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Smart-valleys

Trainer-facilitator's Manual

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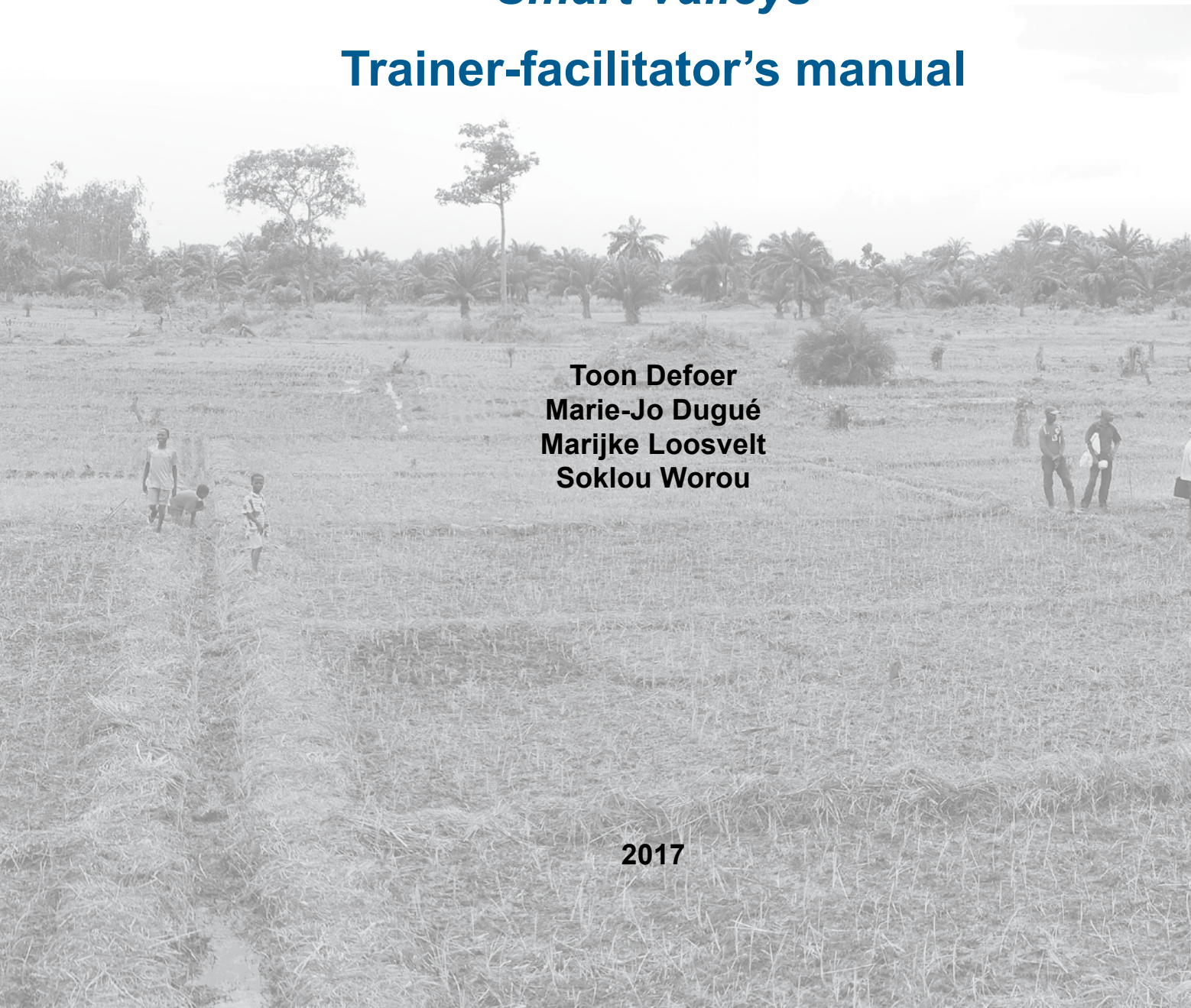
Smart-valleys

Trainer-facilitator's manual



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Smart-valleys
Trainer-facilitator's[1] manual

What is *Smart-valleys* ?

Smart-valleys is an approach for developing lowlands for rice-production systems in sub-saharan Africa, based on a participatory, sustainable and low-cost approach. *Smart-valleys* was developed by Africa Rice Center (AfricaRice) and its national research and development partners in Benin and Togo.

Compared with the traditional approaches, which are costly, due to the topographical studies and high investments on water management infrastructure, *Smart-valleys* lowland developments are cheap and sustainable, because they are developed and constructed by the farmers themselves.

The *Smart-valleys* approach follows a step-by-step method, based on exploration, prospection, validation, design, development of the land-use management plan and the construction of water management infrastructures after selecting the sites on the basis of socioeconomic and biophysical factors and by making use of the farmers' knowledge. The entire *Smart-valleys* approach is developed in the film "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa".

The *Smart-valleys* approach starts with a ***selection phase***, which begins with an *exploration* of the project/program zone in order to pre-select the sites that are suitable for the approach. Then comes the *identification/prospection* of the lowland sites with rice-production potential and this leads to the validation and final selection of the site. Technicians, farmers and leaders within the locality undertake field prospection. If the site is considered appropriate, it goes into the ***development phase***, which begins with meetings to get the farmers to organize themselves and engage in a collective development of the lowland. Thereafter comes the clearing, leaving valuable trees untouched. After that, the farmers and technicians together explore the lowland in order to capture the farmers' knowledge and experience relating to the flow, runoff and retention of surface water.

These data enable the design of an initial lowland development plan, which will subsequently be reviewed and amended by the farmers. This plan comprises the water intake, the layout of the canals and bunds, which should considerably improve water retention and drainage of excessive water from the lowland.

The actual development of the land starts with the physical construction of the key elements in the plan, by using pegs of different colors: red for bunds bordering the site to be developed, blue for the main canals. Green is used for secondary bunds; green and blue combined for secondary canals that will enable more accurate management of water on the plots. The farmers learn to interpret the plan and transpose it onto the lowland by placing pegs of different colors at the right places.

1. In the manual, the terms "trainer-facilitator", "facilitator" and "trainer" mean the same thing.

The real work has only just started: digging the canals and constructing bunds by raising the soil. Guided by the colored pegs, the farmers construct different types of canals, bunds around the plots, and small protective structures against erosion. Simple structures to divert water from a natural source towards the thirsty rice fields when necessary, also improve the entire setup. Finally, the plots of land are levelled, and the plots with sharp slopes are divided into smaller plots to ensure more accurate water management.

But the work is not finished, because like any infrastructure, *Smart-valleys* land-use management also requires maintenance and adaptations. Besides, in the *Smart-valleys* approach, the idea is to develop the lowland little by little and learn, adapt and innovate by doing; it is learning by doing. We then move into the ***phase of managing the developed lowland***. Experience has shown that adequate water management is a critical condition for the farmers to successfully invest in improving rice-farming management practices, such as weeding and timely application of fertilizer.

Who is this manual for?

In order to popularize the *Smart-valleys* approach, it is necessary to train a large number of technician-facilitators[2] affiliated to institutions, programs and projects for the development of lowlands. This training should necessarily comprise theoretical and practical aspects and cover the various phases and stages of the approach. Besides, this training should comprise several "cycles", linked to the phases of the approach.

Each cycle comprises:

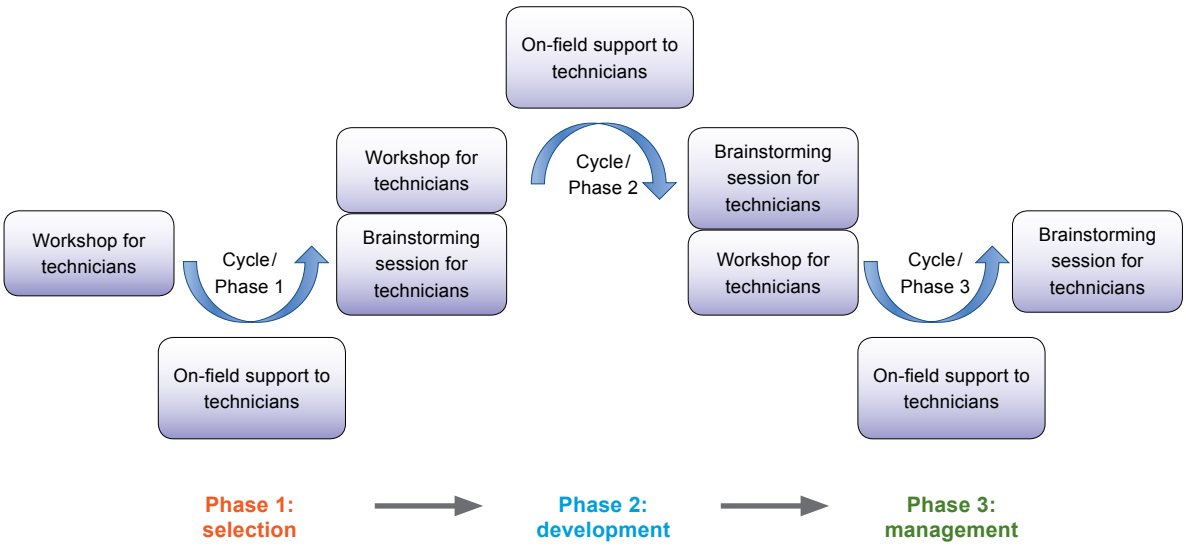
- a training workshop (theoretical-practical) for all the technicians involved
- coaching for the technicians when applying the modules on their respective fields
- a brainstorming-revision session for all the technicians.

In practice, *Smart-valleys* training therefore involves three training cycles, each of them lasting several months and corresponding to the major phases of the approach: ***Cycle 1*** comprising the modules of Phase 1; ***Cycle 2*** the modules of Phase 2, and ***Cycle 3*** for the modules of Phase 3.

The manual is made up of modules, which are to be used by the trainer-facilitator during the training of the technician-facilitators who are in the position to facilitate the *Smart-valleys* development process on the ground. The manual is therefore, first of all, meant for the trainer-facilitators interacting with the technicians during the training workshop. These training workshops, and consequently the accompanying modules, are based on the *principle of training by discovery and by action-training*. Thus, each workshop (and therefore each module or group of modules) comprises a component during which the learners (technicians) discover and learn the basic principles (often indoors) and test-apply the approach in a real situation. Subsequently, at the second stage of the training, they themselves apply the approach to their own land, with coaching from the trainer-facilitator. Even though the modules are first of all designed for use by the trainer-facilitators to facilitate the training workshops, they will

2. The terms "technician" and "technician-facilitator" mean the same thing.

also be useful to the technicians in their interaction with the villagers/farmers, when the modules are being applied on the field. It is indeed through learning by doing, while working with the farmers, that the technicians can capture the farmer's knowledge and adapt the *Smart-valleys* approach to the specific conditions of each site.



The approach on which the manual is based, comprises 3 phases and 20 modules:

- Phase 1: Lowlands selection phase (Modules 1 to 10)
- Phase 2: Lowlands development phase (Modules 11 to 17)
- Phase 3: Developed lowlands management phase (Modules 18 to 20).

Each module is structured the same way and comprises 4 sections:

- an introduction which presents the topic to be treated and explains the rationale of the module
- the learning objectives which indicate the change in skills expected from technicians who follow the module
- the procedure, which describes stage by stage the process involved in conducting the workshop and therefore the use of the module
- the materials required and the possible supplementary documentation.

It is important to emphasize the fact that the modules are based on adult pedagogy, while making use of the knowledge and experiences of the workshop participants. It is therefore not a technical manual which explains from A to Z the *Smart-valleys* principles and techniques for selecting, developing and

maintaining a lowland. The manual and the modules are rather *a basis for initiation and interactive discovery, through action, of the principles and practices* involved in implementation of a *Smart-valleys* type of development.

This manual will help the trainer-facilitator, in collaboration with the technicians, to introduce the *Smart-valleys* approach in a participatory, interactive, reflective and practical way, spread over a period of time.

This manual is supported by the film "SMART-valleys – Developing inland valleys for rice-based systems in sub-saharan Africa".

The *Smart-valleys* approach was developed by experts of the Africa Rice Center in collaboration with the Lowlands Division of the Ministry of Agriculture, Livestock and Fisheries in Benin and the Togolese Institute for Agricultural Research (ITRA).

The Smart-IV project is funded by the Japanese Ministry of Agriculture, Fisheries and Forestry.

Phase 1

Selection of lowlands for *Smart-valleys* development

Selection of lowlands for *Smart-valleys* development

The lowland selection process occupies a quite significant position in the *Smart-valleys* approach. Indeed, even though the *Smart-valleys* approach is relatively simple, compared with the traditional approaches characterized by long costly studies, it is not an intervention that is carried out blindly. On the contrary, considering the fact that the approach requires full participation of the people, it is important to scrupulously determine if the conditions are actually favourable to *Smart-valleys* type of development and if the people are actually ready to fully commit themselves. This is how the chances of success are increased. To succeed in the selection process, there is the need for a team of technicians who are trained in the *Smart-valleys* approach and who understand the environment of the sites in terms of their biophysical, socioeconomic and land-related characteristics.

The selection phase comprises10 modules grouped into 3 parts:

- Part 1: Exploration
- Part 2: Identification/prospection
- Part 3: Validation.

The first part, called exploration, has as its main objective the short-listing of a (limited) number of lowland sites which have the (mainly biophysical) potential to be considered for a closer study, and which will then qualify for **the second part, called identification/prospection**. The identification/prospection, which involves the collection of information on the biophysical, socioeconomic and land-ownership conditions, will enable the technicians to confirm (or refute) the suitability of the lowland for the *Smart-valleys* type of development. However, the selection process does not stop there. Indeed, the lowland, which has gone through parts 1 and 2 of the selection process, will qualify for **the third part, called validation**. Before actually confirming the appropriateness of the choice of a site, it is necessary to verify whether the people are fully committed to the *Smart-valleys* development adventure. With all this information, the technical team is in a position to prepare a report, which will be submitted for approval (or not) by the project/program coordinator.

Part 1: Exploration

Exploration comprises five modules:

Module 1 enables the technicians to assess and present the overall context of lowland development and analyse and interpret the various issues involved in developing lowlands. This module leads to the identification of a list of lowlands to be explored in detail on the basis of their potential advantages while avoiding lowlands with too many (possible) disadvantages or challenges.

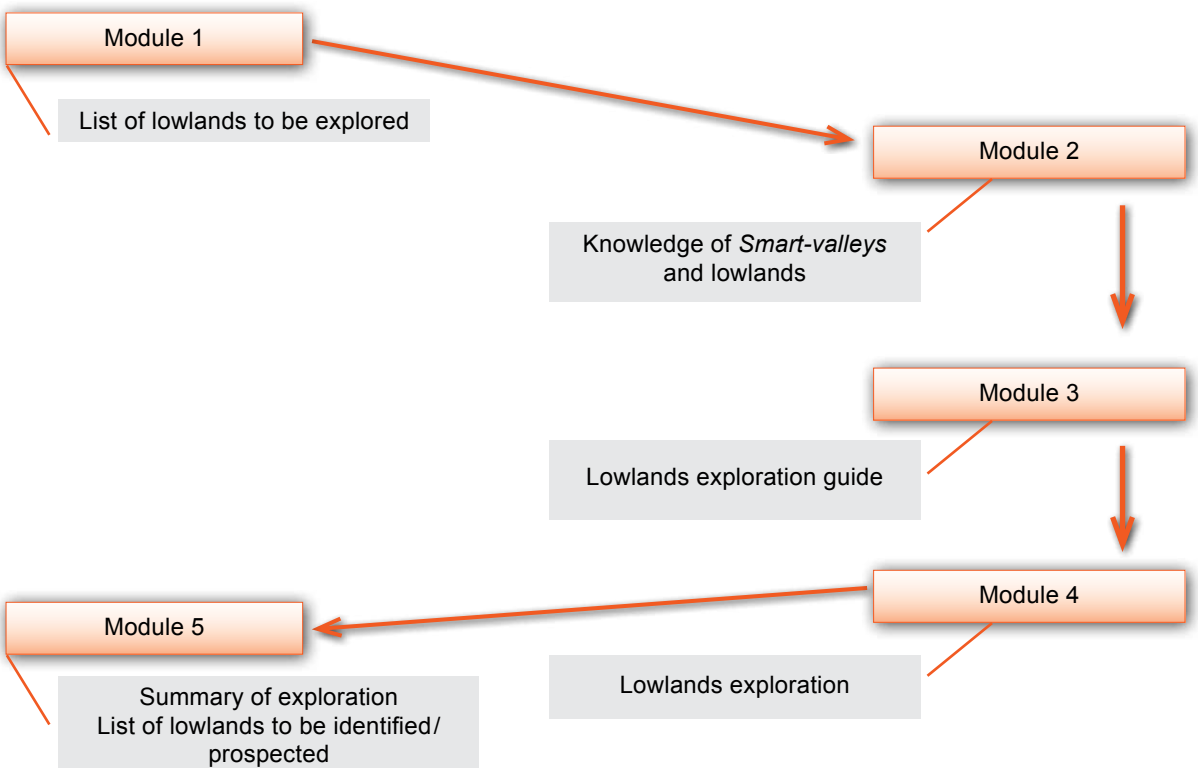
Module 2 introduces the major outline of the *Smart-valleys* approach and contributes to consolidating the basic knowledge concerning, in particular, the factors influencing the functioning of the lowlands.

Modules 3, 4 and 5 correspond to the three exploratory stages of the lowland.

Module 3 enables to prepare for the field exploration and guides the technicians in the identification of a transect to be explored in the lowland to collect the information required for the exploration of this lowland and for establishing the list of biophysical and socioeconomic characteristics that would enable the actual exploration of this lowland.

Module 4 goes together with Module 3 and presents what is required for exploring the lowland short-listed by going through the transect. It also presents a brief discussion with some villagers/farmers in the lowland, with the view to obtaining supplementary information.

Module 5 is the accomplishment of the exploratory phase and guides the technicians to do a summary of the information collected in the field. The technician subsequently prepares a list of lowlands shortlisted for the identification/prospection phase.



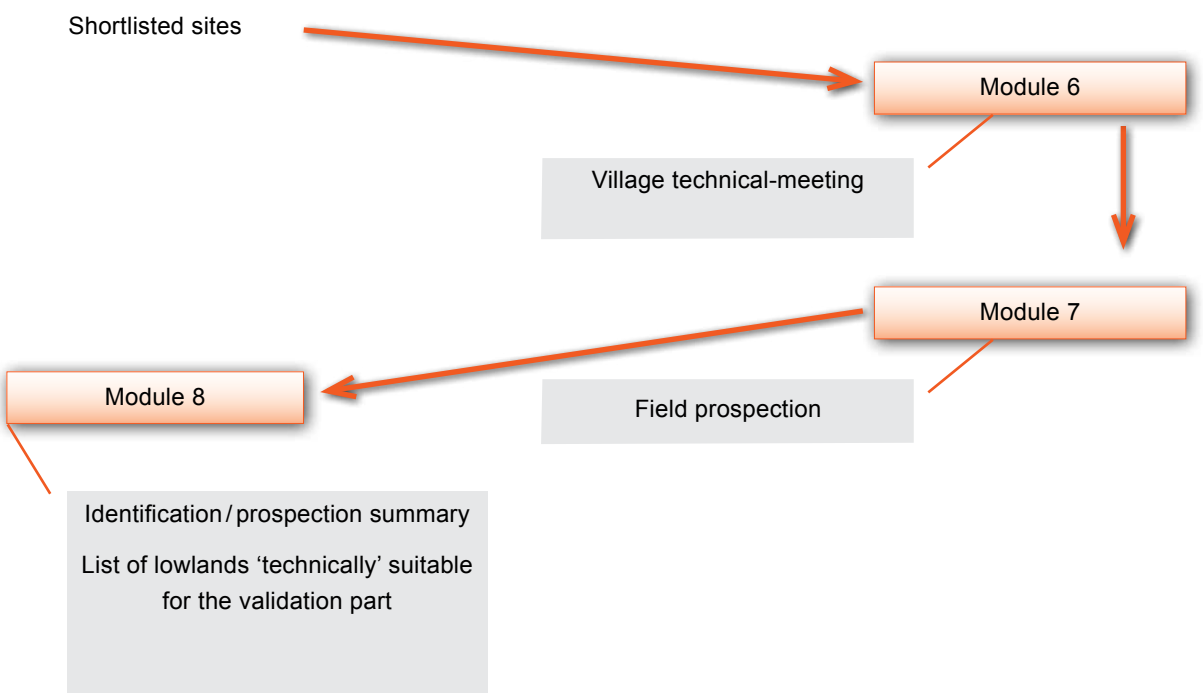
Part 2: Identification/prospection

Identification/prospection comprises three modules, which, like Modules 3-4-5 are inseparable:

Module 6 enables one to prepare and facilitate a village meeting at each of the short-listed sites in the exploration part. This village meeting, mainly for the lowland farmers, involves collecting relevant information/data on the biophysical, socioeconomic and land-ownership characteristics of the site and having an initial idea about how interested the people are in joining the *Smart-valleys* program.

Module 7 is based on a prospection of the lowland together with the farmers. The aim is to supplement, verify and confirm (or refute) the information obtained during the village meeting.

Module 8 guides the technicians to do a summary of the information collected during the village meeting and the field prospection, and this will lead to the identification of the sites that will be considered for the last part of the selection, that is, the validation part.

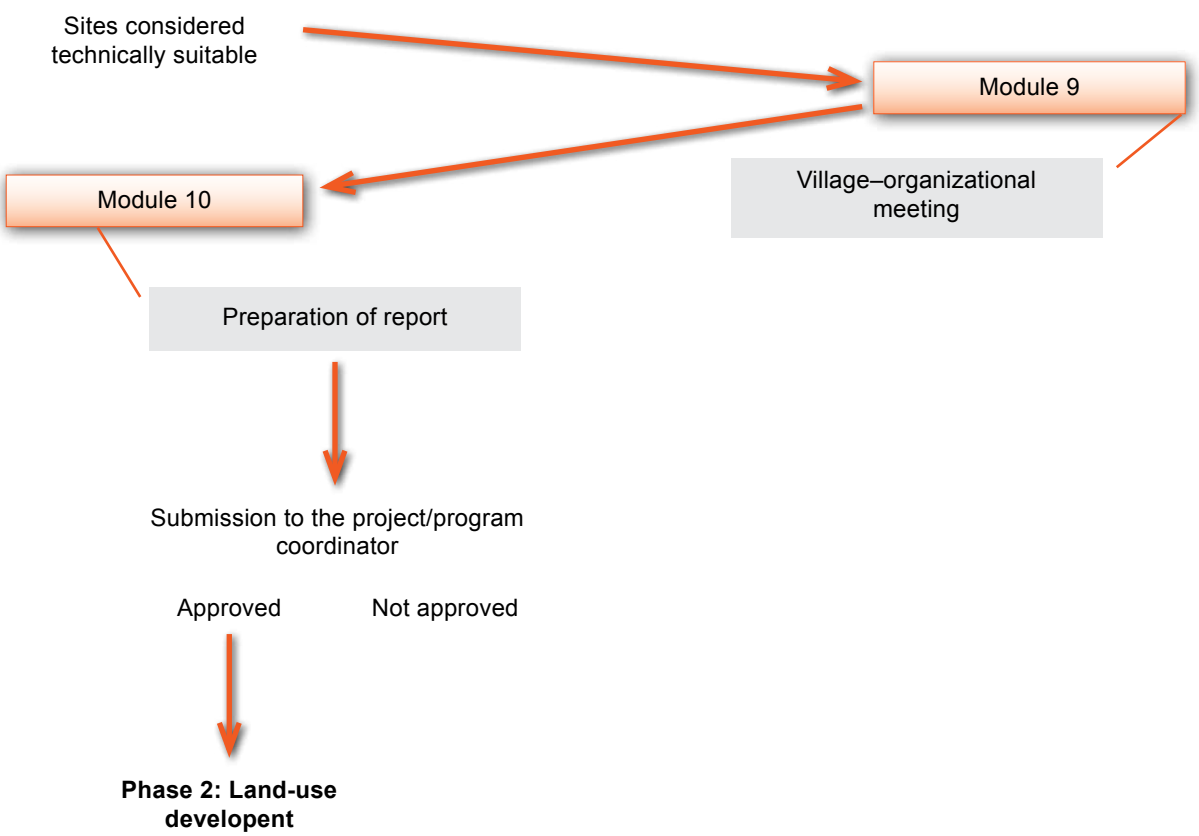


Part 3: Validation

Validation comprises two modules:

Module 9 focuses on the meeting with the villagers (including all the socio-professional organizations) for the sites that passed the identification/prospection test. The aim of this meeting is to determine if the site – from the organizational point of view – is suitable for development, and if the community really wants to contribute to implementation of a possible development project. In case the result is favourable, the villagers indicate the nature of their commitments.

Module 10 represents the "grand finale" of the selection process by the technicians. Indeed, where the site has gone through various selection tests (exploration, identification/prospection and validation), a report is filed and presented to the project/program coordinator for approval. It is then left to the coordinator to approve it or not.



Annexe

A simple and participatory approach to lowland development

The people and the lowland

Farmers usually have a good knowledge of their farmland. They know the different types of soils and their various uses as well as the challenges related to their development. In this description of the farmland, special emphasis is placed on the lowlands. The people are required to define, in their own way, what a lowland is and to highlight its specific characteristics with regard to other types of soil. If these agro-systems are highly valued in the locality, the farmers should give reasons; mention the cultural practices and the crops grown. They should also highlight the challenges related to their development. In case the lowlands are not at all or not much used, the reasons for this should be mentioned. There may be all sorts of reasons for not using these lowlands: the people's ignorance, cultural taboos or availability of uplands which are easier to cultivate, etc. In case it is the farmers' ignorance while little upland is available, then the approach could be tested, with participation of the beneficiaries.

The people's interest and their participation

In the zones where the lowlands are traditionally very much used, it is clear that the people are interested. Elsewhere, there will be the need for innovation; and sensitization is vital. This sensitization should focus on the contribution of the lowland development to food security. Many will be sceptical at the beginning, especially because the areas involved are not easy to develop. The best strategy in this case is to succeed in convincing the opinion leaders, that is, the village chiefs, chairpersons of village development committees and some farmers with the view to starting the development on small plots as a test or pilot operation. In this case, any assurance that the people will buy into it will depend on the fact that the pressure on the uplands is becoming stronger and stronger leading to their low productivity while the lowlands are not or hardly cultivated. Elsewhere, where the uplands are still available, the message will hardly be heard. The strategy will consist in a pilot operation. The results and the balance of the income account from the lowland development compared to the results from the upland, will later determine whether the people will be interested or not in these agro-systems.

Identification of appropriate zones for *Smart-valleys* development

It is important for trainer-facilitators and technicians to note that there have been some activities prior to the actual training. They should know the major zones that have been identified by the officers (coordinators) of the program or project, as well as the identification criteria. This module will help determine the lowlands to be explored. In this regard, it is necessary to know the issues related to the exploitation/utilization of the lowlands.

Learning objectives

At the end of this module, the technicians will be able to:

- assess and present the overall background to the development of the lowlands in the country and in the activity areas of the program/project they belong to
- analyse and interpret the various issues concerning the development of the lowlands
- assess the choice of the major areas for development, identified by the program/project
- specify the lowlands that are to be explored to a greater extent.

