantations as a mixed crop. Due to these efforts, the area expansion of Cashew and cocoa has shown good results in terms of area increase as well as yield increase due to distribution of high yielding planting materials released by research institutes. However, pepper gardens rejuvenated by spice board have not shown significant improvement in pepper production in terms of area and production. This is quite clear from the area and production trends. Area under pepper has declined from 1.42 lakh ha in 2005-06 to 1.22 lakh ha in 2012-13 whereas production has decreased from 0.92 lakh MT to 0.62 lakh MT during this period. This can be attributed to pests and diseases, adverse climate conditions like drought or incessant rainfall, higher cost of cultivation and lack of farmers' interest to rejuvenate the senile gardens as the new plantations takes longer time for giving yield and in the process they lose their income.

With the assistance provided to cocoa and cashew, the production has increased by 20 per cent. However, it has been stated that the area under the cashew and cocoa has increased due to the increase in the price of the produce in the last 2 years and not because of the subsidy. During the study period, it was noted that approximately 70 lakh planting materials were sold from the government and private nurseries.

The production trend of the crops covered under the new gardens and the replanting show some mixed performance if we look at the macro picture of these crops from 2012-13 to 2015-16. The pepper production has shown some improvement but not as expected. The area under this crop has increased from 1.25 lakh ha to 1.29 lakh ha with an increase of 4000 ha. The area under cashew has also increased by 43000 ha from 9.52 lakh ha in 2012-13 to 10.35 lakh ha in 2015-16. But the production declined by 71000 tons. The cocoa area has increased from 71000 ha to 81000 ha during the same period with production from 15000 tons to 17000 tons, an increase of just 2000 tons.

## 2.3. Nursery

### 2.3.1. Production of Seed and Planting Materials

Although, India ranks second in vegetable production, the quality of seed production, timely availability and affordability is a major problem. In case of planting materials, farmers are finding it difficult to procure planting material. Only 20-30 per cent of the planting material is met by government agencies and the rest is through farmer to farmer exchange. In order to overcome this problem, NLAs have been encouraged to production of seeds and planting material under NHM where the DASD, DCCD, Spice Board, NSC and NHRDF agencies were implementing these programmes. The financial targets and expenditure achievement has been shown in [Table 8](#).

Except SFAC, other NLAs agencies were involved in seed production as well as up gradation of nurseries. Including this component an amount of Rs.7730.47 lakhs was spent on these components. The achievement of this component was 87.97 per cent of the target ([Table 8](#)). Among the seed sector, the seed component was more than 92 per cent to the total seed sector expenditure. The share of this component to the total expenditure of components by the NLAs was only 27 per cent. If we look at the performance across the agencies, the NHRDF has undertaken vegetable seed production in 11 states from 2012-13, covering 7027 farmers growing seeds in an area of 5205.4 ha. These farmers were provided with subsidised inputs for seed production. The NSC, another premier seed production agency has produced 27 varieties of vegetable seeds across the country. Its 10 centres across the country are promoting seed production. This agency has provided subsidized seeds to the progressive farmers for production of tomato, brinjal, onion, chilli, cow pea, french beans, cucumber and potato and buyback at higher than the market price.

The complete data on quantum of seeds production is not available under the NHM component. The available information shows that NSC has undertaken potato seed production in an area of 142.5 ha in West Bengal and Orissa between 2012 and 2016. These farmers were provided with Rs.50,000 per ha in the case of Government agencies and Rs. 25,000 in the case of farmers and other organizations for the production of vegetable seeds. The Odisha government had signed an MOU with NSC in 2014 for production of Seed potatoes to make Orissa state self-sufficient in potato production. During 2014-15 the NSC produced approximately 50,000 quintals of seed potatoes and 1,500 quintals of onion seeds for sale in 2015-16. Similarly, one lakh quintals of seed potatoes and 2000 quintals of onion seeds have been produced in 2015-16.

**Table 8: Financial target and achievement of NLAs on the Seeds/planting Materials and up Gradation of Nurseries**

(Rs. in Lakh)

Name of the agency	Seedlings			Seeds			Up gradation of nursery			Total		
	Financial			Financial			Financial			Financial		
	T	A	%	T	A	%	T	A	%	T	A	%
DCCD	-	-	-	-	-	-	362.5	167.25	46.13	362.5	167.25	46.13
DASD	1008.8	998.05	98.93	962.5	962.5	100.00	200	191	95.5	2171.3	2125.58	99.09
NHRDF	-	-	-	2518.83	2518.83	100.00	-	-	-	2518.8	2518.8	100.00
NSC	-	-	-	3600	2782.92	77.3	40	40	100.00	3640	2822.9	77.55
Spices Board	95	95.94	100.99	-	-	-	-	-	-	95	95.94	100.99
<b>Total</b>	<b>1103.8</b>	<b>1093.99</b>	<b>99.11</b>	<b>8043.83</b>	<b>6264.25</b>	<b>77.87</b>	<b>602.5</b>	<b>398.25</b>	<b>66.09</b>	<b>8787.6</b>	<b>7730.47</b>	<b>87.97</b>

Source: Data Collected from the agency

### 2.3.2. Production of Quality Planting Material

Many spices, fruits and vegetables presently available in the market are not free from pesticides and there is a need to promote pest resistant quality planting material that can withstand the pests, diseases and yield more. In addition to this, to produce more quality planting material and making available to the farmers the nurseries are very important for area expansion of new gardens and replanting. To overcome these, a serious effort is being made under the NHM to help universities and research organisation to produce nuclei planting material and distribute to farmers in smaller quantity, so that the farmers can multiply and expand the area. The beneficiaries were also encouraged by Spice Development Board to produce more planting materials for the state programmes for the area expansion, replanting/rejuvenation which requires a sizable quantity of planting materials

The production of planting materials and seed production was undertaken by 5 NLAs. The production of planting material was 171.85 lakh in about 186 ha mostly belong to the Universities and NLAs. The physical achievement of planting material as against the targets was 92.66 per cent. The seed production was undertaken by two NLAs in an area of 4962 ha producing approximately 3013.31 tonnes. The coverage of area under the seeds was 100 per cent and the production was 93.53 per cent of the target (Table 9). NHDRF has only achieved 25.15 per cent in terms of quantity of seeds but in terms of hectares it has achieved 100 per cent. The lower achievement in seeds may be due to the reason that lesser quantity of seeds was sufficient to meet the target in terms of hectares. Under the up gradation of nurseries, 46 nurseries were supposed to be upgraded, however, only 62.29 per cent was achieved. The subsidy assistance under this component was 100 per cent in the case of public sector nurseries and 50 per cent in the case of private sector nursery. The rate of assistance provided was Rs.12.5 lakh per large nursery (model nursery) and Rs.6.25 lakh per small to set up in 2.5 acre of land. This assistance was basically given for building infrastructure which include establishment of hot bed sterilization of media, working shed, hardening chamber/net house, mist chamber, establishment of mother blocks, irrigation and fertigation facility etc. The subsidy has been released in one instalment on the completion of the works.

With respect to DCCD, the physical target was 41.02 as compared to DASD and NSC which has achieved 100 per cent of the targets from 2012 to 2016 (Table 9). DASD has implemented NHM planting materials activities by 49 research centres across the country. These include 39 Agricultural Universities, 10 research institutes and organisations across the country. These organisations have taken up NHM components such as producing nucleus planting materials, constructing storage structure and imparting training and conducting seminars. The most common planting material pertains to spices such as turmeric, betel vine, black pepper, chilli, ginger. Among the 49 institutions and research stations engaged in plant production, 31 are producing planting material. Most of the institutions are producing 2-10 varieties of planting materials. The interaction with Director of IISR, Calicut reveal that if the quality of spices planting material is improved industries will utilize the produce as input for producing quality processed products which is in great demand both in the domestic and international markets consequently improving income levels of farmers.

Table 9: Physical target and achievement of NLAs

Name of the agency	Seedlings			Seedlings			Seeds			Seeds			Up gradation of nursery		
	Physical			Physical			Physical			Physical			Physical		
	T	A	%	T	A	%	T	A	%	T	A	%	T	A	%
Units	No.(Lakh)			Ha			Tonnes			Ha			No.		
DCCD	-	-	-	-	-	-	-	-	-	-	-	-	39	16	41.02
DASD	110.47	109.17	98.82	186	186	100	2925.83	2881.28	98.48	-	-	-	18	18	100.00
NHRDF	-	-	-	-	-	-	183.7	46.2	25.15	4934	4962	100.57	-	-	-
NSC	-	-	-	-	-	-	112.068	85.83	76.58	-	-	-	4	4	100.00
Spices Board	60	61.68	102.8	-	-	-	-	-	-	-	-	-	-	-	-
Total	185.47	171.85	92.66	186	186	100	3221.56	3013.31	93.53	4934	4962	100.57	61	38	62.29

Source: Data Collected from the agency

The setting up of tissue culture in ginger, turmeric units and bio control labs in Tamil Nadu agricultural university with the assistance of DASD and Bio Control lab at Karnal, Haryana by NHRDF for planting materials development and quality maintenance were the other achievements of the NHM through NLAs.

NSC which has encouraged seed production had regularly monitored and made field visits for quality seed production and purchased the seeds grown by the farmers at remunerative prices. The seeds purchased were processed and packed and marketed across the country for production of different vegetables.

### 2.3.3. Impact of Planting Materials

The nucleus planting material, aromatic plants and grafts were produced by 3 NLAs while spices planting materials are produced by DASD, DCCD and Spice Board. The distribution of planting materials to cross section of farmers and departments has helped the farmers not only to multiply them and to improve production, productivity and the quality of the produce and enhanced the farmers' incomes. The evidence shows that the production of quality material has a positive impact. For instance, Central Plantation Crops Research Institute at Vittal and Kerala Agricultural University had developed nine high yielding varieties of cocoa. These new varieties have almost reduced die back disease which had destroyed almost all plantations in the eighties. Because of subsidies there has been a spurt in cocoa plantation.

