International Training Workshop on Quantitative Systems Analysis for the Sustainable Intensification of Mixed Farming Systems

Balthali Mountain Resort, Kavrepalanchowk, Nepal
15-17th February 2023

Contents

Background

Mixed Farming Systems (MFS) are the norm rather than the exception in the Global South. Mixed crop-livestock systems, the most common form of MFS, are estimated to cover about 2.5 billion ha of land globally and, in the developing world, they supply around 75% of milk, 60% of meat, and 41–86% of cereals consumed. MFS are complex systems where multiple components (e.g., livestock, trees, subsistence and cash crops, horticultural crops, fisheries, value adding activities) are tightly interlinked and the whole system is managed towards the satisfaction of multiple productivity, economic, environmental, and societal goals (e.g., food security, income generation, risk management, resource conservation, preservation of cultural values and traditions).

A predominantly commodity and biophysical research approach has been leading to improvements in single system components, but frequently amplifies the trade-offs between different livelihood objectives if the interactions between crop, tree, livestock, and social sub-systems are not properly addressed. This has affected the capacity to scale many of the technologies and practices promoted in the past.

To improve the overall performance and sustainability of MFS, their sustainable intensification requires integrated systems research to identify context-specific pathways towards efficient, resilient, and scalable MFS that preserve natural capital and offer equitable benefits for all. Quantitative systems Analysis tools allow characterize the diversity of farming systems and their level of integration as well as to assess, through multiple criteria, their performance and identify the best social and technical options for the improved performance.

The three days International Training titled "Quantitative Systems Analysis for the Sustainable Intensification of Mixed Farming Systems" was jointly organized by International Maize and Wheat Improvement Centre (CIMMYT), the International Water Management Institute (IWMI) ,the International Rice Research Institute (IRRI) ,International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) , Indian Council of Agricultural Research (ICAR)-Indian Institute of Farming Systems Research (IIFSR) ,Nepal Agriculture Research Council (NARC), Bangladesh Agriculture Research Institute (BARI) between 15-17th February 2023 at Balthali Mountain resort. The overall objective to train the participants on the quantitative system analysis for the Sustainable Intensification of Mixed Farming Systems.

The mode and methodology of the training was interactive, and the trainers ensured that knowledge was not only disseminated but accurately perceived and understood by the participants. Furthermore, to ensure the active participation in the training the forum was open for feedback, queries, and suggestions. These interactive sessions were supported through training material, power point presentations, lectures and handouts.

Training Objective and expected outcomes

The **objectives** of this international training are:

- To provide an overview of advances on systems analysis approaches, tools, methods, and phases on the use of systems analysis for the SI of MFS in diverse Agro-ecologies, notably in South Asia.

- To share results of integrated assessments of MFS in a range of Agro-ecologies in South Asia and discuss main implications for their re-design.
- To share methods for quantitative systems analysis for the characterization, assessment, and design of more sustainable MFS.

Expected Outputs

- Improved understanding and capacity of key researchers on designing and implementing quantitative farming systems analysis for improved efficiency, resilience, and sustainability of MFS.
- Prioritized use cases from diverse ecologies for further application of quantitative farming systems analysis in the context of MFS.
- Mainstreaming of science-based approach (tools and techniques) for farming systems analysis and design in the farming systems research for development programs in participating institutions.

Participants Profile

The training participants included Agriculture scientists and staff members from agriculture research centers, departments, academic institutions, and international research institutions from 5 countries (Bangladesh, India, Laos, Nepal & Netherland). Total number of participants including the resource persons was 29 belonging to 10 different institutions (see Annex I for detailed list of participants). Among the Participants, 34% were female while 66% were Male (Figure 1)

