Name of the Institute

ICAR-Directorate of Mushroom Research, Chambaghat, Solan (H.P.)

Model

Entrepreneurship and Leadership Development Programme for Horticulture Entrepreneurs desirous of applying to Schemes of National Horticulture Board

Crop / Activity	Mushroom Cultivation

2019-20

Become Entrepreneur	
	Lead Change and Innovation
Be creative	
	Lead Profits

Address of Horticulture Training Institute

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Training Programme Name	Entrepreneurship and Leadership Development Programme for Horticulture Entrepreneurs desirous of applying to Schemes of National Horticulture Board

Introduction: India is producing about 1.81 lakh tonnes of mushroom per annum in comparison to 330 lakh tonnes in China. With more than 1.37 billion population, the availability is very meagre as the production is very low. India is having more than 700 million tonnes of agri-residue which is not utilized commercially on large scale. It about 1-2% of the agri-residue is utilized India can produce about 15-20 lakh tonnes of protein rich mushroom which will help to combat the malnutrition along with livelihood opportunities in the rural areas Further, the land and water requirement for the cultivation of mushroom is low compared to other field and horticultural crops. Overall mushroom cultivation demands very good entrepreneurship and leadership.

National Horticulture Board, an autonomous organisation under the Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India has been promoting and developing commercial horticulture in the country since 1984.Appreciating both the challenges and prospects of commercial horticulture, so as to mitigate constraints and risks and maximise benefits and net income, NHB has taken a number of initiatives viz., Model Detail Project Reports, conducting both awareness and technical workshops and simplification of scheme implementation process. One another measure taken up is encouraging farmers, entrepreneurs and applicants desirous of availing benefit under its schemes to have requisite entrepreneurship and leadership by undergoing a 6 day training programme at one of the best training institutes recognised by it.

Rationale: NHB projects are credit linked and back ended and are capital intensive running from several lakhs to several crores. In addition these involve good documentation and time bound activities on the part of promoter, banker and other stakeholders. So endeavour should be to ensure that the project is successful by all means be addressing all possible risks. Over the years it has been observed by NHB that most of the promoters of NHB projects are not having the required understanding of scheme documentation, time bound activities and lack knowledge and skills of handling the project themselves and thus become subjected to vagaries of others ignorance and omissions and commissions. The result is a number of projects have failed or became ineligible for subsidy consideration. Thus so as to rule out any these omissions and commissions and risks, NHB has made it mandatory for every applicant to undergo a 6 day training programme at one of the NHB recognised /approved institution, with a goal of zero rejection of a project for which IPA is issued.

Profile of the Institute:

ICAR-Directorate of Mushroom Research, Solan is engaged in mushroom research for last 36 years at its headquarters at Solan and 32 AICRP mushroom centres across the country. In India, mushroom cultivation started in 1960s and during last couple of years the production has increased due to involvement of various entrepreneurs in mushroom industry. Regular mushroom cultivation trainings are being imparted to the mushroom growers, farmers, rural youth, entrepreneurs, state officials and SMS of KVKs. A large of entrepreneurs are showing keen interest for mushroom cultivation and the Directorate is engaged in fulfilling their demand through new training modules. Apart from ICAR-DMR, Solan, HAIC, Murthal (Haryana), ICAR-IIHR, Bangalore (Karnataka), Khan Mushroom Farm, Una (H.P.) are also giving mushroom cultivation trainings to the stakeholders.

Basic infrastructure and collaboration to be in place

1. Competent Faculty.
2. Research expertise and farm / Demonstration experience.
3. Excellent classrooms with all Audio-visual equipment and aids including PPT facility.
4. Excellent living/ residential accommodation with Computers and internet.
5. Has good networking with experts across India, to invite best of the faculty in a particular area of expertise.
6. Has collaboration with entrepreneurs and Industry.
7. Willing to provide internships with FPOs/ FPCs/entrepreneurs.

Previous experience:

ICAR-DMR, Solan (H.P.) is imparting mushroom cultivation trainings to the entrepreneurs (7 days) twice a year in which more than 50 participants are enrolled in each batch. Similarly, Khan Mushroom Farm, Una (H.P.) is imparting training since 2000 to the farmers as well as students from Agri. Universities. HAIC, Murthal, Sonepat (Haryana) and ICAR-IIHR, Bangalore along with 32 AICRP Mushroom centres in 27 states of the country also provide trainings related to mushroom cultivation at regular intervals. After getting trainings from these centres, the stakeholders are taking up mushroom cultivation activity along with compost preparation and quality spawn production helping them to get better returns from a small unit thereby increasing the socio-economic status. As the job opportunities are limited, small and marginal farmers can get better livelihood opportunities if mushroom cultivation is taken up as a commercial venture.