However, the macro trend in production of spices shows a mixed performance. The area and production of garlic, ginger and fenugreek has increased whereas the area under chillies, turmeric, tamarind, fennel ajwan declined. This shows that the DASD and the efforts of associated ICAR institutes in producing planting materials of spice crops and to make available for further multiplication and distribution to the farmers for area expansion have succeeded partially.



## 2.4. Post-Harvest Management

India is experiencing huge Post-harvest losses of horticultural crops. The data available reveals that the overall post-harvest losses are ranges between 12 and 30 per cent. It was estimated at 1.12 per cent in the case of cashew and 3.9 in the case of black pepper and turmeric and above 7 per cent for coriander. Although, the post-harvest losses are less in the case of spices, in terms of value the loss is significant. Furthermore, there was shortage of primary processing and storage structures. With a view to reduce post-harvest loss and create infrastructure the post-harvest technologies were provided by the NLAs under the NHM assistance. In this regard, the DCCD, NSC and Spice Board have established farm level processing units at their own centre either for cleaning/grading drying of the seeds before distribution to the farmers. The DCCD, NSC and Spice Board have provided primary processing units to the farmers under NHM. The storage structures were only created by the DASD in most of the universities. Most of the units have installed machineries purchased from other programmes or are used for other purposes.

An important programme undertaken by Spice Board was mechanisation. The Spice Board noticed that spices were harvested in an unhygienic way which resulted in contamination of the products with foreign matters like stalks, dirt, and sand, stems bits etc. For instance, the farmers used to harvest by beating the harvested dried plants with bamboo sticks or rubbing the plants manually by hand or trampling under the feet of the cattle. The large cardamom growers traditionally were curing their cardamom by direct heating in the locally constructed *bhatties* (hearths). The capsules dried under this method are black in colour with smell of smoke. This was causing the post-harvest losses very significantly. In order to overcome this, and to enhance the quality of the spices, farmers were helped by offering subsidies for purchase of machineries. During the two years of the 12<sup>th</sup> plan, (2014-15 and 2015-16), the Spice Board mainly focused on post-harvest infrastructure for processing spice crops as innovative programme under which the farmers were provided with the cardamom driers, mace drier for nutmeg, supply of aluminium ladders for pepper harvesting, clove, pepper threshers and turmeric polishing machines to the farmers. The cashew dryer and mace dryer were provided to reduce the residual matter and make them export worthy standard. Nutmeg dryers were provided to improve post-harvest operations in Nutmeg in view of the strict regulations imposed by major buying countries, including the European Union, on account of the presence of Aflatoxin.

The programmes mentioned above were carried out under NHM. Under this scheme, Rs.1332.9 lakh was spent on post-harvest infrastructure of horticulture produce, achieving 98.74 per cent of the targets from 2012-16 ([Table 10](#)). The target for creation of storage structures by DASD was the highest (Rs.590 lakh) followed by machineries (Rs.274.5 lakh) and Rs.485.44 lakh on the farm level processing units created by NSC, Spice Board and DCCD respectively. The financial achievement of seed storage structure was 100 per cent. The component covered by Spice Board on mechanisation was able to achieve more than target (125.29 per cent).

Table 10: Financial target and achievement of NLAs on Post-Harvest Management

(Rs. Lakhs)

Name of the agency	Farm level processing			Machineries			Seed storage structures			Total		
	Financial			Financial			Financial			Financial		
	T	A	%	T	A	%	T	A	%	T	A	%
DCCD	33.26	5.26	15.81	-	-	-	-	-	-	33.26	5.26	15.81
DASD	-	-	-	-	-	-	590	590	100.00	590	590	100.00
NSC	141.43	141.43	100.00	-	-	-	-	-	-	141.43	141.43	100.00
Spices Board	310.75	252.3	81.19	274.5	343.92	125.29	-	-	-	585.25	596.22	101.87
<b>Total</b>	<b>485.44</b>	<b>398.99</b>	<b>82.19</b>	<b>274.5</b>	<b>343.92</b>	<b>125.29</b>	<b>590</b>	<b>590</b>	<b>100.00</b>	<b>1349.9</b>	<b>1332.9</b>	<b>98.74</b>

Source: Data Collected from the agency

The Physical performance of the post-harvest management components show a good performance across all the components covered. About 299 farm level processing units were targeted against this the achievement was 321 units with respect to seed processing units, cardamom dryers (147), mace dryers (12) for nutmeg, pepper dryers (3), turmeric polishing machines (159). In fact the number of machineries distributed to the farmers by the Spice Board was 6793 as against the target of 4000 machineries (Table 11).

Table 11: Physical target and achievement of NLAs on Post-Harvest Management

Name of the agency	Farm level processing			Machineries			Seed storage structures		
	Physical			Physical			Physical		
	T	A	%	T	A	%	T	A	%
<b>Units</b>	<b>No.</b>			<b>No.</b>			<b>No.</b>		
DCCD	16	2	12.5	-	-	-	-	-	-
DASD	-	-	-	-	-	-	59	59	100.00
NSC	1	1	100.00	-	-	-	-	-	-
Spices Board	282	318	112.77	4000	6793	169.83	-	-	-
<b>Total</b>	<b>299</b>	<b>321</b>	<b>107.35</b>	<b>4000</b>	<b>6793</b>	<b>169.83</b>	<b>59</b>	<b>59</b>	<b>100.00</b>

Source: Data Collected from the agency

In addition, the Spice Board had provided 318 Pepper dryers, Cardamom, Nutmeg and Turmeric polishers for primary processing of spice crops with an average subsidy of Rs.25111 from 2012-13 to 2015-16. To facilitate harvesting of pepper and cloves, different sizes of Aluminium ladder which account for 81.65 per cent of the total machinery that were provided to the farmers to harvest the crops as the Bamboo ladders are not durable and the quality is bamboo currently available is poor. An average subsidy of Rs.3000 was given to 5466 farmers. The average ladders given were one per farmers. The pepper threshers were given to 1229 farmers with an average subsidy of Rs.13000 (Computed from the list provided).

## 2.5. Impact of Post-Harvest Management

- Cardamom, Pepper and Nutmeg farmers have benefited under the post-harvest processing machinery. However as they are expensive tools poor farmers are unable to afford it. Therefore, a large unit should be established so that a collective of small farmers have access to such machinery. The pepper threshers are necessary as there was shortage of labour and losses was considerable. The farmers used to thresh the berries manually by shearing between the legs. The berries should be threshed immediately, after harvest. Any delay affects the quality of plucked berries. The machine now separates stack and pepper. The capacity of the machine is 300 kgs per hour.
- The farmers in the eight states were given implements of various kinds for harvesting and processing of spice crops. It was found that most farmers have got more than one implement and a larger proportion of them were well-off farmers. It is quite natural to have these machines by the richer farmers as the cost of these machines is high. Only the small harvesting equipment like aluminium ladder for harvesting of pepper and nutmeg were taken by small and marginal farmers. The cardamom, pepper and nutmeg processors are costly. Initial cost of these machineries and accessories including the generators and heaters were higher, in the long run it would benefit in terms of replacing huge labour which is already scarce in the areas and take up processing during wet seasons that could save lot of time. Moreover they were able to reduce the post-harvest losses and improve the quality of the produce as compared to manual harvesting.
- Farmers who had got the nutmeg dryer were able to reduce moisture below 10 per cent and to dry nutmeg during rainy season. Similarly, the pepper threshers were able to reduce post-harvest losses from 50 per cent to 10 per cent in addition to reducing labour. The NSC as well as DASD has provided storage structure for turmeric breeder seeds.
- The DCCD had provided assistance for cashew processing units at farm level which has helped the value addition to the product.
- The DASD had assisted the storage structure in the premises of SAU and Central Institute for storage of turmeric seeds
- A seed processing unit was established in Karnataka by NSC during 2014-15 and it has been used by the organisation for seed processing and packing of seeds.

## 2.6. Transfer of Technology/ Capacity building

Promoting horticulture development requires application of new technology, its availability and effective use. These three ingredients help to promote the intervention and their impact is visible. Our investigation is intended to understand if this process has been in operation.

### 2.6.1. Process and Operation

Almost all the NLAs involved in implementation of NHM programme have taken transfer of technology and capacity building as one of their important components. This is very important for increasing the

area, production, value addition and marketing. Under capacity building, skill development, demonstrations, seminars and workshops at different levels, exposure visits etc. were undertaken. The objective of all these components is to transfer the technology to the farmers. In most of these components the farmers were trained and imparted knowledge right from land preparation, nursery/seed production, package of practices (application of fertilisers, quantity and timing, irrigation practices/ modern agricultural practices, Good agricultural practices, post-harvest management and marketing). In most cases the progressive farmers were selected by the respective organisations. Sometimes, the organizations will inform one farmer, and then learning from him many farmers approach them through their networks. The trainings were conducted in their head offices and their branches across the country and in research centres, agricultural universities and District Training Centres as they have good facilities to conduct trainings.

If we see the targets and achievements of this component it is found that from 2012-13 to 2015-16 Rs.2914.25 lakh were spent on its component. As against this, the achievement was 76.03 per cent. Across the sub components, the financial achievement was better in the case of exposure visits than other components. The skill development/training supposed to achieve its financial target was not done better. The achievement in this case was only 71.09 per cent of the target (Table 15). The coverage of capacity building by the NLAs comprise of several sub components.

