Horticulture Development in Haryana

Proceedings of
the Stakeholders
Workshop
held on
16-17, December, 2011
at
CCSHAU, Hisar,
Haryana - 125004

Haryana Kisan Ayog
CCS Haryana Agricultural University Campus, Hisar 125004

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Compiled and Edited by :

M. L. Chadha

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FOREWORD

Horticulture has an enormous potential in Haryana due to its excellent geographical location with climate ranging from dry sub-humid to arid. It is playing an increasingly important role in livelihood activity in the rural, urban and peri-urban areas, and also provides better nutrition, environment and economic security compared to traditional agriculture. Increasing the consumption of fruit and vegetables is also critical to improving human health. Lack of nutrients and vitamins causes "hidden hunger" and contributes to a range of diet-related chronic diseases. Diversification into horticulture provides rural households with greater nutritional security. While horticultural crops potentially provide greater profitability, but there is great potential for adding further value through post-harvest processing. Increasing horticultural production will contribute to commercialization by generating associated employment in input supply, processing, packaging and marketing.

Despite considerable advancement in the field of Horticulture in Haryana, the challenges confronting the industry are many. It thus pleases me that a large number of stakeholders (scientists, extension workers, farmers, representative of the private sector) from Haryana, IARI, ICAR and PAU participated in the workshop organized by HKA on 16-17 December, 2011, presented papers and discussed a wide range of issues covering almost all aspects of horticultural crops. I believe that the compilation of workshop proceedings with its recommendations will undoubtedly have enormous use. A compendium of all power point presentations made during the workshop contain in a CD annexed to this publication will enhance value further. This timely initiative on development of Horticulture in Haryana provides valuable directions for use by stakeholders towards increasing production and productivity of horticultural crops in the state.

(R. S. Paroda)

MEMBER SECRETARY
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ACKNOWLEDGEMENTS

The Haryana Kisan Ayog constituted a working group on "Development of Horticulture in Haryana" under the Chairmanship of Dr. K.L.Chadha, Former DDG (Hort.) ICAR, Dr. O. P. Pareek, Former Director, Central Institute for Arid Horticulture and Dr. P. C. Gupta, Former Director, state department of Horticulture were members of the working group with Dr. M. L. Chadha, Consultant as the nodal officer with the group. Besides holding several meetings with different stakeholders, the group organized a workshop on 16-17 December, 2011 with the active participation of scientists and seniors officers from ICAR, CCS HAU, IARI, IIVR, state department of Horticulture, Private sector and farmers. The outcome of the wide range of deliberations of this workshop are being brought out as a proceedings.

I am indebted to Padma Bhushan Dr. R. S. Paroda. who inspired and provided leadership to the programme and thanks to Dr. K. L. Chadha, Chairman, Working Group on Development of Horticulture in Haryana for his guidance from time to time in organizing this workshop. We also thank to Dr. O. P. Pareek and Dr. P. C. Gupta both members of this working group for their help and cooperation. Our special thanks are due to Dr. Satyavir Singh. Director General Horticulture and Dr. Arjun Singh Saini, Additional Director Horticulture for their co-operation & participation. We also thank scientists of ICAR, IARI, CCS HAU, IIVR, Officers of Horticulture Department. Private Sector and farmers for their presentations and sincere participation and valuable suggestions. Thanks and appreciation are also due to Dr. M. L. Chadha, who coordinated the programme and put in all out efforts in organizing this workshop.

Last but not the least, our sincere thanks are due to our other consultants Drs. D. P. Singh, K. N. Rai, M. P. Yadav and Research Fellows Drs. Gajender Singh, Ravikant, Anupma and Deepak Kumar for their sincere efforts and help in making this workshop a great success. We also thankfully acknowledge the efforts put in by the technical and non-technical office staff of the Ayog for making the workshop successful.

(R.S. Dalal)

On the CD

The attached CD contains power point presentations made during the stakeholders workshop on Horticulture Development in Haryana.

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ABBREVIATIONS

CA	:	Conservation Agriculture
CCS HAU	:	Chaudhary Charan Singh Haryana Agricultural University
CEV	:	Centre for Excellence
CIPHET	:	Central Institute of Post Harvest Engineering & Technology
FLDCs	:	Front Line Demonstration Centre
GDP	:	Gross Domestic Product
HAFED	:	The Haryana State Cooperative Supply & Marketing Federation Ltd.
HKA	:	Haryana Kisan Ayog
HDP	:	High Density Planting
IARI	:	Indian Agriculture Research Institute
IHITC	:	International Horticulture Innovation and Training Centre
ICAR	:	Indian Council of Agriculture Research
IPR	:	Intellectual Property Rights
IIHR	:	Indian Institute of Horticulture Research
IIVR	:	Indian Institute of Vegetable Research
INM	:	Integrated Nutrient Management
IPM	:	Integrated Pest Management
MSP	:	Minimum Support Price
NABARD	:	National Bank for Agriculture and Rural Development
NCS-TCP	:	National Certification System for Tissue Culture
PAU	:	Punjab Agriculture University
PPFP	:	Public Private Farmers Partnership

PPP	:	Public Private Partnership
SAU	:	State Agriculture University
SWOT	:	Strengths, Weaknesses, Opportunities and Threats
NDDB	:	National Dairy Development Board
SHGs	:	Self Help Groups
TOT	:	Transfer of Technology
MDB	:	Mushroom Development Board
GGN	:	Govt. Garden Nursery
RFRS	:	Regional Forest Research Station
QPM	:	Quality Protein Maize

Introduction

Presently fruits, vegetables, flowers and mushrooms, are important horticultural crops grown in Haryana which accounts for 6.4% of the total crop area in the State. Every effort is being made to achieve the target of 10%. The State has small acreage under spices, medicinal & aromatic plants also. The total area under fruits was 7.86 thousand hectare with a total production of 27.53 thousand tons and productivity of 3.5 tons per hectare during 1966-67, which had increased to 46.25 thousand hectare with a total production of 356.6 thousand tons and average productivity of 13.04 tons by the end of 2010-11. The total area under vegetables was 11.30 thousand hectare with a total production of 1,35.36 thousand tons and average productivity of 11.97 tons during 1966-67, which has increased to 465 thousand hectare with a total production of 4649.28 thousand tons with average productivity of 13.42 tons by the end of 2010-11.