Objectives of training Programme:

1. Knowledge: Ensure every trainee acquires adequate knowledge and understanding of NHB Scheme Operational guidelines, Annual design and procedure viz.
    a. Eligibility of applicant including definition of family, and project, the process and steps involved in the scheme implementation, timelines Scheme cost norms, pattern of assistance etc. iv. Calculation of Eligible Project cost, Eligible components for subsidy, NHB standards, Basic Data Sheet & Protocols to be complied for availing subsidy etc., Crop / Project specific Model DPR Template, Terms and conditions of IPA, Do's and Don'ts for Applicants /Banks/NHB officials for IPA ,
    b. List of documents to be submitted.
    c. To acquaint with NHB website including registration and modes of online application, operation of online account and contact persons, helpdesk and grievance redressal.
    d. Subsidy claim process through bank/FI and list of documents to be submitted along with claim, JIT process, JIT Format, Documentation, Circumstances to request for and consider Re-JIT& Post-JIT process.
    e. Formats of Agenda and check list used for processing subsidy claim.
    f. How to expand understanding based on the minutes of meetings of previous IC and PAC available on website. It helps the applicant to understand how decision on subsidy is being made.
    g. To know and appreciate specific Horticultural commodity / crop economic importance and potential of fresh commodity and processed / value addition commodity; Country and Global scenario and State/UT Scenario.
    h. To learn / visit success stories / best practices including cluster development / FPOs; interact with successful entrepreneurs; and recognise key factors responsible for success and failure.
2. Personal leadership and skills development
    a. To explore leadership roles required in horticulture business and realign and recalibrate self with new knowledge, concepts and tools.
    b. Managing change and innovation and Taking charge and leading strategy.
    c. To learn/ improve IT/ social media and know how to benefit from Internet and newspapers/media.
    d. To improve leadership / social skills especially common informed vision, communication, team work, negotiation skills; with an exercise and success story.
3. Selection of cultivar, Technology to be adopted and Production practices for crop intensification and high productivity and ecological sustainability.
    a. Spawn production which includes pure culture, mother culture and commercial spawn.
    b. Preparation of compost through short method of composting for the button mushroom.

    c. Modern and high-tech mushroom cultivation as seasonal/climate controlled conditions in different parts of the country.
    d. Cultivation of specialty and medicinal mushrooms for getting higher returns from the mushroom unit
4. Harvesting, Post-Harvest Management practices, technologies and Infrastructure
    a. Time of Harvesting, Moisture level of the produce, post-harvest practices, cleaning, sorting, grading, packing, labelling, pre-cooling, storage and transportation.
    b. To be aware of Post-harvest and storage practices, protocols and technologies.
    c. To know required infrastructure- Supply Chain/ Cold Chain and Marketing infrastructure and Gap analysis to the context of trainees.
5. Processing and value addition including various products, drying/dehydration and canning.
6. Marketing and value chain development
    a. To know value chain and document current value chain of trainees context.
    b. To know how to source inputs from reliable and quality sources economically and explore best way / place to sell.
    c. To know market based production concept; crop planning and preparing crop calendar.
    d. Analyse market prices of various markets and causes of instability. Document market efficiency and share of grower in consumer price realisation and possible way to minimise price spread.
    e. To know importance of branding and promotion.
    f. How to become an Exporter and know the roles of APEDA.
7. Supply/ Cold-chain development both for fresh and processed produce
8. Producing quality produce: Healthy, Food Safety / Traceability and Standards
9. To know Global /national norms of Food Safety & traceability- Good Agricultural Practices, and standards, MRL, IPM, logistics, GMP.
10. DPR and Project Management including Finance & Credit.
    a. To empower selection of crop based project based on Agro-climatic/soil/ water suitability, Market, Finance and Technical viability.
    b. To empower the trainees to prepare Detail Project Report of his/her project. In case it is already prepared with the help of external expert, the trainee is made to understand and critically analyse the same.
    c. To know about Banks/ Financial Institutions; Loan procedure-how to avail finance/ credit- challenges and prospects. Document difficulties in trainees context and facilitate in possible solutions on expeditious and easy access to credit.
    d. To know risks viz., including natural calamities in production and business and their management strategies including insurance schemes.
    e. To learn about Farm record book keeping.
11. Cluster development / Collaborative farming: What is cluster? Essential elements? To know importance of cluster approach,

12. Government organisations and Schemes related to Horticulture and laws to be complied.
13. Horticulture Statistics sources including DAC&FW website and State Horticulture Dept. website.
14. Technology and Entrepreneurship

Pedagogy: Training methods / styles are:

a. Lectures- with two way communication using Audio-visual aids, videos etc.
b. Group discussion
c. Panel discussion
d. Skill practice
e. Interactive field visits etc.

