EIAR SHDI CIP

FARMERS FIELD SCHOOL FACILITATORS' MANNUAL

ON

POST HARVEST MANAGEMENT OF WARE POTATO

Holetta 2007

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Session 1. Introduction to Farmer Field School and Opening session

What is FFS and why it is needed?

The Farmer Field School aims to build each farmers' capacity to analyze their ware potato storage practices, to identify the main constraints and to test the possible solutions on their field, eventually identifying and adopting the practices most suitable to their farming system. The purpose is to assist farmers in developing their ability of making critical informed decisions that render their storage systems of ware potato more appropriate. Through their participation in FFS activities, farmers become experts in their own fields. The FFS uses non-formal adult education methods, particularly experiential learning techniques. Typically a group of farmers meet regularly during the course of an experiment. The school is not meant to teach farmers new technologies developed outside their environment but to provide them with tools which will enable them to analyze their own production practices and identify possible solutions.

The role of a facilitator: A facilitator facilitates the school. The topics of each meeting are related to the stage of the experiment at a particular time. The activities are highly practical involving careful observations of factors and testing of solutions that fit their typical physical and socio-economic situation. There is much sharing of experiences among the farmers with a minimum of lecturing.

The role of a scientist: The role of the scientist is to provide backstopping support to the school. The scientist role is that of a colleague and advisor who brings new ideas and or unknown technologies to the communities.

One of the very important elements contributing to the success of farmer field schools is creating a common understanding about FFS among the school participants. FFS can

only become a success with active participation of the farmers. Since FFS approach is new for a large proportion of the farmers, there is a strong need to introduce what FFS is and why it is needed. This is because, it contributes considerably for the successful development of the school and also to know the expectations of the farmers from the school. The overall objective this manual is therefore to assist the facilitator in FFS by providing the basic framework and materials for the implementation of the school. In scheduling the school, the facilitator should be aware of farmers' availability and it is important to involve participants in setting the time and schedule of meetings.

Objectives

1. To create awareness for the farmers about the school and its importance
2. To understand the expectations of the farmers from the school
3. To discuss on the organization of the school and the sessions selected in the learning processes

Learning outcomes

- The farmers will be aware of the principles of FFS, its advantages and contribution for improving the productivity of potato
- The expectations of the farmers from the school will be identified and known
- The farmers will have an awareness of how the organization of the school and the sessions selected for the learning processes

Notes for the facilitator

Before starting awareness creation sessions, first there is a need to note the farmers' level of understanding about FFS. This is because; there has been an FFS approach in some of the localities in previous times. Hence, the farmers might have been aware of this approach and it is better to start with their level of understanding. This helps to design appropriate learning process taking into consideration of their knowledge levels. When designing teaching practices in the field, there is also a need to clearly differentiate between the formal school which is run under classrooms and the informal school which

is designed to be run in the fields. Since the farmers have a wealth of knowledge on the different farming practices, in general, and on the ware potato storage techniques, in particular, there is also a need to know the differences between the approaches to teach the farmers and the children. The objective of the FFS is, therefore, not to teach the farmers on the theoretical aspects but to facilitate them in discovering the concepts using their ability and capacity for observation, experimentation and deduction. This implies that there is no need to design a type of school in such a way that the facilitator is a professor and the farmer is a student.

The principle of the learning process is that one can learn from another. Multi-way discussion should therefore be the central point of communication between the facilitator and the farmer. The facilitator should be able to answer the questions raised from the farmers with practical examples and exercises rather than giving direct answers. This is because; the exercises are helpful to strengthen learning by discovery approach. We should note to all the school participants that 20% of the people learn by listening, 40% by seeing it and 80% learn by doing it or discovering it. The exercises should focus directly on the surrounding environment, local materials and specific agricultural problems of the farmers.

The farmers should be encouraged to actively participate in the learning processes. All these processes contribute for the learning process to be more effective and successful. The facilitator should explain for the group that we can learn from experiences of each other. In every stage of the sessions, the learning process should be designed in such a way that the discussion is attractive, attentive and pleasant by supplementing with practical examples, exercises, samples, drawings or photographs. Two or more facilitators could be used where appropriate to share responsibilities and create enabling environment for the free discussion of sub-groups during exercises. There should be agreement among the school participants and the facilitator on the time required for each session, frequency of meeting for the school and the date of learning. In general, it is important to note that the learning process should focus in sharing what we know and discovering what we do not know.

