

FPOs are growth engine of Indian Agriculture



BANKERS INSTITUTE OF RURAL DEVELOPMENT, LUCKNOW

(Designated Nodal Training Institution at Central Level by
GoI under CSS on Formation and Promotion of 10000 FPOs)

Training Program Design Hi-Tech Agriculture

under
Central Sector Scheme on Formation &
Promotion of 10000 FPOs



Implemented by

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Training Program Design on Hi Tech Agriculture for FPOs

UNDER Central Sector Scheme on Formation & Promotion of 10000 FPOs

Purpose of the Module

To introduce participants to selected methods of Hi Tech Agriculture to enhance farm productivity and provide a platform for discussion, experience sharing and selecting potential technologies for their FPOs

Program Duration

4 days

Program Mode

Online/Classroom

Broad Coverage of the Program

- **Hi Tech Farming - Concepts, need and importance**
- **Farm improvement by cultural practices -**
 - System of Crop Intensification**
 - Climate Smart Agriculture**
 - Integrated Farming Systems**
 - Integrated Pest Management, Integrated Nutrient Management**
 - Managing Water Efficiently**
- **Concepts of Protected Agriculture**
 - Soil Less Farming**
- **High Density and Ultra High Density Plantations**
- **Digital Farming: Internet of Things for Agriculture**
 - Precision Farming**
- **Convergence with Government schemes and**
 - Collaboration with Agri- Startups**

Specific Learning Objectives of the Programme

At the end of the training programme, the participants will be able to:

- Assess current farming practices among their FPO Members - w.r.t. hi-tech agriculture
- Assess areas where productivity enhancement is possible among member farmers and which particular Hi-tech agriculture practices have most potential locally (local agro-ecological conditions, socio-economic condition of members and markets)
- Identify the number of farmers who can adopt different Hi-tech agriculture practices - partially or comprehensively (as individuals)
- Identify the the number of farmers who can adopt different Hi-tech agriculture practices - partially or comprehensively (as members of small groups (village level/SHG))
- Identify sources of detailed information/training and suppliers of equipment/tools in the FPO's work area (district/state, etc.) - so that upon returning to their FPO the FPO can start background work on Hi-tech agriculture
- Develop a sample budget for different types of Hi-tech farming methods if implemented in an FPO (different sub groups work out for different methods) and how to source finances (own, group, FPO, Bank, NBFC, Government scheme, etc.)
- Work out cost/benefit for individual farmer and FPO
- Discuss in what ways the FPO can support its members to adopt Hi-tech farming methods (such as appointing committees, arranging training/exposure visit, centralised procurement and installation of infrastructure/equipment, hire purchase services through the FPO)

Programme on Hi tech Agriculture for BODs & officials of FPOs	
Objective	To introduce participants to selected methods of Hi Tech Agriculture to enhance farm productivity and provide a platform for discussion, experience sharing and selecting potential technologies for their FPOs under the Central Sector Scheme on Formation & Promotion of 10000 Farmers' Producer Organisations (FPOs). Refer to the list of learning objectives for what the participants will learn during the programme
Duration	4 Days
Course Highlights	▪ High Tech Farming - an Introduction ▪ System of Crop Intensification (SCI) - for paddy, wheat, sugarcane and cotton ▪ Climate-Smart Agriculture (CSA) - concepts and menu of options ▪ Integrated Farming Systems - concepts and menu of options ▪ Integrated Pest Management and Integrated Nutrient Management ▪ Managing Water Efficiently - sprinkler, drip and fertigation ▪ Protected Cultivation - greenhouses, polyhouses, polytunnels and shade net houses ▪ Soil-Less Farming: hydroponics, aeroponics and aquaponics ▪ High-Density and Ultra High-Density Plantations ▪ Internet of Things (IoT) for Agriculture: concepts and use cases ▪ Precision Farming: concepts and use cases ▪ Collaborations between Agri-Startups and FPOs - need for collaboration and use cases ▪ Potential sources of funding under various Central Sector Schemes of the Government of India ▪ Discussion between participants for experience sharing and working out how they will implement some of the ideas in their FPOs
Target Participants	BODs & Officials of FPOs

Day-to-Day Schedule		
Day	Session	Topic
I	1	Formal Inauguration, Introduction
	2	High Tech Farming - an Introduction
	3	System of Crop Intensification (SCI)
	4	Climate-Smart Agriculture (CSA)
II	1	Integrated Farming Systems
	2	Integrated Pest Management and Integrated Nutrient Management
	3	Managing Water Efficiently
	4	Protected Cultivation
III	1	Soil-Less Farming
	2	High-Density and Ultra High-Density Plantations
	3	Internet of Things (IoT) for Agriculture
	4	Precision Farming
IV	1	Collaborations between Agri-Startups and FPOs
	2	Action Planning for how to introduce Hi-tech Agriculture in FPOs
	3	Feedback, Valedictory Ceremony

Exposure Visit to Observe Hi-Tech Farming Projects can be arranged during the programme preferably on day 3; the other sessions can be shortened based on technologies that the participants are likely to see in the field.

