

Proceedings of

Review of Research Achievements (2017-2020) and Future Programmes (2020-2025) of ICAR-IIFSR including AICRP-IFS and AI-NPOF schemes by DDG(NRM), ICAR on 26th May, 2020

Review of research achievements and proposed future programmes of ICAR-IIFSR, Modipuram including AICRP-IFS and AI-NPOF schemes was held through video conference under the Chairmanship of Dr S.K. Chaudhari, DDG (NRM) on 26th May, 2020 between 2.30-6.00 PM. Dr. S. Bhaskar, ADG (AAFCC), Director (s), Project Coordinators, Head of regional stations and scientists of NRM and other institutes participated in the meeting besides Chief Agronomists/Agronomists/Soil Scientists/Agricultural Economists/Principal Investigators of AICRP-IFS and AI-NPOF schemes. The three hour long video conference was participated by more than 210 Scientists/researchers across the country. Chairman Dr. S.K. Chaudhari briefly mentioned about the agenda of the meeting and invited Dr. A.S. Panwar, Director ICAR-IIFSR, Modipuram to make brief presentation on achievements and future programmes of the institute for 2020-2025. Director ICAR-IIFSR highlighted the salient achievements which included development of IFS models, organic farming packages, indices for evaluation of farming systems and outreach activities. He also explained future programmes and activities. Dr N Ravisankar, National PI, AI-NPOF and PF (Coordination Unit) presented the achievements of AICRP-IFS (On-station and On-farm) and AI-NPOF schemes along with proposed research programmes. Major achievements from the scheme includes development/documentation of 60 IFS/IOFS models, 63 farmer participatory refined IFSs, 38 bankable projects and package of practices (PoPs) for organic production of 51 cropping systems.

The proposed research programmes of the institute, AICRP-IFS and AI-NPOF schemes are given below:

Proposed Research Programmes (2020-25)

SI No	Proposed Research Programmes	
	ICAR-IIFSR (Institute)	
1.	Characterization, Development and Refinement of Farming Systems <ul style="list-style-type: none">• Digitization and development of Farming Systems Atlas• Farming Systems Typology analysis• System modeling• Meta-Analysis on farming systems at global and country level• Specialized farming systems (protected, grower group farming systems)• Farming Systems for Nutrition (FSN)• Scaling up of Farming Systems Research (FSR) methodologies	
2.	Monetization of ecosystem services from IFS and Organic Farming <ul style="list-style-type: none">• Methodology for ecosystem services (ESS) from prototype IFS and organic farming• Monetization of ecosystem services (ESS)• Policy development	
3.	Basic and Strategic research on Organic and Natural farming <ul style="list-style-type: none">• Bio-chemical and molecular characterization of produces from organic and inorganic systems• Development of concentrated manure technology for intensification of nutrients in organic manures	

	<ul style="list-style-type: none"> • Development of process of distinctiveness and traceability of organic produce • Processing and packaging techniques for organic farming 	
4.	Design of futuristic cropping and farming systems <ul style="list-style-type: none"> • Assessment of Climate-Carbon-Emission-Water-Energy-Food-Nutrition-Socio-economic arena/trade off in cropping and farming systems • Digitization and updating of cropping system Atlas • Sustainable/climate smart cropping system modules for different farming systems • Refinement of resource management strategies • Futuristic crop plan for 2030, 2040 and 2050 	
5.	Capacity building and up-scaling of farming systems <ul style="list-style-type: none"> • Capacity building of researchers, extension agencies, farmers and advisors on integrated and organic farming systems • Farmer participatory assessment and refinement of farming systems • Extension methodology for scaling up of farming system. 	
AICRP-IFS Scheme		
1.	Micro-farming specific IFSs <ul style="list-style-type: none"> • Typology based targeted interventions and design of alternative farming systems • District specific IFSs (DIFS) for Integrated District Action Plan • IFSs for absentee and under-privileged households. • Integration of secondary agriculture options 	
2.	Sustainable Intensification of Farming Systems <ul style="list-style-type: none"> • IFS for Sustainable Development Goals (SDGs) • Ecosystem services estimation and monetization • Agro-eco tourism-based farming systems for eco-centric education • Futuristic Landscape based Integrated Planning of Farming Systems using Typology (FLIP-FAST) 	
3.	Up-scaling and Impact Assessment of IFSs <ul style="list-style-type: none"> • Creation of model IFS clusters with Central/ State/ other agencies • Assessment of Social impact of IFSs in different regions 	
4.	Capacity building of Stake holders <ul style="list-style-type: none"> • National Digital Repository on IFSs • PG Research Fellowship on IFSs • Skill and entrepreneurship development for State Agencies, rural youth and farmers 	
AI-NPOF Scheme		
1.	Characterization of organic farms <ul style="list-style-type: none"> • Geo-tagged resource characterization of organic farms. • Bio-chemical and molecular characterization of bio-inputs • Characterization, validation and refinement of indigenous 	