Time needed: 2 - 3 hours

Materials required: Flip charts, pencils, markers, flat files

Steps

1. Explain the objectives and outcomes of the FFS approach and the learning processes to the school participants
2. Describe the differences between learning in the field and learning in the classrooms
3. Ask the participants to form small sub-groups of about 7 persons each for group exercises
4. Activate the sub-groups to discuss on the following points:
    a. List down on what they would like to learn from the school
    b. What are your expectations out of the school
    c. Suggest what should happen and what should not happen during the learning processes in the school
5. As the end of the exercises, ask one group to present their group works for the other group
6. Activate a discussion among the groups on the presentations. Discuss in detail and reach consensus on the expectations that could be met and that are not likely to be met in this school.
7. Following the presentations of the groups, the facilitator will present and explain the basic principles and approaches of the school, its advantages and contributions for strengthening knowledge and skills, previous experiences and success stories of the school and the sessions suggested in this school
8. Activate a discussion on the facilitators presentations
9. Discuss on the future plan and frequency of meeting for the school, dates and time of meeting, and length of the learning process in a day.
10. Get feed-back from the participants about the session and the learning processes
11. Wrap-up the session of the day by summarizing the main points discussed during the exercises and the outputs obtained
12. Close up of the session by reminding the theme of the next session, date and time of next meeting

Some suggestions to facilitate group discussion

- Does learning by theory or practical help some one better to learn? Reasons.
- Is learning process in the classrooms or in the field better to gain practical knowledge and skills?
- Should there be classes once in a week or once in two weeks?
- At which season should each session be better learnt?
- Should there be classes for the whole day or for half day?
- What do you expect from the school?
- Can one learn better through theory in the classes or by conducting practical experiments in the fields?

Responses for such questions can help activate and orient the discussions to explain the need for FFS approach further. It would contribute that learning with observations and experimentation is better than learning just by theory.

Official Opening of the School

It is useful to invite officials for the opening of the school. District Council Officials, Executive Leaders of the community, Director of Holetta Research Center and Heads of District Rural Development and Agricultural Offices will be invited in the opening session. Two or three speeches are sufficient to make an impact while ensuring that efficiency and good will are not dissipated.

Session 2. Investigation of knowledge, attitude and practice of the farmers on storage of ware potato

Activity 2.1 Group discussion and description of the farmers' ware potato storage practices and associated problems

Introduction

Before starting a detail analysis of post harvest systems of potato, it is important to start with the description of the farmers' knowledge on potato production, marketing and storage systems. The farmers do have different experiences and skills on potato production depending on their physical environment and socio-economic conditions. The knowledge of marketing practices is also very important since it is affected by accessibility to market places and socio-economic status of the farmers. Prior knowledge of the farmers' post harvest management practices of potato is also very important to design appropriate learning processes. This activity could be addressed by adopting PRA techniques through the use of a checklist developed for the purpose.

Objectives

1. Briefly assess and understand farmers' knowledge, attitude and practices of potato production and marketing ,
2. Describe and investigate in detail the farmers' knowledge, practices and attitudes of ware potato storage.

Learning outcomes

- The farmers' knowledge, attitudes and practices of production and marketing will be described briefly
- The farmers' knowledge, attitudes and practices of ware potato storage will be described and investigated in detail

Notes to the facilitator

It is important to remember that the farmers have ample experiences and skills in the production and marketing, and storage of ware potato.. However, before starting the learning processes, there is a strong need to know the farmers' experiences and skills in potato production and storage systems. The reason to start investigating their experiences on potato production and marketing systems is that these aspects are interrelated to the post harvest management practices of potato. From informal observations, it is realized that there is considerable post harvest losses of potato. Hence, to suggest appropriate mechanisms that help overcome the problems related to losses due to lack of proper storage of ware potato, it is necessary to start with the identification of the farmers' ware potato storage systems and the problems associated with it.

Time needed: 2 - 3 hours

Materials required: Checklist, pencil, markers, flat files, seeds, and notebook

Steps

1. Revise the previous session
2. Brief the days activity
3. Make the checklist (Box number 1) ready to collect information from the respondents
4. Using the groups already established, conduct a group discussion.
5. Activate a discussion among the group members according to the points on the checklist. At this stage, different PRA tools could be used to facilitate the discussion with the farmers (for instance, semi-structured interviews, direct and pair-wise matrix rankings and seed counting techniques). The details of these PRA tools are indicated in Boxes number 2 and 3.
6. Bring all the participants together for general discussion. In this case, activate a general discussion on the problems identified. There should be consensus on various issues at the end of the general discussion.
7. Get feed-back from the participants about the session and the learning processes.

8. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

Note: Inform the farmers that there would be individual interview at household level in some other day using a structured questionnaire. Since the next session is individual interview using a questionnaire, fix appointment only with the farmers that are to be interviewed using a questionnaire. Moreover, duplicate the questionnaire according to the required sample size and s**ession 2 must be completed before the next session.**

Description of PRA Tools

Box no 1: Semi-structured interview (SSI)

Semi-structured interview is one of the PRA tools where the interviewer holds a discussion with the respondents. A checklist with some of the pre-determined questions, is used to activate group discussions. It is the most commonly used tool to collect wide range of qualitative information. Individual interview could also be conducted using this tool.

Some suggested points/ checklist to facilitate group exercises

- How do you practice potato production?
- How do you sale potato and in what forms do you commonly sale (ware/seed)?
- Price fluctuation (seasonal and annual) of ware potato and reasons for the fluctuation
- Awareness of the farmers about improved potato production technologies
- Describe the farmers, storage systems of ware potato
- What are the problems and their effects of ware potato storage (prioritize)?
- Suggest appropriate intervention options to overcome the identified constraints related to ware potato storage
- What are the most important constraints related to the production and marketing of potato?
- What do you suggest the appropriate options to overcome potato production and marketing?
- Suggestions and feedback on the exercises and approaches of the session

Box 2. Matrix rankings

A matrix is a useful tool for ordering and structuring information. There are two types of matrix rankings: direct matrix scoring and pair-wise matrix ranking. Direct matrix scoring helps the respondents to directly rank the parameters according to the set criteria or indicator. For instance, if there are six storage techniques used, the respondents can be asked to rank directly these storage systems from one to six according to their preferences based on the indicator used for ranking, such as effectiveness for storage.

Example of direct matrix ranking technique

Storage systems	**Direct ranks (example)**
Improved ware potato storage	1
Storage on the floor in the house	4
Storage in the sacks	5
Storage in the field before harvesting	2
Storage on bed in the house	3
Storage on the corridors of the house	6

Pair-wise matrix ranking method arranges the parameters vertically in a column and horizontally in a row in the same order. The respondents then pair one parameter from the column and another from the row and select the one that best fulfils their interests according to the criteria set for prioritization. For instance, in the example below, the farmer can easily choose one effective storage systems from using either improved ware potato storage system or storage on the floor in the house. In the same way, ask the respondent to select one best approach from the two pairs. At the end, sum the frequencies of occurrences of each option in the box and based on this, give ranks.

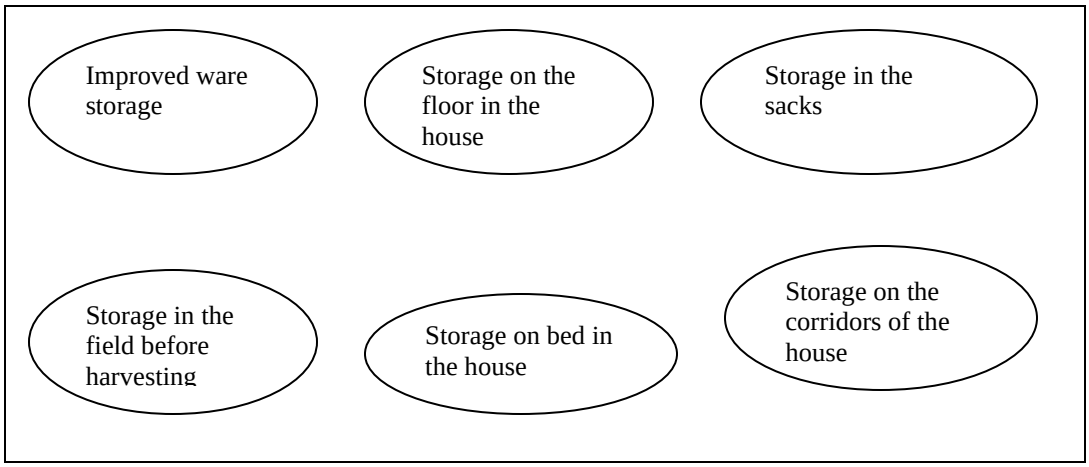
Example of pair-wise ranking technique

Storage systems	Improved ware potato storage	Storage on the floor in the house	Storage in the sacks	Storage in the field before harvesting	Storage on bed in the house	Storage on the corridors of the house	**Score**	**Rank**
Improved ware potato storage	**X**							
Storage on the floor in the house		**X**						
Storage in the sacks			**X**					
Storage in the field before harvesting				**X**				
Storage on bed in the house					**X**			
Storage on the corridors of the house						**X**		

Box 3: Seed counting technique

This is also one of the important PRA tools used to collect information in more explanatory way. In seed counting technique, give about 100 seeds of either maize or faba bean to farmers. For instance, draw six rings on the flip chart paper according to the number of ware potato storage systems the farmers are given to prioritize them. Then give 100 seeds of either maize or faba bean for the farmers. Then allow them to pile up more seeds on the ring of the storage system which they prefer most, less piles on the next, etc until they have piled up all the seeds in each ring. Then, count the seeds in each ring and prioritize accordingly. At the end of seed count, make sure that all the counted seeds are equal to the original count, 100. Each count represents a sort of proportion out of 100. For instance, if the seed count in the first ring is 50, in the second ring 10, in the third 8, in the fourth ring 15, in the fifth ring 12 and in the six ring 5.