Session - 1: Formal Inauguration of the Programme on Hi-Tech Agriculture

Objective: Formal inauguration, introduction to the programme, participants get to know each other

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Formal Inauguration	Formal start to the programme	30	Formal Ceremony
ii	Introduction to the Programme	Overview of the Training Programme - objectives, schedule, norms	20	Presentation
iii	Personal Introductions and expectations	Participants and Facilitators get to know each other and facilitators collect participants learning expectations	30	Microlab
iv	Levelling expectations	Levelling expectations with the objectives of the programme	10	Discussions
v	Summing up	Summing up and link to the next session	10	Discussions
Relevant pages in Reading Material: Pages - Objectives of the Course and Programme Schedule				

Session - 2: High Tech Farming - an Introduction

Objective: At the end of the session participants will be able to:

- Discuss the need for adopting hi-tech farming methods in FPOs
- List some key Hi-Tech Agriculture methods

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	What is Hi tech Farming	Define the term Hi-Tech Define Hi-tech Farming	10	Brainstorming
ii	Quick overview of hi-tech farming methods	Brief description of some hi-tech methods	20	Presentation
iii	Potential areas of hi-tech farming	What methods can FPOs adopt?	30	Simultaneous Sub-group activity followed by plenary presentations; facilitator adds more details
iv	Advantages of hi-tech farming	How can farmers benefit from hi-tech farming?		
v	Challenges of hi-tech farming	What are the challenges in adopting hi-tech farming?		
vi	Adoption of hi-tech agriculture model	Issues in adoption of hi tech agriculture, especially small farmers What schemes and programmes are available to implement hi-tech farming in FPOs? Any first hand experience of participants?	20	A quick presentation on available schemes Case Studies Plenary Discussion
vii	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 1 of Reading Material				

Session - 3: System of Crop Intensification (SCI)

Objective: At the end of the session participants will be able to:

- Describe the concept of System of Crop Intensification and the package of practices in brief
- Discuss relevance to their FPO members' cropping systems

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to System of Crop Intensification	What is SCI? Where is it typically applied?	10	Presentation
ii	System of Rice Intensification	Describing features, benefits and challenges of applying System of Rice Intensification	20	Presentation
iii	Systems of Wheat Intensification, Cotton and Sugarcane	Sub Groups study the SCI methods with other crops using handouts - package of practices, costs and benefits	30	Sub Group Discussion, Plenary Presentation
iv	Potential to implement SCI in the FPO	Personal experiences with SCI among participants, discussion on potential to implement SCI in FPO; Support available from line departments and Central Sector Schemes	20	Plenary Discussion and Short presentation by facilitator
v	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 2 of Reading Material				

Session - 4: Climate-Smart Agriculture (CSA)

Objective: At the end of the session participants will be able to:

- Describe the concept Climate Smart Agriculture and its relevance during climate change
- Describe some of the methods under CSA
- Discuss application of CSA in the FPO

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to Climate Smart Agriculture	What is CSA? why is CSA critical in the Indian context?	10	Presentation
ii	Discussion on climate related issues in the FPO's area	What are the climate related challenges that farmers in the FPOs are facing in the given geography? What kind of losses are farmers facing?	20	Brainstorming
iii	Practices and technologies of CSA	Examples of CSA practices and technologies practiced in India and what each practice addresses	30	Presentations and short videos with discussions
iv	Potential to implement CSA in the FPO	Personal experiences with CSA among participants, discussion on potential to implement CSA in FPO; Support available from line departments and Central Sector Schemes	20	Plenary Discussion and Short presentation by facilitator
v	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 3 of Reading Material				

Session - 5: Integrated Farming Systems

Objective: At the end of the session participants will be able to:

- Describe the concept Integrated Farming Systems and its relevance for small farmers
- Describe some of the methods under IFS
- Discuss application of IFS in the FPO