Procedure

1. The facilitator presents the background and objectives of the module, as well as the outline for applying it.
2. The facilitator then revisits the overall context of the commitment of the program or project to develop the lowlands. Through interactive discussions, the facilitator develops the following topics/aspects:
   - the importance of rice and its development in Africa, the sub-region, the country and some other areas in relation to other crops: consumption, production, importation
   - where is rice produced? There are three major rice production systems: irrigated rice, lowland rice (alluvial plains – see Module 2) and rain-fed rice (upland or plateau):
     - ◊ relative importance (%)
     - ◊ advantages/disadvantages of the various systems
     - ◊ yields, etc.
   - national policy (and that of the project/program) on rice production and preferably with regard to the various systems; comparison between the irrigated systems and the lowland systems, in terms of:
     - ◊ time and cost of initial investment
     - ◊ maintenance of facilities
     - ◊ people's participation, etc.

- the major localities with lowlands in the country or in the zone covered by the project/ program
- the other uses (other than rice farming) of lowlands and their importance for:
  - ◊ other crops (market gardening, …)
  - ◊ livestock breeding
  - ◊ fishing
  - ◊ supply of household water
  - ◊ molding of bricks
  - ◊ maintenance of biodiversity, agro-ecological diversity and sustainability, etc.

3. The facilitator then organizes a "role play", which is meant to enable the technician-participants to "discover" by themselves critical issues related to the exploitation/utilization of lowlands.
   - The participants are divided into subgroups, representing typical users of lowlands: landowners, female rice farmers, male rice farmers, livestock breeders, women (and/or the young) involved in market gardening, fisherfolk, "protectors of nature". One or two observers are also present.

Notes for the facilitator

Collect, if possible, information with figures on:

- trends in production, consumption, imports
- national policy on rice production, land-use planning, … and projects/programs towards the implementation of this policy
- the major lowlands of the country in general and particularly of the region covered by the project/program to which you belong or to which the technicians belong.

In most of the countries, rice consumption increased substantially, more than that of other cereals, especially in urban areas. However, the national production is not able to cover the local demand and therefore rice imports often cover more than half of the consumption needs. Many recovery projects and programs have been initiated by States with external support in order to limit the nation's dependency on imports. Multiple projects have not always produced the expected results because most of them are not actually implemented on the ground two or more years after they are launched, due to long procedures required by donors and also sometimes due to the non-availability of staff.

"Traditional" land-use planning is such that it has little room for the involvement of the local people (future users and producers) in the studies/analysis, designs/plans and implementation of the projects. This planning often consists of hydrological and soil surveys undertaken by specialists form outside, followed by land-use and development plans designed by other specialists with, as much as possible, provision made for controlled irrigation through canals and other constructions made of concrete. It is obvious that the users usually have no knowledge at all of the proper operation, the social organization of the irrigation system and the maintenance works required by all these infrastructures. Consequently, in most cases, this kind of investment results in failure, and the infrastructures, which are half (or more) dilapidated, stand as "past witnesses".

- Each subgroup of stakeholders has 10 minutes to organize itself and prepare a detailed line of arguments/defence. There is one facilitator of the discussion (who represents the extension officer or the local NGO).
- The discussion itself takes 30 minutes (see box: Role play – critical issues in the utilization of lowlands, page 14).
- Presentation of the outline for conducting the role play by observers, followed by a general discussion on the quality of the discussions.

4. The facilitator makes a kind of summary of the aspects to be considered in the identification of areas to be developed; he does so interactively with questions and answers.
   - The lowlands will also be subject to various interests, sometimes contradictory, depending on the concerns of each stakeholder. They are of critical importance and a source of conflict (see the film *Sinima-sinima*).
   - Apart form agricultural use and specifically their rice-farming potential, the lowlands play several roles, namely:
     - ◊ collect rain water and regulate flooding
     - ◊ source of biological, plant and animal biodiversity
     - ◊ farmlands for women: indeed these lands are often given to women, either because the exposed lands are not available for them or because the women have reached an age which makes them free from any commitment towards the men. In some places, the natives reserve the lowlands for immigrant groups because they are more difficult to till. Note that with these land developments, it is often observed that in these cases women or immigrant groups are obliged to leave the lowlands … it is important to take note of this risk and to discuss it with the villagers
     - ◊ sacred places where some rites are performed; the land surrounding lowlands is often the home of some shrines
     - ◊ areas for pasture and watering of animals. Conflicts between farmers and breeders are frequent because the animals searching for pasture cause significant damage to crops, particularly during the dry season. The most significant damage and the major conflicts are caused by migrating animals; particularly cattle. Those undertaking off-season market gardening in these livestock breeding areas are obliged to fence the farmlands
     - ◊ areas with water reserves for drinking, watering off-season market garden crops
     - ◊ possibility for making bricks.
   - From the agricultural point of view, and in order to ensure production and guarantee a successful farming season, the people will be more and more interested in the lowlands:
     - ◊ especially in areas of high population density where uplands are more and more rare

Exercise

Role play – critical issues in the use of lowlands

Topic for debate: an NGO has contacted the village elders for a proposal to develop the lowlands. The villagers meet to discuss.

Depending on the number, the participants are divided up into 5 or 6 subgroups:

- landowners
- female rice farmers
- livestock breeders
- the young in market gardening
- "nature advocates".

There is also 1 facilitator of the session and 1 or 2 observers-rapporteurs.

Each group prepares its line of arguments.

The session lasts 30 minutes, led by the facilitator. The 2 observers take notes.

Presentation by the observers, followed by discussions

Notes for the facilitator

In case the groups (or some groups) have no ideas, they may be provided with the following cues:

- landowners: they quite agree, but do not want to make the investment themselves; and of course they see the value of their land increasing. Some already think of renting, or even selling their lands
- female rice producers: they are willing to produce more rice and harnessing water resources would be a welcome idea, but they are afraid that with such development the men will take over the lowlands and will not allow the women to produce rice
- livestock breeders are afraid that in future their animals would no longer have access to the lowlands where they will need water, particularly in the dry season; otherwise there will be the need to envisage some places to water their animals
- the young market gardeners: they also realize that the land development will reduce their access to the lowlands and their resources during the dry season, because rice generally stays longer on the farmland; undertaking market gardening would be done with much delay, with all the problems of food security, and will take a toll on the small savings by the young, through their sale of vegetables … problems of unemployment and exodus …
- nature advocates are against any land development because that will destroy the role of the lowland ecology; and against rice monoculture, with the possibility of two rice farming seasons per year, which will destroy biodiversity, not forgetting the risk of destroying all the hydrodynamic regimes …

If the arguments developed by the groups (some groups) are very different from those proposed here, and if time permits, the facilitator can propose for discussion, at the end of the exercise, the relevance of the above arguments.

- ◊ easily accessible lowlands will be used much more
- ◊ to have several farming seasons in the year and particularly to diversify production, where possible, depending on the hydrodynamic regimes of the water table, since all the lowlands are not suitable for this type of development
- ◊ by diversifying the crops, the producers guarantee their food security and somehow improve their food intake, of course on condition they consume what they produce
- ◊ improves income levels through the sale of their produce, e.g. for women and the youth, and consequently reduces unemployment
- ◊ the utilization of the lowlands will bring about the emergence of other sectors of activity (sellers of products used for processing, traders in lowland products etc.).

- Critical socioeconomic issues of varying importance depending on the interest shown in the lowlands. This interest varies according to a number of parameters, namely:
  - ◊ the hydrodynamic regime: more or less prolonged availability of water in the ground (water management) leading to production security, particularly of food crops
  - ◊ pressure on dewatered lands: this pressure, if it is strong, will lead to the physical degradation of the soil, loss of fertility, hence significant decrease in yields and a search for other farmlands
  - ◊ climatic variations: dry weather, flooding, change of rainfall pattern, etc. bring about uncertainties in the success of the farming seasons.

- Many factors will therefore influence the development of the lowlands, namely:
  - ◊ population density
  - ◊ accessibility in all seasons
  - ◊ rainfall pattern
  - ◊ hydrodynamic regimes of the water table
  - ◊ water control and management
  - ◊ land pressure
  - ◊ role of women in agriculture
  - ◊ practice or not of livestock breeding in the area
  - ◊ farming cycle of upland crops
  - ◊ presence or not of cash crops
  - ◊ availability of farmlands on the plateau areas
  - ◊ social cohesion and organization
  - ◊ eating habits, etc.

5. After this summary on the critical issues to be taken into account during the identification of lowlands for possible development, the facilitator presents the zones identified by the leaders,

as well as the rather more positive issues (or strong points) and the issues that will require special attention during exploration (Module 3). This information may be presented in the form of a matrix.

In practice, the facilitator together with the project coordinator will get information from the local authorities, NGOs and decentralized agencies in charge of agriculture and rural engineering, in order to find out if other development initiatives are on-going or planned. If that is the case, it could result in possible complementarity, if the intervention methods are not contradictory.

Zone	Number of lowlands	Agro-economic issues[1]	Other issues[1]	Observations

1: Indicate if it is rather a "positive" advantage or issue or otherwise a challenge (or concern) or a "risky" issue that will require special attention during a more detailed identification process (see Module 3).

6. The module ends with the provisional identification of lowlands to be explored. Depending on the extent of the program/project activity area, a provisional identification is undertaken of 10 to 15 lowlands to be explored in detail (see Modules 3 and 4). This identification is based on the matrix characterizing lowlands (see point 5), while identifying those that have maximum advantages (positives issues) and minimum constraints (negative issues).

Materials required and supplementary documentation

- The film *Sinima-sinima*.
- A video projector.

Note for the facilitator

The facilitator should ensure that he or she has the required information from these leaders about the program/project activity areas. It is essential to have other maps of these zones with as much biophysical details as possible, with which it would be possible to identify the various lowlands to be considered. He or she will also get information from local authorities, NGOs in agriculture or rural engineering in order to know about the possible complementary development initiatives or activities in the lowlands.

Any information concerning agricultural or non-agricultural issues, as presented above, should be gathered.

General background of the *Smart-valleys* approach and basic knowledge about lowlands

Before undertaking an in-depth exploration of the designated lowlands (see Module 1), the general background and basic principles of the *Smart-valleys* approach are presented as well as the basic knowledge about lowlands which the technicians should have before they start using the approach. Indeed, for now it is not a detailed lesson on the approach or on the lowlands, but rather, it is about knowledge that is essential for the proper exploration of the lowlands (Modules 3 and 4).

Learning objectives

At the end of this module, the technicians will be capable of:

- defining and describing the basic principles and general outline of the *Smart-valleys* approach
- interpreting the position of a lowland within its geographical setting
- summarize the basic principles about the operation of lowlands
- interpret the principal factors influencing the operation of lowlands.

Procedure

1. The facilitator presents the background and objectives of the module, as well as the main outlines for its application.

2. The facilitator organizes a “round table” in order to have an overview of the concrete/live experiences of participants in the area of participatory approach to development.

3. Then the facilitator presents the basic principles of the *Smart-valleys* approach on flipchart. These principles are as follows:
   - active participation of the villagers/producers in the various phases and stages of the approach: identification/prospection, development, management/maintenance
   - accountability of the people; the technician supports but is not accountable
   - capacity building of stakeholders in the various aspects of the development process and management/maintenance of these developments
   - rapid results; indeed there is no need for long studies of the hydro-morphological and soil characteristics
   - learning by doing
   - graded and progressive development over time
   - low costs due to simple infrastructure, mainly to be implemented by the people themselves
   - sustainable results, because of a good level of understanding, since the works and maintenance, which are monitored are undertaken by the people themselves.

The facilitator then provides the general outline of the approach, classified into phases and parts, by using the diagram presented in the introductory part of this manual.

- **Phase 1**: Selection de lowlands
  - ◊ Part 1: Exploration
  - ◊ Part 2: Identification/prospection
  - ◊ Part 3: Validation and gathering of information for final selection
- **Phase 2**: Development
  - ◊ sensitization/organization of communal labor
  - ◊ clearing
  - ◊ participatory planning – land – provisional development plan – verification/ amendments
  - ◊ finalization of the plan
  - ◊ construction/pegging: belt, central and lateral bunds/canals, secondary bunds/canals, special works
  - ◊ demonstration of communal works
  - ◊ development of the plots
- **Phase 3**: Management/maintenance – revision and leveraging
  - ◊ improved management practice of lowlands
  - ◊ observations and (technical) analysis of the operation
  - ◊ revision and leveraging of the *Smart-valleys* experience.

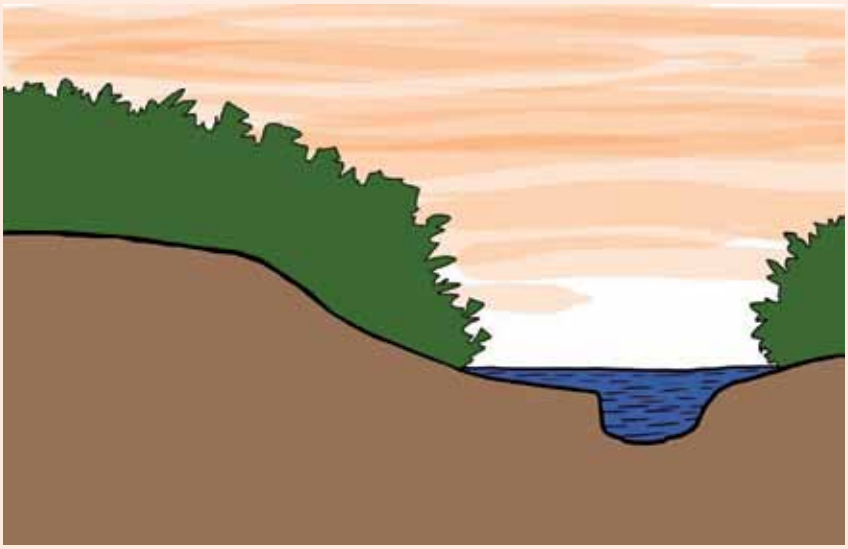
After the presentation led by the facilitator, the participants will ask questions for purposes of clarification.

The section on the approach is concluded by showing the clip and/or the last part of the film "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa".

4. To introduce some basic notions on lowlands, the facilitator illustrates this session of the module with a diagram (see box on Notes for the facilitator) or a picture of a lowland. Then:
   - he asks participants to pair up and define with some key words what they understand by "lowland"
   - the pairs then present their results in plenary, followed by a discussion leading to a consensus on what characterizes a lowland
   - then the facilitator "completes" the diagram by identifying the borders of the zones based on the toposequence, and with an indication of the position of the water table (see second diagram in the box)

Notes for the facilitator

The following diagram could be used, with the only explanation that the line represents the border between ground (below the line) and vegetation and air (above the line) or water and WITHOUT any other descriptions or indications.



Ensure that the following characteristics come out from the discussion:

✓ The lower part of a landscape, … in the toposequence and the water regime

– the lower part (with flat or slightly concave bottom) of the valley

– there is a waterbed (which could be dry in the dry season): there is a water inflow from above the lowland and outflow (water exits) downstream (even though there are also closed lowlands)

– abundant vegetation (due to the humidity)

– relative coolness

– limited by a hydromorphic zone (with a shallow water table) and higher at the dewatered area whose only source of water is rain

– the lowland is only one part of the inland-valley catchment area or watershed

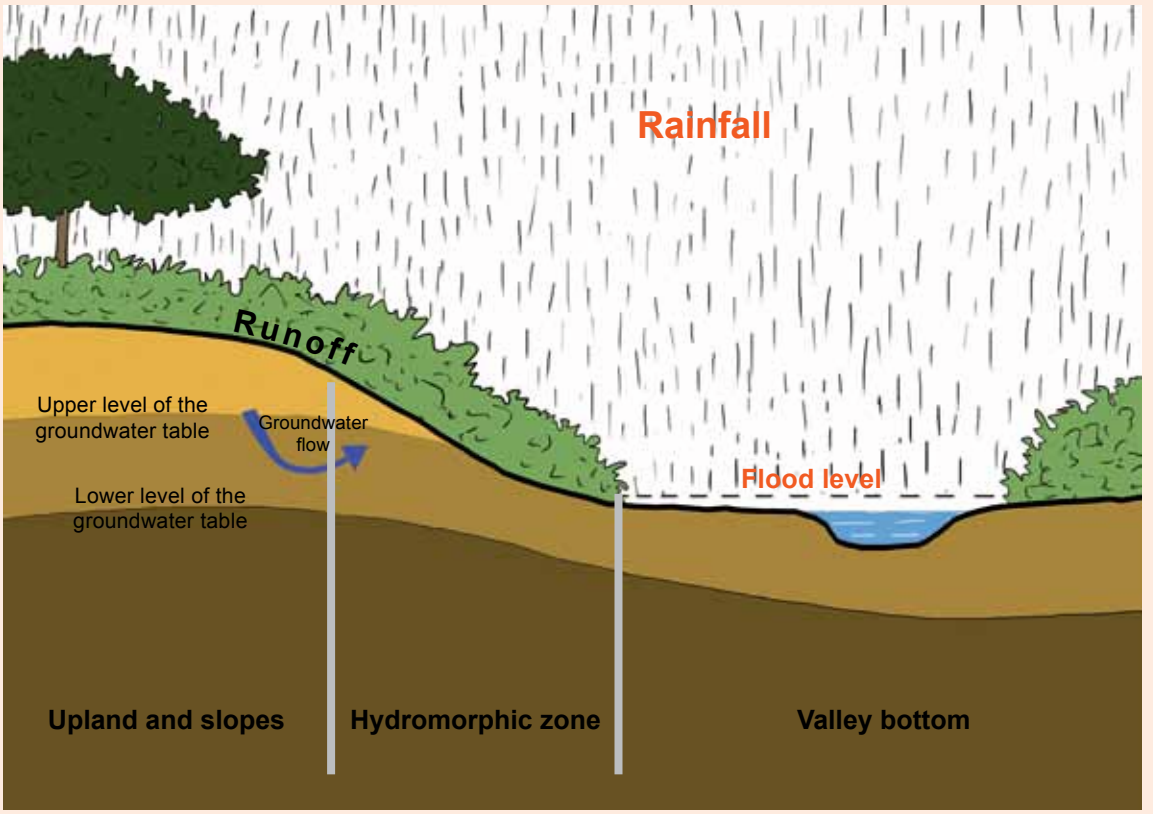
– the flooded part during the rainy season = the part which is under the influence of the river which overflows during the rainy season (catchment of water from the entire hydrological network (rivers).

- the area which collects the runoff water from the plateau and the hillsides
- it is a “colluvium”: earth/soils ripped off from the plateau and hillsides, transported by runoff “deposited”.

  Note that in this regard a lowland is different from a plain, which is formed of “alluvium”, with earth/soils deposited by streams and deposited during floods; a plain is generally more extensive, (covering several villages) than a lowland (generally at village level)
- (any additions?)

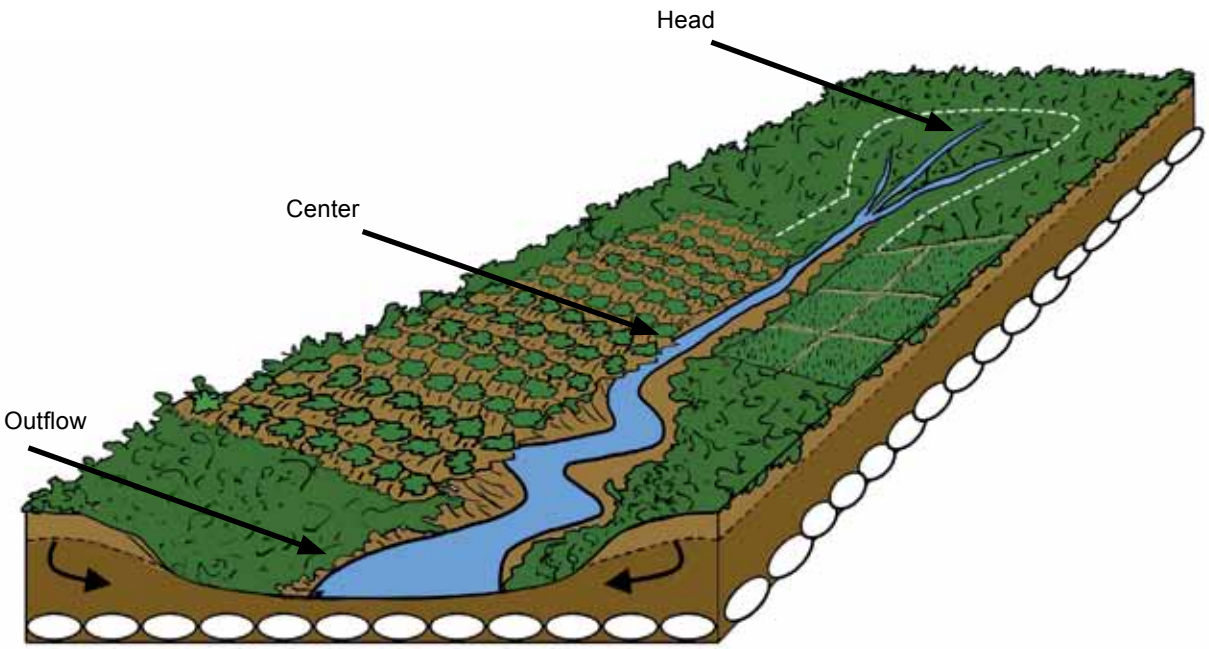
✓ The various crops (rice, vegetables, …)

✓ The type of soils (heavier soil, clayey, clayey-loamy …)



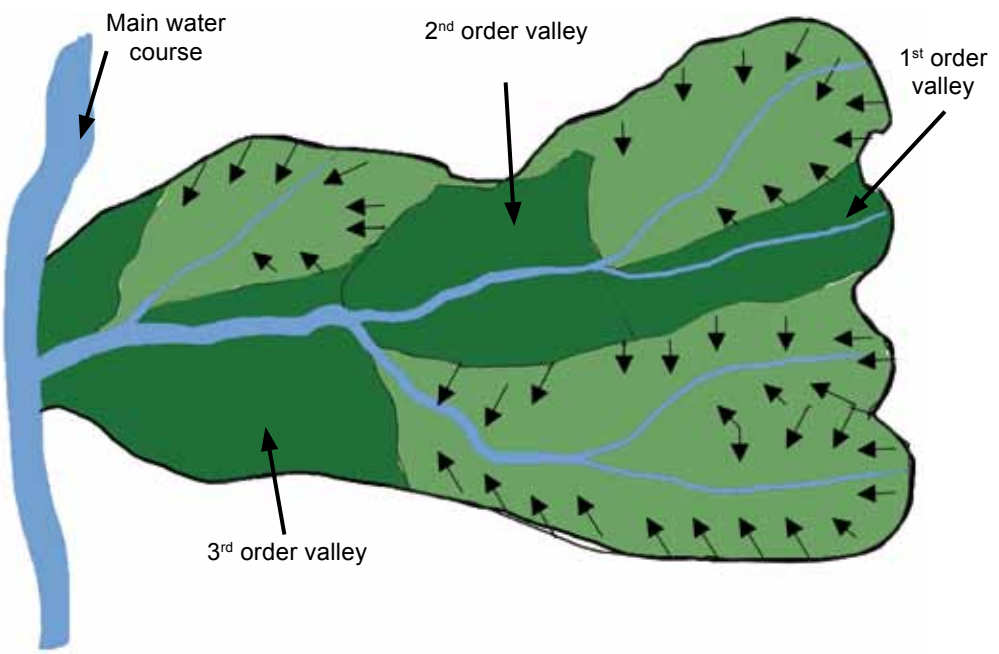
- the facilitator presents a summary of the discussions and recalls the three major components of the watershed which are distinctive due to their position in the toposequence and due to the source of water supply:
    - ◊ the plateau (or highlands) outside the influence of the hydrographical network and which is solely supplied with water from rain
    - ◊ the hydromorphic (or transition) zone characterized by a water table which can rise up to the roots (even though the zone is not flooded, even during the rainy season); this zone is thus supplied with water from rains and from the water table
    - ◊ the lowland: flooded part (at least during part of the rainy season) and which is thus supplied with water from: (1) rains, (2) runoff, depending on the slope of the plateau across the hillsides, (3) the rise of the water table and (4) the stream or (small) river (and its upstream hydrological network).

Summary: the lowland has the characteristic of collecting rain water as well as water from infiltration and runoff from the perpendicular and longitudinal slopes (through the stream which also serves as a drainage system for the water).



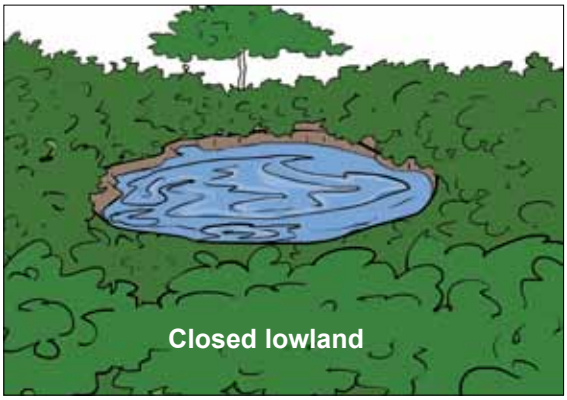
Longitudinal cross-section representation in a small valley showing the head (upstream), the center and the outflow (downstream).

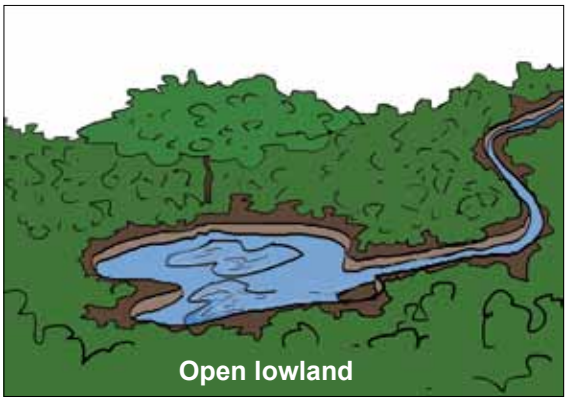
5. After this introduction to the basic notions, the facilitator revisits the importance of knowing the position of the lowland within the entire drainage network.
   - Hydrological network is a general term used to describe the whole area occupied by several catchments or watersheds linked to each other by a drainage network. This drainage network consists of several small streams (perennial or seasonal) that flow into a same river.
   - A typical hydrological network has many watersheds and depressions of various sizes, which can be classified into different orders. These orders run generally from one to four, the watersheds of the first order being upstream and the watersheds of the fourth order downstream:
     - ◊ a first-order watershed is often quite narrow and of little use for agriculture
     - ◊ a second-order watershed receives water from first order valleys; the second order lowlands and slopes are usually somewhat wider with longer perpendicular slopes and with more water
     - ◊ a third-order watershed receives water from first and second order valleys; the lowlands are wider, and the length of the transversal slope is generally longer with deeper and more clayey soils.