#### 2.6.2. Front Line Demonstrations

The front line demonstrations like many programmes of horticulture were also promoted under NHM. The objective of this is to make available, the technologies developed which are proven technologies and which have higher potentialities in terms of yield, disease resistance, quality, and can fit in the existing farming systems and situations in the country, to the farmers. In this connection, demonstrations were taken up by NLAs under NHM funds. These demonstrations were carried out in collaboration with Agricultural Universities and ICAR institutes. The demonstrations were carried out both in the farmer's field and government and universities lands. Each demonstration should not exceed 1ha and rate of financial assistance will be at 75 per cent and 100 per cent respectively in the farmer's field and Government farms towards the cost of the project for conducting the demonstrations. While conducting the demonstrations on a particular farmers land the farmers around the field were invited.

The study of six NLAs reveals that, only three NLAs promoted front line demonstrations incurring a cost of approximately Rs.731.1 lakh from 2012-13 to 2015-16 which accounts for only 81.16 per cent of the targeted amount. However, the financial achievement was 100 per cent in the case of DCCD and NHRDF.

The performance of the capacity building component as against the targets is not satisfactory as none of the important sub components were able to achieve physical targets during the reference period except field exposure which has also achieved the financial targets. The achievements in physical terms across the NLAs and sub sectors, the demonstrations of DASD achieved 100 per cent achievement in number of demonstrations and two agencies namely, NHRDF and NSC have achieved their target set for seminars and workshops. Although the financial targets have not achieved in skill development component, the physical targets achieved were more than 112 per cent (Table 12).

The Physical performance of demonstration as per the data compiled from the list of beneficiaries has shown that the NHRDF has conducted demonstrations in tomato, chilli, and other vegetables. The

demonstration was conducted in 507 ha and 1787 farmers benefited from 2012-13 to 2015-16. This works out to be 0.25 ha per demonstration. The land under demonstration accounts for 8.47 per cent of the area under seed production owned by 25.43 per cent of the total seed growers.

The DASD had conducted demonstration of pepper cultivation under the project component '*Participatory mode Rehabilitation of Black Pepper Gardens*' in Idukki district, Kerala. About 1031 farmers' plots were taken for demonstration of soil reclamation activities. The pilot experiments were established with inputs free of cost. According to information from the DASD, these demonstrations had an impact in terms of increased yield in the last 3 years.

On the lines of DASD, the DCCD had conducted demonstration in farmer's field to the extent of one acre land of bell pepper. From 2012-13 to 2015-16, 356 farmer's plots with 636.66 ha were covered under the demonstration. The performance was not satisfactory (Table 13). While conducting the demonstrations, the critical inputs supplied were worth Rs.5000 and Rs.2000 (per participating farmer) for the purchase of bio pesticides and bio fertilisers. As a follow up to the demonstration, the plot has been visited 4 to 5 times.

SFAC have also conducted training programmes for the members of FPO groups. About 150 farmers who are members of Mujaffarnagar FPO in Uttar Pradesh were benefited from demonstration during 2014-15 and allowed to sell their final produce. The demonstrations were conducted for growing banana and papaya in 150 bighas (1 Bigha = 0.4005 acres). Participants were provided with fertilisers and pesticide by giving Rs.4500 subsidy to undertake demonstration in a plot of 0.50 ha and seed production with Rs.1500 per beneficiary.

**Table 12: Financial targets and achievements of NLAs on capacity building**

(Rs. Lakh)

Name of the agency	Demonstration			Seminars			Skill development			Field exposure			Total		
	Financial			Financial			Financial			Financial			Financial		
	T	A	%	T	A	%	T	A	%	T	A	%	T	A	%
DCCD	269.44	147.03	54.56	363	180.59	49.75	297.28	164.03	55.17	113.8	44.38	38.99	1043.52	536.03	51.36
DASD	457.56	457.56	100.00	165	166.19	100.72	345	342.07	99.15	-	-	-	967.56	965.82	99.82
NHRDF	126.51	126.51	100.00	173	173	100.00	-	-	-	202.08	202.08	100.00	501.59	501.59	100.00
NSC	-	-	-	30	28.29	94.30	-	-	-	-	-	-	30	28.29	94.30
Spices Board	-	-	-	133	101.98	76.67	56.75	43.29	76.28	-	-	-	189.75	145.27	76.56
<b>Total</b>	<b>853.51</b>	<b>731.1</b>	<b>85.65</b>	<b>864.00</b>	<b>650.05</b>	<b>75.23</b>	<b>699.03</b>	<b>549.39</b>	<b>78.59</b>	<b>315.88</b>	<b>246.46</b>	<b>78.02</b>	<b>2732.42</b>	<b>2177.00</b>	<b>79.67</b>

Table 13: Physical targets and achievements of NLAs on capacity building

Name of the agency	Demonstration			Demonstration			Seminars			Skill development			Field exposure		
	Physical			Physical (Area)			Physical			Physical			Physical		
	T	A	%	T	A	%	T	A	%	T	A	%	T	A	%
Unit	No.			Ha			No.			No.			No.		
DCCD	1181	618	52.33	785.3	636.66	81.07	219	125	57.08	452	262	57.96	41	25	60.97
DASD	1031	1031	100.00	-	-	-	74	69	93.24	460	457	99.35	-	-	-
NHRDF	-	-	-	507	507	100.00	56	56	100.00	-	-	-	67	67	100.00
NSC	-	-	-	-	-	-	15	15	100.00	-	-	-	-	-	-
Spices Board	-	-	-	-	-	-	47	39	82.97	6200	7286	117.52	-	-	-
<b>Total</b>	<b>2212</b>	<b>1649</b>	<b>74.55</b>	<b>1292.3</b>	<b>1143.66</b>	<b>88.50</b>	<b>411</b>	<b>304</b>	<b>73.96</b>	<b>7112</b>	<b>8005</b>	<b>112.56</b>	<b>108</b>	<b>92</b>	<b>85.18</b>

### 2.6.3. Seminars/ Workshops

Seminars of different topics were conducted at the district, state, national and international level. These were organised by NLAs by utilising funds provided under NHM. The programmes have been organized by the respective NLAs covering their priority crops. They were conducted through Research Institutes, SAU, KVK, State development departments, Farmers Associations, etc. The National and International level seminars were organised by the respective NLAs in association with the hosting State development department. The basic idea of these seminars and workshops is transfer of technologies to the farmers and officials to discuss production technologies for different crops and region specific issues in crops, constraints faced by the farmers and possible solutions. The national level seminars are basically to bring scientific knowledge together states' growing that particular crop will be invited to these seminars. The duration of the seminars range from 1 to 3 days. Expenditure on seminars and workshop component by 5 agencies was Rs.650.05 lakhs from 2012-13 to 2015-16. But the achievement was 75.23 per cent of the target. By utilising this amount, 4 agencies have conducted/organised 186 seminars. The achievement was 98.95 per cent (Table 12). The type of seminars and nature of participants are presented in Table 14.

Table 14: Composition of Seminars

Sl. No.	Seminars	Participants	No of days	No of Participants	Expenditure per seminars (Rs.)
1	District	Farmers and developmental officials and some experts, universities, Research scientists. Banks and KVKs	1	150	50,000
2	State	Farmers, Developmental officers, Experts, Scientists from Directorates, Agricultural Universities/ Private sector representatives, other stake holders such as industry, trade etc. State Govt. development officials, State horticulture Machine officials, ICAR scientists, State agricultural universities, traders, exporters and Bankers	2	300	3,00,000
3	National	10 per cent of progressive/ innovative farmers, Development officials, Corporate officials, Research Scientists, processors & Exporters.			



#### 2.6.4. Training

The DCCD, DASD and Spice Board conducted training programmes (skill development) for farmers and horticulture department officials. Rs. 699.03 lakhs was spent on this component which is 78.59 per cent of the target. Among the agencies the performance of the DCCD was below 60 per cent (Table 12). Although the financial achievement was low, the achievement in physical terms was good. The three agencies conducted 188 trainings with an achievement of 98.93 per cent (Table 13).

Among the 6 NLAs, 3 NLAs i.e. Spices Board, Directorate of Cashew nut and Cocoa Development (DCCD) and National Horticultural Research and Development Foundation (NHRDF) have carried out capacity building programmes. In the category of trainees, majority (98.91%) of them are farmers followed by Horticulture Department personnel (1.09%). The total number of trainees benefitted from these capacity building programmes among the 3 NLAs was 43,291, among them 42,823 were farmers and 468, Horticulture Department personnel. The duration of the training ranged from 1 to 3 days with about 50 farmers in each batch. These farmers were provided printed instruction manuals in local languages about the spices and seeds cultivation. The components covered and the states participated in this programmes are depicted in (Table 15).

**Table 15: Capacity building programmes taken during the first Four Years of 12<sup>th</sup> Five Year Plan**

Sl. No.	Organization	Category of trainees	No. of trainees	Duration of training	Components covered	Names of states/ UTs participated	Procedure for selection of trainees
1	Spices Board	Farmers	6818	1 day	Adoption of GAP, Post-Harvest Management in spices	Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Uttar Pradesh, Telangana, West Bengal, all NE states	Small and marginal growers who do not have access to technological support
		Horticulture Dept. personnel	468	1 day	Advances in cultivation practices, post-harvest management, adoption of organic farming practices	Andhra Pradesh, Telangana, Tamil Nadu, Mizoram, Nagaland	Officials are nominated by concerned state departments in the spice growing districts who are engaged in activities related to spices sector
2	Directorate of Cashew nut and Cocoa Development	Farmers	35330	3 days	Topics on cashew and cocoa	Andhra Pradesh, Assam, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Kerala, Maharashtra Manipur, Meghalaya Nagaland, Odisha, Tamil Nadu, Telangana, Tripura, West Bengal	Cashew and cocoa farmers
3	National Horticultural Research and development Foundation	Farmers	675	3 days	Vegetable seed production, farmers training	Punjab, Haryana, UP, Karnataka, MP, Rajasthan, AP, Bihar, Gujarat, Tamil Nadu	Vegetable seed growers
	<b>Total</b>		<b>43291</b>				

Each programme has a specific procedure for the selection of the trainees. The boarding, travelling expenditure will be met by the universities. Normally the expenses per trainee amounts to approximately Rs.1,800 and that of one training programme - Rs.90,000.