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to Integrated Farming Systems	What is IFS? why is IFS critical for sustainable farming among FPO members?	10	Presentation and brainstorming
ii	Practices and technologies of IFS	Principles of IFS How can many activities be incorporated into a farm? Different IFS combinations	20	Presentations and short videos with discussions
iii	Case discussion on IFS	Sub-group activity to discuss IFS practiced by farmers in their FPOs; what can we learn from the experiences of these farmers? Benefits and challenges of IFS	30	Sub Group Discussion
iv	Potential to implement IFS in the FPO	Personal experiences with IFS among participants, discussion on potential to implement IFS in FPO; Support available from line departments and Central Sector Schemes	20	Plenary presentation of Sub group work and summarising
v	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 4 of Reading Material				

Session – 6 : Integrated Pest Management and Integrated Nutrient Management

Objective: At the end of the session participants will be able to:

- Describe the concept and principles of IPM and INM
- Describe some of the methods under IPM, INM
- Discuss application of IPM, INM in the FPO

Duration: 90 Minutes

Session outline

Sl.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to IPM	What is IPM? why is IPM critical for sustainable farming among FPO members?	10	Presentation and brainstorming
ii	Practices and technologies of IPM	Principles of IPM Examples of IPM practices and technologies practiced in India and what each practice addresses	15	Presentations and short videos with discussions
iii	Introduction to INM	What is INM? why is INM critical for sustainable farming among FPO members?	10	Presentation and brainstorming
		Principles of INM Examples of INM practices and technologies practiced in India and what each practice addresses	15	Presentations and short videos with discussions
iv	Potential to implement IPM and INM in FPOs	Personal experiences with IPM and INM among participants, discussion on potential to implement IFS in FPO; Support available from line departments and Central Sector Schemes	20	Discussion within two sub groups - one each for IPM and INM
v	Plenary presentation on implementing IPM, INM in FPOs	How can we implement IPM, INM in our FPOs?	15	Plenary presentation and discussion
vi	Summing up	Sum up the session, feedback and link to next session	5	Discussion
Relevant pages in Reading Material: Chapter 5 of Reading Material				

Session – 7 : Managing Water Efficiently - Sprinkler Irrigation, Drip Irrigation and Fertigation

Objective: At the end of the session participants will be able to:

- Explain the need for water use efficiency in farming
- Describe the basic different types of water saving technologies in agriculture
- Discuss the potential for water saving technologies in their FPO

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration minutes	Methodology
i	Introduction to Water Use Efficiency	What is the importance of water in agriculture? When do crops need water?	10	Presentation and brainstorming
ii	The need for water efficiency in agriculture	What are the challenges of water availability in India? How can we get More Crop per Drop in agriculture	10	Brainstorming and discussions
iii	Three major types of water saving technologies	Description of the purpose and systems of Sprinkler Irrigation, Drip Irrigation and Fertigation. Overview of the cost economics and benefits of these technologies	30	Presentation with case studies, videos and cost economics
iv	Advantages and disadvantages of hi-tech irrigation	Plenary discussion on the three major technologies presented	10	Plenary discussion
v	Potential to implement water saving technologies in the FPO	Personal experiences with hi-tech irrigation among participants, discussion on potential to implement in FPO; Support available from line departments and Central Sector Schemes and agri-tech companies	20	Plenary discussions with Facilitator's Support for Information
vi	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 7 of Reading Material				

Session – 8 : Protected Cultivation - Greenhouses, Polyhouses and Shade Net Houses

Objective: At the end of the session participants will be able to:

- Explain the need for covered agriculture in India
- Describe the basic structures and operations of different types of covered agriculture
- Discuss the potential for covered agriculture in their FPO

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration minutes	Methodology
i	Introduction to Protected Agriculture	What is covered agriculture? How can it help farmers in India?	10	Presentation and brainstorming
ii	Different Types of Protected Agriculture	Description of three major types of Protected Cultivation Structures - Greenhouses, Polyhouses and Shade Net Houses	20	Presentations and short videos with discussions
iii	Cost economics of Protected Agriculture	Sub-group activity to review the cost economics of covered agriculture - one group each for Greenhouses, Polyhouses and Shade Net Houses	15	Sub Group Discussion using handouts and facilitator's support
iv	Cost economics of Protected Agriculture	Plenary presentation of sub-group activity	15	Plenary presentation of Sub group work and summarising
v	Potential to implement Protected Agriculture in the FPO	Personal experiences with Protected Agriculture among participants, discussion on potential to implement in FPO; Support available from line departments and Central Sector Schemes	20	Plenary discussions with Facilitator's Support for Information
vi	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 8 of Reading Material				

Session – 9: Soil-less Farming - Hydroponics, Aeroponics, Aquaponics and Vertical Farming

Objective: At the end of the session participants will be able to:

