

Building Flood Resilience through Farmers' Field School

Practical Action: Transforming lives, inspiring change

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Introduction

Farmers' Field School (FFS) is a participatory and interactive group learning process based on 'learning by doing' approach of extension education. It combines theoretical approaches and practical skills and experiences to enable farmers learn, understand and use best practices and technologies that are most suitable and appropriate to their farming systems. This technical brief guides practitioners to design and conduct FFS in flood prone areas.



Photo 1 FFS practical session to learn and understand vegetable nursery establishment techniques in flood prone areas



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Problem/Context

a. Flood damage

Floods and landslides are the most common natural hazards in Nepal causing significant impact on lives of people, their properties and overall economy. During monsoon season starting June to September, most of the rivers in Terai are in spate with bank-full discharges causing flood and inundation.

Historical evidences show that every year flood causes heavy loss of lives and properties in Nepal. In the year 2017 alone, loss in agriculture sector was estimated to be 57 million USDⁱ. Farming communities, who completely rely on crops and animals for sustenance and survival were affected most as they lost their crops including seeds and livestock to flood.

b. Inadequate knowledge on appropriate farming systems in flood prone areas

Majority of the farmers (over 50%)ⁱⁱ in Nepal are marginal and practice subsistence agricultureⁱⁱⁱ. Traditional farming practice consider concentrates on using resources at hand effectively by using the land, rainfall, seeds, and tillage methods to produce whatever nature offers^{iv}. In normal condition, if there is no variation in existing crop environment, crop production remains constant. However, if extreme event like intense rainfall and flood occurs, it hampers normal cropping practice to a greater extent.

In flood prone areas every year, flood damages standing crops in an instant and soil structure, water holding capacity and nutrient availability in a long run. Farmers try to compensate instant loss of crops in subsequent cropping season. However, loss of nutrients from the soil, damage in soil structure and quality due to sand deposition hinder crop establishment and production. In such situation, farmers try to improve production by increasing volume and frequency of fertiliser application. This instead of improving production and income, increases production cost and in some circumstances, farmers' even face complete crop failure due to inappropriate crop management and fertiliser application. This technical brief is prepared to allow facilitators to understand actual problem in flood prone area and design FFS course accordingly.

How to design and conduct FFS in flood prone area

Agriculture practice in flood prone areas differ in many aspects from that in normal condition. While designing course to run FFS in flood prone area, an expert should carefully access information on usual agricultural practice, problems faced by farmers, flood trend and frequency of damage and possible mitigation measures. This will help facilitator to guide FFS towards developing or adapting technologies that works and also are acceptable to farmers. In general, FFS is completed in two phases and individual phases constitute several implementation steps.

a. Phase of socialisation

The first phase concentrates on ground work like problem identification, selection of participants and familiarisation to the subject of interest and curriculum development. The starting month of the FFS is determined by cropping pattern, flood impact on soil structure/nutrient availability and growing season.^v



Figure 1 Major crops and their growing season in Tarai agro-climatic region

Essential components of FFS

Farmers/Participants:

In FFS, farmers are expert. They carry out various activities to better identify and understand technology of their interest. In doing so farmers expertise on the particular technology they are investigating.

The Field:

Learning is based in the field. Farmers learn by experimenting various technology in actual field situation. They analyse pro and cons of the available technologies; discuss on its suitability and make a choice.

The Facilitator:

The facilitator is a technically competent person whose role is very much that of a facilitator rather than a conventional teacher. Facilitator should have knowledge on flood impacts in agriculture and its mitigation measures. He/she helps and guides FFS to build flood resilience.

The Curriculum:

Curriculum should be integrated and problem focused. It should be developed in close

i. Need assessment

This is the most critical step in FFS planning and implementation. Facilitators should first identify constraints and opportunities for FFS implementation. This is done by using need assessment tools like social survey, Focus Group Discussion (FGD) and Key Informants Interview (KII).

While conducting a needs assessment, it is vital to understand what the actual problem is, how it is affecting and what is currently being done to address the problem. So expert and facilitator should:

First organise an interaction meeting with community people, local government agency and other agency working in similar sector.