Example of seed counting technique



Activity 2.2 Quantification of the farmers' ware potato storage practices and associated problems (the questionnaire is annexed).

Introduction

In addition to collecting descriptive information on the farmers' storage practices of ware potato, there is a need to quantify some of the most important parameters at household levels through individual interview. Quantification of some important parameters helps to set baseline conditions that existed before interventions. This condition can be compared with the impact that will be brought up after interventions. However, this activity may not be conducted on session basis. The facilitator can interview the individual farmers by fixing appointment according to their convenience. This activity may take one to two weeks.

Objectives

1. To collect quantified data on the farmers' storage practices of ware potato
2. To briefly quantify some parameters on the farmers' production and marketing practices
3. To quantify and prioritize the problems related to ware potato storage

Time needed: 1 - 2 weeks

Materials required: Questionnaire, pencil, pen, flat file, markers

Steps:

- Explain for the farmer the objectives and outputs of this interview
- Collect the required data using the questionnaire
- Code the questionnaire and prepare the data for data entry
- Enter the data into computer
- Clean the data and analyze it
- Interpret analytical outputs and write a report

Session 3. Designing an experiment for storage of ware potato

Introduction

After assessment of the farmers' knowledge, attitudes and practices of ware potato storage, the next step is to plan interventions and design an experiment to overcome the constraints. In this case, there are two treatments to be compared. One is improved ware potato storage system and the second is the local ware potato storage practice. The farmers will compare the two treatments by observing the differences throughout the experiment. At the end of the experiment, they will be able to make informed decision in selecting the appropriate and feasible option to store ware potato.

Objectives

1. To create awareness for the farmers on how to design an experiment and compare the treatments,
2. To design experiments to compare options of different ware potato storage systems.

Learning outcomes

1. The farmers will be aware on how to design an experiment and compare the treatments,
2. The experiment on testing the storage structures designed..

Notes to the facilitator

After the required information is collected through survey, the farmers will have an opportunity to select and test the options that help overcome their ware potato storage problems. Two treatments will be designed for the farmers. One of the treatments will be improved ware potato storage systems and the second will be the farmers' ware potato storage systems. These two options provide the farmers an opportunity to compare the suggested improved ware potato storage system with their local storage systems. The farmers will observe the differences between these two options throughout the

experiment. It is helpful to encourage the farmers to observe the processes attentively and those who are able to read and write could also take notes.

Time needed: 2 - 3 hrs

Materials required: Flip chart, flat files, markers, pen, pencils

Steps

1. Revise the previous session,
2. Brief the day's activity. Discuss with the farmers on the suggested treatments

Exercise on concepts of basic experimentation

Explain for the farmers what replication is and why it is needed.

3. The experiment will have the following options:

Treatment 1. Improved ware potato storage system

Treatment 2. Commonly used local ware potato storage system(s) the participants would like to test

4. The treatments will be replicated three times
5. Two varieties will be stored
6. Activate a discussion with the school participants on the suggested treatments
7. Share responsibility and make necessary preparations for the next session.
8. Get feed-back from the participants about the session and the learning processes.
9. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

The concept of replication

Replication is repeating the same experiment on the fields of several farmers (the number of replications depends on the nature of the experiment). In this experiment, the treatments will be replicated on three farmers' plots. This is to minimize variability of the performance of the treatments on different farms/plots. Since the management levels and practices of different farmers is not the same, such variabilities could be minimized by repeating the same experiment either on the plots of different farmers or on different blocks of the same plot. The average of the replications will be taken to estimate the measurement of the performances of the treatments.

Exercise on replication

Ask each of the farmers in the group that on how many plots they are growing their barley crop. Activate the discussion on whether the performances of each plot planted with the same barley variety is the same or not. Again ask them about the yield of barley in a timad (a quarter of a hectare) of land and encourage a discussion that the yield of which plot they want to tell. In this exercise, they will realize that the performance of each plot of barley field does not perform equally even though the same barley variety is planted in all the plots. In order to tell the yield of barley per timad, they will also realize that they have to take the average of all the plots planted with barely. In this way they will understand the concept of replication and its importance in experimentation.