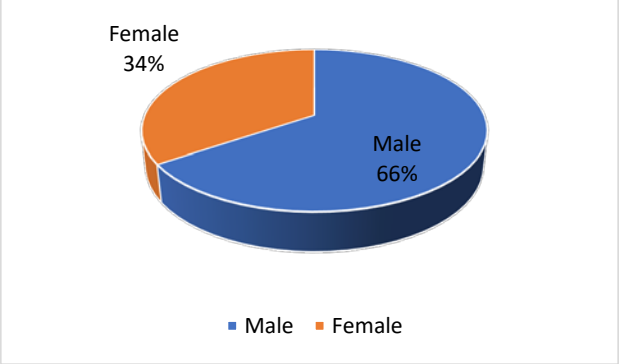

Figure 1: Gender Composition of the participants

The participants of the training event were between the age group of 20 to 60 years old. Within the range 30% were within age group of 35-40 years old, 25% were below 30 years old, 20% were from age group 35-40 years old while 15% were from age group 30-35 while less than 11% were more than 45 years old (Figure 2).

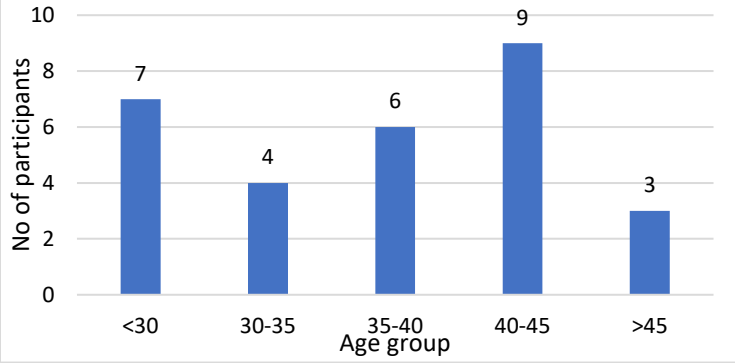

Figure 2: Age Composition of the participants

Resource Person's profile

The team of resource persons delivered sessions during the training comprised of 5 experts from CIMMYT, Wageningen University and ICRA. Given below is a brief description of the trainers along with their sessions conducted by them (See Annex II for detailed agenda).

Resource Parson	Designation	Organization	Session Title
Dr. Santiago Lopez RIDAURA	Principal Scientist, Co-Lead- SI-MFS	CIMMYT-SAS	Welcome, the introduction of the training & context setting
			Session I. Systems analysis, theory, and practice for studying mixed farming systems."
Dr. Mangi Lal Jat	Global research Program Director	ICRISAT	Key Lecture: Re-Designing Farming Systems Towards Carbon Neutrality
Dr. Ashish Prusty	Senior Scientist	ICAR-IIFSR	Session II Farming System Typologies – Concepts, tools, methods, use cases
Dr. Natesan Ravishankar	Principal Investigator	ICAR-IIFSR	Special presentation on Pan India Farming Systems Typologies
Dr. Jeroen Groot	Professor	WUR	Session III Farm DESIGN: Concept, tool, data needs, Hands-on debugging & use cases from South Asia

Proceeding

Day 1

Opening Session

Welcome and introduction of the training & context setting.

Dr. Santiago Lopez RIDAURA, the SI-MFS initiative co-lead welcomed all the participants and introduced the SI-MFS initiative happening in Ethiopia, Nepal, Bangladesh, Laos, Malawi and Ghana. He highlighted that the 3-day capacity building training workshop is focused on the tools and methods to design and analyze sustainable farming systems. He reiterated the need to disseminate tools and approaches that integrate diverse farm components based on a systems approach into research and design.

Remark by Dr. Shreemat Shrestha, Nepal Agricultural Research Council (NARC)

Dr. Shreemat Shrestha, Director of Crop and Horticulture Research at Nepal Agricultural Research Council (NARC) stated that the International Training on Quantitative Systems Analysis for the Sustainable Intensification of Mixed Farming Systems is timely training providing good opportunity for researchers and professionals in the sector to learn quantitative tools for understanding the optimization of resources.