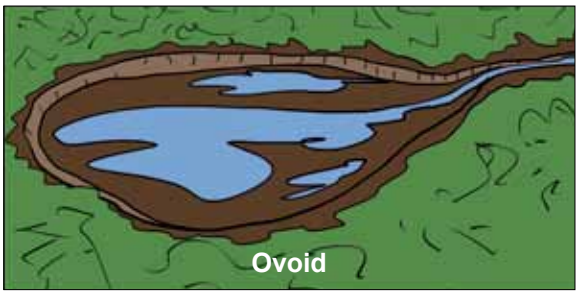


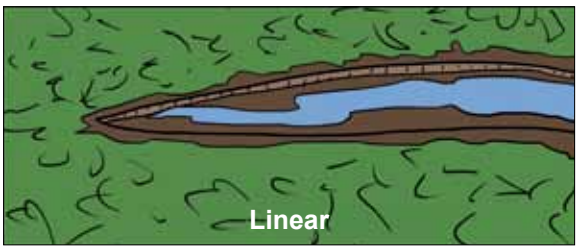
First-, second-, and third-order valleys

6. The facilitator then presents another aspect, which influences the way the lowlands operate. It is about the typical aspect and form of the lowland.
   - Closed (or "isolated") lowlands (where there is no point of discharge/outlet) frequently experience problems of excess water at least during part of the year; these are often marshy areas, not suitable for intensive farming.
   - Open lowlands in most cases found in West Africa are part of a hydrological network. Open lowlands present different "aspects": ovoid, linear and branched.

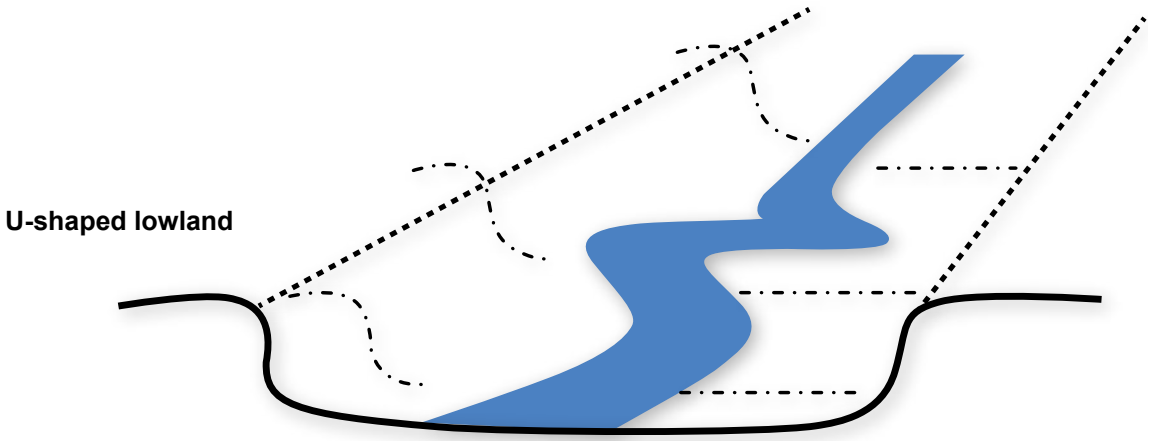


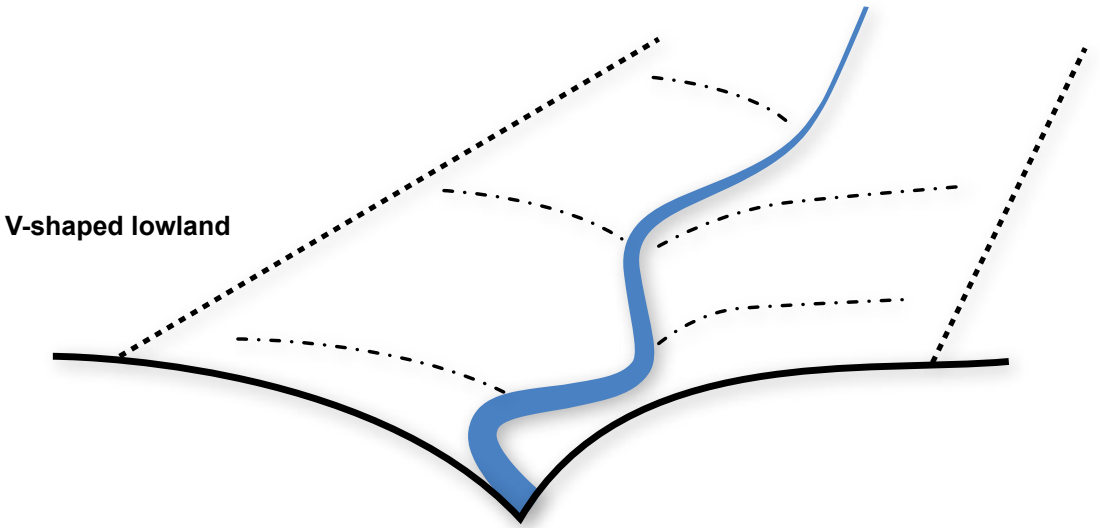






- The shape of lowlands or inland valleys strongly influences the actual relationship between the slopes, the hydromorphic fringe and the lowland. The more extensive and homogenous a lowland is, the more extensive is the cultivable area, and therefore the more the amenities have a chance to be developed. We distinguish U- and V-shaped inland valleys.
- In a V-shaped lowland, the runoff and flow of water is faster than in a U-shaped lowland, which consequently retains the water much longer. Besides, the cultivable area of a U-shaped lowland is generally larger and these lowlands are therefore more useful for possible development.





7. Apart from its position within the drainage network and its form, the manner in which a lowland functions is also influenced by the nature of the soil. That is why the facilitator introduces a discussion on the types of soils that may be found in the lowlands:
   - the textures are very variable and derive from the upstream material; they depend on the nature of material feeding into it (through transversal and longitudinal runoff) and the way in which they were deposited
   - they are generally colluviums that are not fully developed
   - the profiles do not always show clear textural gradient
   - the texture of the layers could be clayey, sandy, loamy, sandy-clayey, or clayey-loamy
   - a sandy layer can be built above a clayey layer and vice versa
   - the more the layer is sandy and thick, (and the lowland U-shaped), the more water can accumulate and therefore the more useful it is from the agronomic point of view.

Depending on the type of soils and the hydrodynamic regime one may find the following scenarios:

Scenario	Type of soil	Hydrodynamique regime	Agricultural potential
1	Compact clay, right from the surface	Rapid flooding, Dries up rapidly	Useable only during the rainy season
2	Sand on clay (with 60–100 cm of sand)	Progressive flooding (slow), Dries up progressively (slow)	Useable at the beginning, middle and end of the season
3	Sandy-loamy or loamy-sandy	Progressive flooding, Dries up progressively (more rapid in scenario 2)	Useable at the beginning and middle of the season
4	Thick sand (> 150 cm)	Progressive flooding, Dries up rapidly	Useable at the beginning and middle of the season

8. The facilitator ends this module with a short evaluation of the knowledge acquired by the technicians during this module. He gives the floor to each participant in order to test their knowledge on the three major biophysical factors that influence the manner in which the lowlands function: the drainage regime, the aspect and form of the lowland and the type of soil.

Annexe – supplementary documentation

The drainage system

A *first-order* inland valley is located at the beginning of the network. No other inland valleys drain (discharge upstream) into it. These valleys are typically located upstream in the hydrological network, but they can also be found further downstream, if their water flows into a valley of a higher order. Such valleys are generally quite narrow with concave lowland fringes, and a thalweg (the drainage pathway of a lowland), which is not well defined. The soils in the lowland are often loamy-sandy.

A *second-order* valley receives water from at least one first-order lowland. It is generally situated further downstream than first-order valleys and they are usually a bit wider. A seasonal stream may be visible in the center of the lowland bottom. The slope (or hillside: distance between the crest and the lowland bottom) is longer and more pronounced than those of first-order valleys.

A *third-order* valley receives water from first- and second-order valleys. Third-order valleys are situated further downstream and are wider, with longer slopes. The lowland soils are deeper and more clayey. Depending on the degree of embranchment of the stream, there may be valleys of the fourth and fifth order.

The watershed

The watershed/catchment area covers the space between the crests and the lowland and includes the landscape drained by a smaller valley into the lowland in question. The draining canals are oriented transversally to the slopes and longitudinally along the valley or stream. The watershed is the smallest unit of the hydrological network.

The watershed contains several components that are defined by their hydrology and ecology in a continuum from the crest, the slope down to the lowland. The most important components in the toposequence of a small valley are the plateau, the hydromorphic fringe and the lowland.

a. ***The plateau/upland area*** (strictly rainfall zone). It comprises the hillcrest and the higher parts of the inland valley slope. It is characterized by risks of water shortage. Rain is the only water supply for the crops since the groundwater table is beyond reach of the roots. The soils are relatively coarse-textured and wet only during the rainy season. Small stones, gravel, iron concretion or stone blocks can hinder crop management practices, particularly tilling the soil. Traces of water erosion due to runoff can usually be observed: sand deposits at the bottom of the slope or gullies and gutters along the slope.

b. ***The hydromorphic fringe*** (groundwater zone). The fringe covers the transition between the lowland bottom and the upland. Rain and capillary rise of groundwater are the principal water sources for crops grown in the fringe. The groundwater table is fed by sub-surface groundwater

flow from the slope and from infiltration of surface water. The hydromorphic fringe is often used to grow vegetables.

c. ***The lowland*** (fluxial zone). This zone is characterized by water saturation and often by flooding. Water is provide by rain, runoff and sub-surface water flow from the plateau and fringes, and drainage from lower order lowlands. The duration of the flooding depends on several factors, including frequency and intensity of rainfall, lowland shape, soil types in the watershed, type and density of vegetation in the upland and the hydromorphic fringes.

   During flooding, some petrol-colored stains may be seen on the surface of the water and rust at the bottom, indicating the presence of iron hydroxides. This shows that the soil is rich in iron and may be toxic to rice. However, these iron hydroxides in this state are not toxic because the iron is blocked by oxygen. There is a problem of ferrous toxicity to rice when the iron is dissolved in the water and is found in high concentrations. The presence of sand and rough aggregates along the edges of the lowland is generally due to their having been transported from the plateau by water erosion.

Types of lowlands and valley bottoms

Andriesse (1986) identifies three types of lowlands:

- narrow valleys with steep and straight to convex slopes found in relatively hard rocks (such as granite and quartz)
- intermediate valleys with moderately steep, concave slopes, in moderately hard rocks (such as schists)
- wide valleys with gentle, concave slopes, in relatively soft formations such as sedimentary rocks.

As for the hydrological characteristics, two major types may be identified (Andriesse, 1986):

- stream-flow valleys in the uppermost parts of the river catchments (lower order valleys). Apart from rainfall, runoff and seepage from the adjacent uplands are the main water sources. These valleys have a poorly defined, more or less centrally located, shallow stream channel, which does not exist in the upper parts. The flat bottoms of the valley varies in width from about 10m in the upper portions to about 100m in the lower extensions. Catchment sizes vary from 2 to 5 km^2 on granitic formations and from 20 to 50 km^2 on sedimentary rocks
- river-overflow valleys, downstream of the stream flow valleys. These valleys have a distinct riverbed, which is generally located at one side of a small floodplain (up to 200 m in width) in the valley bottom. The main water source is overflow from the river, rather than runoff or infiltration.

Andriesse, W., 1986. Wetlands in Sub-Saharan Africa: Area and distribution. In: A.S.R. Juo and J.A. Lowe (eds.). The Wetlands and Rice in Sub-Saharan Africa. Proceedings of an International Conference on Wetland Utilization for Rice Production in Sub-Saharan Africa, 4–8 November 1085, Ibadan, Nigeria. International Institute of Tropical Agriculture, Ibadan, Nigeria. pp.15–30.

Soils of the valley lowlands vary widely in their characteristics, both within and between valleys, ranging from sand to clay. In general, however, textures of the soils as well as their chemical characteristics, correspond to the soils of the surrounding plateaux and the parent material from which they are derived (Andriesse, 1986). Thus, broadly generalized, coarse infertile soils prevail in valley bottoms of poor and acid rocks (sandstone, granite) and medium to fine, relatively fertile soils are found in valley bottoms of areas with rich parent rocks (clayey shales, siltstones, basalts).

Environmental management of lowlands

The pollution risks of the groundwater and watercourses by nitrates contained in fertilizer and the use of pesticides, are real. The recommended products for the treatment of vegetables are not accessible to the farmers, simply because they are very expensive (organophosphates). Instead, the farmers substitute products meant for the treatment of cotton (organochlorates), which are highly residual and toxic. Accidents from food poisoning due to the consumption of vegetables, cultivated or not in the lowland, are frequent. Besides, the intensive exploitation of the lowland soils will certainly lead to their impoverishment in the main mineral components and particularly in organic matter.

Special emphasis should therefore be placed on the rational management of the lowland soils, management that tries to limit the quantity of mineral fertilizer by combining it with organic fertilizer (consumable or forage legumes). In the lowlands where the hydrodynamic regime is favourable, crops such as cowpeas or groundnuts can be cultivated at the beginning of the farming season. The same crops can be cultivated again at the end of the farming season in the same manner as one could envisage the use of short cycle *mucuna*. Concerning the use of pesticides, priority will be given as much as possible to the use of natural product extracts, or by lack to organophosphates. Proper preservation of lowland products will also limit the risks related to their consumption and also give them significant value addition.

Exploration of lowlands (indoor session)

At the end of Module 1, a list of lowlands to be explored was established on the basis of their potential advantages while avoiding lowlands with too many possible constraints or problematic issues. Obviously, in most cases knowledge about the lowlands is quite limited and hence it becomes necessary to undertake a more profound exploration. This is dealt with in Modules 3 and 4, which go together; Module 3 constitutes an indoor session during which any existing information is collected, while Module 4 constitutes the field session to supplement the information.

After the fieldwork, Module 5 allows to synthesize and to conclude the pre-selection exercise.

Learning objectives

At the end of this module, the technicians will be able to:

- identify a transect in a lowland to walk through in order to gather the information required for exploring the lowland
- establish lists of biophysical and socioeconomic criteria that will actually enable the exploration of the lowlands.

Procedure

1. The facilitator presents the objectives of the module, and outlines its procedure.
2. The facilitator asks one of the participants to make a brief summary of Module 1 and more specifically to present the list of lowlands to be explored in detail, with as many possible advantages as may be found as well as the possible constraints.
3. The facilitator thereafter starts a question and answer discussion on the need to undertake in-depth explorations, specifically on:
   - the types of information to be gathered and the criteria to be considered
   - the way of exploring the lowlands
   - the format for the data to be collected and registered.

4. Concerning the way of exploration: it involves a *transect* walk in the company of some villagers/farmers chosen at random (indeed, for now there is no need to inform the villagers about this activity).
   - The facilitator verifies first of all if the technicians have some experience or practical skills in transect walk; and if yes, if the same is true for transect walks in the lowlands.
   - It is important to make understand the villagers/farmers who assist with the transect walk, that it is not a matter of questioning them but a simple "exploration"; the technician will simply ask a few questions in order to have a better understanding.
   - Thereafter, a decision is taken on the lowland to explore:
     - ◊ the cross-section from top to bottom: the upland, the slope, the hydromorphic zone and the lowland
     - ◊ the longitudinal section; from upstream to downstream
     - ◊ besides, it is important to visit on a case by case basis: dried up and submerged areas, the various types of vegetation cover and/or the modes of crop management, eroded areas or areas with problems.
5. Concerning the types of information to be gathered: the participants are divided into two working subgroups. One group will work on the socioeconomic aspects (including land issues) and the other group on the biophysical aspects. Here are the steps:
   - each group prepares a list of criteria
   - thereafter, the lists are presented during the plenary session, followed by discussions and an agreement on the criteria to be used for the information gathering.
6. The facilitator proposes to divide the technicians into subgroups.
   - Attempts are made to combine, in each subgroup, skills that are rather agro-technical and socioeconomic.
   - Each subgroup will have three lowlands to explore during the day; the number of subgroups will therefore depend on the total number of lowlands to be explored. To limit travel and related costs involved, the three lowlands to be explored by a subgroup are close to each other.
7. The facilitator presents the form for recording the information (see form page 32) that will be used during the transect walk (Module 4) and a summary of the results (Module 5).
   - It is important to insist on the fact that it is not just a matter of questioning the villagers/farmers, but having an "informal" preliminary discussion with the view to having a better understanding of the likelihood of the lowland being appropriate for *Smart-valleys* development.
   - The exploration can also be an opportunity for meeting other potential stakeholders in the lowland.

Notes for the facilitator

Here are the criteria to be taken into consideration and introduced if ever they do not come out spontaneously from the proposals made by the groups.

Biophysical criteria:

- accessibility
- (cultivable) area
- shape and transversal slope
- types of (dominant) soil
- vegetation
- major crops: diversity and relative importance of rice
- hydrological regime: order of lowland (supply from upstream and discharge downstream); water table
- eventual existence of problem zones.

Socioeconomic criteria:

- number of villages and farmers
- origin of villagers
- status of the farmers, mode of access to land and the relationship between farmers and landowners
- significance of the lowland in relation to non-flooded zones; in terms of area, staple crops and cash crops
- types of lowland farming: significance of the lowland for domestic water, livestock, artisanal occupations (brick moulding, carpentry, …), rites-customs, crops
- role of women in the lowland
- mode of farming in the lowland (manual, mechanized, …)
- relation with the market, destination of the products.

Supplementary documentation

Map of the zone with the geographical location of the lowlands to be explored.

Form: Exploration criteria for lowlands (1 form to be filled per lowland)

Zone: ……

Name of the lowland: ……

Names of members of the exploration team: ……, ……..,……..,……..,……

First person responsible for the form: ……

Date : ……

Biophysical criteria

Accessibility – distance from tarred road – difficulty during the rainy season?

(Arable) area in hectares (relative size of the arable land)

Shape and transverse slope (U-shaped or V-shaped and estimate of the slope)

Types of (dominant) soil and color

Dominant vegetation

Major crops: diversity and relative significance of rice

Hydrological regime: order of lowlands (upstream supply and downstream discharge); water table

Likely existence of problem zones

Socioeconomic criteria

Number of villages and (approximate) number of farmers having access to lowland

Origin of the villagers; diversity of the ethnic groups and extended families

Status of the farmers, mode of access to land and relationship between farmers and landowners

Size of the lowland in comparison with non-flooded areas; in terms of surface, production

Types of farming in the lowland: significance of water for domestic use, livestock, artisanal occupations (brick moulding, carpentry, …), rites-costumes

Role of women in the lowland

Mode of farming in the lowland (manual, mechanized, …)

Relation with the market – significance of staple crops and cash crops (destination of products)

Exploration of lowlands (field session)

Module 4 goes with Module 3. In this Module 4, the lowlands will be explored through a transect walk and a brief discussion with some villagers/farmers in the lowland with a view to obtaining supplementary information. Each subgroup spends one to two hours maximum in a lowland, and that enables to visit three neighbouring lowlands in a day.

Learning objectives

At the end of this module, the technicians will be able to:

- explore a transect in the lowlands
- undertake an exploratory discussion with the farmers in the lowlands
- gather information, by using exploratory criteria, that is useful to shortlist lowlands for the lowlands identification/prospection phase.

Procedure

On the field, it is the technicians who manage and facilitate the roll-out of this module while the trainer-facilitator comes in in case of blockage or any event requiring his intervention.

As a first step

It is important to make a short courtesy call on the local officials of the department of agriculture and/or the local rural engineering department.

1. On arrival at the first lowland site, the team moves towards one end of the transect line, which generally is the highest point (the upland), in order to have a bird's eye view of the entire watershed and of the lowland. From there, the team moves towards the hydromorphic zone and the lowland.

2. Upon meeting some villagers, you will ask them if they could accompany you down this transect. However, the idea is not to explain the ultimate objective of this exploration, because that could skew the information or otherwise "limit" the validity. You can simply explain that you are learners and that you are undertaking a field study for your learning purposes.

3. Throughout the trip, members of the team will first of all make some observations; that is, use their eyes in order to gather maximum information in accordance with the list of criteria established, while walking through and identifying the plateau, the hydromorphic zone and the lowland itself. Members of the team engage in a discussion and each team member takes notes, using the reportage model; this will be about:
   - accessibility to the lowland
   - estimated (arable) area

- shape and transverse slope
- types of (dominant) soils
- vegetation
- major crops: diversity and relative significance of rice
- hydrological regime: order of lowlands (upstream supply and downstream discharge); water table
- likely problem zones such as the flooding zones or dry zones
- other.

4. Members of the team will also discuss with the villagers the socioeconomic criteria and will have a brief informal discussion on the following topics, without going into detail:
   - number of villages and farmers farming on this lowland
   - origin of the villager
   - status of the farmers, mode of access to land and relationship between farmers and landowners
   - size of the lowland in comparison with dewatered areas; in terms of area, staple crops and cash crops
   - types of farming in the lowland: significance of the lowland for domestic water, livestock, artisanal occupations (brick moulding, carpentry, …), rites-customs, crops
   - role of women in the lowland
   - mode of farming in the lowland (manual, mechanized, …)
   - relation with the market; destination of the products.
5. After exploring the lowland and before going to the next lowland, members of the team exchange notes and one of the team members assumes the responsibility for collecting all the information on the site and filling the form "Exploration criteria for lowlands" (see Module 3, page 32) specifically for this lowland. In practice, if the team has three sites to explore, there will be three lead persons who would fill in the forms.

Summary of the exploratory component and shortlisting of *Smart-valleys* lowlands

This stage/module is crucial in the selection process of the sites. It is undertaken by the teams who actually explored the lowlands. It involves summarizing the data collected from the field. In practice, the data and the positions of the respective teams and lead persons responsible for data collection are indicated in the table in order to facilitate the visualization of the information and the participation of everyone in the exercise. Following the presentation of all the reports, there is a general discussion during which each person defends his/her point of view. This leads to the establishment of a list of pre-selected lowlands, which qualify for Part 2 of the lowland selection phase, that is, the lowlands identification/prospection.

Learning objectives

At the end of this module, the technicians will be able to:

- make a summary of the exploratory information gathered from the field
- prepare a list of pre-selected lowlands for Part 2: lowlands identification/prospection of the *Smart-valleys* lowlands selection phase.

Procedure

1. The facilitator presents the objectives of the module, as well as the outline for rolling it out.
2. Thereafter, each team and lead person responsible for collection/filling is given some time to complete the individual lowlands exploration forms.
3. The facilitator then presents three main summary table-matrices of the data allowing for a comparison of the explored lowlands. The three table-matrices correspond to the three important "classes" of criteria. The first-class criteria are those which are the most relevant for consideration in the lowlands selection and which will be used in the identification/prospection phase (beginning from Module 6).
   - The table-matrix of the first-class criteria comprises:
     - ◊ accessibility
     - ◊ cultivated/arable area
     - ◊ relative significance of rice and of the lowland – non-flooded zones
     - ◊ number of villages and farmers
     - ◊ hydrological regime.

- The table-matrix of the second-class criteria comprises:
  - ◊ mode of access to land
  - ◊ farmer and landowner relationship
  - ◊ role of women in the lowland
  - ◊ types of farming: crops as compared to what is on other farmlands
  - ◊ mode/intensity of farming.
- The table-matrix of the third-class criteria comprises:
  - ◊ origin of the villagers
  - ◊ dominant vegetation
  - ◊ dominant soils
  - ◊ relation with the market
  - ◊ possible existence of problem zones.

4. The lead persons responsible for the forms fill the tables in turn; note that the list and the numbering of the lowlands (column 1) is the same for the three tables.

1. First-class criteria

Name of lowland	Accessibility	Cultivated/arable surface	Flooded/non-flooded Significance of rice	Number of villages/farmers	Hydrology
1.					
2.					
3.					
4.					
5.					
….					

2. Second-class criteria

Name of lowland	Access to land	Farmer–landowner relation	Role of women	"Other" agricultural uses of the lowland	Mode/ intensity of farming
1.					
2.					
3.					
4.					
5.					
….					

3. Third-class criteria					
Name of lowland	**Origin of villagers**	**Dominant vegetation**	**Dominant soils**	**Products – markets**	**Problem zones**
1.					
2.					
3.					
4.					
5.					
….					

5. After completing the tables, the facilitator organizes a plenary session discussion during which each person presents his/her case/lowland and defends his/her point of view. Only consensus points of view supported by all and without any pressure are adopted. There is therefore solidarity in the entire team with regard to the results and the team can defend these results anywhere.
   - It is clear that the table with the first-class criteria will attract greater attention. In practice, selection will be made of only lowlands that are easily accessible at any season, intensively cultivated, having a few dozen of hectares arable land with at least several dozen of users having agriculture as their principal activity.
   - From this discussion a list of sites (lowlands) will be established, which will be considered in Part 2 (identification/prospection) of this phase (selection of lowlands) of the approach.

Village meeting for identification – preparation, action and evaluation

This module is undertaken after Part 1 (exploration) of Phase 1 (selection of lowland) and therefore takes place at the preselected sites in Module 5. It involves the preparation and holding of a village meeting (specifically for those using the lowlands) in order to have a better knowledge of the socioeconomic, land-related and biophysical aspects of the lowland as well as a clearer idea about the likely implementation of a development project.

For training purposes, there will only be one meeting where all the technicians participate. In practice, there will be a village meeting at each preselected site in Module 5.

Learning objectives

At the end of this module, the technicians will be able to:

- prepare and preside over a village meeting and obtain relevant information
- inform the entire community about the *Smart-valleys* program and objectives as well as its prospects
- gather relevant information on the socioeconomic and biophysical aspects, and on the land status within the lowland
- know if the site would be suitable for a development project
- obtain the buy-in of the landowners, the community and the farmers.

Procedure

We propose that this module be rolled out in three stages, which we will designate as **6a**, **6b** and **6c**, since they are inseparable. The central part (6b) is the meeting held on the field and facilitated by the technicians, under the supervision of the trainer-facilitator. This field is the shortlisted site in Module 5.

Parts 6a and 6c take place indoors and are mainly facilitated by the trainer-facilitator; these two stages are necessary for the training of the technicians, since many things come into play during this village meeting, particularly in terms of organization, and that is what will largely determine the subsequent drive. It is therefore important to take time to prepare the meeting (6a) then draw lessons from its conduct (6c) so that everyone will be in a position later on, to adapt to his/her own situation on the ground.

Module 6a
Indoor preparation

1. The facilitator explains to the technicians that they will have to organize a village meeting in order to have a better knowledge of the socioeconomic, land-related and biophysical aspects of the lowland.
   - To organize a meeting requires preparation. One must know, which issues one wants to raise, in order to ask questions that would enable one to obtain as much relevant information as possible.

Notes for the facilitator

The facilitator reminds everyone that they are in action-training, that is, a real meeting will be organized and they should take advantage of it to learn. This real meeting will however be slightly different from those that will follow because there will be many "facilitators" (all of them being technicians in training). And our way of doing will be tested to find out if it "works", but on the whole, one should not forget that it is not just a simple exercise, and therefore things must be done with some seriousness.

2. The facilitator divides the technicians into three groups. One group will have to prepare a checklist of socioeconomic issues, another group on land-related issues, and the last one on the biophysical aspects of the lowland, which will be discussed during the meeting.

3. The facilitator goes to each group to answer questions and provides explanations or cues. Each group writes its issues on a flipchart for presentation.