Note to the facilitator

1. Make sure that all the necessary materials are ready for construction,
2. Make sure that the plots of the three farmers are secured to construct ware potato storage for the experiment,
3. Encourage the farmers to dug the soil and prepare mud to be pasted as soon as wooded construction is completed.

Session 4: Construction of improved ware potato storage

Introduction

After designing an experiment to overcome the problems of ware potato storage, the next stage will be implementation of the experiment. Improved ware potato storage will be constructed on the three farmers' plots. At this stage, the farmers will learn on the methods of constructing ware potato storage. Moreover, there would be a practical discussion on the design of the storage.

Objective

To explain the farmers on the methods of construction of ware potato storage by using the materials available locally and encourage them to participate in the construction process.

Learning outcomes

- The farmer will be aware of the design of ware potato storage, functions of the design structures and materials required for construction
- The farmers will be able to construct ware potato storage with the assistance of the carpenter
- Improved ware potato storage will be constructed

Notes to the facilitator

Taking into consideration of the problems related to ware potato storage, it should be noted that construction of ware potato storage is the most important stage of the learning processes. The materials required for construction are easily available from the local environment of the farmers. The value of each material should be recorded to estimate the cost required to construct improved ware potato storage.

Time needed: The construction process will be completed before the next session.

Materials required: Wooden materials, straw, mud, nails, saw, grass, axe, hammer,

Steps

1. Revise the previous session,
2. Brief the days activity,
3. Share responsibilities to start implementation
4. Start construction of improved ware potato storage
5. Encourage the farmers to observe attentively and to participate on the construction of the storage.
6. Activate a discussion on the design and importance of each parts of the storage during construction
7. Record costs incurred in each processes in this session
8. Get feed-back from the participants about the session and the learning processes.
9. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

Session 5. Dehaulming, harvesting, sorting and storage techniques of ware potato

Introduction

After construction of ware potato storage, the next step is to learn about the dehaulming practice and how to select the ware potato tubers to be stored. The knowledge of appropriate dehaulming and harvesting technique is very important to minimize mechanical damage of potato tubers. After harvesting, sorting of the potato tubers using key indicators, such as, size, condition of mechanical damage and other factors, is indispensable to obtain maximum benefits from storing. After sorting the potato tubers, the next step is knowledge of how to store it. The thickness of accumulation of the tubers in storage has an influence on the ability of the tubers to stay edible and marketable for long period of time. After storing the tubers, monitoring of the storage structure on periodical basis is very important to trace unexpected problems coming up and to take appropriate corrective measures on timely basis.

Objectives

1. To discuss about appropriate dehaulming practice of ware potato
2. To create awareness for the farmers on the appropriate harvesting techniques of potato tubers
3. To discuss on the sorting techniques of potato tubers after harvesting and the key indicators used for sorting
4. To create awareness for the farmers on the techniques of storage after sorting

Learning outcomes

- The farmers will know about the dehaulming practice and its advantages
- The farmers will be aware of the appropriate harvesting techniques of potato tubers
- The farmers will learn on the sorting techniques of potato tubers using different indicators
- The farmers will gain an understanding of appropriate techniques of storage

Notes to the facilitator

The farmers do have ample experiences in the harvesting techniques of potato. Their experiences are well learnt in the second and third sessions. However, it is indispensable to create awareness and demonstrate for them the appropriate harvesting techniques to minimize storage losses. Moreover, sorting is the most important stage to differentiate potato tubers for immediate consumption and for later storage. The farmers could suggest indicators for sorting and some additional indicators could also be suggested to supplement the indicators identified by the farmers. After the sorting processes, storage technique need also be taken into consideration to obtain maximum benefits. In general, this session is both learning from farmers' experiences and demonstrating supplementary improved practices on the storage systems.

Time needed: Half a day

Materials required: hoe, potato tubers, ware potato store,

Steps

1. Revise the previous session,
2. Brief the days activity,
3. Encourage the farmers to describe their experiences in dehaulming, harvesting techniques, sorting systems and indicators used for sorting, and storage techniques of ware potato
4. Encourage the sub-group representatives to present their group work for other sub-group.
5. Activate a discussion on the sub-group presentations
6. The facilitator should present the recommended harvesting, sorting and storage techniques of ware potato