- Explain the concepts behind soil-less farming and where it can be applied
- Describe the functioning of three basic Soil-Less Farming Methods
- Discuss the potential for Soil-Less Farming in their FPO

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to Soil-less Farming	What is Soil-Less Farming? Why soil-less farming?	10	Presentation and brainstorming
ii	Different Types of Soil-less Farming methods	Description of four Soil-less Farming options - Hydroponics, Aeroponics, Aquaponics and Vertical Farming	20	Presentations and short videos with discussions
iii	Understanding the components of soil-less farming methods	How does each system of soil-less farming work? what are the different components involved in these methods?	20	Sub Group work using videos, handouts and facilitator's support
iv	Components of soil-less farming methods	Plenary presentation of sub-group activity	10	Plenary presentation of Sub group work and summarising
v	Potential to implement Protected Agriculture in the FPO	Personal experiences and case studies of Soil-less Farming, discussion on potential to implement in FPO; Support available from line departments and Central Sector Schemes	20	Plenary discussions with Facilitator's Support for Information
vi	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 8 of Reading Material				

Session – 10 : High-Density and Ultra High-Density Plantations

Objective: At the end of the session participants will be able to:

- Explain the concepts behind High-Density and Ultra High-Density Plantations
- Discuss the potential for HDP and UHDP in their FPO

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration minutes	Methodology
i	Introduction to High Density Plantation methods	What are High Density Plantations? How are HDP/UHDP different from conventional plantations?	10	Presentation and brainstorming
ii	How are HDP and UHDP planted and managed	Description of HDP and UHDP - principles and culturing practices	20	Presentations and short videos with discussions
iii	Advantages and Disadvantages of HDP/UHDP	What are the advantages of following HDP/UHDP in plantations? what are the challenges and disadvantages? - Sub group discussions	20	Sub Group work using videos, handouts and facilitator's support
iv	Advantages and Disadvantages of HDP/UHDP	Plenary presentation of sub-group activity	10	Plenary presentation of Sub group work and summarising
v	Potential to implement HDP/UHDP in the FPO	Personal experiences and case studies of HDP/UHDP Farming, discussion on potential to implement in FPO; Support available from line departments and Central Sector Schemes	20	Plenary discussions with Facilitator's Support for Information
vi	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 9 of Reading Material				

Session – 11 : Internet of Things (IoT) for Agriculture

Objective: At the end of the session participants will be able to:

- Explain the concepts behind Digital Agriculture and Internet of Things (IoT) for Agriculture
- Discuss the potential for IoT and Digital Agriculture in FPOs

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to Digital Agriculture and IoT in Agriculture	What is Digital Agriculture and IoT? What are advantages with digitalising agriculture ?	10	Presentation and brainstorming
ii	Case studies of use of IoT in Agriculture	Examples of IoT applications in Agriculture and Case studies of FPOs implementing IoT	20	Presentations and short videos with discussions
iii	How is IoT supporting Agriculture?	Based on case studies presented - participants try to understand the many ways that IoT supports agriculture and farmers' incomes	20	Plenary Discussion
iv	Advantages and Disadvantages of IoT	Plenary presentation of sub-group activity	10	Brainstorming
v	Potential to implement IoT in Agriculture in the FPO	Personal experiences and case studies of IoT in Farming, discussion on potential to implement in FPO; Support available from line departments and Central Sector Schemes, agri-tech firms	20	Plenary discussions with Facilitator's Support for Information
vi	Summing up	Sum up the session, feedback and link to next session	10	Discussion
Relevant pages in Reading Material: Chapter 10 of Reading Material				

Session – 12 : Precision Farming

Objective: At the end of the session participants will be able to:

- Explain the concepts behind Precision Farming
- Discuss the potential for Precision in FPOs

Duration: 60 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to Precision Farming	What is Precision Farming? Is it different from Digital Agriculture?	10	Presentation and brainstorming
ii	Case studies of use of Precision Farming in Agriculture	Examples of Precision Farming applications in Agriculture and Case studies of FPOs implementing IoT	20	Presentations and short videos with discussions
iii	Advantages and Disadvantages of Precision Farming	Advantages and Disadvantages of Precision Farming, especially for diverse farming and small farmers	15	Brainstorming and plenary discussion
iv	Potential to implement Precision Farming in the FPO	Brief discussion on potential to implement in FPO; Support available from line departments and Central Sector Schemes, agri-tech firms	10	Plenary discussions with Facilitator's Support for Information
v	Summing up	Sum up the session, feedback and link to next session	5	Discussion
Relevant pages in Reading Material: Chapter 11 of Reading Material				

Session – 13: Collaborations between Agri-Startups and FPOs

Objective: At the end of the session participants will be able to:

- Describe services and technologies offered by Agri-Startups in India
- Discuss the potential for collaborating with Agri-Startups

Note: This session may be better organised if guest speakers from Agri Startups or Agri-tech companies are invited.