Giving an example of Nepal, where all farming systems are mixed farming system with diversity. The livestock, crop, fishery integration is also exemplary. This training will help us to understand the real scenario, identify the areas of intervention and target good systems on ground. Eg. In Thimi only 2 Ha of land is sustaining whole family all because of the diversity in the farming system. This can be focused learning environment to better understand the Mixed farming system. The combination of horticulture and cropping pattern will provide practical field examples.

He added that In the existing scenario of dependence on system the farm system integration assessment training is expected to help us to understand the real scenario, identify the areas of intervention and target good system on ground with focused learning environment to better understand the Mixed farming system with much more practical implication in future . He appreciated the effort to gather diverse group of participants from India, Bangladesh, Laos and Nepal in one platform and providing cross learning opportunity to hit the right spot at the right time.

Remarks by Dr. Nirman Shrestha- IWMI Nepal

He stated that this is first time such training has been organized, where we learn to apply our learnings and experiences in our daily work also receive feedback to enhance our learnings. He added that this training is very useful, and requested everyone to learn as much as they can so that they can apply this at their work.

Opening remark- Dr. Natesan Ravisankar; Principal Investigator, Indian Council of Agricultural Research

Welcomed all the participants to the 3-day training workshop. He expressed thanks to CIMMYT, IWMI and collaborating institutions for this initiation in the sector of MFS. He stated that farming systems play a very important role in the current as well as the future scenario. Presenting the current scenario, during COVID situation where Multi farming system has proved as one of the most reliable systems ensuring the supply of the daily commodities for local households.

Similarly in the Russia- Ukrain war situations where the fertilizer based agricultural systems are at risk, the multiple MFS can save up to 40-50% of the resources, he highlighted the need to value MFS. Whereas in future scenario where climate change is going to affect the lives of millions of people, MFS also be the sole solution to address the CC scenario at households and landscape level as well as in the emission reduction purpose. Dr Ravishankar presented an example from India indicating many models have shown that MFS is going to play an important role. However, the only problems is that it varies from location to location, household to household, where policy makers might not be able to address the needs of these localized clusters unless we provide them uniformity. Henceforth he emphasized that there is need to support them with good policy recommendations and successful interventions to make MSF sustainable for long run. The organizers are thus acknowledged for their effort to bring the right topic on right time.

Key Lecture

Dr. Mangi Lal Jat Global Research Program Director, International Crop Research Institute for the Semi-Arid Tropics presented on Re-Designing Farming Systems Towards Carbon Neutrality. Dr. Jat emphasized on the power of partnerships and stated that farming system research has been mainstreamed through partnerships between the organizations, so this is an opportunity to build on what has been done in the past decade.

South Asia is hotspot for climate change, with stressed natural resources. The biotic stresses are coming up as additional challenges. Dealing with smallholder systems which are the sources of 75-80% of the food in the region. The dominance of these smallholder farmers in the water limited geographies is growing problem. 1/3rd of GHG is coming from agrifood system, that's why we need more sustainable farming systems. Impacts of anthropogenic CC on global agricultural productivity growth. In global system impact of food system have crossed the planetary boundary. Farming System approach is needed for regenerative agriculture. Conservation farming, organic agriculture, farming systems are all part of regenerative agriculture. Global

synthesis indicates the 9 discourses of regenerative agriculture. Multiple component discourses make it vulnerable to the upcoming changes.

Strategies to address tensions on regenerative agriculture:

- RA discourse coalition
- System based approaches.
- Multi-criteria analysis
- Well defined theory of change at local, sub-national and national level
- Bridging knowledge and capacity gaps
- Get away from bullet and one size fit all based investments.
- Integrate social and behavioral science communication.

Talking about discovery to delivery component, challenges of one size is missing to fit all in one, Dr Jat emphasized the need of quality science, strategic and complementing partnerships, greater and pooled investments, production to consumption continuum and Science of scaling. There is need to understand the existing systems to plan for system scale planning at local as well as regional level. He stated that as plot or farm level have their own limitations henceforth Landscape approach leading to Land degradation neutrality and carbon neutrality is needed to bring out tangible output. Henceforth he stressed on need of targeted bundled system solution rather than solution in isolation. As an option phased Build on Approach can be applied to boost the confidence level of farmers. At end he mentioned that there is need to define the business models and market approaches by identifying the potential niche for scaling and accelerated adoption of RA.