There was no flower cultivation in the State during 1966-67 but covered 6.3 thousand ha during 2010-11. Similarly, mushroom cultivation picked up during 1989-90 and by the end of 2010-11, production went up to the extent of 8 thousand tons with average productivity of 6.07 kilogram per tray and Haryana is now a leading mushroom producing State in the country. Therefore exports of mushroom along with other types of medicinal mushrooms should be the future strategy. Cultivation of aromatic plants is also increasing due to higher returns.

Changes in productivity of important horticultural crops over years are the reflections of good achievements so far. Under Horticulture Mission, efforts will be made to increase it further. Every effort will be made, using cutting edge technology to make horticulture a lucrative proposition for the farmers in Haryana. More emphasis will be placed on increased acreage under hybrids and adoption of protected cultivation in larger areas with soft loan facility. Research and development efforts will be reoriented to meet the need and expectations of farmers. Production of quality seeds and planting materials will receive high priority.

New opportunities will be explored on arid horticulture technology including agro forestry systems and develop functional foods and nutraceuticals using fruits & vegetables and indigenous flora. Perennial fruits for agro horticulture and tree species for agro forestry, using micro irrigation, shall be promoted including raising of bees as pollinators for ensuring higher production of many crops.

To prioritize the horticultural sector activities and to prepare a road map for Horticulture R&D in Haryana, a workshop on Horticulture Development in Haryana was organized by Haryana Kisan Ayog at Hisar on 16 and 17 December, 2011. Seventy participants from state Department of Horticulture, selected progressive farmers and resource speakers from IARI, ICAR and CCS HAU which made the discussion more meaningful participated.

Dr. R.S. Paroda, Chairman Haryana Kisan Ayog in his presidential address emphasized the importance, scope and potential of Horticulture in crop diversification and raising income of the farmers in Haryana. He said the main purpose of the this meeting was to get insight from all stakeholders.

Dr. K.L. Chadha, Former DDG (Hort.) ICAR, Chairman of the Horticulture working group Haryana gave a detailed overview of the ongoing programmes, available infrastructure and institutional capabilities, strength and weaknesses of horticulture sector. Dr. Satayavir Singh Director General, Horticulture, Haryana highlighted on the overall horticulture scenario and discussed various schemes and initiatives launched in last decade by department of horticulture.

Eighteen presentations in four technical sessions were made during the two days workshop, which gathered an overview including background of the programs already underway, progress made so far, gaps and future strategy for Hort. R&D in Haryana. This will help to analyze the strengths, weaknesses, opportunities and threats to Horticulture sector in Haryana.

Abstracts : Power Point Presentations

Haryana Horticulture Scenario

Dr. Satayavir Singh

Haryana bears 4.42 million ha area out of which 3.55 m ha is the only cultivable area. 15.28 lac farming families and total land holdings are categorised as marginal farmers (9%), Small farmers (12%) and others (79%). Horticulture share is 6 % of Haryana State Economy and GDP is 15.3%. Various new schemes were launched during the last decade. The initiatives taken by the department to establish horticulture in Haryana and NHM physical and financial status were elaborated. Horticulture growth crop wise and projections for 12th plan were highlighted. Haryana State, for horticultural crops, has been divided into three clusters viz. (i). Citrus and guava, (ii) Mango and sapota (iii) Flowers, vegetables/ mushrooms. Plantation in waste land and water pond interventions have been highlighted on Indo-Israel projects which are being implemented in Haryana. Further efforts on PPFP (Public-Private-Farmer-Partnership), about the establishment of 14 Front line demonstration centres (FLDCs) and post harvest management infrastructure facilities available in Haryana were also discussed. A modern Farmers' Market has already been established in Rohtak with cold chain, pack house and ripening chamber facility. Highlights were made on emerging trends like plasticulture application, water management system in Horticulture, organic farming, waste water & saline water treatment and bee keeping, stress on spices and micro irrigation in Vegetables. Some gaps like insurance of horticulture crops, protected structures, pesticide residues in vegetables, quality water availability, market information system, proper marketing of perishable produces, price stability, processing, value addition and insufficient staff & trained man power were also discussed.

Development of infrastructure, schemes, priority areas and crops, future programs, progress, gaps and recommendations

Dr. P. C. Gupta

Infrastructure development that increases the production by adopting new technology like captive cultivation in air or water cooled net houses suiting to Haryana conditions. Use of micro irrigation techniques etc. will check spoilage or wastage by establishing pre-cooling centers in specific commodity production areas, using high yielding hybrid genotypes, deputing highly experienced and technically trained manpower, ensuring proper grading, packing, transportation and

marketing. To develop specific crop clusters to harness the expected results, preferably under controlled conditions in Air & Water cooled net houses, trained manpower for crop production may be deployed to look after and guide a specific area of 500 to 2000 ha with a demonstration center having collection, grading, packing precooling facilities and produce be marketed at remunerative price on the pattern of mother dairy / NDDB. All available subsidies and incentives should be provided in these compact areas to 100% growers / societies. Some prevailing schemes in Haryana are already going on like that of subsidies on small and large nurseries and tissue culture unit establishments for vegetables, fruits, flowers, spices, seed production and mushroom production. There is also a good provision of subsidies on mechanized fertigation systems, drip irrigation, community pond construction, rejuvenation of old orchards, poly and net house construction. Adequate training facilities should be created to educate growers of these locations. Location specific suitable genotypes / varieties should be selected by an expert group for recommending to the state farmers. Pest, diseases and deficiency symptoms diagnostic labs should be provided for each district or a group of clusters. Some constraints like shortage of technically trained man power, lack of improved varieties and planting material, lack of guidance & supervision, no maintenance and after care service with follow up of technological adoption. In order to prevent wastage of resources in the absence of proper utilization, there should be legislation for proper land utilization suitable for production. It is necessary to recycle organic waste to the best possible extent. Complete package should be provided to the farmers at their doorsteps.

