



भारतीय कृषि एवं खाद्य परिषद्
INDIAN COUNCIL OF FOOD AND AGRICULTURE

HORTICULTURE

NATIONAL ROUND TABLE CONFERENCE



10TH JANUARY, 2017
INDIA HABITAT CENTRE, NEW DELHI



HORTICULTURE MARKET OVERVIEW



SUMMARY

India with varied soil and climate comprising numerous agro-ecological regions provides abundant opportunity to grow variety of horticulture crops. These crops form a considerable part of total agricultural produce in the country, constituting of fruits, vegetables, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments, plantation crops and mushrooms.

Horticulture crops have a significant contribution in the gross domestic production of the agricultural sector. Due to the increasing demand and important contribution in agricultural sector, horticultural crops are becoming an area of priority. For the commercialization of horticultural crops and diversification of agriculture, various programmes are being implemented within the states by state governments like expansion of area, rejuvenation of old mango, guava and aonla orchards, production of quality planting material and post harvest management etc.

Looking at the spatial distribution of horticultural crops in India, Karnataka along with Maharashtra, Uttar Pradesh, Gujarat and West Bengal occupy fore front positions. Out of 23.79 million hectares of total area under horticultural crops, Karnataka occupied 2.08 million hectares that was around 9% of the total area under horticultural crops. Uttar Pradesh was second with 1.87 million hectares (8% of the total area) while West Bengal and Maharashtra

had third and fourth place with around 7.7% and 7.2%, respectively, under these crops. Gujarat was fifth in area with approximately 6.5% share of all India area cropped.

The production of horticultural crops was found highest in Uttar Pradesh with 36.05 million tones, accounting 13% share in the all India horticulture crops production. West Bengal with 27.25 million metric tonne was second placed in terms of production and had 9% share in production. Madhya Pradesh and Gujarat with above 22 million metric tonne of production were placed third and fourth in all India. To accelerate the growth, the government of India introduced “Mission for Integrated Development of Horticulture”. All states, including, Uttarakhand and UTs, have been covered under the Mission.

HORTICULTURE: SHARE IN AGRICULTURE GDP

Horticulture is considered as one of the fastest growing sectors in agriculture and is a driving force to stimulate agricultural growth, increased by the changing domestic food habits towards more nutritious food and increasing overseas demand.

The percentage share of horticulture output in agriculture increased to 34% in 2015-16 from 28% in 2010-2011 and contributes 38% in the total exports of agricultural commodities from about 13.08% of area. Under the



purview of agriculture and allied activities, the share of plan outlay for horticulture, which was 3.9% during Ninth Plan, has increased to 4.6% during the Twelfth Plan.

Among horticultural crops, fruits, vegetables, flower crops and medicinal crops constitute a major chunk, and the share of fruits and vegetables alone is approximately 25% of agricultural GDP, with a share of about 40% in the total agricultural export earnings.

Thus, horticulture has started attracting entrepreneurs for commercial ventures in a big way, especially through, public private partnership (PPP).

LEADING CROPS

There has been a perceptible change in the consumption pattern characterized by declining share of food grains and increasing share of non-food grain items in the consumption baskets particularly fruits and vegetables. Consequently, horticulture is set to assume a greater role and importance within the agriculture sector and eventually in the national economy.

Presently, fruits and vegetables account for nearly 90% of the total horticulture production in India and is the second largest producer of fruits and vegetables in the world. The annual growth in horticulture has seen fruit production grow faster than vegetables, though the latter constitute the largest segment of this sector of agriculture. Fruits such as, mango, banana, citrus, guava and apple account for 75% of the total fruit production in the country. India produces about 70 different varieties of various vegetables on an area of about four million hectare, major vegetable crops of the country include potato, onion, peas, cauliflower, tomato, brinjal, okra, cabbage and cucurbits.

Also, India is the largest producer and consumer of cashewnut, tea, spices; third largest producer of coconut; fourth largest producer and consumer of rubber and sixth largest producer of coffee in the world.

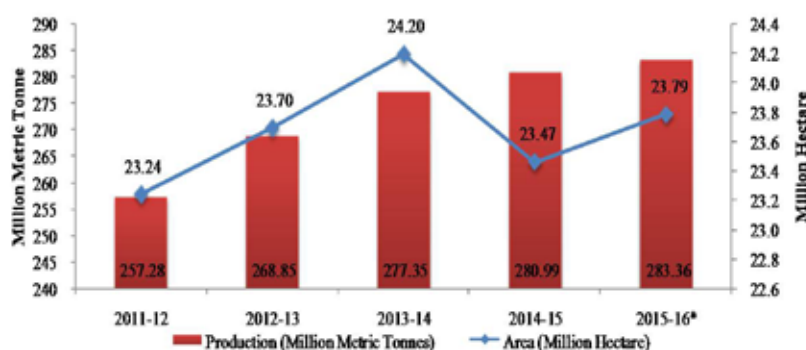
AREA AND PRODUCTION

Indian horticulture has witnessed an increasing trend over the past five years, on the basis of production, growing at a CAGR of 1.95% during 2011-2016. However, in terms of area cropped, there was a decline in 2014-15, which may be attributable to the consecutive droughts and freak weather in 2014 and 2015.