Session I: Systems analysis, theory, and practice for studying mixed farming systems.

Dr. Santiago presented multiple components of farm systems (Figure 3) like Input, existing diverse components of system along with existing different boundary elements and output coming out of the system. He discussed the possible multidimensional interaction and interrelation between different components. As a simple explanation to the complex interactive system gave an example where we can take one sub-system and make a component out of it as well. The same approach, logic and matrix can be used to different farms for the sub-system. What goes in and comes out of a system can change. This overall logical interaction and representation is thus defined as system characterization. He explained that farming system formalization, doing it in participatory typology kind of setting in system approach and this system approach can be used by different disciplines.

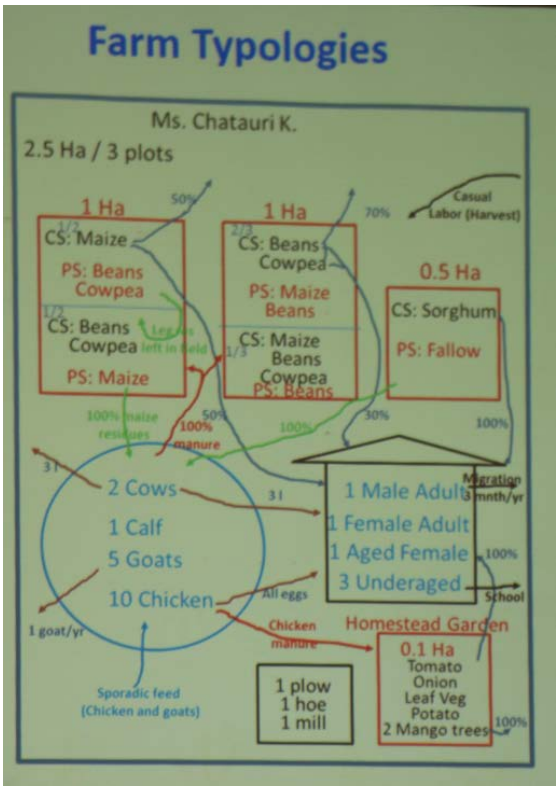

Figure 3: Farm System Typology

He guided participants to observe the farm, understand the system dynamics and document the farm realities (farm size, crop variety, number of households, seasonal cropping details, farmers crop, manure preference) of nearby farm at Balthali, as a part of farm typology documentation. It was mentioned that the documentation was not only about the produce, but also about what they do with the manure as part of farm input while residue as output products. The guiding questions to understand the farm system typology were how much land, how many plots? how many animals? assets and resources? Cropping pattern in fields? Labor coming in residues going out field? resource mobilization and output? With these guiding questions one system will be characterized and follow on with other kind of systems. Then later villages can be accessed in terms of existing different systems and evaluating how much of village look like with system 1 and system 2. In this way Santiago Lopez RIDAURA explained that systems are characterized for a village that will assist to identify the diversity of farming system in different settings (Rice based, Maize based etc. systems).

Short visit to nearby farm of Mr. Narayan Humagain was conducted. In about 1.5 hours KII with local farmer, training participants managed to collect all the information needed for system analysis (total farm input, labor, fertilizer, HH income, far expenditures etc).

Figure: Group Interaction in field

Later, in the classroom setting they characterized farms of the village to capture the diversity of farming systems. It was an interactive information collection and documentation procedure applied for farm system analysis. Applying the learning from field all participants also tried to do farm system characterization activities in country specific groups. The group shared the learning in form of presentation of systems. Henceforth first day was concluded with a complete package of theoretical overview, practical data collection and group characterization exercise in group (Annex III).