Notes for the facilitator

- Here are some cues for the group that deals with the socioeconomic aspects: who uses the lowland, how many farmers by gender, intensity of utilization, crops grown, origin of the farmers, destination of lowland products, utilization of inputs, socioeconomic relevance of the lowland, its distance from the market, economic role of women, ...
- In the second group, the facilitator does the same thing. Here are some cues for the group on "land-related issues": who owns the lowland, difference between landowners and farmers, are there women/foreigners/farmers who are landowners, mode of access to land, problems between landowners and farmers on these lands, the status of women with regard to land ownership, …
- For the third group, the cues could be: area of lowland, its shape, type of soils, hydrodynamic regime, water discharge, types of existing developments (likely infrastructures), water control during the rainy and dry seasons (off-season), accessibility to lowland.

The facilitator can of course draw inspiration from the summary chart of Part 2 (identification/prospection) presented in Module 8 (materials required). But it is advisable not to present this chart as the (only) model to guide the village meeting, otherwise there will be the risk of conducting a kind of "interrogatory" meeting… and that is not the objective.

4. Each group presents its issues in a plenary session. A discussion follows to supplement, amend or discard some issues (possibly some questions) or to add some.

5. The facilitator summarizes the issues and asks the participants how they think they should organize the meeting keeping in mind that they should obtain relevant information. He organizes a discussion on the structure/organization/procedure for the meeting in order to determine the form it should take.

Notes for the facilitator

The facilitator can suggest answers, for example: by presenting, asking questions, by putting the villagers in groups depending on whether they are e.g. landowners, farmers, male rice farmers, female rice farmers, etc., by engaging them in a role play, in a discussion, etc.

6. If there is enough time, the facilitator proposes that the technicians simulate a village meeting before organizing a real one. Otherwise, the facilitator will say that they will turn the exercise into a real village meeting without going through a simulation. In either case, after the "real" village meeting, not only will they summarize the information gathered, but also they will revisit the methodological issues, in order to assess how everything went (see Module 8).
   - Two to four volunteer technicians – preferably of different disciplines (e.g. an agronomist, an economist, a sociologist) – will chair the meeting, present the project to the villagers and raise the prepared issues. All the other technicians who do not chair will be observers who will take notes.
   - The technicians should come to an agreement beforehand, about what each of them should be doing, who will start, who deals with which issue, etc., and preferably a technician e.g. the economist should not handle the economic issues, the sociologist should not deal with social issues, the agronomist should not treat agricultural issues, etc. Each should deal with issues belonging to a discipline other than his/her own.
   - The facilitator emphasizes that it is a matter of "semi-open" discussions and that it is not a matter of quickly going over the various questions and answers.

Note for the facilitator

The role of the observer is very important: They should not only record the answers from the villagers but also they should take note of their reactions, behavior with regard to the various issues: do they all come to a consensus? Do they all express themselves? For example concerning the land-related issue, only some of them expressed an opinion, the others keep quiet (perhaps even appear unhappy); even if that is not expressed, this could be an indication for future conflicts. To facilitate the note-taking, the observers could use a table of the type below (some observers will write down the responses, others will observe the behavior and reactions).

- If the technician – a sociologist for example – finds that his/her peer in another discipline does not sufficiently go into the details of the social issue, he/she can intervene, and vice-versa.
- The observers can also intervene and ask questions to the villagers when they see that their colleague facilitators are not getting it right or that they forget some important issues.
- The facilitator explains that after the meeting, the two to four technicians will be judged by the observers and by himself.
- The technicians together prepare the training material for the meeting, flipcharts with key words for each of the issues to be dealt with (see stage 3 of the procedure), markers, flipcharts, etc.

Remarks form for observers

Issue	Agreement by all (yes / no)	Who does not agree?	Other remarks

Check-list

Biophysical aspects / issues	Socioeconomic aspects / issues	Land-related aspects / issues
- Area - Shape / slope / soil - Accessibility - Hydrology / rainfall - Facilities - Water control - Constraints	- Main activities - Crops grown (by gender, season) - Users (number, %, ethnic groups, origin, gender/ generation, seniority) - Destination of the rice, market access - Cultural practices (inputs, sowing method, labor) - Role of women - Constraints	- Types of land ownership (individual, family, village, …) - Modes of access (types/gender, origins) - Landowner–farmer relations - Status of women

Module 6b
Conduct of the village meeting

We are in a situation of action-training where a real meeting serves as a means of learning for the entire group of technician-facilitators. In the specific case of training, it will be necessary to explain to the villagers that the "outsiders" will participate in the field activities in line with the technician-facilitators training activities and therefore towards capacity building for the project.

As a first step

A project leader, an extension officer, one NGO or other – involved in the community – has informed the local authorities about the holding of a village meeting – purposely for only users of the lowland – on such a date or time as scheduled.

1. The day of the meeting, the technicians and the *Smart-valleys* facilitators, the local authorities, the community representatives such as the landowners, livestock breeders, male rice farmers, market gardeners, female rice farmers, young (other, depending on the situation) are present.

2. One of the project technicians explains the objectives and the prospects of the *Smart-valleys* program; he is supported by one of his colleagues (of a different discipline) if necessary.

3. The flipchart with the key words is placed on a board for all to see, and one of the technicians raises the first issue and then another continues, and so on (in turns).
   - To make the villagers feel at ease, the technician will first of all ask questions on the biophysical aspects. (e.g. what is the surface of the lowland, its shape, the major crops).
   - Thereafter, the various socioeconomic aspects and land-related issues will be explored (e.g. who owns the lowland, who uses the lowland, how many farmers by gender and if they are migrants or natives, what is the mode of access to the land, what is the destination of the lowland products, is the lowland accessible to trucks, …).
   - Sometimes the answers the technician receives require an in-depth discussion of the issue, the technician should then ask questions on the issues that are not necessarily on the prepared check-list, his colleague can assist him.
   - The observers take notes of the responses, attitudes/behavior of the participants (see above) and remarks concerning the behavior of the technicians.

4. One of the technicians then asks the men farmers, women farmers, young, landowners, breeders etc., to form groups to discuss the various positive and negative issues that would affect them, following the development of the lowland.

- A technician assists each group and provides guidance if necessary, without dominating the discussion. There again, he observes if the opinions expressed within the group appear homogenous, if everyone takes the floor, etc.
- After the group discussions, each group presents a summary of the discussions in plenary session.

5. One of the technicians concludes and asks if the farmers in the lowland would be interested in contributing towards the lowland development and explains what form of contribution they could make.

6. One of the technicians explains that there will be a next stage: field prospection; and he agrees with the villagers on the date-time of the field prospection.

7. A technician closes the meeting by thanking all of them for their valid contributions.

Module 6c
Indoor evaluation by participants

There are two types of evaluation: methodological (how the meeting was conducted) and how the information was gathered; and that should enable to determine how suitable the site is likely to be for development.

1. After the meeting, the facilitator returns to the classroom (office), asks two to four technicians to do a kind of self-assessment and bring out their strong and weak points (in their capacity as animators), what has worked well and what has not worked so well.

2. Thereafter, he asks the observers if they have any remarks and/or if they observed any specific reactions/behaviors on the part of the users/villagers. Did they observe any disagreement, dissatisfaction, or other less "comfortable" attitudes/behaviors? Did they all express themselves? (see Remarks form for observers, page 41).

3. The facilitator summarizes the responses and asks the technicians what they learnt from the meeting in terms of **methodology** and what improvements they could bring on board with regard to the way in which such a meeting can be conducted. He summarizes the responses and concludes the evaluation of the methodology.

4. The facilitator then writes on the board: **evaluation of the contents of the information** obtained.
   - All the information from all observers, facilitators and technicians is listed.
     - ◊ The information is "organized" in line with the checklist; see session 6a of the preparation.
     - ◊ How does one assess the quantity and relevance of the information received; is there enough information on (1) socioeconomic aspects, (2) land-related issues and (3) biophysical aspects to evaluate the probable relevance of the site for development and therefore prepare a dossier (see Module 8).
   - What information should have been covered during the lowland prospection in the form of *observation* and *questions to ask* the farmers in order to supplement, verify or confirm the data obtained during the meeting.

Notes for the technicians

- Kick-start with questions that do not cause uneasiness; questions on issues that are familiar to everyone.
- Sometimes the responses received raise questions that are not part of what has been prepared; still ask them in order to obtain more information; do not hesitate to deepen the discussion without getting carried away by the details.
- In case of tension, try to relax the atmosphere.
- If women (or another group) are intimidated into silence, ask them questions or encourage them to take the floor.
- Do not forget to give the floor to minority groups.

Materials required – Supplementary documentation

- Three pre-designed checklists of issues to be dealt with during the sessions with the villagers–lowland users:

Biophysical aspects/issues	Socioeconomic aspects/issues	Land-related aspects/issues
☐ Surface area ☐ Shape/slope/soil ☐ Accessibility ☐ Hydrology/rainfall ☐ Facility development ☐ Water control ☐ Constraints	☐ Principal activities ☐ Crops cultivated (by gender, season) ☐ Users (number, %, ethnic groups, origin, gender/generation, seniority) ☐ Destination of the rice, market access ☐ Cultural practices (inputs, mode de sowing, labor) ☐ Role of women ☐ Constraints	☐ Types de ownership (individual, family, village, …) ☐ Modes of access (types/gender, origin) ☐ Landowners and farmer relations ☐ Status of women

- Video projector.
- The video "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa".

Field prospection

It is very important for the *Smart-valleys* facilitator and the technicians to verify on the ground if the data obtained during the village meeting actually reflect the reality and to obtain more information on socioeconomic aspects, land-related issues and biophysical aspects. Emphasis will be laid on the biophysical aspects. A field visit is organized with the team and the users-farmers (both men and women).

For training purposes, only one inland valley will be visited. In practice, all the lowlands included in Module 5 will be visited.

Learning objectives

At the end of this module, the technicians will be able to:

- obtain more detailed information, especially on the biophysical aspects of the lowland
- produce a sketch with the essential components of the lowland
- have an idea about the possibility or not of adopting this site for possible development.

Procedure

In the first part of this module, which involves preparation towards the prospection of the lowland (indoors), the trainer-facilitator takes the lead. But in the process of conducting the lowland prospection itself, the technicians manage and facilitate the rollout of this module and the trainer-facilitator gets involved in case of a challenge or any other incident requiring him to do so.

Preparation towards the lowland prospection (indoors)

As a first step

The users/farmers in the lowland have been informed about the date, time and venue for the start of the prospection.

1. Before starting the trip, the facilitator explains to the technicians the objectives of the field prospection. This involves an overview of the required information/data (see check-lists page 45) in the light of what was obtained during the village meeting for identification. The information can be used to fill the columns 3 and 4 of the form below (see facing page 47).

2. A list is prepared of key information to be collected through observation and supplementary discussions with the farmers during the field prospection.

3. On the day of prospection, all the technicians and the facilitator leave together and are present on time at the agreed venue.

Information / data to be collected	Information / data obtained during the meeting (Module 6)	Information to be collected during the lowland prospection (Module 7)	
		New data to be collected	Data from the meeting for supplementaion, verification or confirmation
Biophysical			
☐ Surface area ☐ Shape / slope / soil ☐ Accessibility ☐ Hydrology / rainfall ☐ Facilities development ☐ Water control ☐ Constraints			
Socioeconomic			
☐ Principal activities ☐ Crops cultivated (by gender, season) ☐ Users (number, %, ethnic groups, origin, gender / generation, seniority) ☐ Destination of the rice, market access ☐ Cultural practices (inputs, mode de sowing, labor) ☐ Role of women ☐ Constraints			
Land-related issues			
☐ Types of land ownership ☐ Modes of access (types/gender, origin) ☐ Landowner–farmer relations ☐ Status of women			

Carrying out the lowland prospection

1. The facilitator welcomes the group of farmers. Together, they all start the visit and the prospection of the lowland.

2. The technicians observe and note down information relating to accessibility of the lowland (condition of the roads, access by cars, distance from the tarred road and the market, etc.).

3. The entire group (*Smart-valleys* team and farmers) walks through the entire lowland while ...

   - … one or other technician asks the farmers questions in order to confirm or disprove the information – see list.
   - The technicians try to retrieve within the lowland everything they already know through the meeting that was held; they listen to the farmers who show and explain all that they know on the lowland e.g. the area, crops cultivated, types of soil, shape of the lowland, availability of water, inflow and discharge of water in the lowland.
   - Together, they will verify the flow direction of the main source, the direction of secondary drainage, the upper limits of the lowland, etc.
   - All the data obtained is written down by each technician who – if necessary and possible – makes a sketch from it.
   - Special characteristics that were not mentioned during the meeting but which are visible on the ground, e.g. position of an anthill or of a very useful tree, parts where there is stagnant water, areas one may not venture to enter, etc.) are also noted down and indicated in the sketch.

4. The prospection ends and the technicians and facilitators give themselves a rendezvous in the meeting room to continue with the next stages of the program.

Notes for the technicians

- The facilitator observes closely how the technicians act towards the farmers; e.g. if they are giving them an attentive ear.
- The facilitator observes the technicians to identify those who know the lowland and its peculiar characteristics.

Summary of the identification/prospection phase

With all the data collected during the village meeting (Module 6) and the lowland prospection (Module 7), it is now time to do a summary for each identified/prospected site. This will enable an identification of the inland valleys that will be considered in the last part of the selection and for which another village meeting will be organized (see Module 9). This summary will constitute the principal corpus of the documentation to be prepared for the site (see Module 10).

For training purposes, the summary for one identified/prospected site is enough. In practice there certainly will be a summary to be done for each identified/prospected site.

Learning objectives

At the end of this module, the technicians will be able to:

- summarize information collected during the session on identification/prospection (Modules 6 and 7)
- indicate the sites that will be maintained for the last part of the selection: that is, the part on validation.

Procedure

1. The facilitator outlines the objectives of the module.

2. Thereafter, the facilitator kick-starts a discussion on the first feelings concerning the outcomes of the meeting in relation to the field observations. This discussion further leverages the learning process involved in conducting a meeting (an exercise started during the indoor session after the village meeting) and particularly ensures that there is real awareness about the issues relating to the development of the lowlands, in case all the technicians are not familiar with these issues… and also for the fact that it is sometimes delicate to run effective meetings in this kind of "emotive" situation.

3. The facilitator divides the technicians into 4 groups (A, B, C and D) and gives the groups about 1 hour to put together all the information collected during the village meeting and the field prospection.
   - This involves first of all an overview of the requisite information/data (see check-lists in Modules 6 and 7).
   - Then, each group transfers all the details obtained for each item on the list and thereby completes the information obtained during the preparation of the summary on the village meeting (see summary sheet of part 2 of the selection phase: identification/prospection).

- Thereafter, each group prepares its arguments indicating whether they consider the prospected site suitable for consideration in the last part of the selection process, that is, the "validation" part (Modules 9 and 10).

Information/data to be collected	Information/data obtained during the meeting (Module 6)	Information/data obtained during the lowland prospection (Module 7)

4. Then groups A and B exchange their results and make comparisons and additions. They also agree to put all their results on one sheet.

   Groups C and D do the same.

5. Thereafter, the results sheet of groups A–B and that of groups C–D are put on the board, and all the technicians compare and discuss and come to an agreement to put them together on one results sheet.

6. The results are presented in plenary session:
   - If there is consensus, the facilitator announces that the site is maintained for Part 3 of the selection process.
   - In case there is no consensus, there will be a discussion allowing each one to defend his/her point of view in order to arrive at a decision about whether or not the site is maintained for Part 3 of the selection process.

In case there are several sites, there should be a kind of provisional classification by consensus. Priority in the choice is given to lowlands owned by families or the village, lowlands with sufficient soil resources and where access to the land is by farmers who have ownership rights by gift or heritage; or farmers who have had long-term relations with the landowners. Economic significance and market access are equally important.

Summary sheet Part 2 of the selection phase: identification/prospection

Date: ....

1. General information on the site

- Country: …………………………………………..….
- Region/District: …............………………………………………………………………………………...
- Community/locality (or other administrative information): ...…………………………………………..................................
- Name of the lowland:…………………………………………………………………...
- Name(s) of village(s): …………………………………………………………………………………. ....
- Position (proximity) of the village(s) with regard to the lowland: …………………………………………….........................
- Number de persons present at the village meeting (farmers): men: …....... ; women: …........
- Number of persons present at the field prospection: men: …....... ; women: …........

2. Information on the biophysical aspects of the site

- Total area: …...... ; area used during the rainy season: ....…..; area used during the dry season:……..
- Shape of the lowland: U: ……..; V: ……….; other: ……………………………
- Assessment of the slopes (in %): longitudinal: ……….; transversal: …….
- Types of soil: clayey: ....; loamy: ……; sandy: …….; other:…………………
- Hydrodynamic regime of the groundwater: ……………………….. e.g.: does the groundwater show at some periods? (specify…......). Any idea about the depth of the groundwater when it does not show (wells?)
- Rainfall: significant annual variability: yes: …; no: …; significant flooding: yes: …; no: …; significant low water levels: yes: …; no: …
- Accessibility to lowland: tarred road: …; vehicle track: … in all seasons?....; track: …; path: …; none: …; other: ….
- Existing facilities: un-utilized: …; undeveloped: …;
- Types of land development/infrastructure: small bunds: …; terraces: …; other: ………………………………………
- Water control: in rainy season: none: …; partial: …; total: …
- Water control: off-season: none: …; partial: …; total: …

Summary sheet Part 2 of the selection phase: identification/prospection *(continued)*

3. Information on the socioeconomic aspects of the site

► Principal economic activities (indicate the relative importance: 3: much; 2: average; 1: little): artisanal work: …; fishing: …; livestock breeding: … (cattle:…, small ruminants: …); lowland/flooded crops: …; plateau/non-flooded crops: …

► Dominant crops in the lowland:

– Rainy season: rice: ….%; market gardening: ….%; other: ……%

– Off-season: rice: ….%; market garden crops: ….%; other: ……%

– By gender: men: ……; women: ……

► Use of the hydromorphic fringe (indicate the relative importance: 3: much; 2: average; 1: little): not used: …; fallow: …; market gardening: …; tuber: …; leguminous crops: …; other: ……

► Users/farmers of the lowland

– % villagers using the lowlands: ….%

– Ethnic group (indicate, for each ethnic group, the relative importance: 3: much; 2: average; 1: little): ……: (…); ……: (…); ……: (…); ……: (…).

– Origins (in number): natives (…); migrants/foreigners (…)

– Gender/generation (in number): men: (…); women: (…); youth (…)

– Average seniority in the use of the lowland (in years): natives: (…); migrants/foreigners: (…); men: (…); women: (…); youth: (…)

► Market access: easy: …..; difficult: …..

► Destination of the rice (in %): home consumption: ….%; sale: …..%

► Cultural practices on rice

– Use of inputs (indicate the relative importance: 3: much; 2: average; 1: little): fertilizer: ….; pesticides: …; others: ….

– Mode of sowing: direct (seed broadcasting): …..; transplanting: ….

– Principal sources of labor (indicate the relative importance: 3: much; 2: average; 1: little): family: …; local – mutual help: …; locale – daily basis: …; external: ….; other: .....

Give your comments on:

– the relative availability of land in the lowland

– major constraints in lowland farming (e.g.: water management, soil infertility, weed infestation, crop management (rice), ….

– status of women and their role.

Summary sheet Part 2 of the selection phase: identification/prospection *(continued)*

4. Information on the land-related aspects of the site

- If there are several villages surrounding the lowland, there is the need to specify if the users equally come from all the villages, or otherwise indicate how they are distributed.
- Land ownership: (indicate the relative importance: 3 = much; 2 = average; 1 = little):

  individual: …; family: …; village: …; state: …
- Mode of access to land in the lowland by gender and origin of the land-users: (indicate the relative importance: 3: much; 2: average; 1: little).

Types of access	Men		Women	
	Natives	Migrants / foreigners	Natives	Migrants / foreigners
Own – heritage				
Own – gift				
Own – purchase				
Borrowed – without compensation				
Usufruct				
Lease – money				
Share cropping – nature				
Other				

Give your comment on:

- the position of the users *vis-à-vis* the landowners
- the position of the migrants *vis-à-vis* the natives
- the position of women *vis-à-vis* ownership and utilization of the lowlands.

Opinion on the advisability of developing the lowland (considering the biophysical, socio-economic and land-related aspects).

Village validation meeting – preparation, action and evaluation

Not only is it important for the technicians to have collected data on socioeconomic, land-related and biophysical issues (Modules 6 and 7) in order to consider a *Smart-valleys* type of development, they should also know if the community is really interested in investing and collectively participating in such an adventure and how they intend to do so. This is a kind of final selection test.

Learning objectives

At the end of this module, the technicians will be able to:

- determine the social and organizational structure of the community
- judge if the site – from an organizational point of view – is suitable for development
- have an idea about the actual willingness of the community to contribute to the realization of a development project that is likely to take place
- highlight the way in which the farmers and the community can contribute to development and evaluate this contribution
- appreciate the substantial commitment of the landowners, farmers and the community.

Procedure

As was done in Module 6, we propose to roll out this module in three stages, which we shall designate as **9a**, **9b** and **9c** since they are inseparable. The central part (9b) is the meeting, organized on the field and facilitated by the technicians, under the supervision of the trainer-facilitator.

Parts 9a and 9c take place indoors and are facilitated mainly by the trainer-facilitator; these two stages are necessary for the training of technicians since many issues come up during the village meeting particularly in terms of organization, and that is what will determine, to a large extent, the way forward. It is therefore important to take time to prepare the meeting (9a) then draw lessons from the way in which it was conducted (9c) so that each person thereafter can be in the position to adapt it to his/her own situation on the ground.

Module 9a
Preparation indoors

1. The facilitator outlines the objectives and explains to the technicians that they will be organizing a village meeting with the entire community in order to know the organizations working in the village as well as the community expectations vis-à-vis a possible development intervention.

2. He presents the four major sessions of the village meeting.
   - The session on the revision of the process and results obtained so far.
   - The session on watching the film "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa", followed by a discussion so that the community would properly understand what *Smart-valleys* is, as well as the related issues. Indeed, the film is a good way of showing to the community what collective development work entails. The film will also help demonstrate that development work requires the consent of the community.
   - The session involving the analysis of stakeholders – organizations – cooperatives – local and external bodies engaged in the community; the facilitator proposes to do this analysis by means of a Venn diagram.
   - The session that aims to obtain the consent of the community in order to engage and contribute effectively to the implementation of the development project.

3. The facilitator divides the technicians into four groups.
   - One group prepares a summary of the information to be presented (see Module 8 sheet) and prepares a few flipcharts sheets with the key words summarizing the information on the biophysical, socioeconomic aspects as well as on land issues.
   - The second group prepares the discussion based on the SMART-valleys film.
   - The third group prepares the session involving the drawing of the Venn diagram and the analysis of the associations.
   - The fourth group prepares the discussion aiming at obtaining the consent of the community to get involved and contribute effectively to the implementation of the development project. Reference should be made to the results of the Venn diagram, considering the commitment of cooperatives/existing institutions: (internal and possibly external), membership of landowners, farmers, the community, everyone's contribution.

4. The facilitator appoints two technicians who are the main facilitators of the meeting and specifies that there are also two or three observers. For each of the four seasons a session facilitator should be appointed, as well as two or three rapporteurs.

5. The facilitator specifies that after the meeting they will have to put together all the information received, that is, information coming from the diagram and from the responses obtained during the meeting.

Module 9b
Conducting the village meeting

Like in Module 6b, it will be necessary to re-explain to the villagers that "outsiders" will be participating in the field activities in line with the training as part of the training activities of the technician-facilitator and therefore towards building the capacity of the project.

As a first step

A project officer, an extension officer, an NGO or other – engaged in the community – has informed the local authorities about the holding of a big village meeting on such and such date, time and venue.

1. To give more weight to this meeting, it is important that the village chief or other village authority opens the meeting.

2. The main facilitator welcomes everyone and outlines the objectives and the proper conduct of the meeting. This is followed by the introduction of participants: the technicians and the *Smart-valleys* facilitator, the local authorities, representatives of local organizations (e.g. NGO), landowners, livestock breeders, men in rice farming, market gardeners, women in rice farming, the young (others, depending on the situation), etc.

3. The facilitator of the session broadly explains the main activities in the process that has led to the present moment. He/she also presents a status report:
   - he/she recalls the fact that a village meeting was held (Module 6) and the field prospection done (Module 7) and explains that they required the necessary information to judge the suitability of the site for the development program
   - he/she presents the main outcomes from the biophysical, socioeconomic and land-related points of view
   - he/she deduces from these points of view that the site is technically suitable for development.

4. However, the principal facilitator explains that that is not enough to buy into the program and that more information is needed. The facilitator proposes to watch the film "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa", and indicates that after the film they will try to obtain the information they still need.

5. Thereafter, the facilitator of the session devoted to watching the film now presents the film which is followed by a discussion: the session facilitator asks the villagers for their opinions, impressions and assessment regarding:
   - the development of the lowland and the most important activities, in their own opinion (how is the: clearing of the lowland, preparation of the plan, pegging of the field, digging of canals, construction of small bunds, setting out the plot, tilling the plots, levelling the plots, water

management, maintenance of facilities)
- how was the development work carried out (and specifically how was the communal labor organized)
- how do they generally see the cooperation among various individuals of a community
- at what stage (activity) was cooperation, communal labor more important
- in their situation, what will be the greatest challenge and how do they see themselves overcoming it?

6. The main facilitator revisits the necessity for participants' commitment to the development activity: it is not the project that will do the work, but the community. The work takes a long time and therefore the farmers and the community should be aware of this and commit themselves to begin the work and continue for a long time.

7. Then, the facilitator of the session on the Venn diagram takes over and introduces the objective and the process involved in drawing a Venn diagram.
   - The villagers are divided into two groups: a group of women and a group of men; each group is assisted by one of the three technicians.
   - Each group receives a flipchart; each group maps out the main groups, local and external associations present and engaged in the community and the relationships existing among them; priority is given to groups/organizations that have something to do with the lowland; *it is important to find out specifically who takes the decision/gives authorization for work to be done in lowland*.
   - The facilitator explains that one person in each group who can write will take notes and will be the rapporteur.
   - The technicians/observers ask question but are particularly listening in order to obtain every possible piece of information on the organization engaged in the community.
   - Once the sheets are filled, the rapporteur of each group will present in plenary the diagram on the flipchart.
   - A discussion follows the two presentations, leading to a summary of the two diagrams.

Objectives

Help the villagers identify the village institutions and stakeholders, and examine the relationships between them and the importance of these relationships with regard to the commitments towards implementing the development project.

Methodology

► *Identification of local and external organizations by socio-professional groups*

– The villagers do an inventory of the local and external organizations in the village who contribute to the development and to the economy of the village: first, the local organizations (e.g. the village development association, the group of rice processors, livestock breeders, fishermen, youth groups; but the local authority also can be considered as a village organization); followed by the principal external organizations engaged in the village and contributing to development.

– Visually present the organization in the form of "circles" of various sizes corresponding to their importance for the village development.

– The villagers indicate the principal activity of the most important organizations.