The year 2015-16 marked the fourth straight year that India's horticulture production outstripped food grain output, underlining a structural change ongoing in Indian agriculture. In 2015-16, horticulture production exceeded food grain output by more than 31 million tonne. In 2012-13, the difference was 11.3 million tonne.

The fact that horticulture crops are grown on about 10% of India's gross cropped area, compared to over 50% of the area used to grow food grain, also signals the success of small and marginal farmers in growing more fruits and vegetables, driven by higher demand.

Indian Horticulture Crops Area and Production (2011-16*)



Source: MOSPI and NHB. Note: * @ 3rd advance estimates

Although, the horticulture sector is one of the fastest growing segments of agriculture in India, it also faces numerous challenges. The most prominent ones are emanating from climate change, post-harvest losses, bio-security concerns, absence of market linkages and resultant price fluctuations, changing quality consciousness and global competition.

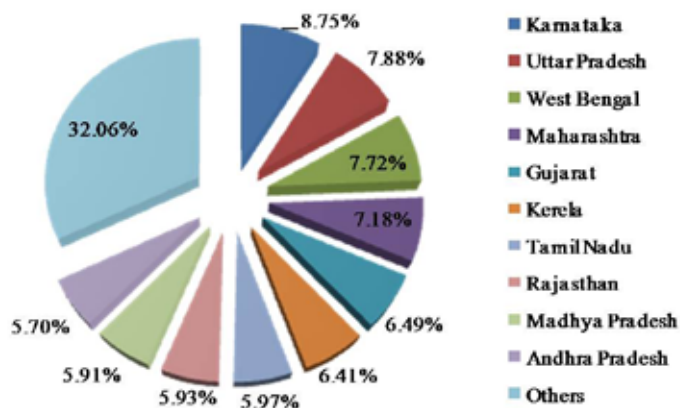
These concerns need to be addressed in order to sustain the growth momentum in horticulture. The focus of growth strategy, therefore, needs to be on raising productivity by supporting high density plantations, protected cultivation, micro irrigation, quality planting material, rejuvenation of senile orchards and a thrust on post-harvest management to ensure that the farmers do not lose their produce in the transit from the farm gate to the consumer's plate.

CROPS BY STATES

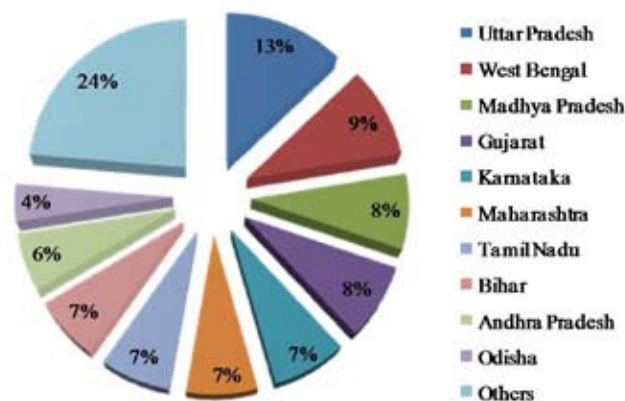
The top four states producing horticulture crops with maximum cropped area are West Bengal, Karnataka, Uttar Pradesh and Gujarat. Among these, Karnataka has the largest cropped area as Karnataka is predominantly an Agriculture State. 24% of the total GDP comes from agriculture and 65% of the work force is dependent on agriculture with 70% of the population still in rural areas,

Indian Horticulture Crops by States (2015-16*)

On the Basis of Area Cropped



On the Basis of Production



Source: NHB

Note: * @ 3rd advance estimates

depending on agriculture for their lively hood. In fact, total gross annual income from horticulture was ₹7,152 crore, which was 40% of the gross annual income from combined agriculture sector.

On the basis of the production, Uttar Pradesh is expected to have produced the largest amount of horticulture crops in 2015-16 with 36.05 million metric tonne production. This may be attributable to the diverse climate of Uttar Pradesh, which is suitable for producing all kinds of horticultural crops. In fact, for more than 90% of small holding farmers, horticultural crops are the main source of higher income, employment and nutrition per unit area.

Also, in the year 2015-16 in Bundelkhand and Vidhya region, beneficiary farmers are being given ₹3,000

per hectare for three years per month as an incentive for establishing orchards in 0.2 hectare to 1 hectare with fencing to be done by the beneficiary to establish new orchard in field of beneficiary farmers and also to ensure the mortality in established orchard. Besides this, under Bundelkhand Special Package various programs also being implemented.

HORTICULTURE CROPS SEGMENTS

India's horticulture production is expected to be around 287.32 million metric tonne, which will continue to outstrip food grain production by a good margin in 2016-17 also, even as vegetables might see just a marginal decline.

Horticulture crops are segmented into vegetables, fruits, plantation crops, spices, flowers and aromatic plantations and honey. Over the years, vegetables and fruits have occupied the foremost importance and thus, constituted more than 90% of the total production of horticulture crops and approximately 70% share of the area cropped in 2015-16.