7. Arrange a field visit to one of the potato farms ready for harvest. Then encourage the farmers to harvest according to the recommended harvesting techniques learnt.
8. After harvesting, encourage the farmers to sort the potato tubers according to the agreed upon indicators. After this exercise, the potato tubers fit for storage will be selected, and the remaining will be disposed for immediate consumption or marketing.
9. Before storing, the sorted potato tubers to be stored have to be weighed to get initial weight from a sample of potato (about 2 – 3 kgs) before storage. The same sample will be monitored through out the experiment. This helps to monitor the weight losses over time starting from the date of storage.
10. Encourage the farmers to store the tubers that are fit for storage according to the lessons they learnt. The height of accumulation is the most important factor to be considered at this stage (the standard height will be considered during monitoring).
11. After ware potato is stored, the next step is making sure the cleanliness of the storage system itself and areas surrounding to it. This helps to minimize the occurrences of pests and insects in the store.
12. Record all the costs associated with this session
13. Get feed-back from the participants about the session and the learning processes.
14. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

At this stage, it is important to note that the farmers should be able to differentiate between ware potato storage and seed potato storage. These two structures are very different in their designs. The seed potato storage is constructed in such a way that diffused light could enter into the storage. Moreover, the wall of the seed storage need not be pasted with a mud. The height of accumulation of seed potato tubers is also different from the height of accumulation of ware potato tubers. Hence, the facilitator should advise the farmers that the storage system that is constructed for ware potato should not be used for storage of seed potato.

Session 6. Monitoring and evaluation of stored ware potato

Introduction

At this stage, ware potato has been stored after creating awareness for the farmers on the different levels from participatory problem identification up to storage processes. After ware potato has been stored, there is a strong need to monitor its change over time in terms of weight loss, color change, taste and other characteristics. This stage is very important to decide and demonstrate for the farmers on the practical importance of the new ware potato storage systems. It also helps to determine the storage length of ware potato maintaining its qualities in terms of taste, color, weight and other important parameters. The farmers have to participate actively in the monitoring process and they have to take their own observations over time.

Objectives

1. To record the changes of stored ware potato over time in terms of taste, weight, color, rotting, sprouting, and other characteristics
2. To demonstrate storage mechanism for the farmers the storage length of ware potato maintaining its qualities for consumption, marketing and other uses.

Learning outcomes

- The changes of stored ware potato over time in terms of taste, weight, color and other characteristics will be monitored, evaluated and recorded
- The storage length of ware potato maintaining its qualities for consumption, marketing and other uses will be determined

Notes to the facilitator

The stored potato tuber can bring changes over time in terms various characteristics. This session is, therefore, a stage where the stored ware potato has to be monitored for its

changes in terms of weight, color, taste and other characteristics. Starting from the date of storage, periodic monitoring has to be conducted and the changes have to be recorded. In this processes, the active participation of the farmers is very important. The farmers need to be encouraged to record the changes observed over time on the stored ware potato. This stage ultimately helps to determine the storage length of ware potato maintaining its consumption, marketing and other qualities.

Time needed: 2 – 3 hours per evaluation day

Materials required: Note book, pencil, pen, markers, flat files, magnifying lens,

Steps

1. Revise the previous session,
2. Brief the days activity,
3. Use existing groups and let them discuss on the point that what changes they would like to see from the stored ware potato and the reasons behind this? What indicators are relevant to record these changes?
4. After group exercises, encourage the group representatives to present their group works. Activate a discussion among the group members after presentations.

- The frequency of monitoring will be monthly at the beginning and fortnightly towards later stages.

5. Following group exercises, the facilitator should present on the monitoring and evaluation techniques of the stored ware potato. Indicators to be observed during monitoring and means of measuring have to be discussed among the participants and there should be consensus on it.
6. Determine the frequency of monitoring the stored potato either on weekly or monthly basis. During monitoring the farmers have to observe closely any of the changes observed after a certain period of storage.
7. Market monitoring for price changes should also be conducted to determine at which time to dispose the stored potato before it gets spoiled and also to take better advantage of storage.
8. The involvement of women during monitoring of stored ware potato is crucial especially to monitor changes over time in terms of taste. During the date of monitoring, a sample of stored potato would be cooked and it needs to be tasted

by both women and men. The changes over time in terms taste would be recorded. Monitoring stage could stop at a stage where the stored ware potato is no more acceptable for consumption and marketing.

9. At the end of monitoring stage, general evaluation need to be conducted on the ware potato storage structure, its strengths, weaknesses and other values.
10. The costs incurred in this session need to be recorded
11. Get feed-back from the participants about the session and the learning processes.
12. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

Session 7: Cost – benefit analysis of improved ware potato storage

Introduction

Even though most of the materials required for the construction of improved ware potato are locally available, there is interest to show the costs and benefits of improved ware potato storage for the farmers. The farmers would like to quantify and evaluate a technology if it is incurring additional cost. They would like to compare a new technology with additional cost with their own traditional practice.