- Collect information on nature of flood, its frequency, impact and coping strategy being practiced by the community and other stakeholders.
- Identify knowledge gaps.

This initial interaction program will also help to let provincial/district administrations well informed about the programme and seek their support for FFS activities in future.

ii. Participant Selection

After knowledge gap identification, facilitators should identify farmers who are willing to participate in FFS and share knowledge with their neighbours. Facilitator must carefully manage the situation when local politicians want to become directly involved in the selection processes. Facilitator should ensure that gender is well considered with at least 40 per cent women's active participation. Participant selection should be transparent and based on:

- Active and practicing farmer
- Willingness to participate
- Ready to work in a group
- Good relationship with others

coordination with participating farmers and expert. This will allow covering all aspects of production system like climate, soil, disaster risk and market.

The expert/team leader:
The expert should have sound knowledge on agriculture production system. He should be able to combine multiple strategy of agriculture production system to improve the productivity and efficiency of agriculture while reducing negative impact of flood.

Why FFS?

- Empowering farmers with knowledge and skills
- Making farmers experts in their own fields.
- Sharpening the farmers' ability to make critical and informed decisions.
- Sensitizing farmers in new ways of thinking and problem solving
- Helping farmers learn how to organize themselves and their communities.

Roles and Duties of FFS Facilitator

- Guide in decision making and technical backstopping
- Links with external facilitator and collaborators
- Helps the group in conflict management and in achieving their objectives
- Help with observations and analysis
- Start from simple to complex endeavours
- Keeps discussion lively and probe to help participants arrive at appropriate conclusions

- Willing to learn
- Farmers must have a common interest
- Must come from same locality (area)
- Willing to follow the norms set by the group
- Must be willing to share experiences

iii. Familiarisation

After finalisation of participants, facilitator should first familiarise participants to the:

- Objective and principle
- Structure
- Operation guidelines and
- Role of individual farmer

After register FFS as a farmers' group at appropriate government office to make it a legal entity. Registered farmers' group are usually prioritised to get government grants, subsidy and other relevant services.

iv. FFS enterprise planning

FFS enterprise planning is a crucial step in identifying and planning for the best solution. Participatory planning process helps to identify right intervention for the right problem which thereby increases rate of uses and adaptation. During enterprise planning, facilitator should consider following points:

- Facilitators should not advise on which enterprises to select. The group might fail if the local environment is not suitable for the selected enterprises.
- Facilitator should facilitate farmers' discussion to analyse their farming systems, identify major constraints and find out possible solution. However, facilitator should not directly participate in the discussion.
- Facilitator should be careful that the selection of enterprise is based on the merits of collective learning and not for the benefit of the large commercial farmer or opinion leaders. If discussion goes in wrong direction, facilitator should guide discussion based on the information and knowledge gap assessed during need assessment.

Farmers might not know possible solution to address problem. So facilitator should help them identify right solution by providing information like pro and cons of intervention, resource need, cost of intervention, ease in implementation, replicability and scalability.

In flood prone areas, possible enterprise to reduce flood damage could be:

- **Flood tolerant rice cultivation:** Rice being a monsoon season crop has higher risk of flood damage. Normally, rice can withstand flood for some extent. However, if submerged for more than a week, it can eventually die. So farmers could be interested in cultivating rice which is more tolerant to submergence.
- **Winter vegetable production:** For winter vegetable production,

- Help to smoothen out domineering cases
- Helps participants to reach an appropriate consensus
- Show respect to all participants and their opinions
- Helps participants identify opportunities and potentials in their environment

Principle of FFS

- The field is the learning place
- Facilitation, not teaching
- Hands-on and discovery-based learning
- The farmer as expert
- Equity and no hierarchy
- Integrated and learner-defined curriculum
- Comparative experiments
- Agro-ecosystem analysis
- Need based topic
- Team building and social animation
- Participatory monitoring and evaluation