Strategies for developing arid horticulture and under-utilized crops in Haryana

Dr. O. P. Pareek

Strategies should be adopted for conservation and utilization of biophysical resources, sustained benefits to farmers/people i.e. economic, nutrition, environment and community life. The planting systems such as i.) Commercial horticulture- intensive monoculture, targeting for export, processing functional foods & nutraceuticals, fresh market. ii.) Intensive multi crop system, targeting for fresh markets processing. iii.) Community horticulture, targeting for watershed basis agro-forestry system were suggested. The fruit species cultivation & utilization for arid region and commercial, indigenous and exotic varieties were discussed. Selection of suitable planting material by adopting proper nursery techniques to develop suitable root architecture and proper hardening of plants were stressed. The nutritional values of underutilized fruits were also discussed.

Research infrastructure and programs on fruit crops, technologies developed, gaps and future needs

Dr. S. K. Bhatia

In the Department of Horticulture, experimental orchard covering 100 acres under various fruits has been established at the CCSHAU headquarters. Presently, there are seven laboratories and a departmental library catering to the needs of postgraduate students for conducting research. Keeping in view the importance of quality planting material, tissue culture laboratory was established in the department for standardization of micro propagation protocols. The department is undertaking the work of PFDC and experiential learning wherein Hi tech and naturally ventilated polyhouse has been installed. More than 100 varieties of Ber, 20 of guava, 25 citrus, 8 aonla, 10 bel, 8 litchi, 5 pear, 4 peach, 12 pomegranate, 15 marigold, 12 of gladiolus have been collected by the department. The various methods involved in crop improvement are adopted in Guava, Citrus and Ber. Varieties Hisar Safeda and Hisar Surkha are famous varieties of Guava. Hisar beauty and Jafri varieties are of marigold. Methods for preparation of various products viz. RTS drink, juice, vinegar, wine, preserves etc. have been standardized in various fruit crops. Modified atmosphere packages were also standardized for mango, citrus, guava etc. Zero energy chambers were found most successful for short term storage of different fruits and vegetables. This can easily be framed by the farmers and are multipurpose for storage of perishables. Early Large Red variety of Litchi has proved to be the most suitable variety. It is regular bearing, high yielding and good quality fruits with an average fruit yield of 35 kg / plant at the 15 years plant age. Collection and evaluation of fruit plants, promotion for indigenous fruit plants and standardization of organic farming technology for fruit crops will be the major future thrust areas. Drip irrigation in orchards, rejuvenation of old and senile orchards, standardization of the intercropping systems in different horticultural crops, protocol for micropropagation of major crops like Guava, Citrus, Mango etc. Production of quality planting material and reduction in post harvest losses of the produce were suggested.

Research infrastructure and programs on vegetable crops, present status and future needs

Dr. S.K. Dhankar

Out of a total of 78 acres area of vegetable farm, 24 acre is under research, 54 acre under seed production. There are 2 research labs, 2 seed processing unit cum seed stores, 2 water tanks, 2 poly houses. Seven schemes are being implemented for

research and seed production. Water management and integrated nutrient management programs are adopted to develop production technology. A total of 65 varieties have been developed till date and more than 50 have been released. The future need of vegetable crops are: Development of hybrids and varieties with high yield, resistant to biotic and abiotic stresses, good quality, suitable for processing. Besides this, water management is through use of drip, sprinkler and rain gun system, utilization of poor quality water with proper treatment, integrated nutrient management- bio-fertilizer and inorganic fertilizer and off-season vegetable production

Research infrastructure and programs on floriculture crops, present status and future needs

Dr. T. Janaki Ram

India ranks 23rd among world exporters of floriculture products and floriculture exports from India is Rs 400 crore (2008-09). About 1.60 lakh hectare area is under Floriculture, 98 % of the area is under open grown traditional Flowers, domestic trade is worth Rs 300 cr, Delhi alone contributes Rs 50 crore. Awareness about new technology, strengthening infrastructures, technology support, quality planting material, development of satellite nurseries by unemployed youth, enhancing the role of Women, linkage with other departments, encouraging self help groups, human resource development, database formation, Increased budgetary support will be the future focus. The Centre has approved two model floriculture projects under horticulture mission for Haryana. The projects worth Rs 1.4 crore will be established in Panchkula and Karnal districts. There was no flower cultivation in the State during 1966-67 but covered about 4,810 ha during 2004-05. Favorable climate for production of quality flowers, proximity to major markets like Delhi, Chandigarh, Ecotourism, Punjab and Haryana for the cultivation of flowers and ornamental plants. A number of weaknesses, like water scarcity, lesser-availability of quality seeds and quality planting material, poor post harvest management and marketing facilities like cold storage, pre-cooling and waxing centers, processing units and lack of farmer training programmes for horticulture, are needed to boost the floriculture sector.

The proximity to NCR offers excellent marketing channels, establishment of processing Industries and export of flowers to EU and Middle East are feasible. Approaches to produce disease free quality planting material were discussed. Haryana State can be one of the potential places for seed production of various winter flowering annuals.