Objective

1. To estimate the costs required for the construction of improved ware potato storage
2. To assess the benefits acquired from the construction of improved potato storage

Learning outcomes

1. The costs required for the construction of improved ware potato storage will be known
2. The benefits acquired from the construction of improved storage

Time required: 2- 3 hours

Materials required: Flip charts, markers, notebooks, pencil and pen

Steps

1. Revise the previous session,
2. Brief the days activity,
3. The facilitator should present all the costs collected in the course of ware potato storage experiment. The facilitator should also present the short-term and long-term benefits of improved ware potato storage.
4. Use existing groups to discuss on the details of each cost and benefit and ask them to come-up with their own comments. The groups could discuss on whether the costs incurred are affordable or not, and also whether there are possibilities to

minimize the costs. The discussion could also focus on whether benefits obtained and expected in the future are satisfactory as compared to the costs spent or not.

5. Encourage the group representatives to present outputs of their group to other groups. Then activate a discussion among the group members. At the end of the discussion, it is expected that a decision will be made on the reasonability and affordability of the costs. Moreover, the short-term and long term benefits will also be understood.
6. Get feed-back from the participants about the session and the learning processes.
7. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

Session 8. Evaluation of FFS approach for the experiment on ware potato storage

Introduction

At the end of the learning process of ware potato storage using FFS approach, there is a strong need evaluate the approach itself. Since FFS approach is one of the different participatory approaches including FRG approach, evaluating its strengths and weakness is crucial at the final stage. If the approach is believed to be appropriate from the farmers point of view, it has to be scaled up for other enterprises by modifying according to the nature of the intervention. If there is also a need to modify the approach, a discussion can be activated how to re-design it in the future. Hence, the farmers have to be encouraged to evaluate the FFS approach taking into consideration of all the sessions from the beginning up to the end.

Objectives

1. To evaluate the FFS approach, its strengths and weaknesses
2. To discuss and suggest scaling up mechanisms of FFS approach into other enterprises
3. To discuss and design mechanisms of the school participants to share their knowledge and experiences gained from the school to their neighbors and other non-participant farmers

Learning outcomes

- The weaknesses and strengths of the FFS approach will be evaluated
- The scaling up mechanisms of the FFS approach into other enterprises will be suggested
- The mechanisms of sharing the knowledge and experiences of the school participants to neighboring and other farmers will be suggested

Notes to the facilitator

It should be noted that evaluating the weaknesses and strengths of the FFS approach is vital at the end of the sessions. At this stage, it is believed that the farmers do have knowledge and experiences of the FFS and its organization techniques. They would also have a realization that why FFS is needed and what are its differences as compared to learning in the class rooms. Hence, the weakness of the FFS could be corrected according to the local conditions and farmers' preferences while the strengths can be scaled up to other enterprise. It is, therefore, important to activate a discussion among the farmers to freely express their feelings on any aspects of the school.

Time needed: 2 – 3 hours

Materials required: Flip charts, papers, flat files, markers

Steps

1. Revise the previous session,
2. Brief the days activity,
3. The facilitator should briefly summarize and recapitulate all the sessions run so far and their major outputs
4. Explain the objectives and expectations of this session
5. Split the group into two sub-groups of equal size for exercises
6. For each of the sub-groups, let them discuss and come up with consensus on the following points:
    a. What are the weaknesses and strengths of FFS approach adopted so far on ware potato storage?
    b. Suggest scaling-up mechanisms of the strengths of the school to other enterprises
    c. Suggest appropriate measures to correct the weaknesses of the school
    d. Suggest the mechanisms of sharing knowledge and experiences of the school participants to neighboring and other farmers
    e. Are all your initial expectations met throughout all the sessions covered in this school?
7. After group discussions, encourage the representatives of the sub-group to present their group works to other sub-group. Activate a discussion after presentations and arrive at consensus on various cross-cutting issues.

8. The facilitator should present the summaries of all the previous sessions and the outcomes. Moreover, indicate the extent to which the participants expectations identified at the beginning of the session are met.
9. At this stage, calculate the total costs incurred in this school and activate a discussion on it whether the cost is reasonable or there is a need to minimize it.
10. Activate a discussion after the facilitator's presentation and arrive at consensus on various issues.
11. Get feed-back from the participants about the session and the learning processes.
12. Using the summary and closure exercise, wrap-up the session of the day by summarizing the main points discussed and consensus reached during the exercises.

Annex 1.