FFS benefit for farmers

- Strengthening observation capability and increasing knowledge ownership through discovery based learning.
- Building self-confidence and enhancing decision-making capacity.
- Minimizing risks in experimenting with new practices
- Changing deep-rooted beliefs and practices
- Developing problem-solving capabilities

vegetable nursery is usually established in the month of August to September. But as per flood trend, flooding occurs mostly in these months and farmers are either unable to establish nursery or their nursery get damaged. Flood deposits wash away nutrients from the main field and such defective and deficient soil does not allow normal vegetable production. So farmers could be interested in establishing healthy nursery during flood months and proper soil management in flood damaged main fields by reclaiming sand deposited soil and by cultivating flood tolerant crops like sugarcane and banana.

v. Curriculum development

FFS curriculum is guided by learning by doing approach of extension education. Expert along with facilitator and participants, develop course curriculum and schedule. Course curriculum includes detail theoretical and practical activities of selected enterprises and group dynamic exercises.

Participants' might have different level of understanding. So, course module should be made as simpler as possible. It should be able to give clear insight on interaction between a crop/livestock and other biotic and abiotic factors coexisting in the field. In general, FFS curriculum in flood prone area contains following module:

Compulsory module: Irrespective of type of solution, soil reclamation/vegetable production/rice cultivation.

Optional module: with respect to solution

Module 1

Understanding weather and flood and their effect in growing crops

Module 2

Familiarisation to weather and flood forecasting and its usage by farmers

Module 3

Impact of flood in relation to cropping season

For soil reclamation:

Module 4

Effect of flood on soil quality, nutrient availability and sand deposition

Module 5

Restoration of soil quality and nutrient availability

Module 6

Site specific soil and nutrient management (sandy loam or sandy soil)

Norms set by and for the participants:

- Respect the time
- Switch off or keep the mobile phones in silence mode
- Speak one at a time
- Active participation
- Active concentration
- Be tolerant (Patient with others)
- Pray or sing before starting with activities
- In case of absence always inform
- Make a summary (always) of the previous lesson
- Do physical exercises
- Avoid unnecessary movements during session
- No smoking or drinking in class
- Group work should be taken serious
- Punctuality should be observed at all time

Conditions of successful FFS

- Well trained facilitators
- Well defined priority problem
- Organized community that is dedicated/committed and willing
- Clear understanding of the concept and procedure by all stakeholders
- Support and goodwill of the authorities at various levels
- Availability of appropriate technology
- Adequate resources and logical support
- Proper identification of site/area
- Proper identification and selection of participants
- Flexible and dynamic farmer group that is well Organized and structured
- Farmers with common interest
- Proper and guaranteed supervision, monitoring and evaluation of the activities.

For Flood tolerant rice cultivation:

Module 7
Introduction to flood effect in rice cultivation

Module 8
Rice varieties tolerant to flood inundation

Module 9
Agronomic packages to reduce flood impact (planting to harvesting)

For vegetable production

Module 10
Vegetable nursery technique during and after flood season

Module 11
Integrated nutrient management in flood affected soil

Module 12
Irrigation water management in flood affected soil

Module 13
Integrated disease pest management

Module 14
Training/pruning

Module 15
Harvesting and post-harvest handling

FFS training module can be designed for other crops as well. However, agronomic package that includes planting time, planting distance, nutrient/disease/pest management and other agronomic procedure should be contextualised as per the prevailing environment and climate/weather forecasts.

b. Phase of institutionalisation

Technology adaptation and success of FFS depends on how participants internalise learning and experience in their real life. During institutionalisation phase, farmers' experiment, innovate and learn technologies of their interest in real world setting. This phase includes site selection, training scheduling, experimentation, discussion, evaluation, field day, final graduation and follow up plan.

i. FFS site selection

FFS site is selected based on the problem prioritised during enterprise planning. If FFS enterprise is on cultivation of flood tolerant rice than site should be selected in the area which is more prone to annual flood. Also, selected site must have previously faced loss of rice due to submergence. Inappropriate site selection would hamper the farmers' willingness to participate. Whereas, selection of site based on the problem allows farmers to experiment, evaluate and learn technology in real situation. Thus, increases farmers' willingness and confidence in the use of technology in similar context. Besides, site selection should satisfy the following criteria:

- Appropriate to experiment solution/technology.
- Be accessible to all farmers and have adequate space for meeting.

ii. FFS field day schedule

Field schedule should be convenient for all farmers. Normally FFS is scheduled for half a day on the prescribed days (days are prescribed based on the timing and sequence of the activities of solution/technology).