All the organisations have conducted training programmes for the farmers. In these trainings, a wide range of aspects relating to the cultivation, organic farming, implementation of good agricultural practices like harvesting, establishment of bio agent production units, food safety (Holistic reduction of pesticides, contamination at the field level) are carried out. The DCCD had conducted training for farmers in various aspects of Cashew and cocoa farming comprising of production technologies, varieties, high density planting, organic cultivations, pest management, processing, value addition and marketing. The duration of the training was normally 3 days per batch with 50 persons. From 2012-13 to 2016, 110 trainings were conducted with a total of 5000 participants. These participants include self-help groups, women and youth who are interested in cashew and cocoa cultivation as agri-business activity. The trainees were provided with free boarding and lodging and travelling facilities. The unemployed women were also trained in preparation of apple syrup by utilising cashew apple. A total of 146 training were conducted involving 3650 women. The trainees were selected by respective state agricultural universities and trained by them.

#### 2.6.5. Group Visits/ Field visits/exposure visits

Except SFAC all agencies had organised farmers' visits to gain first-hand information of scientific practices of cultivation of crops to keep the disease at bay and improve production and processing of the commodities that they are handling. Majority of agencies have not exclusively conducted exposure visits and were part of the training programme. If the training programmes for a period of 1 to 3 days, the participants were taken within the state, if it was more than 7 days, then they were taken to other states. The major objective of these exposures is to familiarise production and management practices followed in farms, Agricultural universities, research stations and industrial units in growing specific crops (spices and vegetable seeds). The only organisation to conduct exposure visits was DCCD and NHRDF with an expenditure of Rs.246.46 lakhs from 2012-13 to 2015-16 for conducting 92 exposure visits (Table 12 and Table 13). The other organizations might have combined the trainings and exposure visits.

#### 2.6.6. Impact of the Capacity Building

The respective NLAs dealing with specific crops have imparted training to the farmers and officials. The Officials of the NLs have indicated the following impacts.

- The training programmes narrowed down gaps in knowledge and skill. Both managerial and technical training to the cashew, cocoa farmers (DCCD), extension workers and progressive farmers (DASD) narrowed down knowledge gaps.
- Exposure of tribes and other farmers from non - traditional cashew growing districts of the states to the traditional cashew growing districts of other states for familiarizing production and management practices being followed in the other states (DCCD).
- The Demonstrations conducted have helped the farmers in knowing agriculture and horticulture practices developed by research stations. DCCD and DASD take up technologies in production and management of areca/spices/aromatic plants.

- Intensive publicity measures for promotion of cashew and cocoa by dissemination of latest production technologies to the farming community and other target groups have helped the farmers in terms of cultivation, processing, marketing and exports (DCCD).
- The published materials also provided to the farmers during the training, demonstrations and seminars help them learn good agricultural practices for cashew and cocoa (DCCD).
- Workshops, Seminars at District, Regional, State and National level provided the best platform for the farmers for exchange of information regarding recent advances in production and post-harvest technologies of spices and challenges in spices production among the growers, scientists and exporters, thereby ensuring adoption of Good Agricultural Practices [GAP] and production and supply of safe and healthy spices from farm to fork. A total of 3640 growers participated in the programmes (Spice Board).
- The outcomes of national seminars also helped different stake holders to improve their policies. One of the important outcomes of the National seminar on Development and exports held at New Delhi in 2015 organised by Spice Board was the preparation of the National policy on Spices. A committee has been constituted to frame the policy and it is now in the pipe line. The Spice Board has been given its inputs to this committee.

#### 2.6.7. Mission Management

About five per cent of the expenditure is earmarked for '*Mission Management*'. These include travelling expenditure, temporary staff, hiring vehicles and labours expenditure and fuel. Inspecting expenses, tours and payment to NGOs involved in motivation of farmers to take area expansion and rejuvenation of spice crops (cashew DCCD). All the agencies have spent Rs.817.53 lakh from 2012-13 to 2015-16 (Table 16). The financial achievement was 72.80 per cent of the target. Among the agencies the NHRDF had spent the targeted amount and the NSC had not spent the targeted amount on this component.

**Table 16: Financial target and achievement of NLAs**

(Rs. lakh)

Name of the agency	Mission management			Total		
	Financial			Financial		
	T	A	%	T	A	%
DCCD	420.6	243.08	57.79	420.6	243.08	57.79
DASD	220.8	202.13	91.54	220.8	202.13	91.54
NHRDF	136.84	136.84	100.00	136.84	136.84	100.00
NSC	104.77	0	0.00	104.77	0	0.00
Spices Board	240	235.48	98.12	240	235.48	98.12
<b>Total</b>	<b>1123.01</b>	<b>817.53</b>	<b>72.80</b>	<b>1123.01</b>	<b>817.53</b>	<b>72.80</b>

## 2.7. Research & Development

The Spice Board had spent Rs.8.23 lakh on creation of one unit for testing the maturity of Cardamom for maintaining quality (Table 17). The NHRDF had spent an amount of Rs.108.55 lakh on area estimation of onion, garlic, tomato and dry chillies through remote sensing. DASD had created one Bio control lab at Agriculture and Horticulture University by spending Rs. 90 lakh utilising NHM funds during 2015-16 for production of bio-control agents of 70 tonnes per annum. The aim is to provide microbial bio-pesticides to the farming community of Shimoga, Davanagere, Chikmagalur, Kodagu, South Kanara, Udupi and Chitradurga Districts of Karnataka.

**Table 17: Financial targets and achievements of NLAs on Research & Development**

(Rs. lakh)

Name of the agency	Testing the maturity of crops			Standardization of technology for area estimation			Bio control lab			Total		
	Financial			Financial			Financial			Financial		
	T	A	%	T	A	%	T	A	%	T	A	%
DASD	-	-	-	-	-	-	90	90	100.00	90.00	90.00	100.00
NHRDF	-	-	-	108.55	108.55	100.00	-	-	-	108.55	108.55	100.00
Spices Board	8.23	8.23	100.00	-	-	-	-	-	-	8.23	8.23	100.00
<b>Total</b>	<b>8.23</b>	<b>8.23</b>	<b>100.00</b>	<b>108.55</b>	<b>108.55</b>	<b>100.00</b>	<b>90</b>	<b>90</b>	<b>100.00</b>	<b>206.55</b>	<b>206.55</b>	<b>100.00</b>

### 2.7.1. Impact of Research & Development

The establishment of Bio-control lab in the University of Agricultural Sciences with the assistance of DASD under NHM had met the demand of bio control agents by the farmers of Shimoga, Davanagere, Chikmagalur, Mangalore, Coorg, Udupi and Chitradurga districts of Karnataka. The establishment of testing the maturity of pepper crop at Spice Boards Research Institute at Myladumpura in Idukki district has helped farmers to test their pepper crop for better nutrient management, shade management as well as expanding the horizon for researchers to identify and develop better breeds.

## 2.8. Formation of FPOs / FIGs by SFAC

Small Farmers' Agribusiness Consortium (SFAC), under the Department of Farmers' Welfare, Agriculture & Cooperation, Ministry of Agriculture has a mandate to link farmers to investment, technology and markets. SFAC has promoted over one Farmers' Producer Organisations (FPOs) and 136 Farmer Interest Groups (FIGs) across the country. The objective of this is to link up the poor and marginal farmers directly to, (which normally comprise of about 20 farmers get together and form an interest group) and FPO (About 50 FIG group join together and register a farmers produce organisation under Companies Act), where infrastructure for post-harvest infrastructure is available and link their produce with private companies that deal with horticulture produce.

The SFAC which is the only agency involved in Formation of Farmers Producer Organisation was able to form one registered organisation namely the Mujaffarnagar Kissan Producer Company limited in Uttar Pradesh.

### 2.8.1. Inclusive Growth through SFAC

It is expected that the schemes of NHM should help the weaker sections of the society. To find out whether this objective was achieved or not, it has been examined by looking into the data collected from 2001 beneficiaries of Farmers Interest Groups (FIGs) in Midnapur district of Uttar Pradesh shows that the objective is met in the respect of the number of small and marginal farmers that accounts for more than 99 per cent. The marginal farmers are 94 per cent and held on an average 0.35 ha of the total land (Table 18). *More than 1000 members required to form an FPO.* Due to non-registration of one FPO, they became one FPO called Muzaffar Nagar Kisan Producer Company Ltd. Among the small and marginal farmers, the participation of women is negligible at 7.35 per cent. This clearly revealed that the women had not owned land to become a member of the FIGs. But the proportion of OBCs is overwhelmingly high with 84.76 per cent. While the scheduled caste is negligible with 0.50 per cent among the 2001 members belonging to 135 FIGs. Overall the proportion of women and the scheduled caste in the FIGs is negligible as compared to OBCs.

**Table 18: Muzaffar Nagar in Uttar Pradesh (SFAC Beneficiaries Fig) 2014-15**

Sl.No.	Size-Group	No. of Beneficiaries	Total Area (Ha)
1	Marginal (Below 1.00 ha)	1881 (94.00)	657.64 (80.47)
2	Small (1.00 - 2.00 ha)	115 (5.75)	148.28 (18.14)
3	Semi-medium (2.00 - 4.00 ha)	5 (0.25)	11.33 (1.39)
Total		2001 (100)	817.25 (100)

Source: Beneficiary list provided by SFAC

### 2.8.2. Kissan Mandi

For providing a platform for direct marketing of fruits & vegetables to these FPOs, SFAC has launched a Kisan Mandy at Delhi. For effectively linking the Kissan Mandi to the Farmers' Producers Organisations (FPOs), SFAC is seeking to empanel agencies, as Back End Support Partner(s) for aligning the FPO production plan with market demand, assuring product quantity & quality and adherence of FPOs to Kissan Mandi operation norms.