Outputs expected: (As on the last date of 6 days training)

1. 100% attendance of all Classes prescribed.
2. Daily studying of reading material provided.
3. Successful and timely completion of assignments.
4. A score a minimum of 75 % in final assessment by each trainee.
5. Knowledge: by each of the trainee
    a. Essential elements of NHB Scheme guidelines, documentation & processes and Do's and Don'ts, understanding DPR, Bank Appraisal and Sanction, identification of risks and vulnerabilities and measures to address the same, Processes and documentation of NHB scheme implementation for successful subsidy release.
    b. Essential elements of scientific and commercial Production, harvesting, post-harvest, Marketing, Exports etc. in English/Hindi/trainees' language.
    c. Food safety (Good Agricultural Practices), traceability, standards etc.
    d. Documentation of analysis of current scenario of trainee's context- production, harvest, post-harvest, supply chain, marketing and gap analysis and possible road map.
6. Skills: by each of the trainee
    a. Curiosity and continuous learning.
    b. Crop: Modern scientific Cultivation, harvesting, post-harvest, food safety, traceability certification and standards.
    c. Project: PHM&CC: Modern scientific operations, technology, safety etc.
    d. Familiarisation of Technology, Standards, Protocols and hands on experience.
    e. Good understanding of DPR and Project Management:
    f. A 3 year Strategic action plan: A Year to Year strategy for 3 years to achieve set goal in 3 years- for improved production & productivity with economy, modern harvest, post-harvest practices, infrastructure, marketing and organisational systems for improved incomes.
    g. Problem solving- to solve existing problem being faced by the trainees.

7. Attitude: developing confidence and leadership to successfully complete NHB project timely as per NHB norms, specifications/standards, protocols etc.
8. Networking with various Government and Non-Government Agencies and mentors.
9. To know various schemes and future useful training programmes across the country.

Outcomes expected (in 18 months)

1. Successful completion of the project with right technology and processes complying with all NHB Scheme requirements.
2. Reduced cost of production; improved crop health, productivity & reduced losses.
3. Improved food safety, certification, standards compliance- at least process is initiated.
4. Improved infrastructure.
5. Improved profits/ net income.

Programme in Brief

<table>
<tr><td>Training Programme Name</td><td colspan="4">Entrepreneurship and Leadership Development Programme for Horticulture Entrepreneurs</td></tr>
<tr><td>Duration</td><td colspan="4">06 working days</td></tr>
<tr><td>Participant Target Group</td><td colspan="4">Individuals desirous of availing NHB benefit under Scheme No.1 or 2 and also for those who want to improve their knowledge and leadership in protected commercial horticulture.</td></tr>
<tr><td>Training Coordinator with Designation and Address Tel, Mobile and email id</td><td colspan="4">Dr V.P. Sharma, Director, ICAR-DMR, Solan (H.P.)- 173 213
Dr M.R. Dinesh, Director, ICAR-IIHR, Bangalore (Karnataka)-560 089
Dr Ajay Yadav, HAIC, Murthal, Sonepat (Haryana)- 131 027
Sh. Yussouf Khan, Khan Mushroom Farm & Training Centre, VPO Nangal Salangari, Dhamandari Road, Una (H.P.)- 174 303</td></tr>
<tr><td>Languages</td><td colspan="4"></td></tr>
<tr><td rowspan="10">Training calendar for 2019-20</td><td>Month</td><td>Last date for Registration</td><td>Training reporting dates</td><td>Training Dates</td></tr>
<tr><td>August 2019</td><td>-</td><td></td><td></td></tr>
<tr><td>September 2019</td><td>Khan Mushroom Farm</td><td></td><td></td></tr>
<tr><td>October 2019</td><td>Khan Mushroom Farm</td><td></td><td></td></tr>
<tr><td>November 2019</td><td>ICAR-DMR, Solan</td><td></td><td></td></tr>
<tr><td>December 2019</td><td>ICAR-IIHR, Bangalore</td><td></td><td></td></tr>
<tr><td>January 2020</td><td>Khan Mushroom Farm</td><td></td><td></td></tr>
<tr><td>February 2020</td><td>HAIC, Murthal, Haryana</td><td></td><td></td></tr>
<tr><td>March 2020</td><td>ICAR-DMR, Solan</td><td></td><td></td></tr>
<tr><td>How to Apply</td><td colspan="4"></td></tr>
<tr><td>Next review/ revision of Training Design</td><td colspan="4">February 2020</td></tr>
<tr><td rowspan="6">Batch size and cost and Payment system</td><td>Batch size</td><td>Course Fees (Per person)</td><td>Hostel: Accommodation, Boarding: BF+L+D + Morning Tea + Afternoon Snacks</td><td>Total cost (Per person)</td></tr>
<tr><td>15 & above</td><td>10,000</td><td>4,000</td><td>14,000</td></tr>
<tr><td>10-15</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>5-10</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td><5</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="4">Payment system and address: ICAR Unit NRCM, payable at SBI Chambaghat, Solan (H.P.)</td></tr>
<tr><td>Enrolment</td><td colspan="4">Is voluntary on the part of trainee and on his/her submission of</td></tr>
</table>