► *Table*

Organization	*Number of members*	*Principal activities*	*Relationship with lowland*	*Role in Smart-valleys*

► *Drawing of Venn diagram by socio-professional groups*

– The basic principle of this diagram is to create a symbol for each organization in the form of a circle. The size of the circle reflects the importance of the organization. The interactions among the organizations are symbolized by arrows. The method gives a lot of freedom for participants to be creative. Conflicts may be represented by the symbols ✎ or ↯ or >, the thickness of the arrows indicates the significance of the relationship.

– A Venn diagram is therefore drawn in order to know the relationships among the local organizations in the village. Concerning the relationships with outside organizations that would carry out activities, the Venn diagram can be enriched with all those engaged in doing something in the village.

8. For the last session of the meeting, the facilitator of the session starts a discussion aimed at achieving the community's consent to get involved and contribute effectively to the implementation of the development project.

   A technician-rapporteur carefully writes down the major conclusions on a flipchart, clearly displayed for all to see.

   - On the basis of the results from the Venn diagram, can one suppose that the existing (local

and possibly external) groups/organizations are committed?

- ◊ First of all, can the landowners specifically state their position?
- ◊ Then, what is the opinion of the farmers?
- ◊ What, specifically, is the opinion of the women and the young; do they not see any "risks"; will the development not risk compromising their position and the role they currently play in the lowland?
- ◊ What about the commitment of the entire community?

- Which internal or external organization in the community would be interested in taking up full responsibility; which of them is best placed to be the leader?
  - ◊ If there is no organization that could be the leader, there would probably be the need to create one, in case the community is still interested in carrying out the development work.
  - ◊ Here … the facilitator insists that it is a matter of communal labor, that they need to organize themselves; he asks if they are still interested.
- If the response is still yes, the technician asks what specific kind of contribution would be made by:
  - ◊ the landowners
  - ◊ the farmers
  - ◊ the women and the young specifically, and
  - ◊ the entire community.
- The technician thanks the audience and says the data obtained today will help complete the site information that has been filed and which will be submitted to the project coordinator for approval/validation. He points out that the team will return after the validation, if the latter is confirmed.

9. The meeting is brought to a conclusion by the village chief and the landowners.

Module 9c
Indoor evaluation of the meeting

There are two types of evaluation: methodological evaluation (how the meeting was conducted) and evaluation of the outcomes, that is, the information obtained on the social organization, which should help determine the possible suitability of the site for development.

1. After the meeting, the facilitator returns to the class (office) and asks the four groups to do a kind of self-evaluation and state their strong and weak points, what worked well and what did not work so well.

2. Thereafter he asks the observers if they have remarks and what they would have done and how they would have reacted.

3. The facilitator summarizes the responses and asks the technicians what they learnt from the meeting from the **methodological point of view** and what improvements they could add to the way in which such types of meetings are conducted. He summarizes the responses and concludes the evaluation of the methodology.

4. Then, the facilitator writes on the board: **evaluation of the content of the information** obtained.
   - All the information from all the observers, the facilitator and the technicians is listed. The information is "structured" in a list (see example below).
   - Thereafter, the quantity and relevance of the information received will be determined: is there enough information on the organizational and social structure of the community and on its willingness to contribute, to determine if a dossier will be made and submitted (see Module 10) for validation of the site.
   - If the response is affirmative, the facilitator asks the technicians to put together all the data obtained in Modules 6, 7, 8 and 9 in order to build a dossier (Module 10).
   - In case there is no consensus, there will be a discussion during which each one will defend his/her point of view until they arrive at a decision if yes or no the site will be accepted to build a dossier.

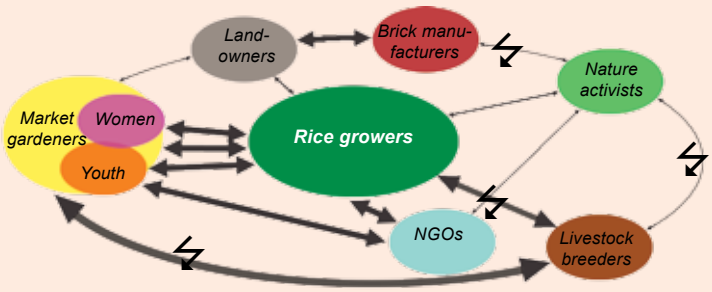
In case several sites are accepted a kind of final classification should be worked out by consensus (it goes without saying that only the sites that have been chosen by the entire community and for which the villagers will make specific contributions will be at the top of the list).

Materials required – supplementary documentation

- A video projector.
- The video "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa".

Example of a list of summary information on the village organizations and acceptance by the villagers of the *Smart-valleys* development

1. Copy of the Venn diagram



2. Analysis of the external and internal organization (in the form of a table)

Name of the organization	Relative importance (number of members)	Principal activities	Relationships with the lowland	Potential role in *Smart-valleys*

3. Opinion on community engagement in the *Smart-valleys* type of development, specifically:

- from landowners
- from farmers
- from women and the young
- from the entire community

Example of a list of summary information on the village organizations and acceptance by the villagers of the *Smart-valleys* development *(continued)*

4. Video: SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa

5. Organization that will take the lead in organizing the *Smart-valleys* communal labor. Nature of the organization (existing: external/local; new, reason, justification)

6. Specific nature of the contributions by the various groups

- from landowners
- from farmers
- from women and the young
- from the entire community

7. Conclusion of the team of technicians

Final decision and justification by the team of technicians regarding the validation of the site.

Preparing a report

At this stage of the process, reports for the sites accepted at the end of Module 9 will be compiled with all the data obtained from these sites. That is, the data from Module 8 sheet and the list of data from Module 9. These reports should be submitted to the project coordinator.

For training purposes, there will be only one report for all the technicians.

Learning objectives

At the end of this module, the technicians will be able to:

- prepare a full report with all the data and information obtained during the two village meetings and the lowland prospection.

Procedure

1. The facilitator outlines the goal of the module.
2. The facilitator says that the report must get to the project coordinator for validation.
3. The facilitator requests that they imagine they are in the shoes of the coordinator when he is compiling the report, and to ask themselves the question: what does the coordinator expect to find in a report? A discussion follows.

Notes for the facilitator

If the technicians are facing challenges, the facilitator can make suggestions:

- a complete report (general, biophysical, socioeconomic, land-related, structural, social and organizational data) but not voluminous (the coordinator receives plenty of dossiers for sorting and validation)
- a clear and well-structured report
- a neat report with a cover page indicating the name of the site and the logos of the project-program, the name of the project and the names of the persons submitting the report
- a clear final page where the coordinator only has to state his decision: accepted for validation or not accepted, and why he took this decision, the date and his signature, stamp (see example 2 below).

4. The facilitator proposes that they get into two groups, and asks each group to compile a report using the summary sheet of Module 8 and the summary list of Module 9 and in line with the previous principles.

5. The two groups present their report in plenary and a discussion follows; agreement is reached to merge the two reports into one, which will be submitted to the coordinator for validation.

6. The facilitator says the technicians should be ready to respond if the coordinator wants some clarification on the report.

Example of a cover page

AfricaRice

Logos

Name of the project

Name of the site

Names of persons submitting the report
Date of submission

Example of the final page of the report

The site (name of site) is validated for development by the project (name of project)

✓ Approved ✗ Not approved

Justification of the decision:

Date:

Coordinator's name Coordinator's signature

Project stamp

Annexe to Module 10

Sites validation by the coordinator

Introduction

The validation is an exercise to seek approval for the sites chosen by the technicians and ensuring the reliability of the data collected with the view to limiting failures during implementation.

Here, the technicians who have selected the sites do not intervene, except, as it may be, to introduce the coordinator (or his team) to the farmers and the community.

This annexe is meant for the project/program coordinator, but the technicians should open their ear and be available to provide further explanations on the report, if necessary, to the coordinator.

Procedure

The validation is done in three phases: examination of the report, field visit and meeting with the community.

For the last two phases, the information and data in the report submitted by the technicians are verified and a favorable or unfavorable decision is pronounced.

Recommendations can be made if the weaknesses are minor. Otherwise, the report and the site are rejected.

The validation by the coordinator enables the organization that carried out the selection exercise to:

- do self-evaluation
- be covered in case of failure of the field activities after a positive decision, and
- reassure the donor about the chances of success of the activities to be carried out.

Phase 2

Developing lowlands with the *Smart-valleys* approach

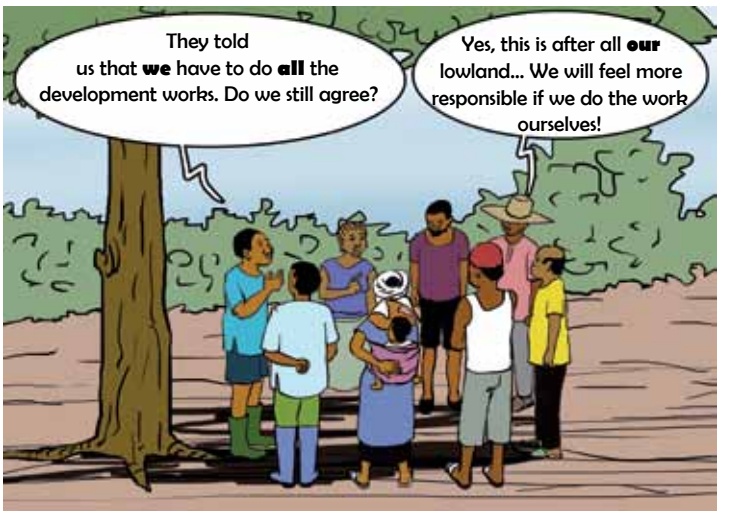
Developing lowlands with the *Smart-valleys* approach (Modules 11 to 17)

The second phase of the *Smart-valleys* approach comprises seven modules. Before actually starting with the land-use development work, there are several preconditions to satisfy. This starts with planning and organizing the work (***Module 11***). Indeed, in each of the selected sites (Module 10), a big village meeting will be organized in order to discuss with the villagers how to get organized and come to an agreement on a specific program of activity. Then, ***Module 12*** aims at consolidating the technicians' knowledge with regard to the principles of drainage, lowland development and the preparation of a land-use development plan.

Module 13 presents the actual beginning of the communal labor, involving the clearing of part of the lowland to be developed. ***Module 14*** is central in the land-use development phase. A land-use development plan is designed on the basis of a basic map (sketch) prepared in close collaboration with the users of the lowland. Once the villagers approve the plan, pegging can start. ***Module 15*** deals with the practical part of pegging, which is done together with the villagers. Demonstration of land-use development work is done in ***Module 16***. This, again, is a session of communal labor in the lowland. Phase 2 ends with some aspects of developing the plots, already treated in ***Module 17***.

It is important to note that *Smart-valleys* type of development is a significant investment by the villagers and more specifically by the rice-farmers. Some critical conditions for the success are, for example:

- the level of participation and compliance, by beneficiary communities, with their commitments
- agreements between farmers and landowners
- actual time spent individually and collectively
- availability and accessibility of materials
- solidity of works done in the first years so as to avoid open gaps and even significant damage.



Planning and organizing of the *Smart-valleys* development work

This module corresponds to the first stage of the actual land development phase.

The first phase (Modules 1 to 10) ended with the final choice of the sites, from among those that had been pre-selected, they will be developed with the support of the project. In each of these cases a village meeting should be organized to inform the villagers that "their" lowland has been considered by the project/institution for development with a *Smart-valleys* approach; then, after recalling the procedure, a discussion is held with them to see how they will organize themselves to undertake the project and agree on a specific program for carrying out the activities. This meeting is the key objective of this module.

Meanwhile, the profile of the technicians engaged to support the process is more often that of "developer" rather than that of facilitator or specialist on organizational issues. That is why, at this stage, we propose to devote a good amount of time to prepare them for this aspect of facilitation and support, as was the case for Modules 6 and 9.

Learning objectives

At the end of this module, the technician-facilitators will be able to:

- prepare and facilitate a village planning meeting for *Smart-valleys* development
- support the community to organize themselves to develop and enhance the value of the lowland
- program the development activities in consultation with the people.

Procedure

As has been indicated in the introduction, we propose to roll out this module in three stages, which we call **11 a**, **11 b** and **11 c** since they are inseparable. The central part (11 b) is the meeting, organized in the field and facilitated by the technicians, under the supervision of the trainer-facilitator. This field is the selected site, which will serve as an action-training platform for the subsequent modules

Parts 11 a and 11 c will take place indoors and are facilitated mainly by the trainer-facilitator; these two stages are necessary for the training of the technicians since many issues are considered during the village meeting, particularly in terms of organization, and that is what will determine, to a large extent, the way forward. It is therefore important to take time to prepare the meeting (11 a) and then draw lessons from how it has been organized (11 c) so that each person then will be in a position to adapt to his/her own situation on the ground.

Module 11a
Indoor preparation

1. The trainer-facilitator starts the session with a round table discussion and asks the following questions:
   - what is the next stage?
   - what are the objectives of the village meeting?
   - what are the critical issues of this meeting?

The key words are written on the board.

Notes for the facilitator

Create awareness among the technicians that the most critical issue at this stage is to practically mobilize the villagers to organize themselves towards the implementation of the development works. Of course, the organizational capacity, motivation and interest of the people constituted one of the major criteria for the choice of the site, but henceforth the reality of the facts will have to be faced. The principal risk at this stage is to underestimate the investment and to neglect the organizational effort required.

It is very important to mobilize as many farmers as possible, explain to the latter that the lowland to be developed is school lowland where everyone will come to learn practical work as well as the organizational aspects.

2. Then, the trainer-facilitator outlines the objectives of the module and goes ahead to prepare the village meeting.
   - First of all, a list of "useful" information gathered during the selection phase is established, particularly information obtained during the previous village meeting (see Module 9c: especially points 4 and 5 of the information summary report):
     - ◊ the Venn diagram and the analysis of the internal/external organizations
     - ◊ the organization that will take the lead in organizing the work
     - ◊ the nature of the contributions.
   - Thereafter, the trainer-facilitator presents the three major sessions of the meeting in the form of a table, with one column indicating the responsibility of the technicians in organizing/facilitating the sessions.

Session	Segment	Tools required	Technician-facilitator in charge
1: Introduction	Information		
2: Stages of the process	a) Identification of the stages b) Implementation of the process	Film	
3: Organization of the work	a) General organization b) Scheduling of the activities c) Logistics issues	List of stakeholders Checklist of materials	

3. Then, two or three groups, depending on the number of farmers mobilized, are constituted. Beyond this number management becomes difficult. Each group will review in detail the procedure of a sequence, based on Module 11b (one group per sequence of the sessions 2 and 3), in order to ensure that what has been proposed is clear, to ensure feasibility and agree on the key points to capitalize. In this regard, the groups work with the guidelines of Module 11b and answer the following questions:
   - is the proposal clear?
   - what information should be gathered before the meeting, which tables are to be filled (prepare on a flipchart the tables to be filled)?
   - does the proposed procedure appear feasible? What are the challenges that could arise?
   - what information will be particularly important to capitalize during the sequence?

Notes for the facilitator

The "outsider" technicians should assume the responsibility of observers for the purpose of capitalization. It should necessarily be "local" technicians who are responsible for facilitating the meeting itself, so that there would not be any ambiguity vis-à-vis the villagers about their discussion partners (with whom they will subsequently maintain contacts, and to whom they will turn in case of a problem).

In the work done in sequences, it is important for participants to be aware that a meeting is not improvised, though that does not mean one knows in advance what will happen precisely, but that one is prepared for a range of possible outcomes. This meeting should enable to collect essential information for the next stages of the process, particularly with regard to organizing the villagers.

4. In conclusion, the trainer-facilitator emphasizes that as the meeting progresses, the villagers are expected to be more and more active.
   - First of all the official announcement of the news (that the villagers' lowlands have been selected for development) comes from outside.
   - Then, reminder about the procedure of the development works; at this time it is the technicians who have much of the information and they support the villagers in the identification of the various stages of the process.
   - Finally, the time devoted to the organization and planning of the work by the villagers; the technicians then play a facilitation role and the villagers, in principle, will take over.

Materials required – Supplementary documents

- A video projector.
- The film "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa".
- Module 11b guidelines (1 per participant).

Module 11b
Conduct of the village meeting (one or two meetings)

Similar to Modules 6 and 9 we are in a situation of action-training where a real meeting serves as a means of learning for the entire group of technician-facilitators. In the specific case of training, it will therefore be necessary to explain to the villagers that "outsiders" will participate in the field activities in line with the technician-facilitators training activities and therefore towards capacity building for the project.

As a first step

A project officer, an extension officer, one NGO or other – engaged in the community – specifically agreed with the local authorities on the holding of the meeting: WHO should be present, with the date, time, and precise venue. (Specify that the meeting will be a bit long: at least two hours). On the other hand, it should not last too long in order not to bore the participants.

► *Session 1: Information*

1. The news that the villagers' lowland has been selected for the *Smart-valleys* approach development is announced officially either by the technician (or a project officer) or by an official of the village who has been previously informed.

2. The technician then announces the schedule for the rest of the meeting: there has to be, first of all, some agreement on the work to be done first, and then to decide what kind of organization will be adopted to undertake the work. The technician insists that the two steps are important and that the active participation of all is necessary. The villagers should not hesitate to ask questions if things are not clear.

Notes for the technician

There is a lot of work to be done during the meeting, don't waste too much time with speeches, etc.

► *Session 2: Rolling out the development process*

During the first village meeting, the process had already been presented. However, it is necessary to let the villagers acquire an accurate vision of the development process: stages, content and schedule. Session 2 is divided into two sequences: the stages and the implementation of the process.

Sequence 1: Stages of the process

1. The technician announces that a film will be projected (which they have probably already watched). He insists that it is not a model to be copied exactly, but that this example will be used to determine together the different stages to be followed in the development of the lowland, using a *Smart-valleys* approach. This will give a preliminary idea about the work to be accomplished stage by stage and every one should watch the film with this in mind.

2. Projection of the film.

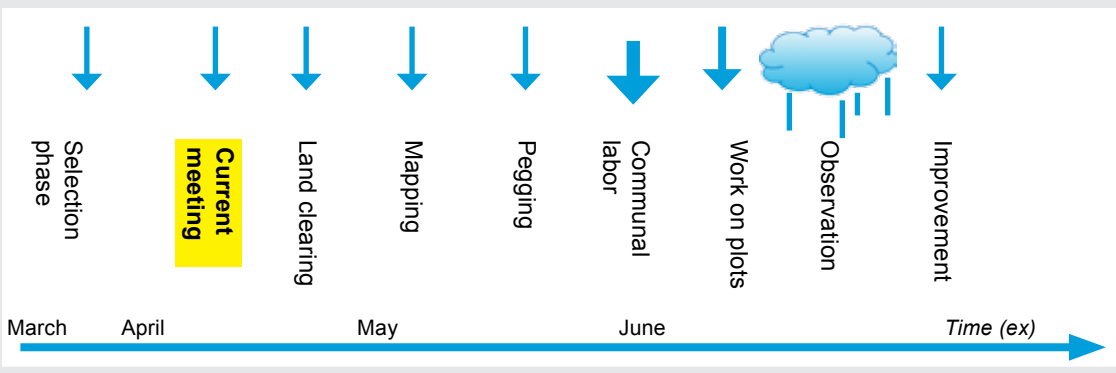
3. After the projection, the technician asks the villagers about the different stages they identified. He asks: what happened initially? Then? Etc. He makes them specify for each response the chronological position (that happens when? after what…).

   He writes down the responses, as they are given, on a board (black board or flipchart) while taking care to ensure that he can place the stages in the right order (if for instance the villager forgets a stage, he leaves a gap and later fits it in the right chronological position). At the end there will be a list of the different stages of the work to be done at each stage (stages which often are mentioned together).

4. Presentation of the schedule: on a time-line, the technician asks the villagers to indicate the major stages and then it is pointed out that we are currently at the stage "before" the land clearing, that is, the meeting to agree on the planning and organization of the work to be done (see below an **example** of the schedule).

Notes for the technician

The villagers will often mention actual activities, rather than stages: for example "dig canals with hoes (*daba*)", rather than "undertake communal labor", or "level the field" rather than "develop the plots". What they say should be noted down and, at the end, establish together with them, based on what they said, a chronological list of the stages and the work to be accomplished at each stage.



Sequence 2: The actual implementation process

1. The technician then asks the villagers, stage by stage, what are the decisions to be taken and what skills are needed. He adds a column to the table, if that is possible, where he writes in a different color.

Notes for the technician

It is at this point that, for example, the following will be noted:

– the area to be developed should have been determined before starting the clearing

– there is the need to have people who know the lowland to do the mapping (perhaps some elderly people, even if later they are not asked to participate in the arduous work).

2. Thereafter, the technician reminds the villagers that what they saw in the film is just an example and that they will have to adapt it to their own situation. They now have to ask themselves several questions.
   - After watching the film and establishing a table of the stages and tasks, what are their expectations and apprehensions with regard to implementation, in their case?
   - To ensure that everyone gets the chance to express themselves, the technician asks the participants to get into groups (for example women, rice farmers, market gardeners, the young, the elderly, …) and discuss the questions in the groups (except if there are less than about fifteen people, in which case the discussion can be done in plenary).
   - Then the discussion is summarized point by point: the expectations, then the apprehensions.

Notes for the technician

If the apprehensions are about lack of know-how, the technician reassures the villagers about the fact that he will support them.

If the apprehensions are about the social and organizational aspect, the technician explains that it will be dealt with in the third part of the meeting.

3. Finally, the technician will revisit two questions, which will certainly arise from the list of expectations and apprehensions: the schedule and the area to be developed.
   - Concerning the schedule, the technician briefly recalls the constraints: no development activity can take place when there is too much water … (but also, it is difficult to work when it is too dry).
   - For the decision concerning the area to develop, the discussion should be open; the technician should insist on the fact that it is the first phase of the work and that the villagers subsequently will be in a position to extend the development of the land in the following years. What is feasible/reasonable should therefore be determined and that depends, first of all, on the

number of workers that could be mobilized. Depending on the situation, this latter point could be decided upon at the next stage.

Notes for the technician

- Remind the groups at the beginning that each group should appoint a rapporteur.
- The questions can be reformulated differently: do they think it could work the same way as in the film? If not, what changes do they think could be brought in? Do they see any possible challenges?
- What is very important at this stage is that the villagers are aware of the "communal labor" dimension. If this does not come out, questions such as these may be asked: "In the film, who works in the lowland?" "Does everyone agree?" "And with you, how do you think it would work?"
- Similarly, if the issues about the schedule and the area are not brought out, the technician can ask: "Concretely, when do you think is the appropriate time to do the work? Covering which area?"

► *Session 3: Organization and scheduling*

Session 3 is divided into three sequences: organization and scheduling of activities and handling logistics issues.

Sequence 1: Organization of activities

1. The technician revisits the importance of sharing responsibilities between the villagers and the technician.
   - He insists first of all on the fact that he does not assume responsibility for the works; he is there to provide support; it is the villagers who do the work and organize themselves.
   - Then, he again raises the issue of how important it is to take firm decisions on the roles and responsibilities in line with the decisions taken during the previous village meeting (see Module 6) as reported in the summary document (Module 9).
2. Then, the technician goes into the details of identifying the stakeholders. In doing so, he presents a table, which he had prepared on the basis of information obtained during the selection phase and summarized in the dossier (Module 9). He indicated in a column who the direct

Notes for the technician

Avoid questioning all the decisions, which have already been taken on the sharing of responsibilities. However, there is the need to actually confirm that the right choices were made; it is still time to make changes if necessary (and that may be the case after a thorough analysis of what is yet to be done).

The question may be asked as follows: "This is what we recorded the last time in terms of sharing of responsibilities. Do you confirm it or do you think there is the need to change something?"

"beneficiaries" were, while distinguishing the different groups, for example, market gardeners (note that market gardening is not practiced in all the lowlands, since the soils are not the same), rice farmers, other, and the champion (or champion group).

3. Thereafter, he asks each group concerned to evaluate the labor force it represents and specifically indicate if they can possibly mobilize other people (on what basis: social connections, indirect beneficiaries, …)? It should be possible, at the end of the discussions, to estimate the labor that can be mobilized (in man × day).

4. Then he insists on how important it is to identify and choose a group leader.
   - In that regard, he starts by recalling that when a significant number of people are being mobilized, it is necessary to get organized; this means identifying a "core" group or "driver" (the users, those who actually know the lowland should be involved); but this does not prevent greater mobilization for the work itself (but in the latter case, it presupposes that everyone sees the usefulness of doing so, or that there is a kind of exchange of services).
   - Thereafter, the technician explains that according to the local habits, when one talks about "organization" the villagers can quickly understand "formalization" (with an office, statutes, etc.). In our case, it is not at all indispensable, and, in any case not urgent, to formalize.
   - He then says that for reasons of efficiency, it is still appropriate to appoint from among the group some individuals who will serve as the main contact persons of the technician. (Two persons are often adequate). It is very important, because the technician does not spend 100% of his time in the village and more so because it is not "his" project. The technician then asks the villagers to appoint two "*Smart-valleys* delegates". He immediately exchanges contact numbers with them.

Notes for the technician

According to the villagers' experience in matters of organization and the initial specific context (there already are, or not, some organizations in the village, which work together very well or not; these same organizations are, or not, stakeholders/leaders for the development of the lowland). It might be useful/necessary to envisage a second meeting after a few days to give the stakeholders some time to decide among themselves on how they are going to specifically organize themselves for the development and how they will organize the subsequent development of the lowland. In this case, it is mainly about revising the planning chart.

Sequence 2: Scheduling of activities

Once the stages are clear and the general organization is determined, it is time to start the actual planning of the activities while taking into account the manpower needs, the scheduling constraints… that is, indicating who will do what at each stage.

1. The technician starts by recalling the list of stages in the development process as they came out at the beginning of the meeting (Session 2) and he notes them down in the schedule below.

2. Then, for each stage, the technician discusses with the villagers on the specific tasks and takes notes in the form of key words placed in column 2. Thereafter, the villagers discuss and decide on the specific participants for the particular stage and indicate the person in charge as well as the time frame for completion.

Notes for the technician

If the number of participants at the meeting is high, it could be more efficient to treat this last part with a small group (in which the stakeholders are represented), on condition this group is committed to sharing the information with everyone and that each one knows when he should be mobilized and for what purpose.

Stage	Task	Participants	Person in charge	Period

Do not forget as part of the tasks: relations with the technicians, fixing of dates, convening to the project site, preparation of logistics, who accounts to whom for what …

Discuss (for each stage) about the minimum number of persons required for the work. They should be quite many but not too many either; otherwise there is loss of efficiency.

Period, dates: take into account the challenges faced by the villagers and the technicians in other to arrive at a compromise; insist on the fact that the technician(s) should be there at least at the beginning of each stage, that the continuation of the work can subsequently be carried out without him, at some stages (clearing, actual development: digging, construction of bunds).

Sequence 3: Logistics issues

1. In this 3rd sequence of Session 3, the technician establishes, together with the village leaders, a list of equipment required for the work, distinguishing the first stage (clearing) from the subsequent ones (development).

2. Thereafter, the villagers are invited to charge someone to put together the collective equipment on the expected date, and/or indicate to each one what they should bring along to the site (machete, hoe/*daba*, other).

Module 11c
Evaluation of the indoor meeting

The evaluation comprises basically two parts: evaluation of the methodological conduct of the meeting and identification of the challenges relating to the development of the specific site.