Table 1 General outline of each field day session

Time and Duration*	Activity	Leader
7:30 – 7:40	Arrival, roll call	Group leader
7:40 – 7:50	Start: Recap of the days programme	Facilitator
7:50 – 8:20	Field observation	Sub group
8:20 – 8:50	Data processing	Sub group
8:50 – 9:20	Plenary discussion	Facilitator
9:20 – 9:45	Group dynamics and tea break	Facilitator
9:45 – 11:45	Special topics and summary	Facilitator
11:45 – 12:00	Next meeting plan and departure	Facilitator, group leader

iii. Field day activity sequence

Field day activity is based on the course curriculum of specific enterprise. Activities are sequenced following the crop stages.

- Farmers are divided into two groups. One group is assigned to experiment new technology where as another group carry on normal practice. This will allow farmers to compare new technology with traditional one.
- To ensure farmers acquire adequate knowledge (for example, for enterprise on flood tolerant rice cultivation), the FFS sessions will be following the farming schedule as indicated below:

Table 2 Activity sequence, FFS on flood tolerant rice cultivation practice

Week	Activity/ Subject
1	Nursery bed preparation (type of nursery), fertiliser management, seed selection, treatment and germination
	Seed sowing in nursery bed
2	Nursery inspection: fertiliser needs assessment, disease pest management requirement. (4-5 days interval for 25 days)
3	Land preparation for transplanting: fertiliser dose calculation, fertiliser application, tillage operation. (20 -25 days after nursery raising)
4	Transplanting: Spacing, number of seedling per hill, pre-emergence herbicide application, irrigation management (25-30 days after nursery raising)
5	Weeding and first top dressing (if submergence or flooding occurs- special management activity).
6	Inspection for fertiliser, disease, pest (5-10 days interval) if submergence or flooding occurs
7	Second – third top dressing if submergence or flooding occurs (special management activity)
8	Harvesting
9	Post-harvest handling

Note: for detail information on above given activities, refer agronomic package developed for flood tolerant rice cultivation.

iv. AESA and special topics

Agro Ecosystem Analysis (AESA) is a tool to assist farmers to develop skills and knowledge about field situations with regard to pests, soil conditions, plant health, influence of climatic factors and their interrelationship for growing healthy crop. Based on AESA, a special topic to experiment during FFS is identified and simple demonstrations are carried out, either in the field or at the meeting place. Some examples include: fertiliser management after flood recedes, arranging agronomic practices according to rainfall/flood forecast and identification of insect/pest and diseases.

AESA Methodology

- Field Observations
- Plant health at different stages
- Soil conditions
- Climatic factors
- Weather
- Farmers' past experience
- Identification of multiple solutions
- Comparative analysis of solutions
- Decisions making on which solution to uptake

v. Group participation and learning activities

These are a variety of team building exercises employed during the training. There are many games and exercises that can be used to enhance group dynamics. The principal emphasis is on creating an environment in which individuals and the group are motivated to experience, reflect and change. In particular, these games and exercises are valuable for:

- Motivating the participants
- Relaxing the participants
- Illustrating a lesson
- Rejuvenating the group
- Making people alert
- Stimulating the flow of communication between strangers
- Bringing private expectations and group reality closer
- Encouraging everyone to participate and learn
- Rounding off or introducing a session
- Developing new skills
- Exposing participants to new ways of judging their own actions, particularly in relation to the impact on group work
- Developing participants into a closer knit team
- Establishing a learning climate that is enjoyable as well as fruitful
- Team building

vi. FFS expo day

A FFS expo day is an event organised by FFS participants to present and expose all activities and achievements to other farmers in the community who did not participate in the FFS. Field days allows participant to interact with other farming communities, get feedback from them and scale up technology in other relevant farming communities.