	willingness in writing to undergo training.
Certificate	Upon successful completion of training with 75% marks in final assessment, the candidates are awarded completion certificate with marks.
NHB Role	1. The training programme is voluntary for any individual or trainee. 2. The cost of training is to be borne by trainee him/herself. 3. The training is not sponsored by NHB nor by any Government. 4. Upon 100% attendance and upon scoring 95% marks is considered as successful completion and then are eligible for training completion certificate. 5. Successful completion of training programme by the applicant and submission of completion certificate is one of the requirement for obtaining In-Principle Approval (IPA). 6. It is compulsory to reside in the hostel/accommodation provided by the institute in the interest of training. 7. The training institute has no say in NHB decision making either in approval or rejection of IPA or sanction or not sanction of Subsidy. 8. Trainees are responsible for their conduct and wellbeing issues.

Expectations from trainee before the arrival to the Training institute:

1. Study NHB scheme guidelines of all schemes with emphasis on specific component for which application is being/ is made including General conditions, Basic structure, Applicant eligibility, Technical standards, Basic Data sheet and Protocols, Budgetary allocation for his/her state/UT, Guidelines for submitting application, cost of application, various prescribed formats, FAQs, Dos and Don'ts, Agenda and Checklist, List of documents to be submitted both for Pre-IPA and IPA available in NHB website and as received in their online account.
2. Study one's own Detail Project Report along with Model DPR available in NHB website.
3. Visit NHB website and study various services available- especially Scheme guidelines, Model DPRs, Technical Standards, Statistics, NHB interactive, Minutes of meetings (past), Public circulars to the extent possible.
4. Should see him/her self whether he/she is satisfying NHB Scheme requirements.
5. To cooperate with Horticulture Training Institute.
6. To share specific problems/ gaps / barriers in horticulture growth and profits in his area.

Material to be brought by each of trainee:

1. Hardcopy of application already submitted to NHB if any.
2. Hardcopy of DPR already submitted to NHB or prepared if any.
3. Hardcopy of Model NHB DPR if possible.
4. Hardcopy of copy of Dos' and Don't's, Agenda and Checklist, List of documents to be submitted.
5. Hardcopy of applicants' eligibility and General Conditions.

Day wise schedule

Session	Module	Learning	Expert
	Registration	**Registration** Prior-Assessment of knowledge, attitude and skills	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 1 Session 1	**Orientation / Inauguration**	• General discipline in class room (Do's and Don'ts) • Every trainee to share their introduction with expectations. • Motivational Talk	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 1 S2	Exposure visit and mushroom as an agri-business activity	1. Exposure visit to the mushroom farm, cropping rooms & laboratories 2. Mushroom production: An agribusiness activity	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 1 S3 & S4	Nutritional value of mushrooms, spawn culture and methods of compost production	1. Nutritional and medicinal value of different mushrooms 2. Mushroom culture preparation, preservation, quality traits of strains and spawn production technology 3. Practical demonstrations on preparation & preservation of culture and spawn production technology	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Quiz	Today's learning	
	Reading material for next day*	1. Study of NHB Scheme guidelines and come up with queries. 2. Climate controlled cultivation technologies, components and erection for mushroom units. 3. Cultivation practices of different mushrooms.	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Evening/Night Home work/ Assignment#	• Creation of WhatsApp group of all trainees. • Joining of NHB crop specific/Project specific WhatsApp group.	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom

*: TO be read in the night before attending next day class.