Day 2

Special presentation - Pan India Farming Systems Typologies

Dr N Ravishankar, Principal Scientist ICAR introduced the ICAR- Indian institute of farming system research, working area and research themes. Looking at Integrated farming system as judicial mix of 2 or more components using cardinal principles of minimum competition and maximum complementarity with advanced agronomic management tools aiming for sustainable and environment friendly improvement of farm income, family nutrition and ecosystem services. The integrated farming system also contribute in preservation of bio-diversity, diversification of cropping/farming system and maximum recycling is the base for success of the farming systems. Integrated Farming system was defined from the four angels (increasing income, reducing expenditure, increasing self-employment & reducing risk).

Dr Ravishankar stated that integrated farming system can only be possible with well-designed farming systems. He briefed about the statewide 64 prototypes of established IFS model that are found doubling the farmers income, improving soil health along with additional benefits of reducing input flow and recycling the resources(Figure 4). He highlighted that guided by the complexity in interaction of diverse farming systems (different HH with different types of resources as well as constrains) identifying common opportunity and constrains of the system through farm typology assessment is the way forward for getting the answer to this question for targeted interventions. Presenting PAN India Farming system typology examples Dr Ravishankar further stated that Classification of farming systems using typology is supportive in optimization of resource allocation in prototypes IFS models. He further mentioned about 6 major farming systems identified in the process. Major types identifies- 6 major farming systems.

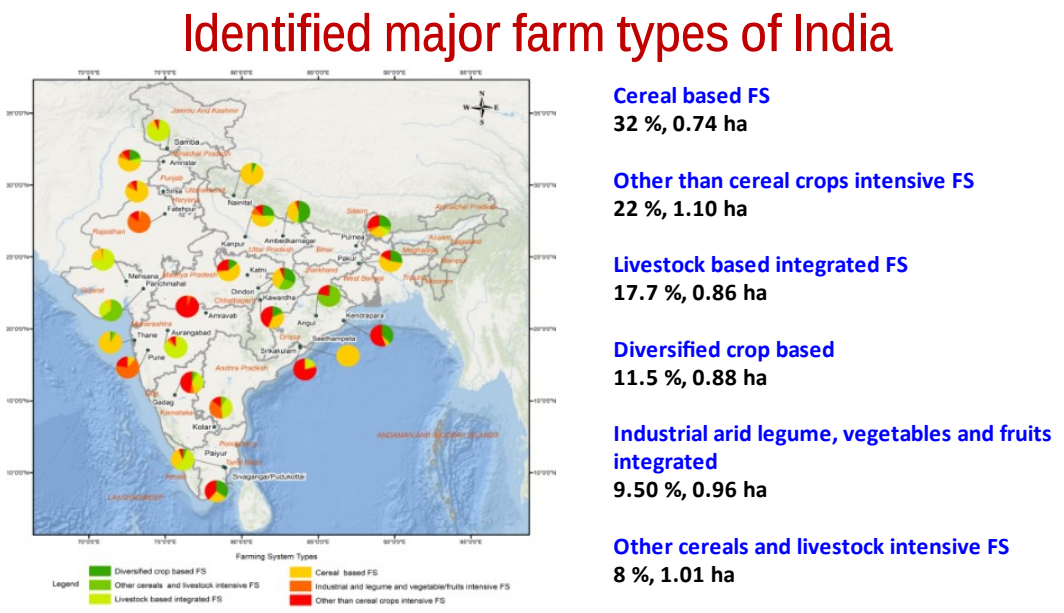

Figure 4: Identified major farm types of India.

Furthermore, he presented the 5 (Cropping system diversification, Livestock diversification, Product diversification/processing, Optional, Capacity building) integrated farm system models of low-cost farmer participatory intensification of FS. With Case Study from Telangana, South India, where 0.91 Ha area of farmers land has observed a significant gradual increment in farmers income from 50597 to 174000 with low-cost interventions, Dr Ravishankar disclosed the immense opportunity of integrated Farming system

for significant implication on farmers life with multiple benefit to society. Based on country-based research experience he stated that science based critical interventions can play crucial role in enhancing the livelihood of the farmers and achieving the target of Climate smart farming system.