Field day is normally organised at the later stage of FFS when most of the objective are achieved. For an instance, in case of flood tolerant rice cultivation, field day should be organised when rice crop reaches its maturity. This will allow visiting farmers to compare between the treatments (improved practice) and control (past/traditional practice). Farmers can observe difference in crop health, panicle size, number of effective tiller, number of grain per panicle between treatment and control experiment. Thus raises willingness and facilitate increased activities and scaling up in the future.

vii. Exchange visit

An exchange visit between FFS group allows FFS participants to learn from one others' experience. During the exchange visit, the farmers can compare progress, achievements and even constraints. To some extent, exchange visits also disseminate new findings and learning to other farmers for their benefit.

viii. Graduation day

A graduation is the end of a successful FFS learning cycle. The graduation ceremony is usually organised by the farmers and facilitator in the presence of representative from district/local agriculture office and other farmers. This event not only honours FFS participant but also helps them to formally link with district agriculture office and its services. Further, it encourages other farmers to join next planned FFS.

ix. Follow up activities

Though graduation ceremony marks the end of the official FFS, it does not necessarily end there. In many cases, it will be difficult for the group to practice and spread its newly gained knowledge. So facilitators should make follow up visits to help the group to identify knowledge gap and solve problem. A strategic follow up support to the FFS takes farmers to the next level of development and create economically vibrant and viable farming society.

Conclusion

Farmer field school is a participatory learning system guided by learning by doing approach of extension education system. FFS course curriculum is designed as per the understanding level of participants and farmers are allowed to experiment, evaluate and learn technologies in real situation. Thus, FFS is one of the best solutions that offer flexibility for farmers to adequately and effectively develop their skills, capacities and potentials to tackle emerging future challenges like flood.

Case-study

Communities benefit from flood tolerant rice cultivation

Ram Prasad Chaudhary, a resident of Tikapur-8, Bangaun and his neighbours had to suffer loss due to annual floods. As their land is located at low lying area, it used to get submerged during monsoon season. Every year, they used to lose most of the rice crops to flood due to submergence. Chaudhary describes the situation in his words, “We used to plant local rice varieties like mansuli in our land. Our land is low lying so we suffer from flood every monsoon. Flood usually stays for a week and our rice crop dies. I used to make only 15 to 20 kg harvest from 6 kattha of land.”

He further adds, “Our neighbours who grow same variety in the upland not much affected by flood harvest around 120 kg rice per kattha.”

Local and most of improved varieties do not withstand flood for longer duration. These varieties usually die if submerged for a week. Farmers were unaware about flood tolerant varieties like Swarna sub-1 and Samba mansuli sub-1. These flood tolerant varieties usually withstand flood for 15 days. However during FGD at the FFS, Chaudhary and his community farmers shared their problem with agriculture Junior Technical Assistant (JTA) of our project and after discussion, they were offered training on flood tolerant rice cultivation.

Chaudhary adds, “We learned all agronomical aspects of Swarna sub-1 practically in our own field. We observed how this variety regenerates after submergence and the final harvest was awesome.”

By the end of FFS, Chaudhary and his neighbours were able to harvest 180 to 200 kg of rice per Kattha.



Photo 2 Ram Prasad Chaudhary sharing his learning and experience from FFS

Cost of solution (based on case study)

Farmers field school itself is a project. So cost varies depending upon the type of project/enterprise that is to be launched. In general, cost of FFS in flood tolerant rice cultivation is NPR 3 33,000 (€ 2,300).

Table 3 Cost of FFS in flood tolerant rice cultivation practice.

S.N	Activity	Cost (NPR)	Remarks
1	Need assessment (FGD and KII)	15,000	
2	Participant selection and familiarisation	5,000	
3	FFS curriculum design	30,000	Expert charge
4	Purchase of materials (seed, fertilisers, chemicals)	15,000	
5	Tea and snacks for 20 participants during field days (approximately 30 days in one crop cycle)	50x20x30=30,000	
6	Other material inputs during FFS (fertilise, pesticide, insecticide, sprayer, etc.)	15,000	
7	FFS expo day	20,000	
8	Exchange visit	50,000	
9	Graduation day	30,000	
10	Salary for facilitator (for six months)	18,000x6=108000	
11	Miscellaneous	15,000	
Total cost of FFS		333,000	

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