#: Are evaluated/tested the following day.

Day 2 S1 & S2	Compost production and crop management	1. Methods of compost production technologies for white button mushroom 2. Crop management of white button mushroom 3. Demonstration on compost preparation for white button mushroom	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 2 S3 & S4	Farm design, and casing soil in button mushroom	1. Farm design & Infrastructure for mushroom cultivation 2. Practical on casing in button mushroom and cropping room management	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Discussion	Evaluation of Assignment and observations	
	Quiz	Learning on yesterday and today	
	Reading for next day	Production technology for button, oyster and paddy straw mushrooms	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Assignment for next day	Difference between Applicants DPR and NHB's Model DPR- What are the learnings.	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom

Day 3 **S1 & S2**	Cultivation of oyster and paddy straw mushroom & economics of button mushroom production	1. Cultivation of oyster mushroom, infrastructure & economics 2. Cultivation and economics of paddy straw mushroom 3. Economics of button mushroom cultivation	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 3 **S3 & 4**	Practical for oyster and paddy straw mushroom and video film on mushroom cultivation	1. Practical demonstration on oyster mushroom cultivation 2. Practical demonstration on cultivation of paddy straw mushroom 3. Video film on mushroom cultivation	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Discussion	Evaluation of Assignment and observations	
	Quiz	Learning on day 3	
	Reading for next day	Speciality mushrooms, Shiitake and diseases of different mushrooms	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Assignment	Techniques for compost for button mushroom preparation from different substrates Preparation of farm design and economics for button mushroom	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom

Day 4 S 1 & 2	Cultivation of milky & *Macrocybe*, Shiitake and substrate for Shiitake mushroom	1. Cultivation of milky (*Calocybe indica*) and *Macrocybe* mushroom 2. Cultivation of shiitake (*Lentinula edodes*) mushroom 3. Practical demonstration on substrate preparation for Shiitake mushroom	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 4 S 3 & 4	Cultivation and practical on speciality mushrooms and diseases of mushrooms	1. Cultivation of speciality mushrooms 2. Practical demonstration cultivation of speciality mushrooms (*Eryngii, Auricularia, Ganoderma, Flammulina, Hericium, Calocybe* and *Macrocybe*) 3. Competitor moulds/fungal/viral diseases of mushrooms	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Quiz	Learning on day 4	
	Reading for next day	Insect-pests of mushrooms, round the year cultivation and postharvest management techniques for mushrooms	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Assignment	Technologies for integrated pest and disease management and recycling of SMS. Preparation of crop calendar including pests, diseases & nematode management	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom

Day 5 S1 & S2	Insect-pests of mushroom, their identification and round the year cultivation of mushroom	1. Insect-pests & nematodes of mushrooms and their management 2. Practical on identification of diseases/moulds/pests of mushrooms 3. Round the year cultivation of mushrooms	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
Day 5 S3 & S4	Recycling of SMS, postharvest handling and practical on value addition	1. Recycling of spent mushroom substrate (SMS) 2. Postharvest handling and value addition of mushrooms 3. Practical demonstration on postharvest handling and value addition of mushroom	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Discussion	Evaluation of Assignment and observations	
	Quiz	Learning on day 5	
	Reading for next day	Financial procedure for getting loan and subsidies from the bank to set up mushroom unit	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Assignment	• Different sources of spawn production, marketing and consultancy etc. • Marketing challenges being faced by trainees in their cluster.	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom

Day 6 S1 &S2	Information sources on mushroom, procedure for loan &subsidies	1. Sources of information for spawn/inputs and consultancy and computer application in mushrooms 2. Financial procedure for getting loan to set up mushroom unit 3. Financial procedure for getting subsidies	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
S 3 & S4	Feedback, interaction with all the scientists and valedictory function	1. Feedback from the participants 2. Interaction and discussion with the scientists for clearing the doubts on mushroom cultivation 3. Valedictory function and distribution of certificates	ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom

Evaluation	Post training evaluation	Training evaluation /Test on 1. Knowledge 2. Skills 3. Attitude Marks in the test are		ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Total Marks Final Assessment	1. Class room participation	25%	
		2. Timely submission of assignments	25%	
		3. Final evaluation	50%	
		Total Marks (Are recorded in Completion Certificate)		
	Feedback 30 Min			3-4 Successful entrepreneurs ICAR-DMR/ICAR-IIHR/HAIC/Khan Mushroom
	Discussion on Feedback			
	Interaction with scientists for clearing doubts and valedictory function			

Trainers' Material: to be used for preparing Participants Handbook first in English and then in local language as far as possible.