1. *Conduct of the village meeting*

   The trainer-facilitator starts with a debriefing session in plenary, during which, sequence by sequence, the participants share their evaluation on how the meeting was organized as well as their suggestions on how improvements could be made (or adaptation to specific cases) from the point of view of facilitation.

2. *Challenges related to implementing the process in the particular case*

   Then the technicians discuss the major challenges they see in this particular case. The objective is to stimulate their thinking and their capacity to anticipate potential challenges when they are in their own field.

Notes for the facilitator

Ensure that the technicians properly perceive the possible social issues at stake, organizational problems or other. It is too early to resolve these problems, of course, but there is a risk, especially with those who have too much of a developer/rural engineering profile, to neglect these issues.

Materials required – Supplementary documents

- A video projector.
- The film "SMART-valleys – Developing inland valleys for rice-based systems in sub-Saharan Africa".
- Table of beneficiaries to be prepared (see Module 9).

Principles of lowland development and simplified mapping

If all the technicians master these notions perfectly, including their application on the field, this module is not necessary. If that is not the case, the facilitator will ask the technicians who are not specialists in development to read the document in Module 2 of the facilitator's manual PLAR-IRM before the session.

This module aims at consolidating the technicians' understanding of the hydrological principles for effective lowland development. It is in fact a supplement to and a more detailed exposition of Module 2. The essential notions about water circulation in the presence or absence of land development are revisited so that the technicians can feel more at ease in drawing up the map of the lowland and the sketch of the provisional land development plan.

Besides, this module aims at providing the technicians with the minimum know-how in marking out and drawing simplified maps. This module does not necessarily require to be in a lowland. It is however necessary to go out with the group into an open space that is quite vast and not too "simple" (for example a cultivated field, a park or a large place, not a football field!) for the practical exercise on mapping.

Learning objectives

At the end of this module, the technicians will be able to:

- understand how the hydrology of a lowland works and explain this in simple terms to the villagers concerned
- ask the villagers relevant questions and draw an "operational" map of the lowland towards the preparation of the land development
- understand the land development principles and use them to mark out a land development plan.

Procedure

The module comprises three sessions. First of all, a reminder of the hydrological principles is given, followed by a practical exercise on mapping and a summary of the principles of land development.

Notes for the facilitator

If there are different skills among the group members (the most frequent case), the trainer will count very much on co-learning. However, the trainer should ensure that they all express themselves and that the discussion is not dominated by those who "know".

► *Session 1: Water circulation: reminder of the hydrological principles*

1. The key points are revised by means of questions/answers. The questions asked by the trainer-facilitator are the following:
   - what determines water circulation?
   - which route does the water follow?
   - what could influence the route?

Notes for the facilitator

The slope determines water circulation; water always follows the steepest possible slope line at a given place: in the absence of any obstacle, it even tends to go down vertically. Of course, limited permeability of the soil material constitutes an obstacle and limits the infiltration as well as the speed of the water: in short, the faster the movement of the water, the less it has time to infiltrate.

2. The facilitator then asks the participants to deduce from the revision the major characteristics to be identified on the ground: it is basically the direction and the steepness of the slope, landmarks, prominent objects and possibly some obstacles.

Notes for the facilitator

Verify that the notions concerning slope measurement are well understood (to what does a degree (°) correspond when it comes to slope) and that the technicians have in mind the order of magnitude when they see a slope (know by sight how to distinguish a slope of about 1°, 5°, or 30°).

► *Session 2: Mapping: practical exercise*

As a first step

Before the session, the facilitator should have identified and "prepared" the area to be mapped.

The area to be mapped should be relatively open and quite clearly indicated, for example "the area between the two-storey building, the fence and the mango tree", or, "the piece of land comprising the old maize field and the plot with cowpeas". It should include some landmarks (particular trees, anthills, stone blocks, wells…); if there are none, they should be created: plant a stick, raise an earth mound or a heap of stones, place a bag, etc.

1. The facilitator points out to the participants that they will have to draw a map of an area of about xxx m^2 (without a compass or measuring tape). He checks to find out those who already have some experience in this area. He specifies that the group will begin by agreeing on the procedure to follow.

2. The facilitator asks each one to reflect on the way in which he/she intends to go about it, and the participants exchange their ideas.

3. Thereafter, the facilitator provides a brief overview of the types of lowlands and the slope estimation.

- The slope of the lowland will vary, depending on the type of lowland and within the same type of lowland. We distinguish two major types of of lowlands namely, V-shaped lowland and U-shaped lowland.
- The V-shaped lowland: there are generally two types, namely lowland with one slope leading to a highly prominent drainage canal or a water-course, and the V-shaped lowland with two slopes and very prominent drainage canal, generally comprising a small watercourse with temporary water flow.
- The U-shaped lowland: it always comprises two slopes. The drainage canal may be prominent or not.

Number of weeks after end of rains	V-shaped lowland (sharp slope)		U-shaped lowland (gentle-average slope)	
	Water flow	Crop behavior	Water flow	Crop behavior
1 week	Slow	Beginning of withering	Normal	Excellent
2 weeks	Nil	Complete withering	Quite good	Good
3 weeks	Dry soil	Dried plants	Slow	Quite good
Recommendations	Land development is possible, but requires a lot of tact; impossible to use in the dry season.		Recommandable for land development, for rice and other dry-season crops.	

Notes for the facilitator

It is extremely difficult for a farmer to grasp the notion of slopes. To enable him to understand this notion, we are going to sketch the examples based on simple physical objects present in his environment and which he sees or has close contact with everyday.

How can the farmer recognize the two types of lowlands in the landscape?

For a V-shaped lowland

The V-shaped lowland with one slope: the slope may be compared with an inclined tree. The principal cause of this inclination is wind. The inclination would be average, sharp or very sharp depending on the intensity of the wind. The degree of inclination of the tree will represent the degree of the slope.

Notes for the facilitator *(continued)*

For a V-shaped lowland

The V-shaped lowland with two slopes will be represented by a forked tree with two branches. One branch represents a slope and the second branch the other slope, and the junction between them is the drainage canal. In case this junction is sharp and narrow, the drainage canal will be quite prominent and overdeepened. In the opposite case, this line will be a bit or averagely large and less overdeepened.

For a U-shaped lowland

It can be compared with a bowl used by women to measure cereals in the market or with a basin used to fetch water from the well or pool or for carrying various objects from the farm to the house or goods from home to the market. Assume the bowl (or basin) is cut through in two equal parts. The bottom of the bowl or basin is still flat and therefore can be compared to the bottom of a U-shaped lowland. The bottom of the bowl or basin will represent the difference between the U-shaped lowlands. The bottom of the basin is always larger than the bottom of a measuring bowl. The same goes for the bottom of U-shaped lowlands. In case the bottom is flat and small, the slope will be sharper and if the bottom is large the slope will be gentle.

4. The facilitator concludes by proposing a common approach and by some practical indications and recommendations for each stage.
   - We start by tracing the overall contour: do we have more or less a square, a rectangle, a trapezium, a polygon – of how many sides? A rough sketch is drawn.
   - Then the sides and/or cross-sections are measured and that enables the tracing of a more precise contour.
   - Finally the required supplementary information is reported (slope, direction…) as well as others (prominent landmarks).

Notes for the facilitator

During the first discussion, give the floor first to those who are less familiar with the exercise.

Thereafter, indicate for each stage how to go about it in practical terms. (If there are technicians who have a good understanding of mapping, ask them to do it, once the stages have been specified):

- measurement: counting with footsteps is the most convenient, but the steps must be calibrated in this particular case: the length of the step changes not only from person to person but also, for the same person depending on the speed and the conditions of the field
- marking the direction (North–South)
- positioning of the dominant landmarks
- identifying the general slope, marking the slope
- drawing to scale (that is, a distance represented by 1 cm at one end of the map is also represented by 1 cm at the other end … and that it is clear what corresponds to 1 cm on the map: 5 m, 10 m, 30 m…).

5. Then, the facilitator constitutes several (three or four) groups to work in parallel to establish the map of the same field. The trainer should also make the map (or should have done so before) in order to have reliable references.

6. The groups go out to the field with the required material (sheets of paper and holder, pencils), the facilitator shows them which zone should be mapped and gives them 30 to 45 min to work, depending on the area and complexity of the terrain.

7. Once they go back indoors, the groups quickly finalize their maps on a flipchart sheet and display it. The facilitator gives the participants a few minutes to observe the various maps.

Note for the facilitator

If none of the maps drawn by the groups is satisfactory, prepare a flipchart showing the "correction".

8. The facilitator thereafter leads a discussion in plenary to compare the results of the groups and discusses the reasons for the differences:
   - were the instructions properly followed?
   - are the differences related to the observations (measurements) on the field or to the traced map?
   - if necessary, the trainer displays his own map, particularly if there are major errors in the participants' maps, such as problems of scale.

Note for the facilitator

Insist, for the benefit of the participants, on the fact that a map of this nature is drawn while having in mind the use to which it will be put: the aim is not to have a very "nice" or extremely precise document in terms of distances and area; nevertheless, the respective positions of the various points must be strictly respected and the informations on the slope well noted.

► *Session 3: The principles of land development*

1. The facilitator leads a discussion in plenary by asking two questions.
   - What does lowland development involve?
     In this regard, highlight the **principles** of land development, that is, bring out the following points:
     - ◊ to develop a piece of land, is to modify the state of the terrain, so as to control (more or less fully) the inflow and outflow of the water (insist that one is not done without the other)

◊ lowland development involves four types of activity, which aim to:

i) facilite water circulation to improve drainage of excess water

ii) slow down water flow to enhance infiltration/storage and therefore avoid the rapid drying up of the lowland

iii) avoid erosion in sensitive areas

iv) evacuate excess water when there is too much.

- What determines the land development?
  The participants should understand clearly that land development will be more or less easy and/or efficient depending on:
  - ◊ the quantity of water to be managed (that is, both rain – quantity and intensity – and water from upstream)
  - ◊ the soil characteristics (more or less permeable, sometimes with piling up of layers with very different characteristics).

Note

It is important that the technicians are able to explain to the villagers the principles of land development; it's this understanding that will enable the latter to actually take ownership of the work done, and above all make useful contributions to its design and improvement.

Notes for the facilitator

Insist that the technicians should be capable of formulating the major principles in simple terms (in order to be in a position to present them to the villagers); find out if they can do it in the local language: stimulate discussions among them with regard to opting for a translation, the examples to use …

Note: it could be useful, especially if the technicians' knowledge is not solid, to have a PowerPoint presentation on stand-by that highlights the key points and which the facilitator will present as a conclusion to this sequence.

On the basis of these fundamental objectives, the technician should keep in mind that the situation after the land development should not be worse than before. The design and land development should necessarily take into account these considerations and adapt the maps to the various scenarios found on the ground.

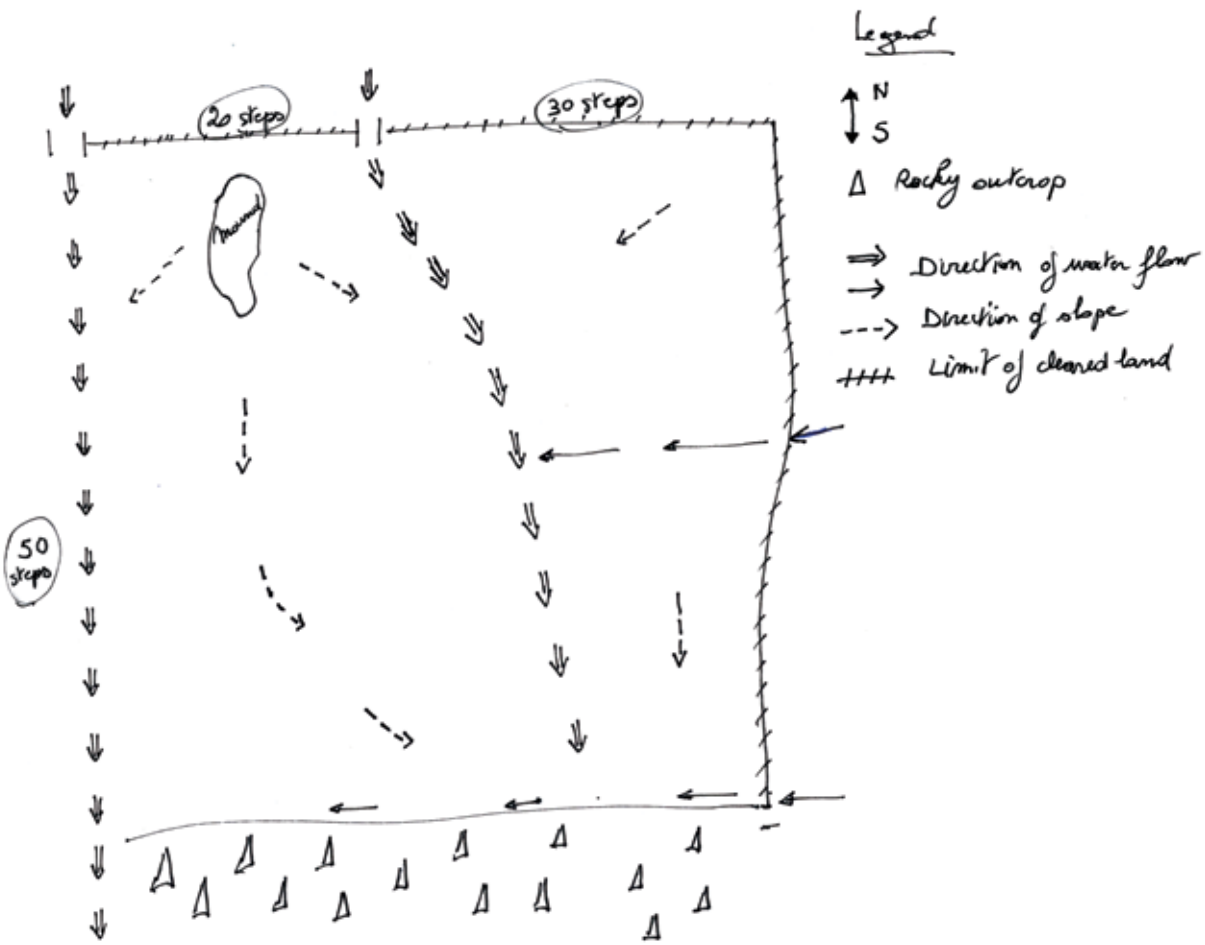
There is no one-cap-fits-all land development. The land development should also take into account the expected crops. Some lowlands on which early season crops were cultivated can no longer be used after the land development because the plots get flooded right from the first rains. Similarly, it is risky to cultivate off-season crops on some lowlands after land development because they dry up rapidly after the rice crop.

► *Session 4: Concrete example of the marking out of a land development plan*

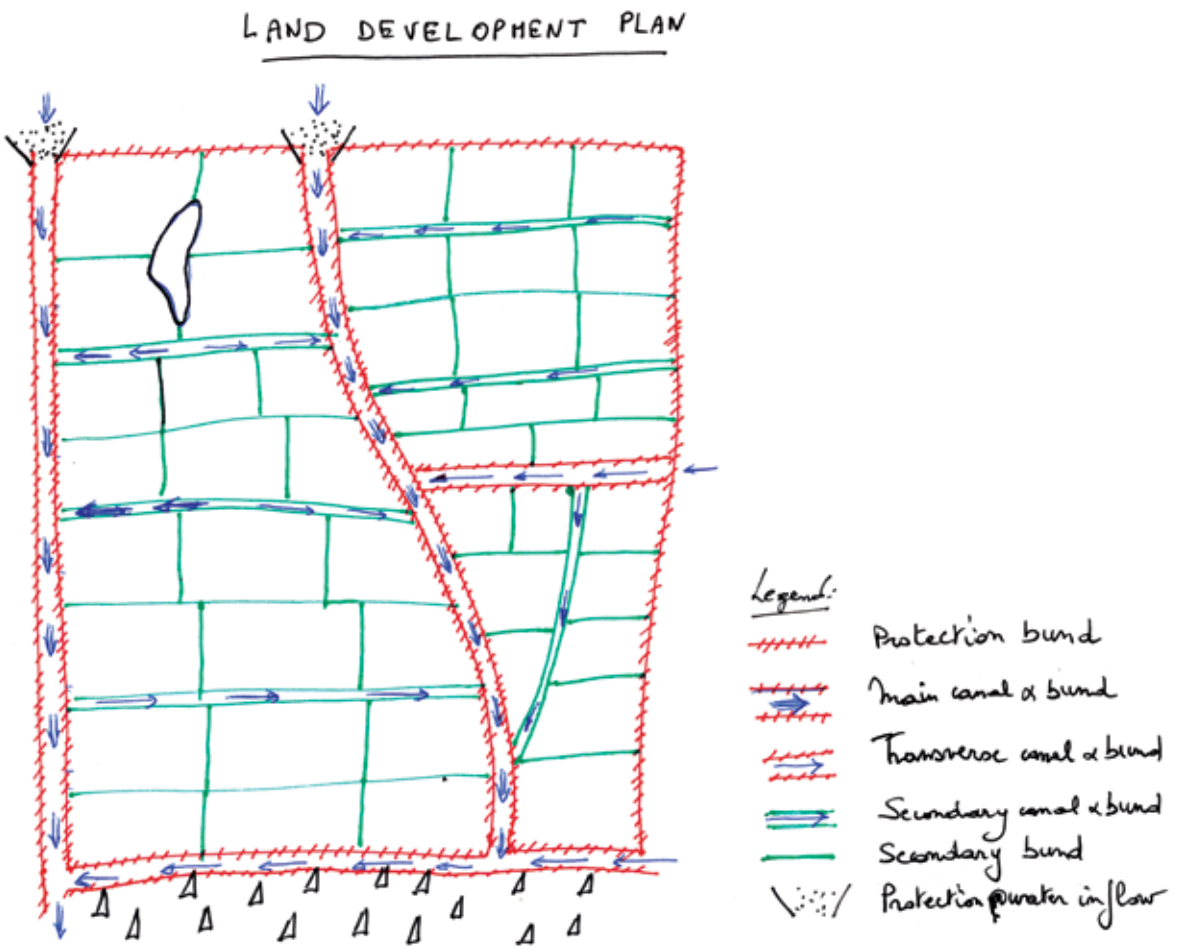
This session recalls how the design of a land development plan is rationalized using a simplified map of a lowland. To avoid overloading this module, the facilitator will "show" how it is done with a concrete example, (the practical exercise will be done in Module 14).

The facilitator should have a basic map of how it was before the land development (made from an already developed lowland), reproduced on a flipchart or a sheet of paper that is large enough to be displayed and be legible. He should also have the land development plan of this lowland.

1. The facilitator displays first of all the basic map (before the land development) and starts by asking participants to indicate which key element will determine the structure of the land development (major drainage canal) and to mark it on the plan, if that is not yet done.



2. Then, he shows them how to draw the development plan by marking out step by step as they watch and he comments:
   - small protection bunds (belts) if necessary, or protective structures or plant barriers, that help avoid erosion or silting of the lowland
   - one or two main drainage canals: which may be
     - ◊ natural (possibly to be overdeepened):
       – central and
       – lateral (or transversal)
     - ◊ artificial (to be designed; often in the case of a V-shaped lowland).



- supply or protection works: stones, metal plates placed across the (principal/secondary) flow and/or drainage canals to slow down the speed of the water and retain it as long as possible
- main bunds to be designed along the major drainage canals and which therefore border these major drainage canals; the canals/small bunds should be designed to facilitate water evacuation (and supply if necessary) and therefore constitute the basis of a "network"
- secondary drainage canals along and perpendicular to the slope and which are connected to the main canals; they are normally artificial and the spacing depends on the shape and slope of the lowland
- secondary small bunds bordering the secondary canals and which separate the plots. Note that it is necessary for each plot to be supplied and drained separately and therefore each plot should necessarily be bordered on one side by a principal or secondary canal[1]
- the spacing between the secondary canals (and small bunds) depends on the type of lowland and on the slope:
  - ◊ these spacings will determine the dimensions of the plots:
    – the length of the plot should always be perpendicular to the slope
    – the width of the plot is therefore along the direction of the slope
  - ◊ the dimensions of the plots are presented in the table below. It is an approximation from field experience and not from specific data. The objective sought is to have homogenous levelling of the plots, which therefore enables good water distribution. During the levelling, if the farmer notices that the plot is still showing a slight slope, he should be in a position to subdivide it into two but still in a perpendicular direction to the slope.

	U-shaped lowland		V-shaped lowland	
Plot dimensions	**Average slope**	**Gentle slope**	**Sharp slope**	**Gentle slope**
Length (meters)	4–5	5–8	3–4	4–5
Width (meters)	3–4	4–5	2,5–3	3,5–4

1. It is not advisable to evacuate the water in a principal small bund that borders the lowland. The first plot constructed after the main small bund is always bordered by a secondary drainage canal.

3. To conclude, the facilitator revisits the way in which the plan will be used to carry out the land development. He emphasizes, in particular, that the map of the development plan is one thing but that it is important to know what dimension to give to the works (canals, small bunds): that depends on the type of soil as indicated in the table below.

Constructed works	Type de soil	Dimensions
Main bunds and belt bunds	Predominantly sandy	Height: 80–100 cm Thickness: 80–100 cm
	Predominantly clayey	Height: 50–60 cm Thickness: 50–60 cm
Secondary bunds	Predominantly sandy	Height: 40–50 cm Thickness: 40–50 cm
	Predominantly clayey	Height: 25–30 cm Thickness: 25–30 cm
Secondary or artificial drainage canals	All types of soil	Depth: 15–20 cm Width: 20–30 cm

Materials required – Supplementary documents

Materials for outdoor exercise: A4 sheets or equivalent with holder (drawing board or a quite rigid exercise book) and soft, dark pencils that will write even on moist or dusty paper, unlike ballpoint pens or felt/ink pens; a hoe or *daba*, if one needs to create prominent landmarks.

Bibliography – Further reading

Windmeijer, P.N. and W. Andriesse (eds.), 1994. Inland valleys in West Africa: an agro-ecological characterization of rice-growing environments. ILRI publication 52, Wageningen, The Netherlands.

Legoupil, J-C. *et al*., 2001 Mise en valeur et aménagement des bas-fonds d'Afrique de l'Ouest, CD-ROM Cirad, IVC/CBF.

Land clearing

This is, strictly speaking, the first working session in the lowland (if the identification and characterization segments are excluded: Modules 4 and 7). It is on this occasion that, for the first time, we will be confronted with the challenge of actually mobilizing stakeholders and the organization: the major issue at stake for the technician(s) is to stick to his role as animator and avoid, as much as possible, acting like a "foreman of the operation", while ensuring a balance between the "participants of the land clearing" in order to maintain the involvement (if some get the feeling of being treated like "servants", chances are that they will be quickly demotivated).

The question of the delimitation of the area for land development was examined during the village meeting on organization (Module 11). The answer depends first of all on the potential users, and also on the people available to accomplish the task (the figures are related, in principle) but, even in the event of a strong mobilization of people, there is the need to remain realistic in the first year which should be seen as a test phase: let the villagers understand that they will be fully able, subsequently, to continue all alone.

Learning objectives

At the end of this module, the technicians will be able to:

- facilitate the reflection of the villagers with regard to the situation and boundaries of the land area to be developed
- guide the identification of things to preserve (prominent trees, things that provide protection against erosion, windbreaks, anthills, etc.)
- support the villagers in the actual land clearing: work organization, rules to follow (security, cutting of pegs).

Procedure

Preparation up-front (indoors or on-site before the arrival of the villagers)

The technicians have individually watched the part of the film corresponding to the module. Before starting the session with the villagers, the trainer-facilitator asks the technicians:

- what is to be done (what will the villagers do) during this module?
- what is important (for the technician as the leader of the process) at each stage in the course of the day?

Notes for the facilitator

Ensure that the technicians have a clear idea of:

– the order in which the activities have to be undertaken

– the instructions that need to be complied with: it might be good to establish a checklist, based on the process below.

On the field with the villagers

On the field, it is the technicians who lead the implementation of this module and the trainer-facilitator steps in only in the case of an impasse, or if it becomes necessary.

For these first "development works" a rendezvous could be given to the villagers to meet directly at the lowland, or meet at the village and go together to the site (depending on the type of road, the distance, etc.). This second solution avoids a situation where the villagers trickle in making it difficult to present the first instruction. (Depending on the configuration of the site, particularly if there is a lot of vegetation, it might even be easier to have this preparatory session at the village; this will no longer be the case afterwards when the clearing is done). The work on the field comprises four stages: the demarcation of the boundaries, agreements before the start, the actual clearing and the debriefing with the leaders.

► *First stage: Demarcation of the boundaries of the land to be developed*

Before starting the actual clearing, the technician goes to the site with a group of leaders (identified during the preparatory meeting) to demarcate the boundaries of the area to be developed. This can be done with colored rags or rope, for greater visibility. These are attached to the bushes or to the trees situated right at the periphery of the zone. These boundaries correspond to the decisions collectively taken during the village meeting (see Module 11).

Notes for the technician

This work can be done the same day as the clearing. But it could be more effective to do it a few days before the actual work on the site, in order to save time and labor. This is particularly true if the boundaries of the zone are not precisely determined, especially in the most frequent cases where only a small area is to be developed.

If the entire lowland is not going to be developed, the demarcation of the zone requires choices, which take into account the area that has been earmarked for development (module 11), the field configuration and the possible utilization of the lowland by other users. It is for the technician to guide the villagers in their choice, taking into account the hydrographic principles as well as their own desires and challenges.

Notes for the technician

It could be more relevant to start the development upstream rather than downstream; it all depends on the hydrographic regime and the topography. However, the development of lowland always starts at the head of the lowland or the part located at a higher zone in order to better control the water. The contrary can hardly be done for reasons of water control.

In any case, to take the decision, one must know how the water circulates before the land development, what are the soil characteristics, what is the status of the field and the vegetation; these pieces of information are in principle available in the summary evaluation report of the site (Module 9).

Notes for the technician (*continued*)

The other criteria to take into account are social and particularly include the existing land rights, but also the other uses of the lowland. For example, if there is a usual watering point for herds of animals, it would be judicious not to include it in the developed zone and reserve an access path for the animals in order to prevent conflicts… If this is not possible, it is better to recommend to the villagers not to neglect this issue and to find solutions with the breeders.

► *Second stage: Agreements before the start of work on the site*

The technician and leaders appointed by the villagers for this stage will remind everyone of the following points:

1. Borders of the zone to be cleared

   To facilitate subsequent work, a decision can be taken to clear a little outside the marked borders; in this case the width of the "additional" strip of land is indicated to everyone. It should not be too wide (from one to a few meters, depending on the type of vegetation, and the taller the trees the wider this strip should be).

2. Types of clearing

   We are at the stage of cleaning up which involves removing the bigger vegetation (some trees, shrubs, tall grasses) in order to have visibility and enable subsequent work to be done. But it is not a matter of clearing away everything and leaving the soil bare; this is to avoid the phenomenon of erosion, which is always more intense in the absence of vegetation.

   The grass must therefore be cut down rather than pulled out. It is later, once the area to be cultivated has been demarcated, that the grass will be pulled out wherever it is a nuisance (not only is the grass not a nuisance at some places but also it is useful, since it hinders water flow and contributes to controlling erosion, thanks to the cohesiveness provided by the roots).