### 2.8.3. Training Achievement of Muzaffar Nagar Kisan Producers Company Ltd,

There were 10 training programmes with 550 participants conducted during 2014-15 and an exposure visit in which 55 members took part. If we look at the funding pattern of the agency it is found that a very small amount was allotted to this agency by the centre under the NHM amounting to Rs.50 lakh for the formation of Farmers Producers Organisations in the country. As against this it had incurred expenditure of Rs.35 lakh falling short of target.

## 2.9. Other Components

The few NLAs have taken a few more activities that are not common across the other NLAs. **Table 19 & Table 20** shows the activities and the investment on them. From 2012-13 to 2015-16, Rs.160.63 lakh were spent against the target of Rs. 607.7 lakh. The performance was very poor (26.43 per cent). The other component that received due share in the investment was on maintenance of data base by three agencies. The only agency that has given some importance for creation of water resources was the DCCD. An amount of Rs.16.59 lakh was spent on this component. This amount is just 18.43 per cent of the target. The only component among the other components, the IPM and INM was undertaken by Spice Board incurring Rs.91.71 lakh achieving more than the target (**Table 19**). The overall performance of the other components was not satisfactory. The two components namely the INM with the achievement in coverage of area and organic farming implemented by Spice Board were performed well. As far as physical achievements are concerned they vary from 20 per cent to 106 per cent across different minor components. (**Table 20**).

**Table 19: Financial Targets and Achievements of Other Components**

(Rs. lakh)

Minor components	National Level Agencies																	
	DCCD			DASD			NHRDF			Spice Board			SFAC			Total		
	T	A	%	T	A	%	T	A	%	T	A	%	T	A	%	T	A	%
Water resources	90	16.59	18.43	-	-	-	-	-	-	-	-	-	-	-	-	90	16.59	18.43
Organic farming	5	0	0	-	-	-	-	-	-	6	6.07	101.17	-	-	-	11	6.07	55.18
IPM/INM	-	-	-	-	-	-	-	-	-	90	91.71	101.9	-	-	-	90	91.71	101.90
Data Base	11.76	7.38	62.75	-	-	-	1.8	1.8	100	5	5.63	112.6	200	0	0	218.56	14.81	6.77
Onion flakes for marketing	-	-	-	-	-	-	-	-	-	-	-	-	100	1.36	1.36	100	1.36	1.36
Programmes for North Eastern states	44.01	1.8	4.08	-	-	-	-	-	-	-	-	-	-	-	-	44.01	1.8	4.08
Mass campaigning	-	-	-	54.13	28.29	52.26	-	-	-	-	-	-	-	-	-	54.13	28.29	52.26
<b>Total</b>	<b>150.77</b>	<b>25.77</b>	<b>17.09</b>	<b>54.13</b>	<b>28.29</b>	<b>52.26</b>	<b>1.8</b>	<b>1.8</b>	<b>100</b>	<b>101</b>	<b>103.41</b>	<b>102.38</b>	<b>300</b>	<b>1.36</b>	<b>0.45</b>	<b>607.7</b>	<b>160.63</b>	<b>26.43</b>

**Table 20: Physical Target and Achievement of Other Components**

Minor components	Unit	National Level Agencies														
		DCCD			DASD			Spice Board			SFAC			Total		
		T	A	%	T	A	%	T	A	%	T	A	%	T	A	%
Water resources	No	150	30	20	-	-	-	-	-	-	-	-	-	150	30	20.00
Organic farming	No	-	-	-	-	-	-	300	312	104	-	-	-	300	312	104.00
IPM/INM	Ha	-	-	-	-	-	-	10000	10555	105.55	-	-	-	10000	10555	105.55
Data Base	No	59	37	62.71	-	-	-	1	1	100	5	5	100	65	43	66.15
Onion flakes for marketing	MT	-	-	-	-	-	-	-	-	-	1	0.75	75	1	0.75	75.00
Mass campaigning	No	-	-	-	13	13	100	-	-	-	-	-	-	13	13	100.00

## 2.10. Innovative Programmes

It was expected that the NLAs should implement innovative projects. However, only two NLAs have undertaken innovative programmes (Table 24). DASD had taken up 7 programmes with an expenditure of 56.25 per cent out of Rs.129.58 lakhs. Whereas the Spice Board has spent Rs.56.69 lakh which accounts for 43.74 per cent on silpauline sheets for chilli and polythene sheets. This means the production of planting material and area expansion received more allocation than mechanisation. The impacts of each innovative programme is varied in nature and are indicated in Table 21.

**Table 21: Innovative programmes undertaken by the National Level Agencies with the assistance of NHM**

Programme	Expenditure (Rs. in Lakh)	Impact
<b>I. Directorate of Arecanut and spices development (DASD)</b>		
Hi-tech production system for quality disease free seed rhizomes of ginger & turmeric (2015-16)	9.00	Ensured availability of disease free quality seed material of ginger and turmeric
Pilot Project on Participatory mode Rehabilitation of black pepper gardens at Cheruthazham Panchayat, Kannur, Kerala (2014-15 to 2016-17)	10.00	Demonstrated the importance of soil reclamation & crop health management activities in black pepper at community level
Improvement of pepper production in Kolli hills by convergence of schemes available with various organizations (2013-14 to 2015-16)	6.50	Disseminated awareness on high production technologies in black pepper under organic conditions
Demonstration plots for vetiver cultivation in the coastal sandy tracts of Kerala (2013-14 to 2015-16)	9.71	Superior vetiver accessions with good yield and oil quality were demonstrated to farmers
Demonstration of Good Agricultural Practices (GAP) for black pepper cultivation (2013-14 to 2015-16)	4.12	Increased pepper productivity through high level management for commercial application was demonstrated
Farmers participation in ginger seed production (2011-12 to 2013-14)	8.50	Three farmer groups were equipped for ginger seed production by providing training and infrastructure facilities during 3 years
Year of Horticulture programmes (2012-13)	25.06	Addressed vital issues in crop production of various spice crops through awareness training programmes (Mass campaign) in the major production zones.
<b>II. SPICES BOARD</b>		
Silpauline sheets for chilli, polythene sheets (2014-15 to 2015-16)	56.69	Increased ease of drying.
<b>Total</b>	<b>129.58</b>	

## 2.11. Impacts and Way Forward

Looking into the impact parameters is the core focus of this exercise. While looking at the impact we have also taken into account the specifics of some of the interventions and shuffled through various problems and suggestions from the NLAs. The water resources funded by DCCD have enabled the



farmers to increase the survival rates of cashew plants to obtain better yields. In addition, the Spice Board is the only agency to encourage organic farming as well as INM/IPM. By adopting these practices, farmers were able to reduce the pest attack in crops and could reduce the cost as well as reap good production. The DCCD had taken up survey to assess the yield of cashew. The other agency SFAC has only conducted survey of onion growers of Maharashtra and MP which helped the ministry of agriculture to take quick decision with regard to import and export and government stocks. Apart from this the agency had sold onion flakes through milk booths in Delhi when the prices of onion had risen that had received a good response from the farmers as they are cheaper than fresh onions. Under the mission management component, the agencies were able to spend the amount for monitoring the programmes in time and utilising the funds to conduct review meetings, monitoring visits and creation of IT infrastructure.

### 3. Insights from the interactions with the NLAs Beneficiaries

#### 3.1. Area Expansion of Cocoa

Under area expansion, we have taken Cocoa, as that has shown good results and a good acceptance rate. Cocoa bean is the primary raw material for the manufacture of chocolates, confectioneries, beverages and other edible products. As the demand for the cocoa is increasing, the area under this crop is being encouraged under NHM. In Kerala, most of the tribal farmers were encouraged to grow this crop. A subsidy of Rs.20,000 per ha was provided to those farmers who came forward to grow his crop. One tribal woman residing in Padikoppa in Idukki district of Kerala had received a subsidy of Rs.2,910 for plating of cocoa in her rubber plantation having 0.25 ha cents. This amount has been released in three year instalments in the ration of 60:20:20. The amount has been released for creating pits, buying manure etc. The necessary 100 planting materials were supplied by Cadbury India now Called Mondelez India Foods Limited. The company has procured the planting materials of cocoa in bulk from the Kerala agricultural University and supplied to all the farmers who had benefited from the NHM. The cost of the planting materials was recovered directly from the DCCD. The company which had supplied planting material in the area is involved in buying their cocoa produce through agents. They are also visiting the farmer's plantations at regular intervals to assess the health of the crop.

#### 3.2. Replanting of Pepper plantation

The replanting of pepper was under taken by one beneficiary with the assistance of Spice Board in Anaviratty village in Devikulam taluk of Idukki district in Kerala in 2015-16. The farmers had planted black pepper in 0.40 ha with 600 two rooted or stem cuttings plants (300 - Chennanur, 300- Panniyur-1 variety) replacing 10-15 years old and pest infected plants with low yield. In addition to this, he owned 1.60 ha under cardamom plantation getting 750 to 800 kg per annum. Before replanting he used to get 50 kg yield per year from pepper. Now, the farmer obtains 350 kg per annum. The gross income from the 350 kgs of pepper was Rs.2.45 lakh and the expenditure was Rs.1.50 lakh and the net income was Rs. 0.90 lakh. Gross income from cardamom was Rs.9.30 lakh and net income was Rs 6.80 lakh. Altogether, the annual income of the family was Rs.8.65 lakh. He had received Rs.5600 (Subsidy per standard replanted/rejuvenated is Rs.28 which is paid in two annual instalments of Rs.16 during the year of planting and Rs.12 during the subsequent year).The farmer had spent Rs.15000 for planting materials, Rs.1800 for digging of pits and Rs.15000 for Slanders.