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to Agri-Startups	What are Agri-Startups? What services and technologies do they provide?	10	Presentation and brainstorming
ii	Case studies of services and technologies provided by Agri-Startups	Examples of services and technologies provided by Agri-Startups	20	Presentations, short videos with discussions
iii	What problems of farmers and FPOs can Agri-Startups solve?	Advantages and Disadvantages of working with Agri-Startups.	15	Brainstorming and plenary discussion
iv	Potential for the FPOs to collaborate with Agri-startups	Discussion on potential for collaboration between Agri-Startups and FPOs; Support available from line departments and Central Sector Schemes, agri-tech firms; how to identify potential collaborators; who will help the FPO with defining a problem and negotiating with Agri-Startups?	10	Plenary discussions with Facilitator's Support for Information Guest Speakers from Agri-Startups
v	Summing up	Sum up the session, feedback and link to next session	5	Discussion
Relevant pages in Reading Material: Chapter 12 of Reading Material				

Session – 14: Action Planning for how to introduce Hi-tech Agriculture in FPOs

Objective: At the end of the session participants will be able to:

- Develop an action plan for adopting the most promising Hi-Tech Agricultural practices in their FPOs
- Discuss in what ways different agencies like BIRD/NABARD, line departments, banks etc. in the FPO's location can support their action plan

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Introduction to the Action Planning Activity	What is the Action Planning Activity? Distribution of Action Planning Formats or Frameworks	10	Presentation
ii	FPO level Action Plans	Each FPO will develop an action plan to prepare and implement most promising Hi-tech Agriculture methods in the FPO. The plan will also include activities such as pre-project surveys.	30	FPO-Wise Sub Group activity using Charts - supported by Facilitator
iii	Action Plan Presentation	Presentation of FPO-Wise Action Plans in plenary - seeking information, feedback and finalising	40	Plenary presentation and discussion
iv	Summing up	Sum up the session, feedback and link to next session	10	Discussion

- Facilitators to use any action planning format regularly used for such activities.
- Sessions 14 and 15 can be shortened and combined if time is short.

Session – 15: Feedback and Valedictory

Objective: At the end of the session participants will be able to:

- Articulate their feedback for the programme
- Complete any written feedback form

Duration: 90 Minutes

Session outline				
S.No.	Session plan	Objective	Duration	Methodology
			minutes	
i	Written feedback	Facilitator describes sections of the Feedback form Participants fill in the written feedback form	15	Instruction by Facilitator and Individual work
ii	Oral Feedback by Participants and Facilitators	Free Flowing Feedback given by all participants, facilitators and other organisers	30	Open House
iii	Vote of Thanks	Facilitators and Organisers propose the Vote of thanks	20	Speech
iv	Closing Ceremony	Formal Valedictory, distribution of certificates and closure	25	Formal Ceremony

- Facilitators to use feedback form template regularly used for such activities.
- Sessions 14 and 15 can be shortened and combined if time is short.



Bankers Institute of Rural Development (BIRD), Lucknow is an autonomous institute promoted by National Bank for Agriculture and Rural Development, the Development Bank of the country. It is a premier institute for providing training research and consultancy services in the field of agriculture and rural development banking in India and abroad. The Institute was established in 1983, for addressing the capacity building needs of stakeholders. BIRD, Lucknow is an ISO 9001: 2015 certified training Institute.

Clients

All Banks, Government agencies, MFIs, NBFCs, Financial Sector, NGOS and Civil Societies.

Coverage (Training, Consultancy, Research)

Project Lending-Agriculture and MSME, Climate Finance, Rural Banking, Farmer Producer Organization, Micro Finance, Human Resource, Financial Inclusion, Training of Trainers, Executive Development, Management Development Programme, IT based Banking, Green Finance, Responsible CSR, Group approach to Development, Women Empowerment, Organizational Development, Investment & Treasury Management, Risk Management.

Faculty

Faculty are drawn from NABARD, banks and scholars of respective fields and have pan-India level field experience. The faculty have specialization in Banking Finance, Financial Inclusion, Agriculture & Allied sector, Fisheries, Forestry and Human Resources, etc.

Infrastructure

43 acre green campus has world class infrastructure in terms of class rooms, simulation and AV Rooms, Board Room, Conference Hall, Auditorium, Library, Gym, Air-conditioned Hostel Rooms, Local and International cuisine.