A questionnaire for
Quantification of the farmers' ware potato storage practices and associated problems

Name of the interviewer: _____

1. District of the study _____
2. PA of the study _____
3. Village of the study _____
4. Name of the farmer _____
5. Age of the farmer _____
6. Educational level of the farmer _____
7. Family size _____
8. Among the household members
    - how many of them are less than 7 years of age _____
    - how many of them aged 7 and above are able to read and write _____
    - how many of them aged 7 and above are not able read and write _____
9. Size of owned land (in timad) _____
10. Type of main house (Tin roofed / grass roofed) _____
11. Have you ever been a member of FFS so far in other crops?

    1. Yes 2. No

12. Livestock ownership:

Type of livestock owned	Number of crossbred owned	Number of local owned
Oxen		
Cows		
Heifers		
Bulls		
Calves		
Donkeys		
Horses		
Sheep		
Chicken		

13. Area of land allocated for potato production over years:

	1996		1995		1994		1993		1992	
	Belg	Kiremt	Belg	Kiremt	Belg	Kiremt	Belg	Kiremt	Belg	Kiremt
Area of land allocated for local potato (timad)										
Area of land allocated for improved potato (timad)										

14. Do you plant improved potato varieties? 1. Yes 2. No

15. If yes, when did you start planting improved potato varieties? _____

16. Are you still planting improved potato varieties?

1. Yes 2. No, I have discontinued

17. If you have discontinued, reasons _____

18. If you have never planted improved potato varieties yet, why? _____

19. How many potato varieties do you plant:

- Number of improved potato varieties _____
- Number of local potato varieties _____

20. Do you plant potato in the belg season? 1. Yes 2. No

21. If no, why _____

22. Do you plant potato during rainy season (kiremt)? 1. Yes 2. No

23. If no why? _____

24. How do you store improved potato varieties?

1. I store in improved ware potato storage
2. I store on the floor in the house
3. I store on shelf/bed in the house
4. I store in sacks
5. I just leave potato in the field/soil and harvest when the need arises
6. I store in corridors of the house
7. Any other storage mechanism (please specify)

25. How do you store local potato varieties?

1. I store in improved ware potato storage
2. I store on the floor in the house
3. I store on shelf/bed in the house
4. I store in sacks
5. I just leave potato in the field/soil and harvest when the need arises
6. I store in corridors of the house
7. Any other storage mechanism (please specify)

26. Among the storage systems you are using, which ones do you prefer?

1. Improved ware potato storage
2. Storing on the floor in the house
3. Storing on shelf/bed in the house
4. Storing in sacks
5. Storing/just leaving potato in the field/soil and harvest when the need arises
6. Storing in corridors of the house
7. Any other storage mechanism (please specify)

27. Have you constructed improved ware potato storage? 1. Yes 2. No

28. If yes, when did you construct it? _____

29. What is the capacity of the storage you constructed in quintals? _____

30. Why do you construct improved ware potato storage? _____

31. Who constructed ware potato storage for you?

    1. I constructed my self
    2. Holetta Research Center
    3. District Agricultural Office
    4. NGOs
    5. Others (please specify)

32. How much cost did you spend in constructing ware potato storage? _____

33. What are your comments on the constructed potato storage? _____

34. If you have not constructed improved potato storage, why?

    1. Because I am not aware of it
    2. Because I do not have storage problems
    3. Because I can not afford to construct new storage
    4. Because I do not have much potato product to be stored
    5. Any other reasons (please specify)

35. If you have not constructed improved potato storage so far, do you have plans to construct in the future? 1. Yes 2. No

36. If either yes or no, why? _____

37. How much yield could you get from one timad of improved potato varieties on average? _____

38. How much yield could you get from one timad of local potato on average in quintals? _____

39. Have you ever obtained training on improved potato production?

    1. Yes 2. No

40. If yes, how many times? _____

41. If you have received training so far, have you learnt about improved potato storage systems? 1. Yes 2. No

42. If you have received training, what do you learn specifically about improved potato storage systems? _____

43. Did you ever face storage losses of potato? 1. Yes 2. No

44. If yes, how many quintals of potato on average did you lose in storage? _____

45. After how many months of storage do you face storage losses? _____

46. What is the storage length of the following storage practices if you have ever used them?

Storage system	**For how many months can this storage system store potato before the potato gets spoiled?**
Storing in improved storage system	
Storing in sacks	
Storing on the floor in the house	
Storing in the corridor of the house	
Storing on bed/shelf in the house	
Leaving potato in the field/soil and harvesting it when the need arises	
Any other storage systems the farmer practiced (specify)	

47. What are the problems you faced related to storing of potato?

_____

_____

_____

========== ***Thank You*** ==========