#### 3.3. Farm Level Processing Units

The above beneficiary has also availed subsidy for cardamom dryer. The total investment on the dryer was Rs.2.50 lakh. Out of this, the subsidy was Rs.1.3 lakh (45%). The farmer was informed that the subsidy has been reduced from Rs.1.00 lakh to Rs.87,500. This dryer was used 10-12 times both for processing 800 kg of cardamom and 5000 kg of others and earned Rs.90000. This machine was able to dry the cardamom capsules of 250-300 kg in 18 hours and the farmer was equipped with a generator and firewood to supply heat. This machine is very useful in replacing high labour requirement and in handling the cardamom capsules particularly during the periods of inclement weather that can result in high costs, crop damage and loss in quality.

Another progressive farmer/business man from Adimaly village, Devikulam taluk in Iddukki district, Kerala and beneficiary of Spice Board was given a pepper thresher in 2014-15 and 2015-16 costing Rs.24000. A subsidy of Rs.12000 was released to his account after installing the machine. The pepper thresher with a capacity of 300kg/hour was used for threshing the 1600 kgs of pepper produce grown in an area of 1.8 ha. This machine has replaced 32 labours required to thresh the pepper of manually saving an annual labor cost of Rs.14400 and time. The above beneficiary was also given subsidy for purchase of Mace dryer at the cost of Rs.21000 and got a subsidy of Rs.8400. He has used this device to process the produce of 500 Nutmeg trees in his pepper plantation. The yield of 500 trees was 1000 kg Nutmeg and 40 kg Mace. This machine has saved labor costs of Rs.40000. There was no insurance for both the machines that he had purchased under the NHM subsidy programmes. The annual income of the family from both crops and business was Rs.4.51 lakh per annum. The income from the crops was Rs.2.51 lakh and Rs.2 lakh from business.

### 3.4. Multiplication of Pepper varieties

DASD has financed the Indian Institute of Spices Research (IISR) Calicut under NHM for creation of Poly houses as well as storage structure. The poly house with a dimension of 350 sq.mts. each was financed in 2012-13 and 2013-14. The cost of poly houses were Rs.5 lakhs and Rs.8 lakh respectively. The poly house constructed during 2013-14 was used for multiplication of 19 varieties of pepper cuttings. The average pepper cuttings raised in the poly house was Rs.5 lakh per annum and these cuttings were sold to different users. Out of the total production, 50 per cent was sold to Government department, 40 per cent to farmers and remaining 10 per cent to research organisations, self-help groups and NGOs. The major user of the planting materials was Kodagu district in Karnataka.

The same organisation was financed to construct 16\*8 mts storage structure with a capacity of 2-3 tons during 2015-16 at the cost of Rs.6.8 lakh and was nearing completion. It is intended to store nucleus seed of ginger and turmeric.

### 3.5. Production of Onion seeds, bulbs and Potato seeds

The NHRDF has provided breeder seeds to the farmers for growing the onion seeds for propagation as well as supplied quality seeds to farmers for producing bulbs for commercial purpose. These were provided at a subsidised rate by utilising NHM funds. In Karnataka, a sample of 9 farmers were benefited by these schemes and they expressed its impact on production and income. Among the nine beneficiaries interviewed, one of the farmers was producing onion seeds located at Gouribidanur taluk of Karnataka state. He was provided free seeds and Rs. 5000 worth of inputs per acre. These inputs include fertilizers and plant protection chemicals. The farmer was trained in all aspects of seed production techniques by NHRDF and was provided with seeds. The sprayer was also provided free of cost. The NHRDF field staff frequently visited the farmer's field to ensure that the process of seed production. The crop yielded around 200 Kgs of onion seeds per acre which was bought back by the NHRDF at the price of Rs.200 per Kg for marketing elsewhere for growing the onions.

Of the 9 beneficiaries of NHRDF, 8 farmers were located in Vijayapur district of Karnataka who has received seeds from the NHRDF. The average area under beneficiaries was 0.94 ha. Farmers have expressed mixed response with respect to onion production from seeds distributed by NHRDF. Farmers were initially growing onion by purchasing seeds from local seed growers. Expecting good yield from the seeds available with NHRDF, they purchased the seeds. Such farmers were given subsidy of Rs.1900 irrespective of the area under cultivation. The production of onion has increased from 15.54 tons per

ha to 25 tons per ha due to use of NHRDF improved seeds. As a result, there has been a significant improvement in the incomes that have increased from Rs.38666 to Rs.75000 per ha. This increase has enhanced the levels of income of the family. However, one of the farmers was of the opinion that the bulbs produced from the seeds distributed by NHRDF was not only smaller in size but also the production is less per ha as compared to the onion production of the farmers who had used local seeds. It was said that cost of NHRDF seeds was high (Rs.1000/Kg) as compared to the locally obtained seeds (Rs.500/Kg).

One farmer of Bhaneerakhudd village, Loni taluk, Ghaziabad District of Uttar Pradesh State has got potato seed from the NHRDF and has cultivated potato in 9 acres. The impact from the usage of quality seeds, the yield which was 40 quintals before intervention was more than 120 quintals per hectare of potato after intervention. He is getting subsidy from NHRDF without any problem and he is able to enhance his annual income from the earlier Rs.2-3 lakh per year to that of Rs.7-8 lakh. He is getting the training and the technical advice from NHRDF.

## 4. Problems/ Challenges

The selected NLAs have given wide range of problems which are in the way of achieving intended impacts of NHM and offered suggestions.

### 4.1. Lack of Information

- Lack of information on activities undertaken by state departments on spices under NHM (DASD).
- Lack of facilities for online monitoring of the programmes implemented by the Directorate in spices at SAUs / Central Institute (DASD).
- Lack of awareness and facilities of post-harvest management and value addition (DCCD)
- Lack of irrigation sources
- Inability to achieve targets mainly due to inadequate staff and the implementing agencies do not strictly adhere the instruction of the directorate as it is independent body.

### 4.2. Cost Norms, Funds, Guidelines and Subsidies

- Cost norms for certain spices are not appropriate (DASD)
- Delay in Approval of AAP and release of funds (Spice board)
- Allocations of funds to Spices Board under MIDH is reduced year by year in spite of 100 per cent achievement of released funds (Spice board)
- The rate of subsidy for post-harvest equipment's related to spices is not clearly specified in the guidelines (Spice board).
- Delay in release of funds is the cause for the unspent balance an account of the kharif season was over. This has hampered the implementation of the nursery programme. In this kind of circumstances, the directorate has to permit to utilise unspent balance with revalidation to compensate the season (All NLAs)
- The current pattern of assistance made available to promote cashew crop in the country is said to be quite inadequate and to motivate the farmers to take up its cultivation it has to be enhanced to make it attractive given the increased input costs (DCCD)
- The cost allocated for rising of the targeted planting materials was low considering the cost of the land, labour other inputs required for raising the plants. Therefore the allocations for the nursery should be enhanced (DCCD).
- The funds are released in Month of February or March. During this period, it is not possible to raise the plants required for kharif season (DCCD)

#### 4.3. Procurement of Planting Material / Quality Seeds

- Procurement of planting material from unrecognized sources rather than from recognized and certified source (DCCD).
- Availability of quality onion seed is national problem because producing onion seed is risky (NHRDF).
- Unable to reach the target since farmers don't sell the seeds to NSC.
- Farmers are still unable/unwilling to remove senile plantation as the new plantation has a gestation period of five years (Spice board).

#### 4.4. Approval

- Delay in getting the permission for cutting the old and senile cashew trees from forest departments which also delay in formulating the proposal for annual action plan (DCCD).

#### 4.5. Farmers not adopting

- Non adoption of technologies by farming community (DCCD)

#### 4.6. Data

- Data collection on spices to be improved to assess the ground realities on production front (DASD)

#### 4.7. Other constraints

- It has been said that cost norms of RKVY components of onion storage structures more attractive than those of NHM.
- It has been said that the subsidy given for certain components is less than the RKVY and state programmes. For example, the subsidy given under RKVY for onion cold storage is more attractive than the NHM (Ref Report of the Joint Inspection Team on its visit to Karnataka during 3<sup>rd</sup> January to 12<sup>th</sup> January, 2013 to review the progress under the National Horticulture Mission).

## 5. Impact in a Kernel

### 5.1. Immediate Corrections

The foregoing analysis brought forth four important aspects. First, the NLAs are serving as a critical link between the ultimate beneficiaries and project objectives in various ways. Second, we have described the process of each of the NLAs and their intervention leaving the learning points to be brought forth at the end. There were many issues that have propped up during the discussion in the preceding pages. Third, we felt that the usual official dogmatism, if relaxed can give better results. Flexibility in operations needs to be provided to the ground level implementing officers. Fourth, utmost care has to be taken while designing the programme and the allocations should be based on the demand from the area as also the capacity of absorption of the target region. The operational details of the interventions should be amenable to adjustments during the implementation phase also. A periodic critical review of the implementation bottlenecks can make the intervention sharp and effective. We noted the issues in two phases those which we feel call for immediate attention and the others could be taken are mentioned below.