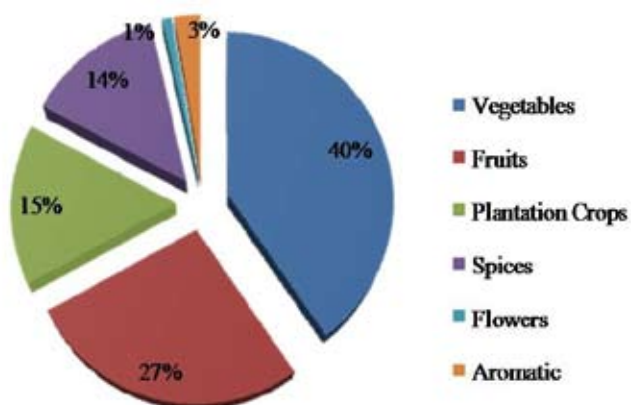
Under horticulture, fruit production in 2016-17 is expected to be 91.72 million metric tonne, against 91.44 million metric tonne last year. Vegetables production in the aforementioned year, according to the first advanced estimates, is expected to touch 168.59 million metric tonne, against 166.61 million metric tonne in 2015-16.



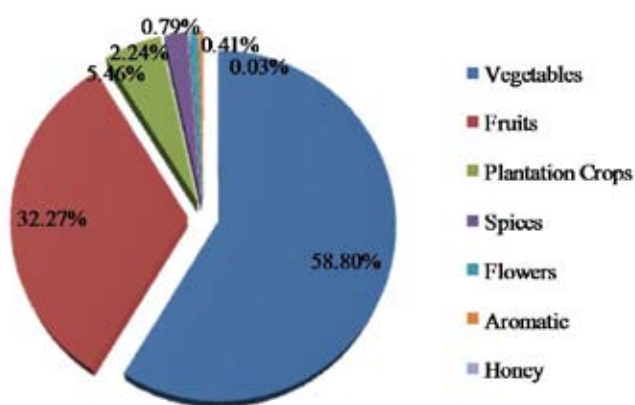


Indian Horticulture Crops by Segments (2015-16*)

On the Basis of Area Cropped



On the Basis of Production



Source: NHB

Note: * @ 3rd advance estimates

INDIA AND WORLD SCENARIO

The horticulture industry is one of the most significant sectors in the world. The production of fruits, vegetables and flowers has abundant importance in recent times because of the increasing demand. Shifting lifestyles of people across the globe and attempts to overcome the stressful lifestyle, and inclination towards healthy and balanced eating habits has made people include fruits and vegetables in their daily diet. In the case of flowers, the demand for fresh flowers has steadily increased not only for decoration but also for many other purposes like medicines, perfumes, cosmetics and etc.

Indian Horticulture Fruits and Vegetables Share in World Production; 2013

Fruits and Vegetables	Share (%)
Mango	44.1%
Papaya	42.6%
Okra	37%
Cauliflower	35.6%
Banana	25.6%
Onion	20.2%

Source: Hortidaily.com

vegetables, contributing 12.6% and 14% respectively in the world production.

Global Agricultural Output – Countries Ranking; 2014

Rank	Country	Agricultural Output (US\$ Billion)
1	China	1,005
2	India	367
3	U.S.A	279
4	Brazil	130
5	Nigeria	122
6	Indonesia	121

Source: Business-standard.com

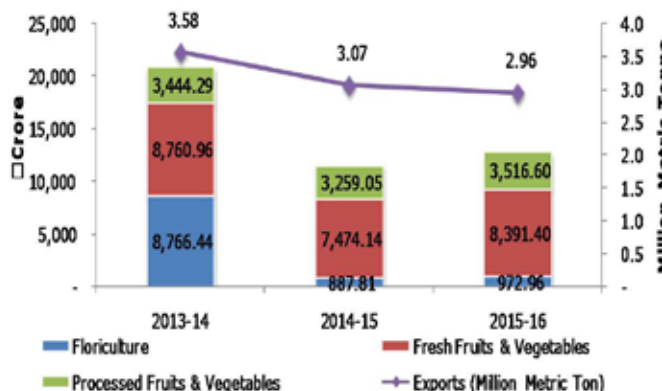
The global market for horticulture is largely lead by China and India. China tops the list of fruit production followed by India, Brazil, U.S.A, Spain, Mexico, Italy and Indonesia. According to the Statistics of 2013, India was the largest producer of ginger and okra and ranked second in the production of fruits and

EXPORTS

Besides meeting the increasing demand of the domestic population, which continues to grow, India exports some portion of its horticulture produce. During 2015-16, total exports of horticulture produce by India were 2.96 million metric tonne, which amounted to about ₹128.81 billion. Even though the quantum of export decreased in comparison to the preceding year i.e. 2014-15, when it was 3.07 million metric tonne, the value of export of horticulture produce increased by 10.84% from ₹116.21 billion in 2014-15. The untimely rains that caused the damage, may have affected the volume of exports during 2015-16.

The consecutive drought and freak weather along with the impact of the currency depreciation of Black Sea

Indian Horticulture Crops Exports (2013-16)



Source: APEDA

and South American countries, and the falling crude prices in 2014 compelled Indian agricultural exports, including horticulture crops to become a trickle.