3. Identifying the prominent areas to be preserved

   Attention! There should be consensus right from the beginning in identifying the key areas that should be left untouched: trees and shrubs of special interest, anthills. If everyone goes around cutting in a disorderly manner with a machete, there could be unpleasant surprises: a tree once felled cannot be replanted!

4. It should not be forgotten that pegs will be needed in the next stages

   Either a team is specially trained for this purpose, or each one is responsible for cutting pegs when (s)he "sees some"; in practice, the pegs are prepared before the start of the land development work because looking for pegs at the time of the land development causes much loss of time. Each farmer is often advised two weeks before the land development to come back every day from the field with about 10 to 20 pegs.

5. Security instructions

   In the case of a site with many people working together with dangerous tools, it is appropriate to recall the basic security rules: do not use a machete less than 3 m from each other (agree on whether you work in a forward movement or in a circle around yourself), always give warning when a tree is about to fall (agree on a signal).

► *Third stage: The actual clearing*

Once the approximate borders are marked out and everyone is reminded of the working rules, the actual clearing can start.

The technician ensures compliance with the instructions and responds to any issue that may arise. Depending on the number of workers present, it may be appropriate to organize the work to be done in teams, each team having a leader responsible of ensuring compliance with the instructions.

► *Fourth stage: Debriefing with the team of village leaders*

This first communal work activity is an opportunity to test the organization. Also take the opportunity to check the level of mobilization; depending on the particular case, it is appropriate for the technician to initiate some brainstorming with the group leader (during a break, or at the end of the day) on what will happen subsequently on the basis of this mobilization:

- if there are many people (as compared with the area), there is a risk of having some people disappointed in case everyone is not a direct beneficiary and/or others will be demotivated to continue
- if the number is less than expected: why? Should a remedy be found? (Not necessarily) How? (For example by creating awareness through a meeting with people who have already experienced land development of this kind)? Who should be given that responsibility?

Materials required

- *Dabas*, hoes, machetes, axes, etc.
- Catering arrangements, first-aid.

Preparing the land development plan

Once the clearing is done (Module 13), a preliminary map (sketch) of the lowland could be drawn to serve later on as a base map for the land development plan. This module is in fact the practical application on the site of what was learnt in Module 12: drawing of the basic map and outlining the land development plan. It comprises field work with the villagers who know the lowland very well, and another component at the office (meeting room in the case of training), followed by a return to the field in order to agree on the plan.

Even though all the land development implementation stages and modules are participatory, one of the most important remains the design and elaboration of the lowland development plan. No one can have a better knowledge of the lowland and of the manner in which it functions than the people who use it. Without the lowland farmers, it would therefore be impossible to produce any plan and continue with the land development. The farmers know the best the functioning of their lowland in terms of hydrodynamic regime, soil characteristics and crop behavior throughout the year. This first activity of drawing the basic map (sketch) in collaboration with the technicians and the farmers is based on information provided by the latter. The map is then fine-tuned by the technicians and presented again to the farmers who then validate it before it becomes a final document of the land development plan. A poorly prepared plan can cause damage, which sometimes, can lead to the disappearance of the lowland.

Learning objectives

At the end of this module, the technicians will be able to:

- collect on the field, together with the farmers, some key elements of the hydrographic situation of the lowland
- produce, during the field survey, a preliminary basic/background map (sketch) of the lowland
- carry out (at the office) a provisional land development plan
- verify together with the farmers the relevance of the provisional land development plan and fine-tune it.

Procedure

Preparation up-front (indoors or on site before the arrival of the villagers)

The technicians have individually watched the part of the film corresponding to this module. Before starting the session with the villagers, the trainer-facilitator asks the technicians:

- what will be done (what will the villagers do) during this module?
- what is important (for the technician as leader of the process) at each stage in the course of the day?

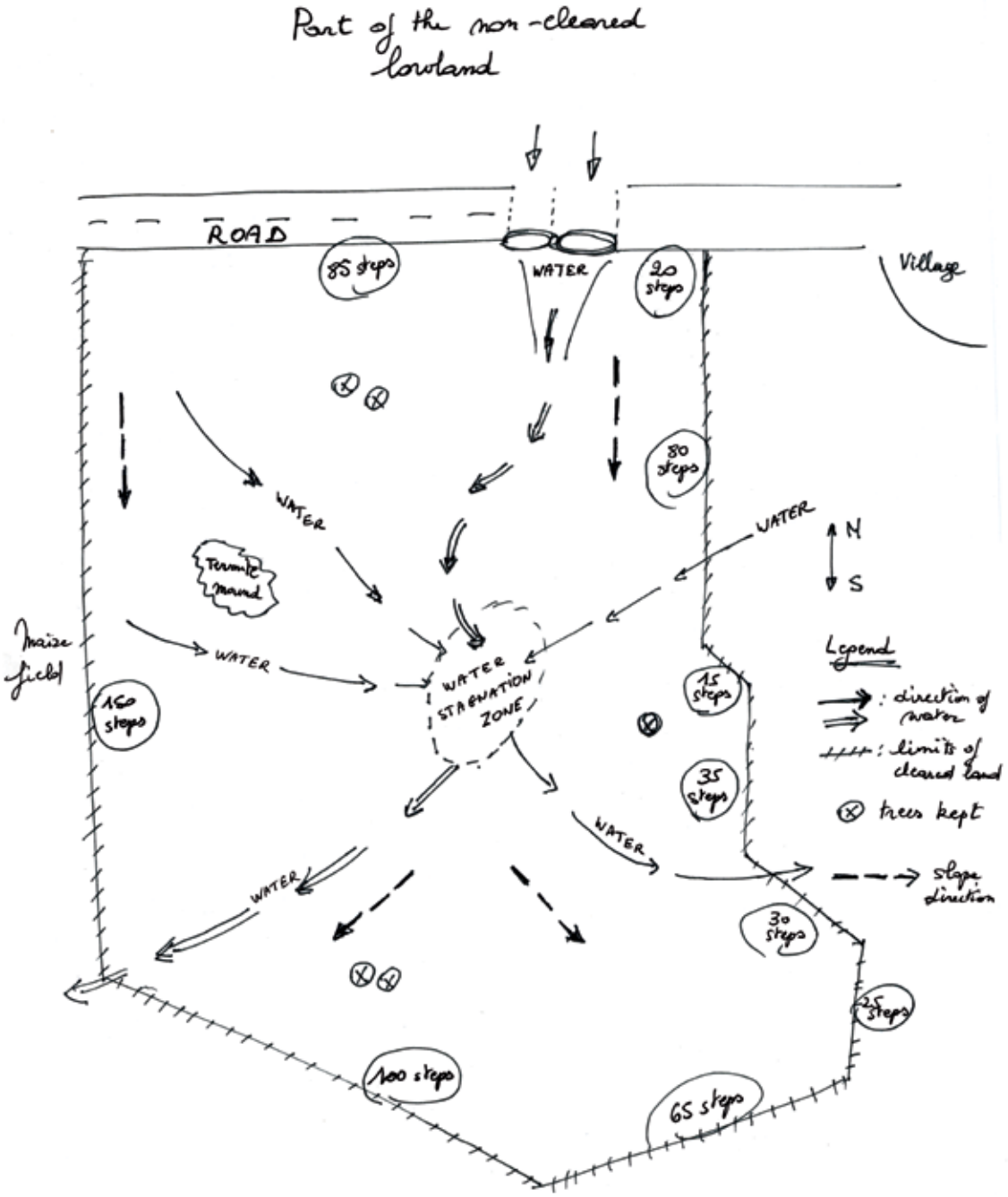
On the field

On the field, it is the technicians who lead in rolling out this module and the trainer-facilitator steps in only in the case of an impasse, or if it becomes necessary.

As a first step

It is important to agree with the villagers on WHO will accompany the technician to the field. It goes without saying that it should be a small group of people from the village who know the lowland very well.

1. The technician, accompanied by the group of "knowledgeable" villagers with field experience, tour the lowland and more specifically the part that has been cleared. The villagers agree on the boundaries of the area to be developed and the technician, assisted by the villagers, starts marking out the outlines of the lowland (general shape), and the cleared part within it, as well as the slopes.
   - Then the dimensions are specified through a measurement by the same person: length, width (at various levels, if the shape is irregular) in number of steps.
   - The (N–S) orientation is indicated; the plan can possibly go beyond the land development zone in the case of a huge lowland, if that is important for the understanding of the water flow.
   - Then the technician identifies and indicates "precisely" on the sketch the prominent landmarks (trees, anthills, outcrops, etc.). He will use the landmarks for the other map outlines (for example, does the water flow to the right or to the left side of the anthill…).
2. Then comes the tracing of the water flow plan. Here the lowland users are of key importance as they have the critical information relating to the "natural" water flow.
   - The technician identifies, together with the villagers, the water inflow/outflow points and the natural drainage canals; he transfers this information onto the sketch.
   - He also verifies the position of the lowland and the cleared portion within the hydrographic network of the zone.
   - Finally, he identifies the direction of the slope and estimates its gradient at the various parts of the lowland: there again, especially when it is a gentle slope and/or when the topography is complex, the knowledge of the field the users have constitutes a source of essential information.
   - He transfers onto the sketch some indications on the direction of the slope and its gradient (shown with arrows).


Part of the non-cleared lowland
ROAD
WATER
85 steps
20 steps
Village
80 steps
WATER
WATER
Termite mound
N
S
Maize field
WATER
WATER STAGNATION ZONE
150 steps
15 steps
Legend
: direction of water
: limits of cleared land
trees kept
35 steps
WATER
WATER
slope direction
30 steps
25 steps
100 steps
65 steps

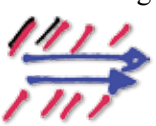
Return to the office

For training purposes, this segment is organized indoors. In line with the training, this session provides the opportunity to ensure that the technicians fully understand the principles of simplified mapping and land development (see Module 12).

1. The trainer points out to the technicians that, for their respective sites, they will do this exercise in the office, but that it is always preferable to do it with some others rather than to do it alone.

2. The trainer-facilitator asks the technicians to divide themselves into three or four groups; each of the groups will do the following exercise (on the basis of what has been learnt in Module 12): fine-tuning the document and proposition of the outlines of the map.
   - protection bunds (belt) if necessary, in order to avoid erosion or silting

     Symbol 
   - main drainage canals, which may be:
     - ◊ natural (possibly to be deepened): central and lateral (or transversal) or
     - ◊ artificial (to be designed; often in the case of a V-shaped lowland)
   - main bunds to be designed along the main drainage canals

     Symbol 
   - secondary drainage canals along and perpendicular to the slope, and which are connected to the main canals; they are normally artificial; the spacing depends on the slope (see principles of land development) of the secondary bunds bordering the secondary canals and separating the plots. Note that it is necessary that each plot can be supplied with water and drained separately, and therefore each plot should necessarily be bordered on one side by a main or secondary canal

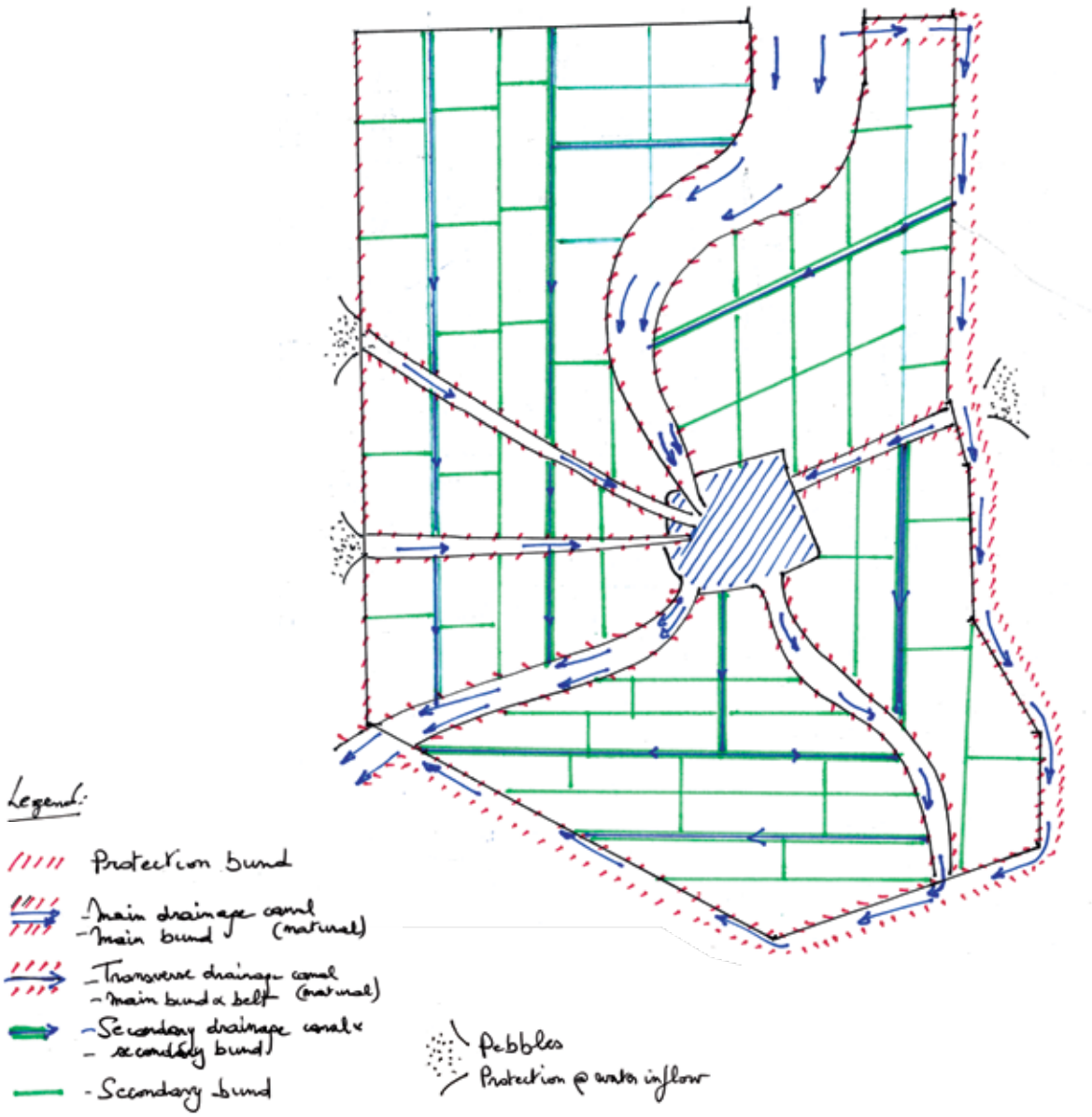
     Symbol 
   - the other secondary bunds (without a drainage canal) to separate the plots

     Symbol 
   - constructions to supply water or provide protection

     Symbol 

3. After comparing the various results, the participants will be asked to comment on the differences and correct the possible errors. The trainer will conclude by providing the final "corrected" version.

Example of a map, drawn on the basis of the sketch (hypothetical example)



Validation by the villagers

As a first step

It is important to make an appointment with the villagers on the field, preferably with the same small group that may be expanded, if possible, to include other farmers who committed themselves to the *Smart-valleys* development.

1. The technician presents the land development plan, which he prepared at the office and verifies if the villagers have really understood the various symbols.
2. Then he asks one of the villagers to explain the plan in order to see if he has fully understood it.
3. Thereafter, some time is given for the villagers to make comments on the plan as well as suggestions for amendments and/or improvements and possibly taking into account some elements that were ignored.
4. The technician makes the necessary amendments in order to produce a final land development plan.

Materials required

Drawing board, paper, pencils.

Pegging

This is a working session on the site to be developed with the participation of the villagers. As was done previously, the technicians considered as "outsiders" mainly limit themselves to the role of observers.

Successful pegging, that is, well done and properly explained, facilitates the task for everyone and, first of all, for the technician. The farmers who have very good skills in pegging can do the work all alone.

Learning objectives

At the end of this module, the technicians will be able to:

- explain to the villagers the principles of pegging: colors, color combinations, marking out (where to start from, how to align the pegs, place pegs where there are prominent landmarks, …)
- organize the actual pegging: work organization.

Procedure

Preparation up-front (indoors or on the site before the arrival of the villagers)

The technicians have individually watched the part of the film that corresponds to the module. Before starting the session with the villagers, the trainer-facilitator asks the technicians:

- what will be done (what will the villagers do) during this module?
- what is important (for the technician as leader of the process) at each stage in the course of the day?

On the site

The technicians meet on the site with the villagers selected for this task (see Module 11).

► *Session 1: Pegs and colors*

The principal technician starts by explaining to the villagers the principle behind the pegs and colors (this is important for good organization of the work on site afterwards and to empower the villagers).

- The outline of the various constructions (canals, bunds) will be identified by the use of pegs and that will subsequently enable to work without permanently referring to the plan.

- Each peg is painted with one or several colors which have the following meanings:
  - ◊ blue: means it is a waterway
    Remark: we could eventually distinguish a main or "natural" drainage in the direction of the slope (deep blue), from a secondary or artificial drain, which is more or less perpendicular to the first, separating the two plots (light blue); this could turn out to be useful when the main drainage canal is not quite remarkable, but in general this is not indispensable.
  - ◊ red: marks the position of a construction to "stop or border the water" that is, a main bund
    The red pegs are also used to mark the limits of the lowland, because a "big" bund (protection belt) will also be constructed at the periphery.
  - ◊ green: marks the position of a secondary bund which "obstructs the water"
  - ◊ yellow: corresponds to a peculiar place
  - ◊ black: indicates the position of an anti-erosion construction (at the outlet of a red).

- If a peg has several colors, it mean it is at an intersection, for example:
    - ◊ blue–red: arrival of a main bund at the main drainage canal
    - ◊ blue–green: arrival of a secondary bund at a secondary drainage canal
    - ◊ blue–red–black: anti-erosion construction, at the arrival of a main bund at a main drainage canal.

Note that local materials can be used instead of the paints. For example, we could mention threads of different colors sold by traders, un-usable cloths of different colors. The farmers who have a good knowledge of the approach can also make different types of notches on the pegs and each notch has a meaning understood by the entire team.

► *Session 2: Preparing the pegs*

The villagers prepare the "main" pegs which have:

- a red mark
- a red and blue mark
- a red mark, a blue mark and a black mark
- a green mark
- a green and blue mark
- a yellow mark.

The technician explains that the marking will be completed (addition of other paint marks) as the pegging goes on and when necessary.

► *Session 3: Fixing of the pegs*

It is important to insist again on the fact that the work is to be done by the villagers, and the technician plays the role of an advisor; this is important so that the villagers properly learn to peg and be capable of doing it without the support of the technician.

1. The fixing of the pegs is done in accordance with what is on the map and the technician therefore briefly reviews to see how well the map is understood.

   - He asks one of the villagers to explain before everyone the positioning of the map in relation to the field and to show the correspondence between the map and the field with regard to the main canals and the peculiar landmarks; and corrections can be made if necessary.
   - The other villagers help each other in explaining things and the technician intervenes if necessary.

   - The technician ensures that everyone understands; as a test, he asks a villager to indicate on the map where the group is currently standing.

2. The fixing of the pegs starts, preferably along the borders of the cleared field, at the part that requires protection, and doing so on the basis of the land development plan.
   - The pegs (red) are first of all fixed at the two extreme ends of a straight portion.
   - Then a long rope is stretched between the two pegs.
   - Then intermediary pegs (red) are fixed at a distance of 5 to 10 m depending on the configuration of the field so as to be able to subsequently work without continuously stopping to verify one's position, while regularly checking the alignment along the rope.

3. After demarcating the lowland to be developed, the pegging continues along the "natural" watercourses or main drainage canals, perpendicular canals and eventually along the ramifications (there could be several in the case of large lowlands – not recommended for a start).
   - This is done with red–blue pegs: red to indicate the bund and blue for the watercourse.
   - Pegs are (solidly) planted systematically on both sides or in the middle of the main drainage canal, depending on its width.

4. Then the secondary drainage canals and the secondary bunds bordering these canals are physically demarcated.
   - This is done with blue and green pegs: green to indicate the secondary bund and blue for the watercourse.
   - At the intersection of a canal/secondary bund with a canal/main bund a red color is added to the pegs with blue–green colors.
5. Thereafter, and in line with the plan, the secondary bunds are indicated.
   - This is done with green pegs.
   - At the intersection of a secondary bund with a main bund a red color is added, or if it is with a main or secondary canal a blue color is added.
6. Then the areas where protection works are to come, are indicated by pegs. Normally where there is a watercourse, (main drainage canal + main bund) by a peg with black, red and blue colors.
7. Finally, the "yellow" pegs are fixed at special places indicating that these parts of the land should not be developed.

Note that colored marks are added to the main pegs, systematically, as the need arises.

It is important to ensure that the villagers properly understand the process. In that regard, the technician, each time, asks what color will be added, and why, rather than telling them for instance "there, a red mark should be added". The objective, after the pegging, is to be able to work without constantly referring to the plan.

NB: advice on the organization (see clearing).

Materials required

- Pegs (many): 400 per hectare; the basis of the calculation is based on a square plot of 5 m on the side (100 : 5 = 20 × 20 = 400)
- Stones to drive in the pegs (if there are none on the site)
- Long rope of at least 100 meters; the rope of 100 m is theoretically ideal but it rapidly gets intertwined when it is being rolled up. The best is to have a chain of 50 m
- Paint: blue, green, red, yellow, black.

The main land-use development: works on the collective facilities

This module follows the session on pegging. Once again, it is about facilitating a collective working session in the lowland. More specifically, it involves raising the main bunds around the developed site, constructing the main and transversal drainage canals, raising of the main bunds, carrying out protective constructions, digging secondary canals and raising secondary bunds.

Learning objectives

At the end of this module, the technicians will be able to:

- explain to the villagers the principles behind the construction works
- facilitate the overall construction work done by the people.

Procedure

Preparation up-front (indoors or on the site before the arrival of the villagers)

The technicians have individually watched the part of the film corresponding to the module. Before starting the session with the villagers, the trainer-facilitator asks the technicians:

- what will be done (what will the villagers do) during this module?
- what is important (for the technician as leader of the process) at each stage in the course of the day?

The group compares the responses with the proposed procedure, and suggests possible adaptations it considers relevant.

On the site

The technicians meet on the site with the villagers selected for this work (see Modules 11 and 15).

1. The technicians invite the villagers to have a look, once again, at the development plan because, even if it was already validated, it is useful for each one to understand the overall logic.

2. The principal technician verifies that everyone fully remembers the principles adopted for pegging and is capable of locating and remembers the convention of coloring the pegs.
   - Where are the pegs representing the borders of the site that requires protection; what is the color of the pegs and why; what work is to be done at the place?
   - Where do the main and transversal drainage canals pass? What are the colors of the pegs and why; what construction will be done at these places?

- Where are the pegs with black color located? Why is this color used? What constructions will be done there? What other colors are on these pegs, and why?
- What do the pegs with green color indicate? Where are they located?
- Where and how are the secondary canals indicated; on the map and on the field? What is the color of the pegs, why were these colors used; and when a secondary canal joins a main canal what are the colors of the pegs?
- Pegs with yellow color are also seen, what does that indicate?

Notes for the technician

It is important for the villagers to fully understand the rationale for the land development works because that is what will enable them subsequently to propose some improvements.

3. Thereafter, the technician explains the order in which the work will be carried out; in principle, the constructions are done in the following sequence:
   - the bund belt
   - the main drainage canals bordered by the main bunds
   - the transversal/lateral drainage canals bordered by the main bunds
   - the protection works: planting of vegetation to serve as a barrier and/or other constructions to protect against erosion, such as a bed of stones, etc.
   - the secondary canals bordered with secondary bunds
   - the secondary bunds.
4. The appointed leader, with the help of the technician, reminds everyone of the general instructions governing the work and then assigns the tasks. Each one (each team) should know exactly how to go about the work.
5. Together, the technician and the appointed leader monitor the teams, in turns, in order to provide explanations, if necessary. The following aspects should particularly be complied with and the required information provided:
   a. the bund belts: constructed along the borders of the lowland (except at places where the drainage canals pass)

Notes for the technician

The technician recalls the fact that it is preferable to finish with all collective construction work before going on to develop the plots; the latter constitutes the next (and last) stage of the basic land development work.

Depending on the form of organization adopted, this work will be done in groups or individually (general case) by the farmers.

At the beginning of the land development work, the presence of the technician is indispensable but after one or two days of working together, the farmers are in a position to continue with the operations without external support. The land development can be progressive and can be continued every year depending on the interest the farmers have in the lowland.

b. the main drainage canal and the transversal canals: as much as possible the existing drainage canals are not deepened. Leaving some grass on the watercourse (over a width of 2 to 3 m, even more, if there is a lot of water) is the best way to avoid erosion

c. protective constructions: to avoid erosion, the lateral drainage canals should not discharge directly into the natural canals; to avoid a "cascading" effect arising from the speed of run-off, it is appropriate to envisage some "constructions" or relay (stones) systems

   It is useful also to envisage anti-erosion measures (vegetation, stone belt) at the head of the secondary drainage (in order to avoid a rapid rise of the head of the canals (rill erosion), but especially to reduce the speed of the flow in the canals, thereby reducing the erosive force of the water

d. "construction" of the main bunds: it is done with earth embankment (and compacting), see table below for the dimensions

e. "making" of secondary canals; contrary to the main drainage canal whose location corresponds to the "natural" watercourse, the secondary drainage canals should be deepened (an artificial passage is therefore created to channel the water) (dimensions: see table below)

f. the secondary bunds are constructed with earth embankments (dimensions: see table below) and are constructed first on both sides of the secondary canals

g. thereafter, the other secondary bunds are raised to separate the individual plots; in principle the land development plan is followed, but it is possible that some additional bunds would have to be constructed; however, it is important to ensure that each plot has a border with at least one side of a secondary or main canal in order to ensure that water can be brought in or drained out without passing it through other plots

h. we finish up by demarcating or isolating the peculiar areas (small bund or bund – depending on the land configuration – around an anthill, for example).

Note that the dimensions of the constructions depend on the type of soil, and particularly on its permeability and cohesiveness (sandy soil is more permeable and has less resistance than clayey soil). The summary table below may be referred to.

Construction	Type of soil	Dimensions
Main bunds and belt bunds	Predominantly sandy	Height: 80–100 cm Thickness: 80–100 cm
	Predominantly clayey	Height: 50–60 cm Thickness: 50–60 cm
Secondary bunds	Predominantly sandy	Height: 40–50 cm Thickness: 40–50 cm
	Predominantly clayey	Height: 25–30 cm Thickness: 25–30 cm
Secondary or artificial drainage canals	All types of soil	Depth: 15–20 cm Width: 20–30 cm

Notes for the technician

It is probable that the work will not be finished at the end of the first day. The presence of the technician is not obligatory throughout the work. However, it is for him to evaluate how autonomous the villagers can be, the most embarrassing being to allow the people to work the wrong way and to have to re-do everything.

6. The module ends with a debriefing session between the technician, the delegates and the leaders appointed for this stage; this session is organized at the end of the day. It particularly involves analyzing the difficulties that could have been faced in terms of organizing and ensuring that it does not impact negatively on the subsequent development. There may also be technical challenges requiring some analysis.

Materials required

- Hoes, *dabas*, machetes, 50-m chain
- Land development plan
- Catering arrangements.