Session II: Characterization of farming system through typology

Dr. Aashish Prusty, scientist at Indian Council of Agricultural Research explained about the theoretical background on characterization of farming system through typology. Starting his presentation with methodology Dr. Prusty briefed the importance of characterization through statistical typology in capturing capture the diversity of farming system. He briefed the use of Principle Component Analysis for data reduction and cluster analysis (CA)for grouping of farms into similar types. Furthermore, he highlighted the advantage of capturing the complexities of farming systems through considering, numerous farm dimensions at same time and then highlighting few of them that are significantly important for decision making. Explaining on the proposes of developing typology, he explained step-by-step methodology involved in farm typology characterization along with consideration of biophysical Structural social, economic drivers in integrated ways.

Concepts, tools, methods, use cases.

To guide the hand on exercise Dr Prusty explained the steps starting from data collection (HH survey) data cleaning to the principal component analysis procedure applied for the process. He explained that Principal Component Analysis allows us to identify the hidden pattern in the data set, identify correlated variables, reduce the dimensionality by removing noise and such redundancy leading to supporting in process of extracting the important useful information from a whole multivariate data table and express this information as a set of new variables called principal components. This determination of farm types based on multiple variables is useful for effective targeted interventions of technologies at farm level. Effective targeted interventions for large scale upscaling and implementation of technology policy had better acceptability if we go ahead with typology.

All the participants downloaded the R program and R-studio along with R Packages setup (FactoMineR, factoestra, corrplot, ggplot2, ade) and were guided to do the hand on exercise for rest of the day. All the participants actively participated in the learning process.

Day 03

Session III: Farm DESIGN: Concept, tool, data needs. Hands-on exercise

Dr Jeroen Groot, Professor, Wageningen University presented on process of Farm Design model. Professor Groot explained the concepts based on learning cycle. He explained that The Farm system analysis workflow starting from characterization, Describe, explain, explore, design, implement and scale out. He briefed Farm DESIGN- farm-household model- dependent on propose, purpose methods, model specific parameters and application in farm design analysis. Visualization of farm household configuration is the interesting part of the model. On regional and global scenario that can be run used for comparative assessment process. After the explanation all the participants downloaded the software and did the hands-on exercise on farm design analysis.

Wrap-up and reflections of the course. Idea of applications and further training

Three days course reflection:

First day was qualitative understanding of system approach to understand the interactions between different components. On second day the diversity of system was tried to simplify the reality by grouping them into typology with process of typology assessment through quantitative assessment with Principal Component analysis followed by clustering into relatively homogeneous farm households. Using that table doing relative description of different cluster systems to support farmer segmentation process. Then these representative farms were taken forward for modeling through Farm Design. Henceforth output of one model was applied in another model for well-directed intervention.

Feedback from participants

Overall: Too short to learn the real application of the learning- If needed we can organize a longer training with wider group of people and work with real data from existing systems.

Md. Sirajul Islam from BARI Bangladesh acknowledged the resource persons for this excellent course for participants from different countries. I have learned a lot of things about MFS. First learning from typology, R studio, packages, along with hands on practice to the Farm Design. This overall package was productive learning opportunity where personally felt learned at least 75% of the teaching in workshop. We all understood Importance of MFS during Co-VID situation we all know the importance of the system. Livestock is key component to enhance Farm productivity, sustainability as well as value addition point of view. It's a strong recommendation to include more participants from livestock sector from region. Request to continue this type of program in different places. Welcomed all other participants to visit Bangladesh for more cross-learning opportunities.

Mr. Ramesh Acharya, NARC, Nepal, acknowledged organizers for making them a part of this wonderful training. Acknowledged the effort of resource person for their effort to bring diverse group of people.

Learned the interrelatedness of the farm components and techniques for quantification and analysis. I'm sure it will be supportive for other studies as well. Farm Design package was wonderful visualization technique and how it can be applied for farm resources optimization. Rough discussion is that typology characterization for Nepal was realized, we can take this learning in our research work at our organizations. Its request to organize such training programs to capacitate more of people like us. There is good possibility and willingness for collaboration.