The decline in the volume of the exports of horticulture crops also signifies the increasing per capita availability of crops, along with increase in the domestic demand of the crops.

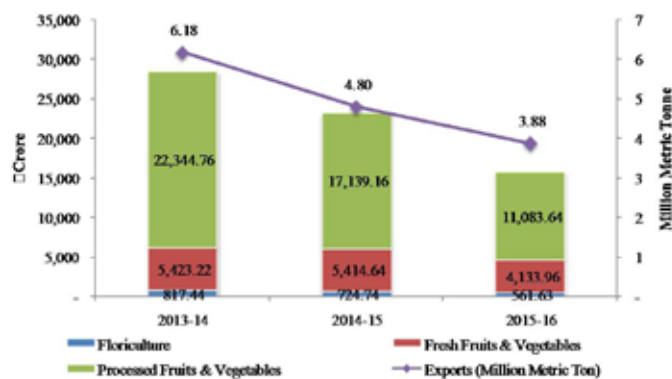
Horticulture crops can be segmented into three categories, namely, Floriculture, Fresh Fruits & Vegetables and Processed Fruits & Vegetables. Of all, in 2015-16, Fresh Fruits & Vegetables accounted for largest share, constituting 65.15%, followed by Processed Fruits & Vegetables with 27.3% share. Although, in 2013-14, floriculture exports share was 41.8%, which drastically declined to 7.64% during 2014-15 and further to 7.55% during 2015-16. The major reasons for the same may be attributable to the several production level challenges faced by the industry, such as, small size land holding day by day, unavailability of basic inputs and skilled manpower for harvesting and post harvesting techniques. Also, with increasing involvement of supermarkets in flower trade, organizing logistic is also becoming a critical factor for the flower exporters.

IMPORTS

The imports of the horticulture crops have declined in

terms of both value and volume over the years. The import volume decreased to 3.88 million metric tonne in 2015-16 from 6.18 million metric tonne in 2013-14, while imports in terms of value, decline to ₹15,779 crore from ₹28,585 crore. The imports were largely affected by the high import duties and increasing self sufficiency of horticulture products in the country.

Indian Horticulture Crops Imports (2013-16)



Source: APEDA

There was a decline in the imports of processed fruits and vegetables at a negative CAGR of 20.84% during 2013-16. This may be attributed to the rise in the number of food processing units in India, during the period. However, there was a significant decline in the imports of fresh fruits & vegetables and floriculture of 8.65% and 11.76%, respectively, during the aforementioned period.

CONCLUSION

The productivity of horticultural crops has increased by about 34% over the span of past 10 years. The special attention given to the sector, especially after the introduction of the Horticulture Mission for North East and Himalayan States (HMNEH) and the National Horticulture Mission (NHM) in the 11th Plan, has borne bumper fruit. Given the increasing pressure on land, growth strategies have been focusing on raising productivity through high density plantations, protected cultivation, micro irrigation, quality planting material, rejuvenation of senile orchards and an emphasis on post harvest management and marketing of produce for better price realization.



DELIBERATIONS



In spite of impressive achievements; there yet remains many constraints due to which horticulture sector is not able to unleash its full potential. In order to discuss the bottlenecks and possible solutions a national round table on horticulture was organized by Indian Council of Food and Agriculture (ICFA) on January 10, 2017 at India Habitat Centre, New Delhi. The main purpose was to provide a platform to private players, government officials and heads of research and academic institutions of Indian horticulture sector to interact face to face and talk over the issues and concerns in its development and the steps required to overcome them, with major focus on marketing and logistic aspects.

The event was graced by the presence of Hon'ble Secretary-Department of Agriculture and Farmers Welfare, Sh. S. K. Pattanayak. The conference was chaired by Dr. K.L. Chadha, President, HIS and Chairman, ICFA Working Group (WG) on Horticulture with the presence of Special secretary Mr. J.P. Meena, MFPI, Horticulture Commissioner Dr. S.K. Malhotra, Dr. H.P. Singh, Chairman-Confederation

of Horticulture Association of India and other eminent persons from horticulture sector. In all forty three esteemed executive members of Government associations, scientists along with policy makers and corporate heads were present for the brainstorming session.

Dr. M. J. Khan, Chairman-ICFA, opened the session by welcoming all the eminent personalities present and discussed the growth and importance of horticulture sector, increasing production and Agri-GDP





contribution of horticultural crops. He further threw light on employment opportunities being generated by horticulture and scope for startups in this sector. Dr. K.L. Chadha, Chairman- ICFA WG on Horticulture, took up the issue of post-harvest losses in horticultural crops and focused on need for effective marketing and logistic support for improving farmer income from horticultural industry.