Strategies for quality production of planting material of Horticultural crops in Haryana

Dr. A. K. Singh

Planting in new areas (Area expansion), replacement planting (to replace old and senile orchards), and harness genetic potential of the crop are three major points. Genetically true-to-type mother plants of the variety from the Institute/ University of release should be collected. The plants should be healthy and free from any disease, pest infestations and physiological disorders. The plants should have known pedigree records regarding bearing potential, fruit quality and disease problems, if any. More than twenty virus and virus-like pathogens have been reported to attack fruit crops. Strategies for freedom from diseases and in this regard, production of disease-free citrus plants through tissue culture with strict implementation of National Certification System for Tissue Culture Plants (NCS – TCP) should be adopted. Establishment of Model Hi-Tech Nurseries should be taken up as a profession with proper training. Establishment of structures and facilities for mass production of any fruit crop(s) should be ensured following the efficient propagation methods for maintenance of Scion Bank and Rootstocks blocks. To follow only the standard nursery practices in propagation, maintenance and sale of plants and to meet the current and future demand of planting material with scientific management of resources, manpower and records, Nursery site should be away from the commercial orchards and nursery should be raised in containers (plastic trays/ polythene bags). Only sterilized potting mixture should be used. There should be use of healthy quality seeds extracted from fresh fruits in case of rootstocks. Seed trays must be kept at least 15-20 cm above the ground to avoid soil-borne contaminations. Nursery floor should be covered with stones/ stone dust to avoid contamination from soil. Use only nuclear seedlings for grafting/ budding. Nursery Legislation should be strictly enforced and every commercial nursery should be registered under the Fruit Nursery Registration Act. Each nursery should comply with the uniform norms.

Planting material of fruit crops availability, gaps and strategies to meet future demand in Haryana

Dr. R. K. Arora

Provision of good quality plants to the farmers is the main lecuna. Since quality plants are the backbone of horticulture industry. Planting material supplied to the farmers, must be true to type in respect of geniuses of the cultivars and must be propagated from the trees having high yielding pedigree record. Mother stock tree

must be free from viral bacterial and fungal diseases. Nutritional status of the mother stocks must be known. Nursery pruning and training is needed to get healthy and study plans to bear field stocks. Rootstock must be according to that particular agro-climatic conditions. Mother stocks should be tested by MIR for the presence of fungal spores in the xylum and phloem parts of the plants. If such plants fulfills this parameters, than the plants can be called as quality plants and fit for field plantation. Genuine plants availability from the reliable sources like. State Agricultural universities and HAU : Hisar Campus – For almost all the fruits crops. Buria HAU research Station – Mango, Litchi, Sapota, Peaches. College of Agriculture Kaul – Sapota, Peaches & Plum; PAU : Ludhiana almost all fruits plants. RFRS Abohar – Citrus, Fruit Research Station Bahadurgarh – Guava, Peaches Plum, Fruit Research Station Bhatinda ;Bikaner Agri. University Campus Ganga Nagar – Citrus.

Haryana State Govt. Nurseries ie. Govt. Garden and Nursery Nabipur (Ambala) for Mango, Sepota, GGN Chachhrauli (Yamuna Nagar) for Mango, Litchi, Sepota, CEF Mangiana (Sirsa) for Citrus, GGN Jind for Guava, GGN Bhuna (Fatehabad) for Guava, GGN Barwala (Hisar) for Citrus, GGN Bhiwani for Ber, Pomegranate, Aonla. Approved, registered and licensed private nurseries having at least 5 acres of land under the mother stock properly checked by the Department of Horticulture about its pedigree record in respect to yield and nutritional status like. Maugarh fruit farm Abohar (Citrus), Dada Nursery – Ganga Nagar for Citrus, Punjab Govt Nursery Hoshiarpur , Layalpur Nursery – Ganga Nagar.

Planting material of vegetable crops availability, gaps and strategies to meet future demand in Haryana

Dr. Satyender Yadav

The performances of tomato, cucumber, bell paper and eggplant hybrids raised from the quality planting material were discussed. The center is providing quality seedlings of cherry tomato hybrids- BSS 834,460008, Olle, Nagmoti, Raisy, Heemshiker, IR 75474, Tolstoi, for cucumber hybrid varieties - Isatis, Kiyan, Multistar and Deltastar, Valleystar, KUK 9/24, Cengel. Planting material for bellpapers- Oreobelle , NS 285,Tanvi , Bombai , Chofer , Neta , Chocolate wonder, Tanvi +, Kranti, 1701. As Genetic Hybrid seeds are very costly, seedling production should be done in Hi – Tech Green house. "One seed – one plant & benefit" Public Private partnership. Technology transfer centers like CEV Gharaunda, organize regular workshops for idea sharing. Easy import /quarantine system should be the strategy. Shortage of professional persons for the expansion of Hi-tech cultivation of vegetables was highlighted.

Planting material of spices, availability, gaps and strategies to meet future demand in Haryana

Dr. T.P. Malik

India is the largest producer, consumer and exporter of seed spices. About 10% of the production is exported in raw, as well as in value added form. There is a good potential for increasing export of seed spices. The North-Eastern part of Haryana has got potential for producing the spices where these are used as condiments or for other purposes and these may be graded in different forms (whole or uncrushed or powdered form). Best quality of turmeric, ginger, chili, coriander and fenugreek are grown in the State. For strengthening seed production programme of improved varieties to meet the growing demands of farmers for quality seed, there should be improvement in marketing facilities for procurement of produce such as organizing demonstrations, training of farmers to follow improved cultivation methods including use of varieties, integrated pest and disease management and agronomic practices. There is an urgent need for Govt. support by way of declaring minimum support price, crop insurance scheme in order to compensate losses due to diseases epidemics or natural calamity like frost. By installing seed spices laboratories for quality assessment of seed spices produced in different areas of State. Besides there is a need for developing and popularizing industrial units in major producing areas and also agro metrological services are required for weather forecasting and advising farmers to protect seed spices against disease, insect-pest and frost.