Sl.No.	NLAs	Issues that need Immediate attention for Corrections
1	DCCD	<ul style="list-style-type: none"> <li>There has been a gap between physical targets and achievements in components like area expansion, which needs to be bridged. Assessment of the absorbing capacity is a crucial determinant.</li> <li>Emphasis may be increased on cashew and coconut cultivation in non-traditional areas as these crop suit rain fed conditions.</li> </ul>
2	DASD	<ul style="list-style-type: none"> <li>Give priority for dissemination of advance technology in spices to reduce cost of production.</li> <li>The decrease in production of pepper by 40% during the last 5 to 10 years is due to aging of pepper vines. These need replacement and good quality planting material be supplied.</li> </ul>
3	NHRDF	<ul style="list-style-type: none"> <li>Quality of vegetable seed needs to be enhanced to increase the yield per ha which is low at present as compared to other countries.</li> <li>Good dissemination is a key to success. This be prioritized in pre and post-harvest management practices for minimizing storage losses which is still high at present.</li> </ul>
4	NSC	<ul style="list-style-type: none"> <li>The subsidy for vegetable seed production need to be on the basis of quintals of production rather than area.</li> <li>Farmer awareness needs to be built continuously and better seed material should be provided. Ascertaining demand may be undertaken for effective dissemination.</li> </ul>
5	Spice Board	<ul style="list-style-type: none"> <li>Develop low cost post-harvest technologies and enhance the subsidy rates to these categories of farmers which will benefit them without much difficulty.</li> <li>Creating water resources in conjunction with micro irrigation by NHM. Hill areas and Water stressed regions should get priority.</li> </ul>
6	SFAC	<ul style="list-style-type: none"> <li>The Target - Achievement gap is due to improper assessment of demand and absorption capacity. This lacuna needs to be plugged.</li> <li>The agency has to increase the number of FPOs under NHM.</li> </ul>

*Note: Arrived from the analyses carried out above and the discussions during Field visits*



## 5.2. Design Issues and Modifications

In any intervention towards development the design of the intervention has to be fool proof. This is not always feasible and therefore, scope should be provided for online corrections. Our field visits as well as discussions with the stake-holders and officials indicated some of these modifications are parts that could be corrected in the existing design and others may be considered for incorporation in the existing programme. If a few of these already exist then the suggestion provided indicates ineffective implementation and therefore in such cases emphasis needs to be stepped up.

Sl.No.	NLAs	Modification of the design
1	DCCD	<ul style="list-style-type: none"> <li>• Upgradation of infrastructure facilities of nurseries for cashew and cocoa planting materials.</li> <li>• Pruning and shade management are essential in cocoa.</li> <li>• Cashew productivity enhancement calls for attention by extending the proper knowledge to the farmers.</li> </ul>
2	DASD	<ul style="list-style-type: none"> <li>• Seed storage structures for turmeric rhizomes have to be established at a larger scale as it is having more medicinal value.</li> <li>• Importance for the IPM/INM needs to be intensified as well as increase the bio control labs.</li> </ul>
3	NHRDF	<ul style="list-style-type: none"> <li>• Onion storage structures need to be established in other regions according to needs.</li> <li>• The provision of the production of breeder seeds to the farmers has been made only to a few farmers for producing bulbs.</li> <li>• Crop, supply and price forecasting seasonally, monthly and sometimes weekly for perishable produce making use of satellite and remote sensing technology shall be made a regular feature which helps the Government to take appropriate policy decision of procurement, stock, movement, import or export of the produce for stabilizing the prices.</li> </ul>
4	NSC	<ul style="list-style-type: none"> <li>• Seed processing units need to be given more popularity among the farmers to utilize the benefits.</li> <li>• Seed wending machines at rural and semi urban areas for supplying small vegetable quality seed packets have to be extended to other areas.</li> </ul>
5	Spices Board	<ul style="list-style-type: none"> <li>• Mixed cropping of black pepper in coconut and arecanut gardens has to be practiced for better crop production and crop protection.</li> <li>• Post-harvest infrastructures for processing of spices like cardamom driers, mace driers for nutmeg, aluminium ladders for pepper, cloves, supply of pepper thrushes and turmeric polishing machines need to be given importance.</li> </ul>
6	SFAC	<ul style="list-style-type: none"> <li>• Kisan mandis have to be setup on the lines of Delhi Kisan mandis for providing platform for direct marketing of fruits and vegetables.</li> <li>• In addition to promotion of FPOs, they are to be guided and trained in agri business and the target should include number, quantity and value of horticultural commodities handled by the FPOs</li> </ul>

*Note: Arrived from the analyses carried out above and the discussions during field visits.*

### 5.3. Impact of NLAs Interventions

In final analysis of any intervention can be judged from the impact it has created. The NLAs were assigned the task as the conduit agencies to take the intervention to the beneficiaries. It not only creates awareness about the benefits but also induced a great change in the sector.

Sl.No.	NLAs	Impact
1	DCCD	<ul style="list-style-type: none"> <li>From 2005 to 2016 an area of about 20100 ha was bought under cashew and cocoa crop every year.</li> <li>The assistance for cashew processing units at farm level has helped the value addition to the products.</li> </ul>
2	DASD	<ul style="list-style-type: none"> <li>Nucleus planting material of spices and aromatic plants were multiplied and distributed to farmers which helped in improving production and productivity.</li> <li>Established bio control labs to meet the demand of bio control agents.</li> </ul>
3	NHRDF	<ul style="list-style-type: none"> <li>Standardization of technology for area estimation was done through remote sensing.</li> <li>Encouraged seed production of onion among the farmers by providing inputs and also trained the farmers in this regard.</li> </ul>
4	NSC	<ul style="list-style-type: none"> <li>Seed processing unit established at Raichur in Karnataka for seed storage , processing and package</li> <li>Seed production of potatoes and onion was undertaken by providing subsidies to the farmers to an extent of Rs. 25000 per ha to the farmers.</li> </ul>
5	Spice Board	<ul style="list-style-type: none"> <li>Assisted the growers to adopt better, clean and eco-friendly processing techniques through distribution of improved machineries thereby increasing the market values of the produce.</li> <li>Established lab for testing the nutritional deficiency of the pepper crops to advise the farmers to take appropriate measures to increase the yield.</li> </ul>
6	SFAC	<ul style="list-style-type: none"> <li>Promoted around 136 FPOs/FIGs across the country.</li> <li>Kisan mandi has been setup for providing platform for direct marketing of fruits and vegetables</li> </ul>

*Note: Based on the analyses above and the discussions with NLAs.*

## 6. Conclusions, Policy suggestions and Future Plan

### 6.1. Conclusions

The NLAs are taken as the best conduits for taking the interventions for horticulture development. Over the years the allocations made to them is coming down. The NLAs which have got more resources are able to take up more programmes. The expenditure of the agencies and the growth rate in targets and expenditure is also high. The performance of the sample NLAs is mixed in nature. In certain components they were able to achieve the targets (financial and physical). Of the total expenditure of all sectors, a major share has gone to the nursery (40.54%), area expansion (34.65%) and capacity building components such as trainings, demonstrations and seminars (11.42%). The post-harvest infrastructure (6.99%) and mission managements (4.29%) has got lesser priority followed by minor components (0.84%) and formation of FPOs (0.18%) ([Appendix Table 1](#)) and the physical target and achievement can be seen in [Appendix Table 2](#). From the table it is clear that, the nursery and seed sector, Area expansion and rejuvenation fell short of the physical targets. Better performance was observed in the case of capacity building and post-harvest infrastructure and the SFAC has not made significant performance. Another interesting fact is that some of the programmes covered in the initial stages have been dropped on the ground of some improvement. For instance, the closure of pepper replanting programme in Kerala is definitely a setback for the development of pepper production which is showing decline in the recent past and its impact can be seen in rising prices. The increase in production and productivity is another major trend that NHM/ HMNEH has brought about in horticulture. But they failed to minimise the farmers suicide, failed to provide good market in the case of bumper price and doubling the income of the farmers.

### 6.2. Policy Suggestions

Various suggestions were given by the NLAs participating in implementation of NHM/HMNEH. *They are indicated below.*

#### 6.2.1. Providing information/ conducting programmes and Awareness creation

- Strengthen the IT-infrastructure of the Directorate and develop an online monitoring portal to review the progress of the programmes implemented periodically (DASD).
- Build up skilled workers by conducting various skill development programmes and help them to make facilities through bankable projects.
- Make farmers aware regarding the importance of irrigation and establish irrigation facilities by providing financial assistance with convergence.
- Regular persuasion and education to the farmers to provide the seed to NSC as per allotted seed production programme (NSC).

#### 6.2.2. Cost Norms/ Funds and Guidelines

- Periodic revision of cost norms need to be undertaken (DASD).
- Early approval of AAP in April and early release of the funds to commence the programmes. The AAP is approved for 2016-17 in September 2016 (Spice board).

- Higher allocation of funds to Spices Board to cover larger number of farmers approaching Board's offices to avail MIDH scheme on seeing the benefits available under MIDH.
- Their need for clear guidelines for post-harvest equipment's related to Spices and the same may be approved in consultation with Spices Board (Spice board).
- Higher allocation of funds to Spices Board as NLA undertaken MIDH is suggested (Spice board)
- Some states have unutilized amount earmarked to the post-harvest infrastructure. This amount may be released to the boards to implement the programmes. The board has made an attempt in this regard and requested the Kerala Horticulture department which is not considered. This has not been specified in the guidelines of NHM/ MIDH. Therefore some guidelines may be incorporated under NHM (Spice Board).
- The subsidy for the North East regions to be increased from 35 per cent to 75 per cent (Spice Board).
- The subsidy for vegetable seed production should be extended to farmers on the basis of quintals of production rather than area (NSC).
- At present many universities and research centers are producing the seedlings and selling them to the farmers. The revenue received goes to university funds rather than the NHM account. A separate account may be maintained for the revenue so that the concerned project head can spend this amount till the release of the funds from DASD.