Mr. J.P. Meena, Special Secretary-MFPI, critically spoke about the production gap between India and developed countries. He mentioned “In India everybody is producing for everybody”, which implied that farmers produce without identifying the consumer category they want to cater to. He opined that R&D was majorly focused to increase production and in some cases to improve the appearance of the produce whereas less is being done to strengthen the fruit and vegetable processing industry (currently less than 10 per cent), which need to be concentrated on. Horticulture crops were limited season crops and there was almost fixed demand for fresh fruits and vegetables in the market, thus to prolong the use and minimize the wastage (which currently was 16-18 per cent amounting to INR 93 thousand crore annually). He brought to the light that in-spite of increasing

production; majority of pulp required by processing industry was imported because processing industry required sizeable production of particular varieties, in which our country lacks.

According to him, not only inappropriate cold storage and ripening chamber structure but also insufficient technical know-how was responsible for majority of post-harvest losses. As storing various produce together at a particular setting will lead to decay or shorten life, hence he stressed the importance of different storage protocol for different crops and scientific techniques for ripening without compromising the nutrition and life of the produce. Further referring to traceability and profits of farmers, he said that because of presence of middlemen in the supply chain the quality of produce as well as better price to farmers can never be ensured. Thus, backward integration with farmers was necessary to ensure the traceability and conditions of crop growth. Credit to farmers for quality produce except monetary returns would catalyze the process, he added.

Dr. H. P. Singh, Chairman-Confederation of Horticulture Association of India, addressed to the challenge “to produce more with less”. He credited the



growth of horticulture sector to increasing spendable income and desire of good food among consumers and also to increasing urbanization. He shared that to promote horticulture three aspects need to be focused on, which are technology, policy environment and investment in the sector. Better packing material with better technology would enhance the life of produce while making it attractive. He underlined the importance of better production system management and private sector investment could revolutionize the organised horticultural sector, which currently restricts to few fruit crops.

He emphasized on the amendments in policy framework with changing market scenario to promote the growth of sector and economy as a whole. Concentrating on required modifications he said that government support on issues like multi-chamber and multi-temporal cold storage, landless farmers cultivating leased in land was essential. He voiced the need to shift to alternative marketing models, direct marketing or backward and forward linked marketing, when few states still stick to APMC law. He briefly touched upon the issue of import and export of seeds and need to strengthen the input support system. He pressed, its high time that we focus on policy guidelines for horticulture so that the farmers interested to cultivate without subsidy could be readily benefitted.

Talking about technologies like hydroponics, vertical gardening, fertigation system and pulse integration system which utilize resources in an efficient manner, he pointed to embrace all these resource efficient technologies huge investments are needed for which government and private players need to come

together. Lastly he suggested integrating the horticulture with “Make In India” and “Stand Up India” programme to make it an integral component of development programme.

Mr. Kulwant Singh, Chairman–KisanVikas Chamber, Punjab, drew attention of the house towards need to diversify from traditional cropping system. He spoke of farmers receiving only 15-18 per cent of consumer price and rest being pocketed by intermediaries. To enhance the same, he reaffirmed the need to promote processing of fruit and vegetables and the urgent need to modify the APMC law. He also urged to promote hyper end market for fruit and vegetable for horticulture sector to flourish. He advocated that promoting processing industry is not only beneficial for the Indian economy rather practical for farmers to cultivate horticultural crops because of availability of their own labour; considering the increasing labour wage rate.

He shared successful experience of exporting chili paste to Saudi Arabia which helped them provide better price to chili farmers of their region. Agreeing to lack of knowledge among farmers (especially about precooling), he urged to strengthen extension system of the country. He also talked about adopting new technologies like nanotechnology and the most recent space breeding, as well as promoting rural entrepreneurs to install small plants to make intermediary products for processing industry.

Sh. B. P. Singh, Secretary- Litchi Grower Association, Nainital, invited suggestions to increase quality under limited water availability and no rainfall condition. Putting the problem of manual tilling he requested 90 per cent subsidy for power tillers. He spoke of limited scope of litchi even in domestic market considering less shelf life and said transporting the produce to southern states require cold storage, thus sought subsidy. He further mentioned that earlier NHB had a provision of sending farmers abroad to learn new technologies which now had been limited for scientists. He requested the government to continue the same.

Dr. S. K. Malhotra, Agriculture cum Horticulture Commissioner, assured the house that ministry was in process to take up development of horticulture sector through area based differentiated techniques.



The points mentioned were:

- Productivity led growth as future requirement and said that schemes in order to promote horticulture could be expected in the upcoming 12th five year plan.
- Currently there were 7395 cold stores in the country with a storage capacity of 35m. tones which was found lacking against a total production of 283 m tonnes and hence resulting to the losses around 15-18 per cent. In order to minimize the losses, there is a need to promote complete cold chain with all the essential components. He assured that the capacity would be raised to 21 per cent from current 12 per cent.
- The financial assistance for post-harvest management might see a hike from present 25 per cent to generous 40 per cent and also multi-chamber and multi temporal cold storage might be provided with some.
- Under NHM and HMNEH feedback and demand to increase funds to 30 per cent for protected cultivation had been received which would facilitate the installation by small farmers.
- Moreover the focus be shifted to high density planting system and root stalk technique of propagation with an objective to get rid of soil borne problems.
- Provision for hydroponics had been made but aeroponics and aquaponics might take some time to come.
- Regarding bee keeping for pollination improvement he mentioned that in order to have financial assistance, provision would be made to establish boxes i.e. 3-5 boxes for one hectare.
- On the subject of quality planting material he mentioned, there were at present 7000 accredited nurseries and planting material would have to be procured from them.
- Emphasizing the need to increase the farmer income he spoke that safal model (Hobb Combs model) would be replicated as pilot project initially in NCR region for three main crops i.e. onion, potato and tomato, utilizing urban and peri-urban horticulture system.