Planting material of medicinal plants availability, gaps and strategies to meet future demand in Haryana

Dr. I.S. Yadav

Haryana has conducive soil and climatic conditions for the cultivation of wide range of medicinal plant species which need to be exploited by way of providing quality planting material, latest technical know-how, extension support, post harvest handling techniques, processing & value addition and organized- marketing avenues to the growers. Some of the important plant species which can be grown under South-Western Region of Haryana with low rainfall, dry climate and light soil types are Isabgol, Senna, Mulhatti, Ashwagandha, Satawar, *Aloe vera*, Kalmegh, Aonla, Guggal, Bael etc. The important plant species which require high irrigation facilities, fertility and medium to heavy clay soil types are Buch, Brahmi,

Mandukparni, Kalihari, Amahaldi, Haldi, Giloe, Kawanch, Satawar, Coleus, Akarkara, Sarapgandha, Tulsi etc. The production of quality seed/planting material is very important to have high quality produce to be utilized by the pharmaceutical industries in drug manufacturing. The importance of QPM making available in adequate quantity and in right time cannot be underestimated. Therefore, the responsibility for production of quality seeds/planting materials of high quality released varieties is given to SAU and Government organizations involved in seed production and certification for seasonal crops. Seed production of some of the crops has already being done in sufficient quantity at CCS HAU, Hisar. Transfer of technology takes place through trainings and seminars at District, State and National levels. The strategy for marketing of these crops suggest to divide whole of Haryana into three agro- ecological regions based on agro-climatic & geographical conditions and types of medicinal plants grown. Also establishing a multipurpose primary processing and marketing agency in each region located at the central place is the need of the hour. MSP of Medicinal Plants may be fixed by the Govt. Herbal Mandis should be established at least at the regional level.

Public- private partnership in research and development of horticulture sector in Haryana

Dr. S. Mauria

Public Private Partnership in Agriculture Sector in Haryana is required in all necessary sectors like - Inputs, Research, Extension, Financial Services, Produce Marketing Services. Public Private Partnership examples in Horticulture are- Technology licensing directly to Private seed / other product companies, Technology licensing to private sector organizations, through a public sector mediator. Technology licensing directly to other public sector organizations, Advanced breeding lines and lines with specific traits like 'male sterility', Post Harvest Technology products. Fabrications of implements/ devices/machineries, crop protection technologies and micronutrient formulations. Since implementation of ICAR's IPR Guidelines, it has entered into 196 PPPs with 119 Private Organizations for 56 Horticultural Technologies from its 12 Research Institutes. Public-private partnerships in research, education building and to integrate proficiencies in agriculture sciences with management, such as market intelligence, pricing and valuation issues, to nurture demand-driven research. Programs on capacity building in IP and technology management along with. Streamlining of intellectual assets - patents, plant varieties, know-how etc. were discussed.

Urban and peri urban horticulture present status, gaps and recommendations in Haryana

Dr. Pritam Kalia

By 2030, the 45 per cent of Indian population is expected to live in urban areas. Horticulture within and around the cities is already a preferred activity for many of the unskilled migrants. City farmers have developed small and medium size market gardens specializing in the production of vegetables, fruits and flower crops for sale on city markets. Among the horticultural crops, vegetable cultivation and floriculture have tremendous potentiality in peri-urban areas of the Haryana. Fruit crops especially mango, guava, strawberry, papaya, lemon, kinnow also have an added advantages in peri-urban horticulture to be fitted suitably under nutrition gardening. Haryana climate is suitable for cultivation of all types of vegetable crops. Major vegetables that can be taken up commercially include cole crops, solanaceous vegetables, cucurbits, root crops, bulb crops, leafy and legume vegetables. An important factor affecting both land use and cropping pattern is access to transport network for linkage with urban market. The unemployed educated rural youth can be trained for gainful employment and increased production. Protected cultivation of horticultural crops for high quality and off season cultivation can be promoted with the improved techniques. The concept of organic farms can be established and recycled waste from city and mandis can be used as organic manure resulting of in reduction of environmental pollution and health hazard and improvement of soil health. A large number of processing and preservation units are functioning, though on part time basis, because of irregular supply of raw material. Ensuring their full time functioning in an organized way that will ensure utilization of market glut as well as availability of products during off-season. Farmers are mostly ignorant of right stage of harvesting, proper cleaning, grading and packing of the produce, which results in low price for their produce. Sometimes, improper labeling of different grades also results into low price in the market. In spite of satisfactory network of wholesale markets, less suitable transportation facilities and unplanned production, creates market glut, resulting in poor payment to the farmers. Lack of sufficient cold storage facilities to store surpluses for next day marketing also cause a major constraint. Lack of local marketing system also results in low sale price as well as market glut. There has been inadequate attention towards post-harvest management, especially on farm primary processing and storage. Infrastructure facilities like pre-cooling units, cold stores, refrigerated transportation system, pack houses, modernized market places are either absent or negligible. Market information system is also either non-existent or not available in big *mandis* resulting in irregular production, uncertain availability of the produce and unorganized market prices were highlighted.

Protected cultivation: Current trends and potential in Haryana

Dr. Arjun Singh Saini

To make Haryana a modern fruit & vegetable cultivation State with a vision to lead in domestic and export market, growing them under proper protected structures is important. Global food production will have to be raised to 70% by 2050 as the world population expands to 9.1 billion people from about 6.8 billion people in 2010. In Haryana, high tech green houses increased from 1000 to 4000 sq m, for both tubular and channel structures. Naturally Ventilated Green Houses from 500 sq m to 4000 sq m for tubular and channel structures. Walk-in-tunnels/single span structures from 400 sq m to 1000 sq m for tubular structures. Insect net houses from 500 sq m to 4000 sq m for tubular structures. Sixteen firms are empanelled, eight are active for installation of protected structures, Firms are bonded with bank guarantee, rates are at par across the firms throughout the State, Bankable Projects- Preparation of protected structures project reports from IHITC, Jaipur, Covered eight crops, Flowers, Vegetables, Herbs, Projects sent to NABARD for evaluation and finalization., Meeting with Lead Banks for Loaning to farmers, Technical Support-, Farmers' exposure visit to CEV Project: free of cost, arrangement of farmers training at HTI for 3-6 days: free of cost. Training to Deptt. Officers for 3 months and residential: first batch completed from different districts (15 nos.). Visit of experts from CEV to farmers field where poly houses cultivation has been taken: 2 days per week in each district. Pre and post installation inspection of poly houses by Technical team from Directorate: mandatory before completion certificate to the Firm.