The following weblinks are illustrative. Training Institute is requested to explore more and the best fit material for the trainees socio-economic condition, crop and enterprise.

S.No	Module	Reading Material	
		For the Trainer	For the trainee
1.	Economic Potential and Specific State/ UTs context and Success stories.	Horticulture Statistics at a glance: http://agricoop.gov.in/statistics/publication-reports World fruit and vegetable map: 2018: Robo Bank https://research.rabobank.com/far/en/sectors/regional-food-agri/world_fruit_map_2018.html APEDA AGRIEXCHANGE: http://agriexchange.apeda.gov.in/ ICAR institutions publications on specific crop CII / FICCI/ASSOCHAM/ PHDCC reports http://www.fao.org/docs/eims/upload/210971/global_issues_paper.pdf Success stories: http://agritech.tnau.ac.in/success_stories/sstories_horti_2015.html	
2.	Personal skills development	Internet and youtbue	
3.	Selection of cultivar and Production practices for high productivity	ICAR institutions publications on specific crop Package of practices of specific crop (s). e-learning: videos from authentic sources- ICAR/ SAU/SHU/Global Institutions. ICAR e-courses: https://ecourses.icar.gov.in/	
4.	Harvesting, Post-Harvest Management / Infrastructure	Analysis of FPO model for Vegetables https://nccd.gov.in/PDF/Analysis_FPO_model.pdf Doubling of Farmers Income Report: Vol.III and IV http://agricoop.gov.in/doubling-farmers	
5.	Processing / Value Addition	ICAR / Any reputed R&D Institution publications e-learning: videos from authentic sources- ICAR/ SAU/SHU/Global Institutions.	
6.	Supply/ Cold-chain development both for fresh and processed produce	Cold Chain Awareness program https://nccd.gov.in/PDF/Cold-chain%20Awareness%20Booklet.pdf Analysis of NDDB Model for Vegetables https://nccd.gov.in/PDF/Analysis_NDDB_veg_model.pdf All India Cold Chain Infrastructure Capacity : Gap Analysis https://nccd.gov.in/PDF/CCSG_Final%20Report_Web.pdf	
7.	Marketing and value chain development	Directorate of Marketing and Inspection website: http://agmarknet.gov.in/ Crop specific market information sources	
8.	Maintain quality of produce: Health &	TNAU AgriTech portal on Food Safety: http://agritech.tnau.ac.in/gap_gmp_glp/gap_fresh%20_%20fruits%20&%20veg.html http://agritech.tnau.ac.in/food_safetyindex.html	

	Food Safety / Traceability and Standards	Global Gap: https://www.globalgap.org/uk_en/ INDGAP: http://www.qcin.org/CAS/INDGAP/ Global gap India facilities: http://agriexchange.apeda.gov.in/Market%20Profile/Market_Inteligence/Annexure_III.pdf Food Traceability in Inda: http://face-cii.in/sites/default/files/final_report-version_2.pdf FAO International Code of Conduct on Pesticide Management http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/en/ TRACEABILITY IN FOOD AND AGRICULTURAL PRODUCTS: ITC, Switzerland publication at http://www.intracen.org/ GRASP: Global GAP Risk Assessment on Social Practice The Global Social Compliance Programme GSCP https://www.gscpequivalenceprocess.com/	
9.	Finance, Credit & Farm/ Project & Risk Management	Model DPR Templates for NHB Schemes ww.nhb.gov.in	
10.	Cluster development : Collaborative farming/ FPOs/ FPC	NHB Website: Proposed scheme: Horticulture Business Cluster and Supply chain development Programme FAO (2010) Agro-based clusters in developing countries: staying competitive in a globalized economy http://www.fao.org/docrep/012/i1560e/i1560e.pdf World Bank: Agriculture Clusters https://www.innovationpolicyplatform.org/sites/default/files/rdf_imported_documents/Agricultural_Clusters.pdf How Can the Poor Benefit from the Growing Markets for High Value Agricultural Products? FAO / UN Paper https://papers.ssrn.com/sol3/papers.cfm?abstract_id=944027 Crop specific Producers Society and company online authentic sources	
11.	Government organisations and Schemes	http://agricoop.gov.in/ http://mofpi.nic.in/ http://apeda.gov.in/ http://nhb.gov.in/ http://coconutboard.nic.in/Scheme.aspx	
12.	Knowledge and Statistics	ICAR Indian Horticulture Magazine: https://icar.org.in/node/9420 IIHR: https://iihr.res.in/documentary-video-clips-for-farmers FAO: http://www.fao.org/e-agriculture/stub-28	
13.	Technology and Entrepreneurship	Visit ICAR – Institutions / Directorates/ Bureaux/ NRCs: https://icar.org.in/ Innovation in Agriculture:http://www.fao.org/3/CA2460EN/ca2460en.PDF Specific technologies: https://icar.org.in/content/agricultural-technologies e-learning: https://ecourses.icar.gov.in/ ICAR Publications: https://krishi.icar.gov.in/jspui/ Local University publications Local University success stories	
14.	Protected (/Greenhouse /	National Committee on plasticulture Agriculture with the Horticulture https://www.ncpahindia.com/	