Dr. W.S. Dhillon, ADG Horticulture (Fruit)-ICAR, bought to notice that horticultural production was not suitable for processing industry, as it require A and B grade produce. He proposed instead of increasing production it must be restricted to optimum, while



maintaining the higher quality which would fetch better returns to farmer. He spoke of mechanized harvesting if canopy hierarchy could be managed.

Dr. H. C. Sharma, Vice Chancellor- Y. S. Parmar University of Horticulture, H.P., spoke of need of diversity in horticulture at genetic as well as regional level. He invited the industry to support the production of planting material by tissue culture. He briefly talked about advantages of drip irrigation, water harvesting and mulching for horticultural crops. He also drew attention towards dried fruit and vegetables which were easier to transport because of reduced volume therefore, university was already popularizing sun-drying technique.

Mr. Vibhesh Mishra, Founder & MD-ApnaHaat Retail Pvt. Ltd. reaffirmed the need to bridge the gap between farmer price and consumer price. In this regard he suggested fixing the margin over cost of production to ensure better returns to farmers. He raised the issue of financial support that startups didn't receive once the model was successfully executed as a prototype to expand it to next level. He also discussed the model to form a cluster from which the produce is not purchased and then sold; instead the fixed percentage of amount would directly credit to farmers' account on daily basis, so as to ensure the transparency.

Mr. Vipul Mittal, National Category Head - F&V at Supermarket Grocery Supplies Pvt. Ltd. (BigBasket.com), discussed their chain of collecting and supplying the fruit and vegetables to final consumers. He



mentioned that the simple benefit of operating on-line was that the farmers were aware of price being charged from the consumer for their produce. He voiced that horticulture industry needed to be broken into product specific industry for instance Litchi industry Kiwi industry, mango industry etc. Quality had always been an important aspect; hence quality standards need to be defined at national level for facilitating online trade. Although expensive yet Modified Atmosphere Packages (MAP) can be used to increase the shelf life, he concluded.

Mr. Gopal Bihani, Head-Farm Fresh Big Bazaar, Future Group, revealed that they were planning to tie up with 10,000 farmers for various crops. He restated the importance of packaging for farm fresh (fruit and vegetables) products in enhancing the shelf life and proposed developing a consortium at filed level of young entrepreneurs (farmers, traders and retailers) to bring imagination and speed in the horticulture sector. He underlined the importance of customer profile which enabled easy sorting and grading of fruit as well as vegetables, which could be done at collection centre only.

Dr. Kalpana Pokhriyal, Project Manager-Small Farmers Agricultural Business Consortium, briefly talked of need to focus on FPO (Farmers Producer Organisation) model and to debrief farmer of APMC act. She reported that 28000 m. ton of fruit and vegetable were sold from the platform of Delhi Kisan Mandi.

Dr. Balraj Singh, Vice Chancellor- Agriculture University, Jodhpur, bought to notice the necessity to develop waste land through horticulture to reduce the pressure on agriculture to meet out the production requirement. He reported that there is almost 100 per cent import of planting material for bulbous ornamental plants. In the same sequence he suggested storing the planting material in colder states and transporting it to plain region whenever required and further stressed the importance of hi-tech horticulture and hi-tech seed production. He also mentioned the need to tap export market for crops like cumin for which the export has grown tremendously from INR 95 crore to INR 2000 crore in last three years.

He restated the importance of protected cultivation, further highlighted that India and China started protected cultivation together around 1985-86 but

China is presently far ahead of us. He suggested KMP (Kundli-Manesar-Palwal) highway could be utilized by developing hubs for protected cultivation and marketing, one on each side of the highway. He concluded with significance of traceability which can be ensured by GAP certification initially for global market and later applying it for domestic market. At last, he also spoke of developing new varieties with longer storage duration of produce.

Mr. Pradipta Sahu, Business Head-Safal, told the gathering that Safal operated with 360 degree spectrum and was currently exporting to 42 countries generating revenue of around 650 crores. He referred lack of crop planning as the basic loophole in horticulture sector and suggested, it could be done at cluster level as in grain crops. He voiced that urban consumer made investment in fruit and vegetables for health, which because of heavy use of pesticides are compromised. Thus, Safal made sure that fruit and vegetables are not treated with bromides. He also declared that they provide 50-60 per cent of consumer's wallet to farmers. In his concluding remarks he said that precision farming can take horticulture sector to next level.

In between Dr. W.S. Dhillon raised the issue of heavy metal toxicity found in vegetables especially those grown in peri-urban area.

Mr. Sunil Kumar, GM operations-Sabziwala, mentioned that some produce could not be directly purchased from farmers, for that purchase was to be made from wholesale market. He suggested there should be live pricing mechanism to ensure fair price to farmers as well as buyers.

