

Preparing the rice field

Appropriate land preparation is one of the key determinants of rice yield in inland-valley lowland rice production systems. Timely land preparation is crucial to avoid delays in crop establishment and to enable decomposition of organic material, such as crop residues and weeds. Land-leveling facilitates water management, reduces weed germination and increases the efficiency of mineral fertilizers. This module mainly deals with technical aspects of land preparation (Reference 12). The various steps in land preparation (from initial removal of weeds to land-leveling) require at least three weeks. It is, therefore, usually not possible to evaluate all these stages in the field during a single PLAR-IRM session. Module 9 will discuss time-management aspects of land preparation. The present module enables farmers to share experiences in field preparation, but does not include either a field demonstration or an evaluation.

- ❶ Start a discussion of farmers' experiences in field preparation.
- ❷ Go deeper into the subject by discussing the following aspects: cleaning-up, pre-irrigation, first tillage, flooding, basal fertilization application, second tillage, leveling, drainage, etc.



Learning objectives

At the end of this module, farmers will:

- Be aware of the importance of appropriate land preparation to integrated rice management and rice yield.
- Know the most important steps to be taken to ensure adequate land preparation.



Procedure

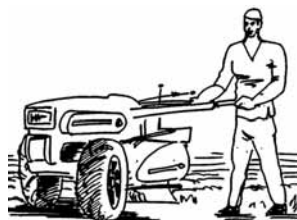
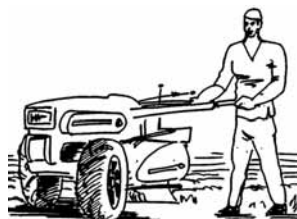
1. Farmers and the PLAR-IRM team meet at the PLAR-IRM Center. The facilitator briefly reviews the previous module and invites farmers' feedback.
2. One of the PLAR-IRM team members explains the learning objectives and procedures for the current module.
3. Discuss farmers' experiences in rice field preparation. The facilitator asks about any activities farmers carry out before sowing:
 - Which activities?
 - How are they implemented: timing and equipment used?
 - In what order?
4. The facilitator goes deeper into the subject by addressing the technical and practical aspects, the 'how,' time-management and 'objective' for carrying out the practices. Land preparation may include land-clearing, weeding, pre-irrigation, first and second plowing, and leveling.

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It is important to note that these are only options. Special attention must be given to differences between farmers. For instance, in undeveloped inland valleys, the option often chosen by farmers is zero-tillage—fields are cleared and flooded for one or two months before transplanting without plowing nor leveling. The following aspects of land preparation and their objectives can be discussed:

- Field clean-up: clear the field and place all tall vegetation on the bunds; cut and mix the smaller vegetation with crop residues and spread on the field.
- Pre-irrigation: the field is flooded during two to three days depending on soil type to:
 - soften the soil to facilitate tillage;
 - facilitate incorporation of crop residues and weeds;
 - kill or expel (chase away) insects that hide in the crop residues.
- First tillage to:
 - turn and loosen the soil;
 - incorporate rice straw and other plant residues to hasten their decomposition;
 - break-up soil clogs;
 - increase contact between soil and water.
- Flooding the field with about 10-cm layer of water for two to three weeks to:
 - kill insect pests that hide in weed and crop residues and in the soil;
 - decompose all plant residues;
 - allow weed seeds to germinate or rot.
- Application of basal organic fertilizers:
 - organic fertilizers: domestic waste, manure, compost.
- Second land preparation to:
 - turn the soil and mix with water;
 - distribute decomposed organic residues;
 - remove germinated seeds;
 - puddle the soil to make leveling easier and to prepare a good bed for transplanting.
- Land-leveling, i.e. moving soil from the higher portions of the field towards the lower portions of the field to achieve even flood-water depth in the whole field.



- Drainage and possibly basal fertilizer application:
 - basal mineral fertilizer: phosphorous or compound fertilizers (Module 10).
 - Transplanting seedlings or direct-seeding.
5. Evaluation: the facilitator asks what the farmers appreciated (or did not appreciate), what they learnt, and what they intend to do with their newly obtained knowledge.
 6. The facilitator asks volunteer farmers to conclude the session, and then invites farmers to the next session.