	technical knowledge and preparations	
2.	PoPs for Organic farming <ul style="list-style-type: none"> • Resource specific PoPs • Re-designing of existing package for improving the yield of <i>rabi</i> crops • Technologies / packages for improving the yield of crops during conversion period especially in high input areas • Farm waste recycling and enrichment 	
3.	Organic farming systems <ul style="list-style-type: none"> • Establishment of Integrated Organic Farming Systems (IOFS) models in niche areas • Ecosystem Services and monetization • Scaling up of developed IOFS models with Central and State Agencies • Assessment of social impact of organic farming promoted in niche areas 	
4.	Natural Farming (NF) <ul style="list-style-type: none"> • Geo-tagged characterization of NF farms • Bio-chemical and molecular characterization of NF inputs • Multi location evaluation of NF practices in different agro-ecologies • Improvement and integration of NF practices in to organic farming package 	
5.	Capacity building of Stakeholders <ul style="list-style-type: none"> • National Digital Repository on Organic Farming • PG Research Fellowship on Organic Farming • Skill and entrepreneurship development for rural youth and farmers 	

DDG (NRM) appreciated the efforts of institute in delivering IFSs and organic farming packages which are major focus areas of Government for doubling farmers' income and sustainable agriculture. He invited all the participants including Programme facilitator(s) of ICAR-IIFSR, Chief Agronomists/ Principal Investigators of AICRP-IFS and AI- NPOF schemes for suggestions on future programmes. This was followed by inputs on researchable issues from all the Director (s) of NRM institutes, Heads of regional stations and Scientists working in the field of IFS and Organic Farming across India. The consolidated suggestions given by participants are given below:

SI No	Suggestions/Comments	Remarks
1.	Vertical farming in IFSs	
2.	Mechanization of IFSs to reduce drudgery and manpower requirement	
3.	Integration of aquaponics in IFSs	
4.	Assessment of biogenic resources in IFSs is essential rather than identifying IFS models as emission positive/negative or neutral.	
5.	Use of sophisticated tools such as artificial intelligence is required to suggest tailor made IFS for various needs.	
6.	IFSs are knowledge intensive. Contract farming models can be explored.	

7.	Horizontal expansion of IFSs and standardization of acreage for meeting the household demand needs to be made.	
8.	Energy efficiency in IFSs should be estimated. Inclusion of solar energy harvesting systems may be explored.	
9.	Major parameters for evaluation of IFSs in arid regions should be fodder production, resilience to abiotic stresses and risk reduction instead of maximization of income/production.	
10.	Up-scaling of IFSs needs to be given special emphasis besides incorporation of soil health related aspects.	
11.	Economic efficiency of IFSs should be estimated than economics alone.	
12.	Need to incorporate mathematical modeling, water budgeting, water productivity <i>etc</i> in IFSs and organic farming research.	
13.	Inclusion of social science study to delineate the factors affecting expansion of IFS.	
14.	Promotion of bee keeping along with floriculture as well as agroforestry component in IFS models wherever feasible.	
15.	Agro-ecotourism based farming systems needs to be attempted to make it more remunerative.	
16.	Integrated simulation modeling in IFS in future research programmes.	
17.	Precision agriculture should be given importance in integrated farming systems	
18.	Synergistic and systems approach needs to be adopted rather than component approach in farming systems research.	
19.	Micro-farming situation specific integration of livestock and fodder area allocation needs to be made.	
20.	Screening and isolation of microbes from long term organic management plots in different ecosystems and development of microbial consortia needs to be attempted. This can also be patented.	
21.	Organic farming packages development for protected cultivation.	
22.	Long term sustainability assessment of traditional and organic farming systems under climate change should be addressed.	
23.	More high value crops needs to be added under organic farming research.	
24.	Policy dialogue on integration of indigenous cattle in farming systems is needed considering repeat breeding problem of HF.	
25.	Institute/ ICAR may explore involvement in certification of organic farming areas/growers through appropriate policy.	
26.	Studies on assessment of ecosystem services from IFS, Traditional farming and organic farming should also be initiated. Climate resilience vis-à-vis monitoring of pest/disease incidence should be focused areas in organic farming research.	
27.	IFSs/ Organic Farming need to be developed for peri-urban areas.	
28.	Identification of hotspots for IFSs and organic farming should be done on priority basis jointly by ICAR-IIFSR and ICAR-NBLSS&UP.	