Mr. Dinesh Somani, F&V Head(North)-Aditya Birla Group, told the house that as round the year availability of horticultural crops was not possible, hence working on crop calendar basis and integrating farmers across 12 collection sectors to grow specific crop variety, ensured round the year availability of crop to them. He also mentioned that because of lack of quality standards varied prices are charged by the farmers.

Mr. J.P. Meena, revealed that licenses were being issued to facilitate comfortable dealing with aggregators. Initially 10 fruit and vegetables each would be



dealt with. He also quoted that entire seed industry was working on contract basis on trust and still no legal case had ever come up, hence similar need to be replicated for horticulture.

Referring to the issue of heavy metal toxicity Dr. Balraj Singh said that an area of 10,000 ha on both sides of river Yamuna around Delhi should be used for floriculture instead of cultivating vegetables; considering presence of heavy metals in the river and quoted the similar step taken in Jaipur.

Dr. C. Vasudevappa, Vice Chancellor- University of horticulture, Shimoga, briefly talked about the significance of bee keeping and mushroom cultivation, and addressed the issue of recycling organic matter and waste water management.

Dr. Saraswat, Executive Director-National Bee Board, stressed on the need to promote scientific bee keeping as they provide pollination support to crops and increase productivity and income to farmers. He brought to light that there is 10 per cent increase in litchi crop by putting in bees at the time of flowering. He further said that beekeeping should now be considered as fifth input.

Mr. Gurkanwal Singh, Director of Horticulture, Punjab, underlined the importance to certify the land that farmers put under horticultural crops and the need to establish farm fresh as a particular category and list down the entire requirement for certification. He also discussed about introduction of bumble bee and new species of honey bee in India, to this Dr. Balraj put forth that biodiversity had restricted the

use of bumble bee.

Continuing again, Mr. Gurkanwal said that farmers were unaware of blooming technologies and reaffirmed the need to strengthen extension system at ground level and suggested conception of market intelligence wing which would act as an advisory for farmers and would guide them about what crop to grow and in what quantum. He further advocated that cold chain should start from farm level itself and it need not be large.

He concluded by bringing to light the delay in getting assistance provided under NHM due to policy changes which earlier was executed timely. Presently, Govt of India released money to state finance department, from there it was routed to beneficiary through proper channel. This system of fund transfer from one department to another took most of the time leaving lesser time for programme implementation after money was received at actual point of disbursement to beneficiary. Therefore to cut down the time lag, old system of money disbursement should be revitalized.

Dr. Ramesh Deshpande, CEO- Indian Agriculture Group, Washington DC, quickly mentioned below stated points;

- The need to analyze the horticulture sector requirements by NABARD at national level with state agencies and then devise national strategy and invite private players to mobilize resources.
- Mega food park model need to be reconsidered as benefits were not being transferred to farmers. He also suggested replicating Dutch model.



Mr. Sohrab, Managing Director-Quality Care services, noted that basis of all this discussion was food safety. Unless raw material was of good quality, final product would not be good. He mentioned an initial study showed that there was 30-35 per cent decline in input use when GAP was implemented, therefore its high-time to tie up with international global GAP certification which was acceptable over 180 countries.

Mr. Anand Chandra, Executive Director- Arya Collateral Warehousing, restated the challenges in horticulture like aggregation of fruit and vegetables, price discrepancy, cold storage infrastructure and ripening chambers. He further focused on managing output for which he said there was a need of suitable mechanism. He concluded by saying that if we could manage the output the prices would automatically be managed.

Dr. Akhilesh Kumar, Founder & CEO, Eden Horticulture Services, reaffirmed the lack of extension services faced by farmers and rural entrepreneurs. He said that now people from various backgrounds were entering the field of horticulture hence information rather right information had become a crucial element. He also stressed on the gap in skill development and training in horticulture sector when compared with other sectors and subsequent need of NSDC connectivity to provide training packages for farmers.

Dr. V.V. Sadamate, Chairman-ICFA WG on Agriculture Extension, spoke of weak extension linkages and need to promote KVKs, ATMAs outreach programme of Agricultural Universities and ICAR centres. He voiced the need to promote rural entrepreneurs, progressive farmers, farmer associations and commodity groups. Strong interface between farmers, scientists and field functionaries via cluster approach need to be developed. He underlined the importance of feedback from farmers and development functionaries to find out right corners of solution. Speaking crucially of production and delivery of content he said it was needed to pro-activate media for providing effective information support. In his concluding remarks, he said to ensure household nutrition security front line agencies need to play a substantial role by providing trainings.

Dr. Vibha Dhawan, Senior Director, TERI, critically spoke of majority of substandard stocks from nurser-

ies therefore need to initiate nationwide programme for nursery cultivation and promote tissue culture for virus free planting material. She raised the issue of carbon footprint when sustaining cold chain storage structure.