	Shade net / Walk in Tunnel) cultivation:	Agriculture Skill Council of India: Curriculum and Occupational / Qualification standards: http://asci-india.com/National%20Occupation%20Standards.php	
15.	Cold Storage / Cold Chain Development:		

Reading material for the trainee is to be prepared by the Training Institute based on trainers' reading material in local language either in brief or in detail based on the module and need. May share booklets or print out of detailed scientific package of practices recommended locally.

Success Stories: Illustrative

IARI	http://iari.res.in/index.php?option=com_content&view=article&id=539&Itemid=1516 http://www.iari.res.in/files/Pusa_Hydrogel.pdf
IIHR	https://iihr.res.in/success-stories
CISH	http://www.cish.res.in/success_story.php
CCRI Nagpur	https://www.youtube.com/watch?v=QwE6oFkq3F8
NRC Banana	http://nrcb.res.in/success-stories.php
CITH Srinagar	http://www.cith.org.in/index.php?option=com_content&view=article&id=83&Itemid=11&lang=en
IIVR	https://iivr.org.in/success-stories
Grapes	https://rkvy.nic.in/Uploads/SucessStory/TAMILNADU/2018/20180440133.%20GRS%20Success%20story.pdf

https://www.innovationpolicyplatform.org/sites/default/files/rdf_imported_documents/Agricultural_Clusters.pdf

Activities prior to training by Horticulture Training Institute:

The training institute shall undertake

1. Desk Analysis:
    a. About specific commodity: State/ UT and District's Area, Production, Productivity, cost of cultivation, production, post-harvest and marketing problems etc.
    b. Road map formulated by State/UT government to develop the area/ crop / farmers income of the area including State/UT Economic Survey, Annual Report of Agriculture/Horticulture Dept., District website etc.
    c. Explore various research articles on crop production, marketing etc. of the State/ Area.
    d. Examine various study reports of Government agencies- State/ DACFW/ APEDA/ SFAC/MoFPI and private agencies- CII /FICCI/ASSOCHAM/ Others for the horticulture Development of the State, Specific location, India etc.
2. Preparation of training design and teaching-learning material.
    a. Preparation of training schedule with good mix of theory, practicals (both in class room and field visits) and home work (After class hours) and also physical fitness and site seeing.
    b. Participants Handbook: A brief note on each of teaching module in local language for circulation to each trainee, with the help of local technical expert.
    c. Preparation of case studies/ exercises for class room discussion / brain storming / homework.
    d. Access to internet and computers to explore the potential of technology.
    e. Identification of the best experts for each of the session and invitation of successful FPOs/ entrepreneurs/ experts for interaction session with the trainees.
    f. Identification of FPOs/Entrepreneurs/Firms/ Organisations for internship with clear Do's and Don'ts.
    g. Every trainee to come with 2 problems with respect to each of the session.
    h. Use of Audio-visual aids for teaching-learning& Good logistics for field visits
3. Identification of fields, FPOs, enterprises and operations etc. for the visit of trainees.
4. Good preparation of trainees accommodation, food (of trainees cultural context as far as possible), primary health care etc.