Dr Md. Robiul Alam Principal Scientist, Bangladesh Agriculture research Institute (BARI) Bangladesh, thanked organizers for this wonderful opportunity. Dr Alam stated that just like our body, head, hand, legs are looking different but they are integrated as body, similar is case of farm system. There are different aspects where system integration is needed. Within CGIAR, there are lots of organization doing research in silos, global transformation is needed for integrated development. First came across this MFS. MFS approach globally needed. My concern is that there is a need to make good connectivity and networking and collaboration. We can have cross learning from our neighboring countries. We'd like to sensitize other community members how we can integrate different systems. With this integrated learning we can grow together.

ANNEX I: Participants List

SN	Participants	Position	Country	Organization
1	Anju Pandit	Research Project Coordinator	Nepal	International Water management Institute
2	Ashish Prusty	Scientist	India	Indian Council of Agricultural Research
3	Bisheshwor Prasad Pandey	Scientist, National wheat research program	Nepal	Nepal Agricultural research Council
4	Deepak Bijarniya	Research Associate	India	International Maize and Wheat Improvement Center,
5	Deepika Timsina	Assistant Professor	Nepal	Agriculture and Forestry University
6	Dipok Kumar Choudhury	Socio-economist	Bangladesh	International Rice Research Institute
7	Ishrat Jahanara	Research Associate	Bangladesh	International Maize and Wheat Improvement Center,
8	Jagadish Chandra Barman	Principal Scientist	Bangladesh	Bangladesh Agriculture research Institute
9	Jeroen Groot	Scientist	Netherlands	Wageningen University & Research
10	Kohima Noopur	Research Associate	India	Indian Council of Agricultural Research
11	Keshab Raj Pokhrel	Plant Breeder, Directorate of Agricultural Research, Karnali Province	Nepal	Nepal Agricultural research Council
12	Kul Bahadur Thapa	Assistant Professor	Nepal	Agriculture and Forestry University
13	Lois Veenings	Intern	Nepal	International Water management Institute
14	Mangi Lal Jat	Global research Program Director	India	International Crop Research Institute for the Semi-Arid Tropics
15	Md. Robiul Alam	Principal Scientist	Bangladesh	Bangladesh Agriculture research Institute
16	Md. Sirajul Islam	Scientific Officer	Bangladesh	Bangladesh Agriculture research Institute

17	Natesan Ravisankar	Principal Investigator	India	Indian Council of Agricultural Research
18	Nirman Shrestha	Regional Researcher - Agricultural Water Management	Nepal	International Water management Institute
19	Ram Das Chaudhary	Scientist, Directorate of Agricultural Research	Nepal	Nepal Agricultural research Council
20	Ramesh Acharya	Scientist, Agronomy, Gandaki Province	Nepal	Nepal Agricultural research Council
21	Md. Saiful Islam	Research Associate	Bangladesh	International Maize and Wheat Improvement Center,
22	Sanjana Thakur	Horticulture Development Officer	Nepal	Department of Agriculture
23	Sanju Koirala	Researcher-Social Science-water and natural resources	Nepal	International Water management Institute
24	Santiago Lopez-RIDAURA	Principal Scientist	Mexico	International Maize and Wheat Improvement Center,
25	Shristi Shakya	Consultant	Nepal	International Water management Institute
26	Simone vongkhamho	Head of Forest Economics and Technology Research Unit, Forestry Research Center	Laos	National Agriculture and Forestry research Institute
27	Sunil Dulal	SI-MFS persons to be joined	Nepal	International Maize and Wheat Improvement Center,
28	Sulochana Nepal	Intern	Nepal	
29	Tara Sharma	Horticulture Development Officer	Nepal	Department of Agriculture
30	Tika Ram Adhikari	Intern	Nepal	International Water management Institute
31	Tulsi Parajuli	Assistant Professor	Nepal	Agriculture and Forestry University

32	Ujjwala Shahu Shrestha	Crop Development Officer	Nepal	Department of Agriculture
33	Shreemat Shrestha	Director of Crop and Horticulture Research	Nepal	Nepal Agricultural Research Council

ANNEX II: Program Agenda

General Program:

Day 0 (14th February 2023): Arrival of participants, resource person, side meetings and socializing.