Mushroom production present status, future scope, strategies gaps and recommendations in Haryana.

Dr. Surjeet Singh

The mushroom production is a highly profitable proposition. The 34.9% of the total investment is on fixed inputs; while 65.1% is on variable inputs. In the fixed investment, major share is spent on construction of mushroom sheds. In the variable costs, maximum proportion is spent on labour (28.09%) followed by that on straw (14.96%) and bran (8.96%). Net returns per kg of mushroom produced was Rs. 9.15 on an average selling price of Rs. 35.00 per kg. The major marketing costs are commission charges (41.05 percent) and transportation (36.52%). Mushroom produced in the state is sold in Delhi/other markets through commission agents and also sold directly either to the processing firms or the traders. But these are not transparent and the farmers remain at the receiving end due to highly perishable

nature. The marketing costs such as washing, weighing, packing etc, have to be made by the farmers. Farmers also point out the unauthorized charging of commission fee for selling their mushroom from designated 'farmers sheds' where they are not supposed to pay any commission charges. Some key developmental programmes which require due attentions are- Timely availability of quality spawn, Monitoring the establishment of spawn units in public and private sectors and enforcing spawn standards and fair price, Establishment of compost mother units for supply of quality compost to the small growers in potential areas, Supply of spawn run substrates in urban and peri-urban areas for home cultivation of mushrooms, Involvement of cooperatives and other marketing organizations for providing the required inputs as well as help in viable marketing of mushroom, Ensuring liberal financial support by the government agencies and financial institutions, Declaration of a minimum support-price for mushrooms and provisions for insurance coverage, Technical guidance and financial support to the small scale and export oriented processing industries, Creation of Mushroom Development Board (MDB) like Coffee Board and Coir Board for promotion of mushroom processing and marketing in India, Establishment of cold chains for mushroom transport, Guidelines for notification and release of mushroom varieties on the lines of Central Committee for crop standards and variety release. Cultivation of Oyster and milky mushroom in Haryana has tremendous potential, which is yet to be fully harnessed.

Rural based primary processing technologies for horticulture, value addition, gaps and future potential in Haryana

Dr. R. T. Patil

In Haryana, post harvest losses are 3-18 per cent, low level of processing of fruits and vegetables at only 2%. Food processing is employment intensive, creates 1.8 jobs directly and 6.4 indirectly for every Rs. 10 lakh investment. Processing is mostly controlled by urban rather than rural entrepreneurs. Shorten the supply chain, increase the profitability of farmers and ultimately increase in GDP from agriculture and reduce poverty. Reduce post harvest losses and increased availability of by products for further processing. High Value Products from Horticultural Wastes like Pectin from fruit and vegetable peels. Lycopene from tomato peel and oil from seeds. Dietary fibres from fruit pomace. Bio-plastics from tapioca. Anti oxidents and phenolic compounds from peels. Various methods of post harvesting to increase the productivity and profitability were also discussed. The new machines developed for processing like pomegranate aril extractor, vegetable washer, carrot washer, anola juicer, kinnow juicer, heat pump dryer, tomato grader may be promoted with 50%

subsidy. Processed fruit products like Jam be introduced in school meal programmes to promote this sector .The locally processed tomato ketchup and mixed fruit jams be provided through PDS to meet nutritional requirement and also to prevent losses and for that local SHGs be involved. Nurture upcoming entrepreneurs and help them in establishing and marketing by establishing a state level institute for PHM&VA. Modern Technologies for Food Processing and Storage are essential for reducing the post harvest losses and increasing the profitability of farmers.

Strategies for developing of marketing system and infrastructure for horticulture crops in Haryana

Dr. J. K. Sandooja

Owing to growing concentration in the retail sector, changes in consumer attitudes, depressed commodity prices, changes in wholesale marketing, survival of horticultural firms is often at risk. Competitive strategies to exploit quality differences (size, color, taste, varieties, etc.) command higher prices. Integrate vertically-move forward into the marketing chain toward retail to capture more of the value-added revenue and also identify new markets. Marketing strategies, when targeting wholesale opportunities, should be competitive for both price and service , quick to respond to customer needs, sharing costs and risks of customer, maintaining good relationship with the "customer", understanding the marketing channel and keeping up with changes, taking advantage of information technology, becoming a preferred supplier. Retail opportunities with chain stores, supermarkets, Wal-Mart, independent retail stores. Local farmer's market (APNI MANDIES), direct to business users (produce to restaurants ornamental plants to business offices), Urban farmer's market (Near Commercial Market), Mail Orders and E-Commerce, Marketing and trade strategies for small farmers/ traders targeting retail opportunities like high quality, value-added products, agri-tourism, owner's identity, collaboration, joint ventures, Another important outlet in marketing is Direct to consumers. Roadside Market which depends on type of consumers, buying habits. The first impression for customers should be impressive. Surrounding area should be neat & clean with beautiful landscaping. Packing should be attractive & of different sizes for different type of customers. Prices should be uniform, genuine, fair & competitive. Salesmen should be smart & should have capability to attend the customer. Discussion was also held about the common demands of the farmers in marketing. - Minimum Support Price (MSP) for buying by governments, food processing to utilize surpluses, subsidized transport, ultra-modern, post-harvest

techniques, storage of produce to exploit price rises, government-run trading operations, imposing national grading standards for the domestic market.