Services by the Horticulture Training Institute

1. **Facilities to Participants during training**
    a. Safe and joyful learning environment.
    b. Classrooms are : At training Institutes
    c. Safe hostel accommodation and healthy Boarding.
    d. Accommodation/Hostel is at: At training institutes/near by hotels
    e. Hostel check in: One day before training
    f. Hostel check out: following day of completion of course.
    g. Internet and computer systems.
2. **Material to be made available to Participants by Horticulture Training Institute**
    a. Training Brochure before training
    b. Reading Material during training
3. **Faculty:**

4. **Post-training activities:**
    1. Take written feedback on each of session with respect to content, clarity and delivery style, opportunity for Q&A, accommodation, food, other facilities, suggestions for improvement etc. and share action proposed in future trainings, during valedictory session.
    2. Submission of training report to be submitted within 15 days of completion of EDP:
        a. Objectives, outputs and outcomes of training.
        b. Training schedule
        c. Trainee's / participant list with postal address and contact numbers.
        d. Photographs and Video (Also to be hosted by training institute and NHB)
        e. Analysis of feedback and action taken report.
        f. Action taken on networking with trainees local R&D Institution / experts for regular extension and entrepreneurship development activities.
        g. Utilisation Certificate.

Photographs of Campus/ Class rooms / Hostel / Technology / Infrastructure

What is cluster? When a group of individual growers or farms are called as Cluster? Essential elements / components of a cluster:

Cluster sprout: Large scale areas where a particular crop is under cultivation already, but lack all the characteristics of Cluster.

Cluster: A cluster is a geographic concentration of firms that work in a related value chain. (Professor C. Leigh Anderson 2015: Univ. Washington)

Principle (s):

1. Firms that operate close to related firms and supporting institutions are often more innovative and, therefore, more successful in raising productivity than firms that operate in isolation.
2. To counter increasing fragmentation in farm holding size, by promoting collaboration in land holders. This is expected to regain economy of scale- on inputs and on outputs.

The essential characteristics / elements of a horticulture cluster are :

1. Geography: Located within an identifiable & as far as practicable, contiguous area.

2. Specialisation: Similarity in the commodity (s) production and complementarily in the methods of production, Channels for communication among the members, quality control and testing, technology and marketing strategies/practices energy consumption, Common challenges and opportunities etc.
    i. In case of Fruits: Commodity specific
    ii. In case of Vegetables: 4-5 crops of similar nature capable of rotation.
    iii. In case of Floriculture: Commodity /Similar commodity specific

3. Intensive linkages viz., Horizontal, Vertical and Support relationships

    a. Horizontal relationships among producers:
        Cooperatives / FPOs/ Companies/Smallholder business consortia but for the NHB scheme it is within the FPC model.
    b. Vertical relationships -among
        i. Agricultural producers,
        ii. Production Input Suppliers,
        iii. Production, Harvest and Post-Harvest Service providers
        iv. Financial Institutions,
        v. Processors and exporters,
        vi. Logistics/ Supply Chain providers
        vii. Branded buyers and retailers;

        Collocation of actors at multiple parts of the value chain is one of the defining features of agribusiness clusters. In such contexts co-location through agribusiness clusters can reduce transaction costs, and increase productivity and innovation.

c. Support relationships between producers and facilitating organizations:- that reinforce the quality, efficiency and sustainability aspects of the chain
    i. Governments, business service providers,
    ii. Research institutes, universities and
    iii. Non-government service organizations).
    iv. Cluster members may benefit from linkages from supporting institutions that provide specialized training, education, information, research and technical support (Porter, 1998). Clusters also often involve private sector financial firms who provide access to financial services and investment.

4. Critical mass of Actors: Number of growers and size: Critical mass of actors, resources and competencies necessary for a cluster to effectively lower transaction costs, facilitate information flows, provide access to specialized factor markets and interact effectively with local, regional and national consumers. Area of willing growers with produce volume capable of viable capacity use of the post-harvest infrastructure components while retaining priority to reach distant markets.

5. Producer ownership: Holds ownership of trading / marketing of produce: Removes intermediary traders/Bypass wholesale traders. Deals with buyers / retailers directly.

6. Shall serve identified Targeted Market (s).

7. Undertake promotion of produce with collective branding

8. Evolution and diversification of commodity trade with time and entrepreneurship- Fresh produce, processing and Export, new markets.

9. Inclusiveness: have provision for enrolling new members to enable prospective entrepreneurs and utilise facilities / services within set limits.

10. Generate innovation and promote evolution of the business model.

India’s Success Story: Sahyadri Farms: Farmers Producers Company