29.	Organic seed production, conservation agriculture and climate resilience practices to be incorporated in organic farming research.	
30.	Agro-ecology sub region based resource optimization for IFS besides sustainability studies of systems for reserve nutrients and microbiota for organic farming.	
31.	Native nutrient supplying capacity of soil should be assessed under difficult production systems like organic, inorganic, integrated and natural farming.	

Suggestions received through Chat Box

1.	Need to implement the stable and sustainable identified farming systems under different topographical situations on large scale	
2.	There is a need to evolve and evaluate soil and water resource health restoring systems on degraded areas like chemically and physically and even biologically degraded areas.	
3.	Development of IFS models for rehabilitated ravine lands in different parts of the country.	
4.	Collaborative approach for weed management in different farming system models either through institute level or AICRP-WM level.	
5.	Landscape-based farming system models to be developed considering landform-land use units and land management units upholding the outputs of ICAR-NBSS&LUP programmes.	
6.	Participatory development of IFS models suited to the natural calamity affected areas on an agro-ecological unit basis	
7.	Development of energy efficient sustainable farming system for diversified agro ecological situations.	
8.	Model IFS farms should be established in different zones/blocks of the country soon to showcase to the farmers of the region; SAUs/ICAR institutes in the zones may take initiative to establish under the guidance of IIFSR.	
9.	Solar power panel installation and power operated small hand tools should be given due importance in IFS model for inter culturing/weeding/threshing/harvesting	
10.	Farming system recycling in terms of energy and economy to be taken care of in future.	
11.	Development of extension research methodology for up-scaling IFS through farmer participation	
12.	A detailed molecular analyses and empirical validation of in-farm, household and industrial wastes. This would enable to understand the systems as well as microbial diversity. So that, we can formulate the newest ITKs with this information.	
13.	Include verities of seed spices performed in organic management system.	
14.	Greenhouse gas emission studies should be undertaken in organic field as compared to inorganic and INM. Rhizosphere bacterial community structure in long term organic field should be studied.	

15.	Documentation of ITK and its standardization in the light of scientific organic farming	
16.	Development of full proof organic IFS model with minimum gap between farmers' yield and best potential yield.	
17.	Wide publicity of success stories of organic farming to attract farmers in confusion to opt non chemical based farming	
18.	Sensor based studies to prove nutrient release and crop uptake in organic farming research and to see the preferential absorption is from organic or integrated or inorganic farming.	

Dr. S. Bhaskar, ADG (AAF & CC) apprised that many farmers do practice 2-3 components of IFS and few more modules need to be added to get extra income to the household. Farmer is free to choose the components from the basket of options tested at experimental fields based on preference, requirement and feasibility. For large scale up-scaling of different modules 3-4 best performing modules suiting to local needs may be identified.

In his concluding remarks Dr. S. K. Chaudhari, DDG (NRM) appreciated the view points from different experts and cherished the efforts of ICAR-IIFSR, AICRP-IFS and AI-NPOF centres for their determined efforts to showcase new dimension to IFS/OF research. He also highlighted the importance of IFS as it holds the key to achieve sustainable way of doubling farmers' income. Considering the complexity in IFS research, the institute and its schemes have done systematic analysis of various systems and significant improvements are observed over the years. The following key action points were suggested by Dr. S. K. Chaudhari, DDG (NRM):-

- All the centres should prepare small document on developed IFS models under the guidance of ICAR-IIFSR, Modipuram and submit to the respective state government for its up-scaling.
- Crop plan and natural farming work/reports needs to be expedited.
- Development/ application of ICT tools for studying diversification vis-à-vis intensification based on operational functions including the marketing aspects.
- Big data analysis/ meta-analysis with advanced logarithmic system to utilize lot of data generated under schemes.
- Linking scheme to different flagship programmes of Govt. e.g. Clean India, Green India, Swachh Bharat Mission etc.
- Climate smart farming systems with emphasis on conservation agriculture.
- Integrated simulation modelling studies in IFS needs to be initiated.

He also suggested to organise a meeting by ADG (AAF&CC) with all the ZBNF centres and committee members to discuss the preliminary observations and recommendations along with the action plan of future programmes. Many participants have expressed that up-scaling of IFSA models is a major issue. He explained, this is mainly because other components are having dedicated schemes while IFS as a whole have no such scheme till date. However, Govt. of India has launched a scheme and it is good opportunity to upscale the developed IFSSs.

The meeting concluded with formal vote of thanks proposed by the Director, ICAR-IIFSR to DDG (NRM), ADG (AAF&CC) and all the participants.