Dr. T. Janakiram, ADG-Horticulture (Veg), ICAR, suggested promoting terrace farming and vertical horticulture on mission mode to overcome heavy metal toxicity. He opined that the advanced technologies like aeroponics for potato and crops with good export opportunities like drumstick, jackfruit and tamarind should be promoted as part of government programme. He stressed on development of diagnostic methods and technologies and should be included in Package of Practices for better adoption.

Dr. M. J.Khan spoke of need to focus important commercial crops and end to end approach in order to ensure farmers profitability. Quoting an example of banana festival, he suggested organizing series of trade event for commercially important crops.

All the discussion was summarized by Dr. K. L. Chadha and requested to all the participants to send two recommendations which could be included and could have been missed during the discussions.

Further, Hon'ble Secretary-Department of Agriculture and Farmers Welfare, **Sh. S. K. Pattanayak** made the closing remarks by saying horticulture could bring more income to farmers and nutritional security if connected well to the markets. He further stressed the need to replenish waste land and marginal land. He spoke of protected cultivation as an upcoming alternative but would require investment from private sector.

Finally the formal vote of thanks was presented by Director General of ICFA, **Mr. A. K. Sinha**. He requested states to own horticulture in same way as they do agriculture and also requested government to introduce MSP for horticultural crops.

Further he expressed gratitude to Sh. Pattanayak ji for his gracious presence and worthy remarks. He thanked all other dignitaries for sparing their valuable time and active participation in the conference and making it a success.



MAJOR RECOMMENDATIONS

1. Value addition and food processing are two key aspects with huge potential for growth of horticulture industry. Only 10 per cent of the produce is currently being processed. Targeted efforts are therefore required for improving the situation by development of varieties suitable for processing with time bound mission mode programme.
2. Processing of fruits and vegetables need to be promoted in the country as it will not only avoid wastage but will also enable consumption in off season. Further promoting processing and decentralizing it to village cluster levels will involve young rural entrepreneurs and create skilled jobs in rural areas. For this aggregation, sorting and grading should be encouraged at village level. Government should support establishing collection centers to help small farmers for aggregating the produce by providing subsidy.
3. The government should increase technological and financial support towards development of clusters of horticultural farmers and promote value addition and processing at a near to production sites so that the benefits of value addition would also be availed by the farmers/ producers of horticultural crops. Using technology to forecast production as well as sharing market prices on real time basis, would go a long way to remove the anomalies in prices across geography & season.
4. To ensure the availability of quality produce in the market without contaminants like pesticide residues and toxic heavy metals as per prescribed international and national standards, implementation of GAP is the need of the hour. As development of certification infrastructure involves high costs with low and delayed returns, government needs to come up with incentives for farmers to promote GAP certification as well as financial support to GAP certification agencies in private sector.
5. A system needs to be developed to make TraceNet of APEDA (for Export Purposes) and PGS of NCOF (for Domestic consumption) interoperable in conjunction with GAP to streamline the certification process.
6. Setting up of packaging standards for horticulture crops, would help develop a role of assayer in the production areas, hence generating rural employment. Simultaneously, it would help trading of these commodities through on line portals like e-NAM.
7. There is a vicious cycle of high production and depressed prices for horticultural crops with lean production and high prices in one year and high production and lean prices in next, causing losses to farmers while creating drastic market uncertainties. The government should devise some mechanism to ensure that the market price as well as the production levels has a minimum sustainability level year to year in respect of major horticultural crops.
8. APMC laws need to be amended in all states to de list F&V from the APMC market. Maharashtra & Delhi have already done so. This would help create more competition for the farmer's produce & hence better prices for him. While, declaring a MSP may not be possible, but it would be worthwhile to declare a 'cost of production' benchmark every year for each crop. This would help those who buy directly from the farmers to decide prices, rather than remain dependent on the Mandi for price discovery.



LIST OF PARTICIPANTS

1. Sh. S. K. Pattanayak, Hon'ble Secretary-Department of Agriculture and Farmers Welfare
2. Dr. K.L. Chadha, President, HIS and Chairman, ICFA Working Group (WG) on Horticulture
3. Mr. J.P. Meena, Special secretary, MFPI
4. Dr. S.K. Malhotra, Horticulture Commissioner
5. Dr. H.P. Singh, Chairman-Confederation of Horticulture Association of India
6. Mr. Kulwant Singh, Chairman-KisanVikas Chamber, Punjab
7. Sh. B. P. Singh, Secretary- Litchi Grower Association, Nainital
8. Dr. W.S. Dhillon, ADG Horticulture (Fruit)-ICAR
9. Dr. H. C. Sharma, Vice Chancellor- Y. S. Parmar University of Horticulture, H.P
10. Mr. Vibhesh Mishra, Founder & MD-ApnaHaat Retail Pvt. Ltd.
11. Mr. Vipul Mittal, National Category Head - F&V at Supermarket Grocery Supplies Pvt. Ltd. (Big-Basket.com)
12. Mr. Gopal Bihani, Head-Farm Fresh Big Bazaar, Future Group
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17. Mr. Dinesh Somani, F&V Head(North)-Aditya Birla Group
18. Dr. C. Vasudevappa, Vice Chancellor- University of horticulture, Shimoga
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20. Mr. Gurkanwal Singh, Director of Horticulture, Punjab
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