Time required

- Two hours



Materials required

- If a field demonstration is planned, a power-tiller or rake may be required for the different steps in land preparation.

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Box 7

Farmers and owners of power-tillers in the irrigated rice scheme of Lokakpli blame one another for the delays that are observed in land preparation. Farmers complained and accused the owners of the power-tillers of lack of cooperation. Power-tiller owners countered by saying that they refused to help many farmers because they did not settle debts accrued over the previous seasons. A report is given (below) of a meeting held between power-tiller owners and farmers of Lokakpli to illustrate this type of problem, which is relatively frequent, and the need to find workable solutions for both sides. Objectives of the meeting held in Lokakpli were to find solutions to the land-preparation issue raised by the two parties and improve the understanding between farmers and owners of power-tillers. The meeting also aimed at creating an organizational structure capable of resolving this type of problem in the future. The meeting started with each party telling its side of the story.

Issues emphasized by farmers

- Machine owners do not respect the tillage schedule or the terms of the agreement, and do not have a set work-plan or schedule for operating their machines. They may stop preparing a rice field to give priority to those who pay more or pay cash.
- Some farmers think that the number of power-tillers available (five) is too few for the size of the irrigation scheme (about 120 ha); they emphasized the lack of cooperation and coordination among machine owners and users.

Issues emphasized by machine owners

- Many farmers do not pay their debts accrued over the previous seasons.
- Many of their machines are old (17-years old for some) and due for replacement, but they cannot afford to replace them and, if farmers do not pay on time, the owners do not have enough cash to buy spare parts.
- The prices of fuel oil and spare parts have increased over the last year, but their fees per hectare did not change.
- Good mechanics for the machines are scarce and some spare parts cannot be found on the local market.

Possible solutions: Suggestions by machine owners

- The tillage fee per hectare should be raised from CFA 72,000 to CFA 80,000 with an advance of CFA 50,000.
- After the first land preparation, farmers should be obliged to flood their fields before the second land tillage.
- Farmers should not set up their nursery in the middle of their plot, because it obstructs the field-preparation work. Farmers should inform machine operators that they want a second field preparation at least three days before transplanting.
- Farmers should strive to clean up their fields of any weeds before requesting land tillage.

Farmers' response

- Farmers said that the 'perimeter' development project started badly. The coordinating agency, *Projet riz centre* (PRC), put farmers in debt from the beginning. They said that PRC charged up-front costs for initial land preparation, which many farmers are still repaying. For them, it is difficult to repay all debts at the same time.
- They added that in late 1999, the tillage costs per hectare was CFA 60,000, but that in 2000, the price increased up to CFA 72,000, which they consider too high. They finally accepted to pay that fee during the past year, hoping to receive a better service, but they were disappointed because instead of improvement, the machine owners have made things worse. They said that the amount of CFA 80,000 currently suggested is very high. (Owners explained that the costs of fuel, oil and spare parts had also increased.)

Tremendous efforts were made to help both parties agree and find an acceptable solution. Farmers finally agreed to pay CFA 80,000 for tillage (an amount suggested by machine owners), but only provided that the machine owners comply with their work schedule. The amount must be paid as follows: CFA 50,000 as an advance and the remainder at harvest. This means that the advance payment is CFA 25,000 for 0.5 ha and CFA 12,500 for 0.25 ha. The PLAR-IRM team suggested that the farmers set up a liaison committee to manage issues like this one. This committee will be responsible for (1) collecting money from farmers who want their fields to be tilled, (2) discussing with machine operators, (3) planning work according to the advance payments received, and (4) ensuring that work is conducted adequately. Users (farmers) did not agree to set up such a committee because there are already several groups. Then, the suggestion was made for owners to set up a committee in order to better manage operations. It was agreed that the work and the money representing advance payments would be split among owners. Each power-tiller will be used for one block of fields before moving onto the next block, i.e. each block will have one power-tiller dedicated to it and that block will be completed before the power-tiller is moved to another block, rather than power-tillers being moved around the blocks and fields in an ad-hoc fashion. Then, a few farmers were chosen to represent the users of machines in a larger committee in charge of defining the terms of agreement between owners and users, with the support of the PLAR-IRM team.