Technology transfer and training programs in horticulture, gaps, future strategies and recommendations

Dr. Kartar Singh

Various training programmes organized from time to time were highlighted. Objective of the training, advertisement / publicity, registration, selection of program content, selection of resource persons, selection of techniques used, distribution of material, evaluation of the training are the pre-requisite for organizing a training program. Trainings organized on fruit and vegetable preservation, kitchen gardening, production technology of fruit crops, nursery raising, refresher course for post harvest technology. TOT through- horticultural officers workshop, udyan gosthi, specialized trainings on fruits, group meetings, gyan diwas , field days, campaigns, front line demonstrations. Future strategies on diversification, increasing production & productivity, transportation facilities, improving quality of products for export, value addition, marketing & export. Recommendations-Gap should be avoided, proper planting time, proper & timely application of fertilizers, control of insect pest & diseases, application of irrigation, training & pruning of plants, installation of more number of processing units were emphasized.

Post harvest management, infrastructure and technology gaps and future strategies for Haryana

Dr. (Mrs.) R. B. Grewal

Application of appropriate maturity indices based on external quality color, consistence, phenological stage, etc. should be ensured. Harvesting time should be early in the morning or late in the afternoon in order to minimize the sun effect. Optimizing harvesting recipes/containers (size, materials, height, number of produce layers, conditions, etc.) protection of product of direct sun intensity. Bottlenecks in cold storage including during transit are non-efficient storage/warehousing, processing & marketing techniques, non adoption of efficient technologies, high electricity tariff, low area under irrigation, high capital cost and inadequate institutional finance at low rates, high insurance premium in risk coverage, farm connectivity by road yet to be taken off. Inputs delivery is not on time, innumerable varieties, poor procurement and logistics, lack of cheap and timely credit were highlighted. Larger intermediaries exert negative pressure on

farmer margin, and deteriorates quality due to multiple handling. Bottle-necks in cold storage & processing industry- higher tax duties including on packaging material. High cost of finance, infrastructural constraints, dependence on intermediaries as well as inadequate farmer and processor linkages are the other problems. Proper product handling during the post-harvest chain relies on understanding the factors that affect the quality and safety of the product, and the different mechanisms to minimize their impact. Simple handling practices can have desired impact on product quality and safety like proper harvesting time, avoiding direct sun light, proper handling, proper ventilation, etc. Effective training and supervision of personnel must be an integral part of quality and safety assurance program

Recommendations

1. There is need to develop quality seeds/ including hybrids and other plating material for all horticultural crops (i.e. vegetables, fruits, flowers, spices, medicinal plants) and also to develop varieties which are biotic and abiotic resistant, suitable for protected cultivation and processing. Good varieties/ hybrids wherever available need to be introduced in the state for adaptation to help in year round quality production of horticultural crops.
2. The pace of accreditation of nurseries in the state is quite slow. All nurseries in public and private sector need be accredited by the Government agency to ensure production of quality planting material. There should be establishment of Model nurseries and development of crop-specific Scion blocks in SAUs.
3. It is recommended that purchase of planting material on quotation must be discouraged at any cost to avoid compromise on the quality of the planting material.
4. There is need to rejuvenate the senile orchards as well as to promote arid horticulture by utilizing both indigenous and exotic varieties suitable for arid region.
5. Hybrid Seed Production of varieties developed by the University/ private sector or in PPP/ PPFP mode to reduce the cost and enhance availability.
6. It is important to constitute Mushroom Development Board (MDB) like Coffee Board and Coir Board for promotion of mushroom processing and marketing in India. Need was also felt for accreditation of spawn units in public and private sectors and enforcing spawn standards and fair price for timely availability of quality spawn.
7. Establishment of compost mother units for supply of quality compost to the small growers in potential areas. Supply of spawn run substrates in urban and peri-urban areas for home cultivation of mushrooms.
8. There is need to rationalize the concept of a cluster and implementation of cluster development concept for up scaling of horticultural crops and increasing profitability of grower and linking them to the market.
9. The Bee-keeping - aspect needs to be intensified. Fruit set and production has been shown to increase by 15-30% if honey bee hives are kept in orchards, this is in addition to honey, its main product.
10. There is need for Pest & Disease forecasting for timely control of insect pest & diseases.

11. Declaration of minimum support-price for major horticultural crops and provisions for insurance coverage.
12. Strengthen contract farming in Horticulture crops i.e. marigold for pigment production and encourage Co-operative development for regularized production and marketing. Government should take initiatives in developing contract farming models under PPP mode for high-value vegetables, organic villages, speciality mushrooms.
13. The state has a huge potential for growing lawn grass for supplying to the emerging turf grass industry of the country. Selected clusters in the vicinity of NCR may be promoted for growing lawn grass for this purpose.
14. The new machines developed for processing like pomegranate aril extractor, vegetable washer, carrot washer, aonla juicer, kinnow juicer, heat pump dryer, tomato grader may be promoted with adequate subsidy. The government should help with suitable policy support to promote mobile cool chamber, AC Room and AC structures for Horticulture crops.
15. There is need to nurture upcoming entrepreneurs and help them in establishing and marketing by establishment of state level institute for Post Harvest Management &Value Addition.
16. It is suggested that subsidy should also be considered for self constructed green houses and low cost temporary structures.
17. It is necessary to provide basic inputs like power and irrigation water to sensitive horticultural crops on priority and preference given to drip irrigation in orchards.
18. There is need to increase the strength of the well qualified and well trained manpower for implementation of several hi-tech based horticulture development programmes now in operation in the State.
19. There should be adequate technical guidance/ training programs and financial support to the small scale and export oriented processing industries, as there is paucity of value addition and processing units for horticulture crops especially at rural level in state. This will not only help in reducing post harvest losses but also benefit farmers considerably.
20. Policy decision is required to effectively control the menace of blue bull in horticulture plantations. Adequate subsidy for fencing to control damage to crops from blue bull and other animals needs consideration.