#### 6.2.3. Use of Quality Materials and Seeds

- Abolition of tender system and use of quality planting materials of recommended varieties of the region from accredited sources only (DCCD)
- State Governments should give priority to National Level Agencies for meeting their vegetable seed requirement for distribution to farmers under various Govt. Schemes(NHRDF)
- Use of quality seed and planting material is necessary for getting higher productivity & quality in vegetable. Hence in distribution of vegetable seed to farmers by State Governments, the seed produced by National Level Agencies (NLA's)/State Seed Corporation should be given 1<sup>st</sup> priority by State Governments.
- Purchase of raw material from the nurseries should be distributed to the farmers during the right season (DCCD).
- The cashew plantation should be encouraged rather than mango plantation (DCCD).
- The aid per plant of cashew works out to Rs. 45 per plant in 2009. Later the subsidy was raised to Rs.20000 per ha. It needs to be enhanced to somewhere near the level of assistance given to other cash crops such as rubber, tea, coffee. It may be increased to Rs.150 per tree for three years. This is because; the cost of various inputs has gone up while the labour cost in Kerala has shot up several folds. The actual cost per plant for three years works out to Rs.358 and against this the assistance needs to be Rs. 100 for a plant for three years for all the cashew growing states except Kerala, where it has to be Rs. 200 given the high labour cost (DCCD).

#### 6.2.4. Replanting of Crops

- Ministry of Environment and Forest may give the clearance for cutting old senile cashew trees for replanting with high yielding varieties of cashew.

#### 6.2.5. Transfer of Technology

- Conduct intensive technology transfer programmes in traditional and non-traditional areas (DCCD).
- Support capacity building and HRD at all levels.
- Improvement in processing for value addition and marketing infrastructure.

#### 6.2.6. Data collection

- Re-organise data collection of area and production of spices to assess the ground realities. Digitalization of the data collection and compilation process to make the data available in time (DASD).

#### 6.2.7. Area expansion

- The waste lands to be brought under horticulture particularly, plantations without curtailing the area under food crops.
- Certain spice crops are declining and this certainly is a worrying trend, which requires some urgent measures to support farmers. Therefore, the NLAs schemes for pepper under the National Horticulture Mission should continue in the 13<sup>th</sup> plan.
- Mono crop pepper should be encouraged than intercrop by providing institutional support to farmers. At present farmers are growing this crop as intercrop which is suffering from afflictions like root wilt, and slow-wilt and also price fluctuations forcing them to abandon. This is necessary to arrest the downward trend in pepper.
- Mixed cropping of black pepper in coconut and areca nut gardens as practiced in the CPCRI has to be practiced for better crop Production and crop Protection (Spice Board)
- Many of the indigenous varieties of pepper vines conducive to our geographical and climate conditions have disappeared over the decades. The present ones are vulnerable and afflicted by diseases. So it is important to make available quality planting material to the farmers.
- Growing of cocoa as a mixed crop is not so popular. Steps may be taken to motivate the farmer's to grow this crop either with coconut, areca and oil plantation with a wider space (DCCD).

#### 6.2.8. Improvement of water resources

- There was acute shortage of water for irrigating the pepper crop, particularly during summer months. This could be addressed by creating water resources in conjunction with micro irrigation by SHM (Spice Board).

#### 6.2.9. Encouraging the farm processing

- Farm Machinery programme of the states does not have the provision for supply of machinery needed for spices post-harvest. Only sprayers and weed cutter are provisioned. Therefore, assistance for these components under the Central scheme needs to be made.
- The state government also to be informed to cover this programme under mechanisation programme (Spice Board).

#### 6.2.10. Others

- Buy back agreements to be encouraged in Cocoa. Already Tamil Nadu horticulture department has entered into an agreement to promote cocoa farming and intercrop via contract farming and buyback arrangement with coconut farmers (DCCD).
- Programmes on spices allotted to state departments by centre to be conveyed to the Directorate specialised agencies meant for the development of specific spice.
- Many farmers are not coming forward to remove the old plants of pepper gardens due to fear of losing income till the new plants starts yielding. The Institutional support for farmers is required in the interim period. So that they can take up rejuvenation programmes.
- There shall be a coordinated approach among different NLAs especially when they are taking up similar activities like area expansion, rejuvenation, nursery, etc, among commodities so that there shall not be any duplication and the programme could be extended to maximum states and areas. Before finalizing the annual targets this aspect could be examined.
- Formation of FPOs and supporting their agri business activities to be promoted in the areas where the MIDH scheme is being implemented so that integration of activities of different components of the scheme through the NLAs and other Departments and Organisations could help achieve maximum results.

### 6.3. Future Plans

All the agencies have indicated that the existing MIDH should continue in the 13<sup>th</sup> Five Plans and indicated their priorities. The priorities are mainly related to improve cultivation practices and production. These activities are indicated in (Table 22).

Table 22: Priorities for the Next Five Year Plan

Sl.No.	DASD	DCCD	NHRDF	NSC	Spice Board
1	To increase the production of quality planting materials in spices	Establishment of cashew and cocoa production zones, Plan to increase the cashew and coconut cultivation in non-traditional areas	Vegetable seed production	Seed wending machine at rural / semi urban area for supplying small vegetable quality seed packets	Mechanization in post-harvest management of spices
2	Implementation of nursery accreditation programme and popularising the nursery portal of Directorate	Production and distribution of good quality planting materials of cashew and cocoa and upgrade infrastructure facilities of nurseries	Area expansion in non-traditional state, increasing production and productivity of onion and garlic	MOU with State Government for supply of quality hybrid vegetable seed	Strengthening of Spices Producers Societies by establishing infrastructural facilities
3	Dissemination of advance technology in spices to reduce cost of production	Productivity improvement by removing the old and senile plantations and replanting with high yielding varieties	Disseminating pre and post-harvest management practices for minimizing storage losses	Providing seasonal kits of quality vegetable seeds on cheaper rates before sowing season	Skill development programmes for the stakeholders
4	Imparting skill to farmers in the area of cultivation and processing	Transfer of technology programmes in association with ICAR institutes/SAU's/AICRP			Baseline survey for major spice crops including value chain analysis

*Note: As indicated by the NLAS during discussions*



## 7. Appendices

Appendix Table 1: Percentage of financial target and achievement with all the sectors

(Rs. Lakh)

Sl.No.	Components	Total financial		Percentage for total of all sectors	
		T	A	% of T	% of A
1	Area expansion and rejuvenation of horticulture crops	8167.20	6607.23	35.47	34.65
2	Nursery	8787.60	7730.47	38.17	40.54
3	Post-harvest management	1349.90	1332.90	5.86	6.99
4	Capacity building	2732.42	2177.00	11.87	11.42
5	Mission management	1123.01	817.53	4.88	4.29
6	Research & Development	206.55	206.55	0.90	1.08
7	Minor components (water resources, organic farming, IPM/INM, , Data base, campaigning, marketing of onion flakes marketing )	607.7	160.63	2.64	0.84
8	Formation of FPOs	50.00	35.00	0.22	0.18
Total of all sectors		23024.4	19067.31	100.00	100.00

Appendix Table 2: Percentage of physical target and achievement with all the sectors

Sl.No.	Components	Units	Total physical		Percentage for total of all sectors	
			T	A	% of T	% of A
1	Area expansion and rejuvenation of horticulture crops	Ha	108070	78529.04	86.82	82.34
2	Nursery	Lakh	185.47	171.85	100.00	100.00
		No	61	38	0.41	0.20
		Tonnes	3221.56	3013.31	100.00	100.00
		Ha	5120	5148	4.11	5.40
3	Post-harvest management	No	4358	7172	29.20	38.05
4	Capacity building	No	9843	11101.6	65.95	58.90
		Ha	1292.3	1143.66	1.04	1.20
5	Research & Development	No	2	2	0.01	0.01
6	Minor components (water resources, organic farming, IPM/INM, database, marketing of onion flakes, Campaigning,	No	528	398	3.54	2.11
		Ha	10000	10555	8.03	11.07
		MT	1	0.75	100.00	100.00
7	Formation of FPOs	No	134	136	0.90	0.72
Total of all sectors		Lakh	185.47	171.85	92.66*	
		Number	14926	18847.6	126.27*	
		Tonnes	3221.56	3013.31	93.54*	
		Ha	124482.3	95375.7	76.62*	
		MT	1	0.75	75.00*	

\*Percentage of achievement to target

## Field Visit Photos



Picture 1: DASD Beneficiary of Poly house: Indian Institute of Spices Research, Calicut, Kerala



Picture 2: Discussion with the Director of DASD, Calicut



Picture 3: Poly house of DASD- Planting Materials



Picture 4: Discussion with the Director of DCCD, Cochin



Picture 5: Discussion with Director and the staff of Spice Board, Cochin



Picture 6: Beneficiary (Sridaran) of Cardamoms Dryer at Adimaly, Kerala





Picture 7: Spice Board Beneficiary (Sridaran) of Replanting of Pepper Garden  
At Adimaly, Kerala



Picture 8: Spice Board Beneficiary (Vijayan) of Pepper Thresher at Adimaly, Kerala



Picture 9: DCCD Beneficiary (Meenakshi, Padikopa) of Cocoa Plantation (Tribal Family), Kerala



Picture 10: Interaction with Mr. BhuleramTyagi, a potato seed cultivating farmer in Bhaneerakhudd village, Loni Taluk, Ghaziabad District, UP







Agricultural Development and Rural Transformation Centre  
**INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE**

Dr. V.K.R.V. Rao Road, Nagarabhavi, Bengaluru - 560 072

**Phone:** +91-80-23215468, 23215519; **Fax:** +91-80-23217008

**Email:** [admn@isec.ac.in](mailto:admn@isec.ac.in); **website:** <http://www.isec.ac.in>