	DAY 1 (15th Feb)	DAY 2 (16th Feb)	DAY 3 (17th Feb)
Morning 1	Opening remarks, presentation of participants, key lectures.	Session-2 : Farming System Typologies – Concepts, tools, methods, use cases **A. K. Prusty**.	Session-3: Farm DESIGN: Concept, tool, data needs. Hands-on exercise. **J. C. Groot**
BREAK			
Morning 2	Session 1. Systems analysis, theory, and practice for studying mixed farming systems." **Santiago-Lopez Ridaura**	Session-2: Farming System Typologies – Concepts, tools, methods, use cases **A. K. Prusty**.	Session-3: Farm DESIGN: Concept, tool, data needs. Hands-on exercise. **J. C. Groot**
LUNCH			
Afternoon 1	Session 1. Systems analysis, theory, and practice for studying mixed farming systems." **Santiago-Lopez Ridaura**.	Session-2: Farming System Typologies – Concepts, tools, methods, use cases **A. K. Prusty**.	Session-3: Farm DESIGN: Concept, tool, data needs. Hands-on exercise. **J. C. Groot**
BREAK			
Afternoon 2	Exercise, wrap-up session and discussion.	Session-2: Farming System Typologies – Concepts, tools, methods, use cases **A. K. Prusty**.	Session-3: Farm DESIGN: Concept, tool, data needs. Hands-on exercise. **J. C. Groot**

Detailed Program:

Program Outline (Draft)		
14 February 2023 (Day 0): Arrival of participants, resource persons, socialization, side meetings		
15 February 2023 (Day 1):		
09:00-10:30	**Session-I (Opening Session)**	
09:00-09:10	Welcome, the introduction of the training & context setting	Santiago
09:10-09:20	Self-introduction of participants	All
09:20-09:30	Key Lecture: M.L. Jat ICRISAT	M.L. Jat (ICRISAT)
09:30-09:40	Remarks by NARC: Shreemat Shrestha	Shreemat Shrestha, NARC
09:40-10:00	Remarks by Nirman, IWMI	Nirman
10:00-10:15	Remarks by N Ravishankar (ICAR-IIFSR)	N Ravishankar (ICAR-IIFSR)
10:15-10:55	Vote of Thanks Nirman	Nirman Shrestha, (IWMI-Nepal)
10:55-11:30	*Coffee Break, Group photo*	
11:30-12:15	Session 1. Systems analysis, theory, and practice for studying mixed farming systems."	Santiago Lopez RIDAURA
12:15-13:15	Lunch	
13:15-17:00	Session 1 *continuation*. Systems analysis, theory, and practice for studying mixed farming systems."	Santiago Lopez RIDAURA
19:00-21:30	Réception Dinner	
16 February 2023 (Day 2):		
09:00-12:00	**Session-2: Farming System Typologies – Concepts, tools, methods, use cases**	Ashish Prusty et al
12:00-13:00	Lunch	
13:00-15:00	**Session-2 continue**	Ashish Prusty et al
15:00-15:30	Coffee Break	
15:30-16:30	Special presentation on Pan India Farming Systems Typologies	N Ravishankar
16:30-17:00	Wrap-up and reflections of Day 2	Santiago/Humnath
17 February 2023 (Day 3):		
09:00-12:00	**Session-3: Farm DESIGN: Concept, tool, data needs, Hands-on debugging & use cases from South Asia**	Jeroen Groot et al
12:00-13:00	Lunch	
13:00-16:30	**Session -3 continue**	
16:30-17:00	Wrap-up and reflections of the course. Idea of applications and further training.	
18 February 2023 (Departures):		

ANNEX III: Glimpse of the training event