Stakeholders Workshop on:

HORTICULTURE DEVELOPMENT IN HARYANA

16-17 December, 2011

CCSHAU, HISAR, HARYANA 125004

Program of the workshop

Day 1 (16-12-2011)

09:00 -11:05	**Inaugural Session**	
09:00-10:00	**Registration**	
10:00 -10:15	Welcome Address	**Dr. R. S. Dalal, Member Secretary** Haryana Farmers Commission
10:15 -10:30	Opening Remarks	**Dr. K. L. Chadha** Chairman, Working Group on Horticulture
10:30-10:40	Remarks	**Dr. Satyavir Singh** Director General, Horticulture
10:40- 10:50	Remarks	**Dr. K.S. Khokhar,** Vice-Chancellor, CCSHAU, Hisar
10:50-11:05	Presidential Address	**Dr. R. S. Paroda** Chairman, Haryana Kisan Ayog
11:05 -11:10	Vote of thanks	**Dr. M. L. Chadha** Nodal Officer, Working Group on Horticulture
11:10 – 11:30	**Tea**	

Technical Session I: Horticulture R&D in Haryana

11:30 - 13:00		Chair : **Dr. K. L. Chadha** Co-Chair: **Dr. O. P. Pareek**
11:30-11:45	Lead Presentation: Haryana Horticulture scenario: (Districts status, crop wise status, major pockets, potential of diversification)	**Dr. Satyavir Singh,** Director General, Horticulture, Government of Haryana
11:45-12:00	Development infrastructure, schemes, priority areas and crops, future programs, progress, gaps and recommendations	**Dr. P.C. Gupta,** Former Director, Department of Horticulture Haryana
12:00-12:15	Strategies for developing arid horticulture and underutilized crops in Haryana	**Dr. O.P. Pareek,** Member, Working Group on Horticulture, Haryana
12:15-12:30	Research infrastructure and programs on fruit crops, technologies developed, gaps and future needs	**Dr. S.K. Bhatia,** Prof. & Head Deptt. of Horticulture
12:30-12:45	Research infrastructure and programs on vegetable crops, present status and future needs	**Dr. B.S. Dudi,** Prof. & Head and **Dr. S.K. Dhankar,** Deptt. of Vegetable Sciences

12:45-13:00	Research infrastructure and programs on floriculture crops, present status and future needs	**Dr. T. Janaki Ram,** Head of Division Floriculture & Landscaping, IARI,
13:00– 14:00	**Lunch**	

Technical Session II: Planting material

14:00– 15:30		Chair : **Dr. K. L. Chadha** Co-Chair: **Dr. S. K. Bhatia**
14:00-14:20	Strategies for quality production of planting material of Horticultural crops in Haryana	**Dr A.K. Singh,** Head of Division Fruit & Horticulture Technology IARI
14:20-14:45	Planting material of fruit crops availability, gaps and strategies to meet future demand in Haryana	**Dr. R. K. Arora,** Chief Consultant, CEF
14:45-15:00	Planting material of vegetable crops availability, gaps and strategies to meet future demand in Haryana	**Dr. Satyender Yadav,** Project Officer, CEV
15:00-15:15	Planting material of spices availability gaps and strategies to meet future demand in Haryana	**Dr. T.P. Malik,** Professor, COA, CCSHAU, Hisar
15:15-15:30	Planting material of medicinal plants availability gaps and strategies to meet future demand in Haryana	**Dr. I.S. Yadav,** Professor, COA, CCSHAU, Hisar
15:30-15:50	**Tea**	

Technical session III: Specialized Horticulture

15:50-16:50		Chair : **Dr. K. L. Chadha** Co-Chair: **Dr. P. C. Gupta**
15:50-16:05	Public- private partnership in research and development of horticulture sector in Haryana	**Dr. S. Mauria,** ADG (IP&TM), IARI
16:05-16:20	Urban and peri urban horticulture present status, gaps and recommendations in Haryana	**Dr. Pritam Kalia,** Head of Division, Vegetable Sciences, IARI
16:20-16:35	Protected cultivation: Current trends and potential in Haryana	**Dr. Arjun Singh Saini** Addnl Director, Horticulture
16:35-16:50	Mushroom production present status, future scope, strategies gaps and recommendations in Haryana.	**Dr. Surjeet Singh,** Sr. Scientist, Plant Pathology, CCSHAU Hisar

Program Day 2 (17-12-2011)

Technical session IV: Transfer of Technology

09:30– 12:00		Chair : **Dr. K. L. Chadha** Co-Chair: **Dr. J.S. Dhankar**
09:30-09:50	Rural based primary processing technologies for horticulture, value addition, gaps and future potential in Haryana	**Dr. R. T. Patil** Principal Scientist, ICAR
09:50-10:10	Strategies for developing of marketing system and infrastructure for horticulture crops in Haryana	**Dr. J.K. Sandooja,** Sr. Veg. Physiologist, CCSHAU, Hisar
10:10-10:30	Available human resources, future needs for sustainable horticulture sector in Haryana	**Dr R. K. Kashyap** Director, HRM, CCSHAU Hisar
10:30-10:50	Technology transfer and training programs in horticulture, gaps, future strategies and recommendations	**Dr. J.S. Dhankar** DEE, CCSHAU Hisar
10:50-11:10	Post harvest management, infrastructure and technology gaps and future strategies for Haryana	**Dr. (Mrs.) R. B. Grewal** Prof. & Head, FST, CCSHAU Hisar
11:10-11:30	**Tea**	
11:30- 12:30	**Discussion with farmers**	
12:30- 13:10	**Plenary Session**	Chair : **Dr. R.S. Paroda** Co-chair : **Dr. K. L. Chadha**
13:10-13:20	Remarks by group Chairman	
13:20-12:30	Concluding Remarks by Chairman, HKA	
13:30-13:35	Vote of thanks	**Dr. Ravi Kant,** HKA

Annexure I

Stakeholders Workshop on

HORTICULTURE DEVELOPMENT IN HARYANA:

16-17, December, 2011

CCSHAU, HISAR, HARYANA 125004

Workshop Participants

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