Developing the plots

The last stage consists of developing the plots and that comprises two operations: demarcating the plots by raising small bunds and levelling.

Learning objectives

At the end of this module, the technicians will be able to guide the farmers in developing their plots.

Procedure

Preparation up-front (indoors or on the site before the arrival of the villagers)

The technicians have individually watched the part of the film "SMART-valleys", which corresponds to the module. Before starting the session with the villagers, the trainer-facilitator asks the technicians:

- what will be done (what will the villagers do) during this module?
- what is important (for the technician as leader of the process) at each stage in the course of the day?

On the site

The technicians meet on the site with the farmers using the lowland and the workers (family or other) who they chose to mobilize (see Module 11).

1. The technician starts by recalling the basic principles.
   - The task is to create a homogenous zone from the point of view of water circulation: water sheet of the same thickness at the time of flooding, drying up at the same rate during the dry period. This is what will ensure optimal management of the crop.

- The steeper the slope, the more difficult it is to obtain this homogenous condition, and that is why the plots will necessarily be small when the slope is relatively steep.
- One of the borders of a plot should correspond to a main or secondary bund.

2. The technician explains that the cultural practices will also enable "fine-tuning" the levelling, on condition the levelling is well reasoned.
   - Tilling, if it is to take place, should be done in the direction of the plot that is more or less perpendicular to the slope.
   - Depending on the case, it will be done in a manner that will raise the soil (to compensate for natural "erosion"), or on the contrary lower it (thus contributing to creating terraces, on condition the lower bund is high and solid enough to hold the soil.
3. The technician starts a discussion on the fact that the contours of the plot do not only reflect the objective of the land development, they also take into account land tenure issues: who cultivates which portion of the lowland?

Materials required

Daba, machete.

Phase 3

Management of the developed lowlands

Management of the developed lowlands (Modules 18 to 20)

Experience has shown that adequate water management is a critical condition for farmers to successfully invest in the improvement of the rice farming management practices, such as weeding and timely application of fertilizers. ***Module 18*** will present a brief summary of the improved lowland management practices, more specifically on water management principles and practices, integrated soil fertility management and integrated weed management.

The *Smart-valleys* approach is a participatory, pragmatic, adaptive and iterative method, based on the "learn by doing" principle. This implies that in practice, the villagers often start by developing a (more or less extensive) portion of the lowland. This therefore is, in a way, an "adaptability test" of the approach to specific conditions of the village lowland. Thus, at the end of the first experimental season, there will be the need to organize an evaluation of this test, and that will enable an assessment of the operations and the results obtained in the part of the *Smart-valleys* type of developed lowland and subsequently decide on the possible maintenance, adaptations and extensions to carry out. ***Module 19*** deals with the field aspect of the observations and the (technical) analysis of the functioning of the *Smart-valleys* development, while ***Module 20*** concludes with a rather more formal part involving a review and leveraging of the *Smart-valleys* experience.

Improved lowland management practice

To fully take advantage of a *Smart-valleys* type development, it is necessary to apply a minimum of integrated lowland rice management (IRM) practices. The idea behind this module is not to present the entire IRM practices, but rather to briefly recall the basic principles and to refer to the corresponding modules of the PLAR-IRM manual: < http://www.africarice.org/warda/guide-plar.asp >. It is clear that this module is specifically meant for rice farmers and, depending on their interest, several sessions are to be organized, mainly on the field.

Learning objectives

At the end of this module, the technicians will be able to:

- explain to the rice farmers the basic principles of integrated rice management (IRM)
- facilitate reflection, by rice farmers, on the options for applying improved sowing/transplanting techniques, integrated water, weeds and soil fertility management
- guide the rice farmers in the implementation of IRM techniques.

Procedure

Preparation up-front (indoors)

1. Depending on the experience of the technicians in the matter, the trainer-facilitator recalls, more or less briefly, the basic principles of the IRM (see document: < http://www.africarice.org/publications/PLAR/madagascar/principes.pdf >):
   - a set of innovative options (and not a set of rigid technical prescriptions to be applied compulsorily)
   - a holistic approach, integrated into the context
   - the use and upgrading of local resources
   - gradually introduced adaptations to local realities
   - coverage of the entire rice farming season, from preparing the campaign to taking stock of it, storage, processing and marketing.
2. Thereafter, the trainer-facilitator has an interactive discussion with the technicians on the following themes (making use of the corresponding modules of the PLAR-IRM manual and the references presented in the technical manual < http://www.africarice.org/warda/guide-plar-tech.asp >):
   - nursery and transplanting, with special attention to time management and the transplanting of young plants (PLAR-IRM Modules 8, 9 and 12)
   - water management (Reference 7)

- weed management (Module 16 and Reference 18)
- soil fertility management (Reference 15).

3. Before starting the session with the villagers, the trainer-facilitator asks the technicians to get prepared for this field session. It is clear that they will first of all have an exploratory discussion to know the interests of the rice farmers.

   This first discussion can be followed by sessions in the rice fields. In this module we limit ourselves to this exploratory discussion; for the supplementary sessions, refer to the PLAR-IRM manual.

4. Even though the discussion is exploratory, the technicians should prepare themselves for the session. They get into small groups to prepare some visual animation tools, such as:
   - rice farming calendar with figurines representing the stages of development of the rice plant (based on Module 6)
   - illustration of water management for a transplanted plot (page 25; Reference 7)
   - pictures of transplanting (page 63; Reference 16).

5. The group work is followed by a presentation in plenary and discussions, followed by some improvements made to the tools, if there is the need.

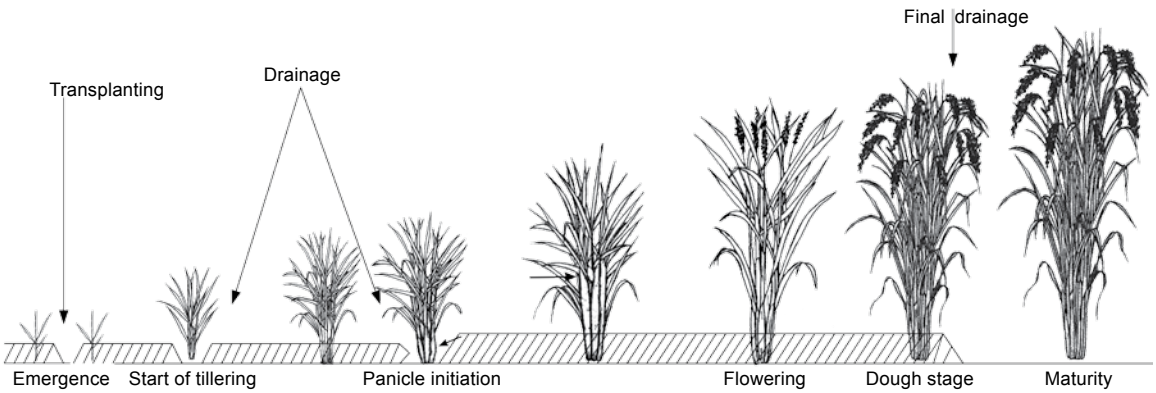
6. For the technicians who have no experience with PLAR-IRM tools/modules, it would be necessary to have an in-depth reading of these PLAR-IRM modules and references and more specifically those cited here: Module 6 and References 7 and 16. Thereafter it is strongly advised that a simulation be carried out.

On the field with the rice farmers

1. The technicians invite the rice farmers for a discussion on their knowledge about rice farming practices, more specifically on practices involving: sowing-transplanting, fertility management, weed management.

2. Thereafter, the technicians present an overview of good rice farming practices in relation to the rice farming calendar and to the development stages of rice; they use the animation technique presented in Module 6 of PLAR-IRM, followed by discussion on:
   - the comparison between farmers' current practices and the 'optimal' practices (based on the stages of development of the plant)
   - time management concerns the age of the plants transplanted and the factors that hinder timely transplanting
   - soil fertilization practices
   - weed control.

3. Then, a more in-depth discussion is held on water management of the plot, depending on the stage of development of the plant. The technicians base their discussion on Reference 7 and more specifically on Figure 7.1 of this reference.



4. This is followed by an in-depth discussion on the effect of weeds on water availability, light, nutrients and finally yield and on the significance of controlling weeds. The technicians introduce the notion of integrated control with the distinction between preventive and curative methods:
   - preventive: field preparation, levelling; cleaning of canals and bunds; water management (see no. 3)
   - curative: manual and timely weeding; mechanical weeding and use of the weeding machine; chemical control: use of herbicides.
5. The module ends with a discussion on the importance of cultivating the plant under "optimal" conditions to obtain a "healthy" plant; they also discuss the role of nutrients and the integrated management of soil fertility.

   Mineral fertilizers are not medicines and can be useful only when the plant is healthy; this good health is dependent on good water management and weed control.
6. Based on the interests expressed, the technicians make appointments with groups of rice farmers to support them in techniques of transplanting, water management, weeds and soil fertility.

Materials required – supplementary documents

- http://www.africarice.org/publications/PLAR/madagascar/principes.pdf
- http://www.africarice.org/warda/guide-plar-tech.asp

Observation and analysis of the land development functioning

The functioning of the land development should always be evaluated after a rain. It is extremely rare for everything to work perfectly, and it is therefore necessary to adjust the land development on the basis of observations and analyses. This means the technicians should go to the field during the rainy season, but also (and especially) they should collect from the rice farmers/users the necessary information. These observations constitute the basis of an analysis and an evaluation of the implementation of the first *Smart-valleys* season, mainly from the technical point of view.

Learning objectives

At the end of this module, the technicians will be able to:

- make relevant observations on the field
- gather useful information from the users
- conduct an evaluation session with the villagers about the first experience of implementing *Smart-valleys*
- identify the major problems that characterize the operation of *Smart-valleys* development and analyse the factors/causes of these problems
- propose the necessary adjustments.

Procedure

Preparation up-front

1. The trainer-facilitator explains to the technicians that they should regularly make field observations, accompanied by groups of rice farmers. The principal aim of these observations is to analyse the functioning of the *Smart-valleys* land development and suggest improvements.

2. The trainer-facilitator divides the technicians into two sub-groups to prepare a list of specific points to take note of during the season. After the group work, a plenary session and discussions are organized and the trainer-facilitator completes the list, if necessary.

   The information gathered should be carefully recorded in a notebook.

3. At the end of the session, preferably just after harvest, a more profound assessment of the first *Smart-valleys* experiences is organized, if possible at a place in the lowland or quite close to it (that will make room for some supplementary observations to be made, if necessary). This assessment focuses primarily the rice farmers who have been involved in this first *Smart-valleys* experience. It is mainly about the same list of points arising from observation/analysis that have been made throughout the season, followed by suggestions for interventions to be

made in order to consolidate the strong points and correct the weaknesses. On the basis of the content of the observations notebook, the technician prepares a three-column table: operational problem, causes/factors, and proposed solutions; only the first column will be filled before the session (making room to addition possible new points).

Notes for the facilitator

Ensure that the list includes the following elements:

- the water inflow and outflow points (and the flow rate)
- the water level in the plots
- the width and depth of the canals
- the width and height of the bunds
- the water stagnation points
- the development of the rice
- the bunds which gave way under the water pressure
- the proper or improper functioning of the constructions protecting the water inlet points in the lowland
- the change in the watercourse due to the construction works to protect water entry points
- new water entry points that are likely to occur unexpectedly within the land development scheme
- silting of the plots.

Field observations during the seasons

1. The technician undertakes some "surprise" observation visits, without informing the rice farmers ahead of time; that can be done preferably after periods of more or less heavy rains.
    - The purpose of conducting such "surprise" observation visits is not to act as "the controller" of the completed works. It is important to explain to the farmers the reason for these unexpected visits, in order not to damage the trust they have. A farmer often wants to "please" the technician who has helped him, and therefore if he knows that the technician will be paying a visit he will do his best to ensure that everything appears perfect. This can mask the problems he is facing, for example: he does not have enough available labor to actually weed on time … If

the technician does not see this problem (weeds in the plot), the solution sought will never be found though the problem actually exists.

2. He tours the lowland starting from the upstream side of the *Smart-valleys* land development to the downstream end and meets farmers at work or making observations. He gets a few people or a small group to accompany him, depending on their availability.

3. They take a direction that will enable them to observe the major land development and construction works undertaken, such as:
   - protection bunds
   - central and transversal drainage canals, and main bunds
   - drainage canals and secondary bunds.

4. They observe the functioning of the drainage canals and bunds as well as the water management, and the results in terms of presence/absence of water in the plots.

   In case of operational "limitation" (e.g. plot with too much or too little water), they try to:
   - understand why and
   - make proposals for improvement.

5. The technician takes note of the observations, analyses and proposals; these notes will be used during the evaluation meeting at the end of the season.

Evaluation meeting on the first *Smart-valleys* experience

1. At the end of the season, preferably just after harvest, the technician organizes a meeting with all the rice farmers who have been involved in the *Smart-valleys* land development and who have experimented the effects of these developments.

2. He starts the meeting by congratulating all those who have contributed in one way or another to the land development work.

3. Thereafter, he asks some rice farmers to express their overall assessment of the *Smart-valleys* experience, and give a summary of some key results.

4. Then, the technician presents the table, with the first column largely filled out (however, there are still some incomplete lines in case there are other problems which were not identified during the regular observation in the rainy season).

5. The technician starts by presenting the pre-established list and invites the rice farmers to comment and add other mentioned problems.

Operational problems	Causes/factors	Proposals for improvement
(*column largely filled out, based on the field observations*)		
...		
...		
...		

6. Then, the technician starts a discussion on the causes/factors relating to each of the problems, one after the other, and takes notes in the form of keywords in the second column.
   - If the rice farmers are not able to identify the causes (often multiple), the technician consults his notebook and presents an overview of what has been discussed during the observations made throughout the season.
   - If the need arises, an extra visit may be undertaken to the "problem" areas.
7. The proposals for improvement are then discussed.
8. The facilitator concludes the meeting and an appointment is made for another village evaluation meeting with much larger participation. He explains properly that this important meeting should be an opportunity not only to evaluate the impact of the land development on rice farming, but also to evaluate what happened from the social point of view (organizing towards the *Smart-valleys* lowland development) and also analyzing the consequences for other users of the lowland. It will be quite an "intense" working session and if people want to have a "harvest feast" it would be preferable to have the feast before.

Review and capitalization of the *Smart-valleys* experience

After the evaluation based on the field observations, together with the involved rice farmers, it is necessary to review and capitalize the experience with all the villagers, including other users of the lowland. This involves going beyond the technical results, and also evaluating what happened socially (organization towards the development of the lowland) and analysing the consequences for other users of the lowland. All these reviews will lead to the capitalization of experiences and to decision making on pursuing the *Smart-valleys* activities within the lowland. To maintain a rather objective frame of mind, it is not advisable to combine this review and capitalization with a possible "harvest feast". The harvest should better be celebrated before. Besides, it will be a rather "intensive" working meeting that will not leave room for other events.

Learning objectives

At the end of this module, the technicians-facilitators will be able to:

- prepare and facilitate a village meeting to review and capitalize the *Smart-valleys* experience
- identify the major changes induced by the *Smart-valleys* activities and land developments
- review the main *Smart-valleys* activities which led to these changes
- support the community to take decisions relating to the pursuit of the *Smart-valleys* activities.

Procedure

Just like in modules 6, 9 and 11, we propose to roll out the module in three stages, which we call **20a**, **20b** and **20c**, since they are inseparable. The central part (20b) is the meeting, conducted on the field and facilitated by the technicians, under the supervision of the trainer-facilitator.

Parts 20a and 20c take place indoors and are facilitated mainly by the trainer-facilitator. These two phases are necessary for the training of technicians since many issues are at stake during the village meeting, particularly in terms of lessons learnt and giving a (new) direction to, and pursuing, the *Smart-valleys* activities. It is therefore important to take the time to prepare the meeting (20a), then draw lessons from it (20c) that will serve as a basis for a more general evaluation of the *Smart-valleys* project.

Module 20a
Indoor preparation

1. The trainer-facilitator presents the objectives of the meeting and begins to prepare the meeting on reviewing and capitalization.
   - He specifies that it is in principle a meeting, for all the villagers, users of the lowland; and that it is important for all the user groups (rice farmers, livestock breeders, fisherfolk, market gardeners, protectors of nature, men, women, young, etc.) to have the opportunity to express themselves.
   - The review and capitalization process comprises two major sessions:
     1. Evaluation of the first experience, with two stages:
        a. notice of changes (results) felt/perceived/observed/verified by the users
        b. the major *Smart-valleys* activities undertaken and their effect on the changes.
     2. The future directions, with (three stages):
        a. the prospects for the lowland
        b. the desired changes in the near future
        c. the activities to be planned towards implementing these changes.
   - It is important to consider three types of changes and activities:
     a. technical and economic: related to rice farming: yield, water management, …
     b. social: related to social organization, group management, engagement
     c. ecological: related to the diverse uses of the lowland by various types/groups of users.

2. Thereafter, two groups are formed to make preparations for the meeting.
   - The first group works on the review of the results (stages 1 a and b of the process) and the second group on the prospects (stages 2 a, b and c of the process).
   - Each group will review the roll-out of the session as proposed in Module 20b, in order to verify and ensure the feasibility of what is proposed and get prepared to facilitate the session.
   - It is very important for the facilitator of the session to ensure that the various user groups express themselves, including those that are reticent. Note that contrary to what is proposed in the film, all those who are reticent from the beginning will not change their minds easily after a first *Smart-valleys* experience; nevertheless, it is important to know the reasons for their reservations.

3. In conclusion the trainer-facilitator emphasizes the importance of good preparation of the meeting, which is crucial for decision-making on the basis of this first *Smart-valleys* experience.

Notes for the facilitator

Like in the previous village meetings, the "outsider" technicians should rather assume responsibility as observers for the purpose of capitalization. Of course it is the "local" technician(s) who handle(s) the actual facilitation of the meeting, to ensure that the villagers know without ambiguity who their contact persons are (with whom they will maintain contacts subsequently, and towards whom they will turn in case of any problem).

Materials required – Supplementary documents

Guidelines of Module 20b (1 per participant).

Module 20b
Conduct of the village meeting

Like for modules 6, 9 and 11, the situation is that of action-training where a real meeting serves as a means of learning for the entire group of technicians-facilitators. In the specific case of training, it will therefore be necessary to re-explain to the villagers that some "outsiders" will be participating in the field activities in line with the technician-facilitators training activities, and therefore within the framework of building the capacity of the project.

As a first step

A project officer, an extension officer, and NGO or other – engaged in the community – agree specifically with the local authorities on holding the meeting: WHO should be present, date, time and specific venue of the meeting (specify that the meeting will be quite long, at least 2 hours). On the other hand, the meeting should not last too long, so as not to bore the participants.

► Session 1: Evaluation of the first *Smart-valleys* experience

1. The technician welcomes everyone and announces the program for the meeting, and also points out that it is a program with two sessions: first we "look back" and therefore do a retrospective assessment of the *Smart-valleys* experience and then we "turn to the future" and decide on what is to be done in future.

2. The technician insists on the fact that all of them should express themselves, that is, all the user-groups (rice farmers, livestock breeders, fisherfolk, market gardeners, protectors of nature, men, women, young, etc.); it is not a meeting to hear the voices of only the rice farmers and those who have worked hard on the land development.

   - If necessary, the discussions can be carried out among user-groups, rather than in plenary, or in 2 to 4 groups made up of a few representatives of users. In this case each group will be assisted by a technician-facilitator. The summary of the discussions will be presented in plenary, followed by interactions and discussions.

3. Each user-group representative is asked to say what the groups' perception about the changes is: what is different now – as compared to the situation before the start of *Smart-valleys*; the facilitator points out that this is what this user-group feels, perceives, observes (on the ground); in exactly what way has this "new (*Smart-valleys*) situation" changed the use and the specific functioning of THEIR activities (specifically as a user-group).

   - If necessary, the facilitator can suggest the consideration of various "types" of changes:
     - ◊ technical and economic: e.g. related to rice farming: yield, marketing of rice, water management, availability of water, … , accessibility to the lowland, …
     - ◊ social: related to social organization, group management, engagement, differences between men-women-young …
     - ◊ ecological: related to the diverse utilization of the lowland by the various types/ groups of users.

4. The summary of the discussion is written down in the form of key words in a table; see model below; columns 3 and 4 will be empty and without a heading at this point.

Lowland user groups[1]	Changes perceived/ observed		
1. Livestock breeders			
2. Market gardeners			
3. Rice farmers[2]			
4. ...			

1: List to be established based on the situation.
2: It is advisable to list at the end all changes experienced by the rice farmers in order to avoid any dominance by these rice farmers.

Thereafter, the technician asks each representative of the user-groups to present what he/she remembers to be the *Smart-valleys* major activities undertaken, beginning with the "non-rice farmer" users who have not been directly involved in the activities.

- Each activity is written down in column 3, using a key word.
- For each activity, it is indicated to what extent it has contributed to one or several changes listed in column 2, by linking activities to the corresponding changes, using arrows, if necessary.
- For each activity an indication is given of who was in charge.

A table, resembling the one below, becomes the result (what is indicated in the table is just an example).

Lowland user groups[1]	Changes perceived/ observed	Major activities induced by these changes	By whom?[3]
1. Livestock breeders	Access to water by animals became limited	Channelling water	Rice farmers and the technician
2. Market gardeners	Tomatoes could no longer be cultivated on time	Construction of secondary canals in the hydromorphic zone	Rice farmers and the technician
3. Rice farmers[2]	...		
4. ...	...		

1: List to be established based on the situation.
2: It is advisable to list the changes experienced by the rice farmers in order to avoid any dominance by these rice farmers.
3: Specify if an activity supported from "outside" (e.g. the technician or another person/department) or if it is a purely "internal" activity; name the person and his/her position.

Remark: if necessary, discussion can be held again among the user-groups instead of doing so in plenary; this will be followed by a presentation in plenary.

5. The first session ends with a discussion on the major advantages and disadvantages of the *Smart-valleys* development.
   - The technician ensures that each type of stakeholder is represented.
   - A list of actions/activities is made:
     - ◊ the most beneficial
     - ◊ the most constraining
       - what have been the technical and socio-organizational challenges?
       - what did not work and what should not be repeated?
       - other questions.
     - ◊ actions/activities that the villagers are capable of undertaking without support
     - ◊ those that require technical/other support.

► Session 2: The prospects for our lowland

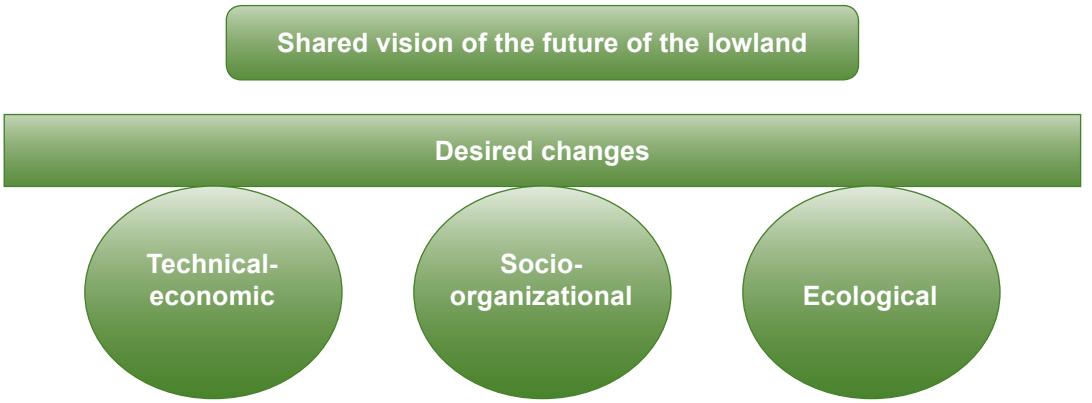
1. The technician starts this session by stating the importance for the entire group of users of the lowland to have an idea about what they expect from their lowland, or rather how they see the future of this unique ecological zone.

2. The technician asks the villagers to state their wishes or rather their vision of the future of the lowland:
   - in 5 years time how should the lowland be?
   - what "services" should it provide to the user?
   - what should be its significance with regard to the other farming areas (plateau area, …)?

3. The technician encourages the users to find a "compromise" and arrive at a consensus on a statement of their "shared" vision of the future of the lowland, and in a few key words he captures the statement on a flipchart.

4. Thereafter, the working groups are constituted; each group represents a type of user.
   - Each group discusses and develops ideas on the major changes they wish to see; changes that will contribute to the realization of the vision of the future.
   - In case a large number of changes are identified, the group prioritizes on the basis of the significance of the changes they wish to see.
   - The group visualizes the results on a flipchart for presentation in plenary.

5. The results of the group work are presented in plenary session, followed by discussions.
   - The technician tries to classify the changes into three major areas:
     - ◊ technical and economic (with possible specification of the lowland user-groups involved)
     - ◊ socio-organizational
     - ◊ ecological.
   - If necessary, the villagers clarify the contribution (or the relationship) of the desired change to the shared vision of the future of the lowland.
   - In case of similar proposals, a reformulation could be jointly done.
   - In case of a large number of desired changes, the technician proposes a prioritization.
   - Only changes that have been finally approved by all the user-groups will be adopted; in case of ambiguity, the issue will be left for subsequent discussion.



6. The session ends with a plenary session to provisionally identify, for the next season, some activities that will contribute to the desired changes.
   - The technician takes note, using key words written on cards, and placing the cards under the corresponding changes desired.
   - A mark is placed on the cards which correspond to *Smart-valleys* type of activity and which will subsequently be planned.
7. The meeting ends with a possible rendezvous for a *Smart-valleys* Planning session – Season 2.

Notes for the technician

Here, there are no *Smart-valleys* activities planned, but rather an exchange of ideas related to the desired changes. In case the villagers are sufficiently motivated to continue with the *Smart-valleys* land development, the technician should make an appointment for a planning session (see Module 11).

Module 20c
Indoor evaluation of the meeting

The evaluation essentially comprises two parts: evaluation of how the meeting was methodologically rolled-out and identification of the challenges related to the development of the specific site.

1. Roll-out of the village meeting

   The trainer-facilitator starts with a debriefing session in plenary, during which the participants share their evaluation of how the meeting was conducted and their suggestions for improvement (or adaptation to specific cases) from the point of view of facilitation.

2. The challenges related to the *Smart-valleys* approach

   Thereafter, the technicians discuss the major challenges they see in this particular case. The objective is to stimulate their thinking and their capacity to summarize the field results, which will serve as an input towards a more general evaluation of the *Smart-valleys* approach.

The film "Smart-valleys: developing inland valleys for rice-based systems in sub-Saharan Africa" can be accessed online (on YouTube) at: https://www.youtube.com/user/SMARTIVproject

This 40-minute film presents the *Smart-valleys* approach implemented at a site in Benin by a community of rice growers. It documents the various steps of the *Smart-valleys* procedure. It focuses on the design, organization, and construction of the low-cost water control infrastructure, after a rigorous site-selection procedure that takes into account socioeconomic and biophysical factors, and based on local farmers' knowledge.

The film serves as an excellent learning tool. The *Smart-valleys* Manual makes extensive reference to this film as it helps to effectively visualize the stages of the *Smart-valleys* approach.

The film can also be used to create awareness of and encourage the adoption of the *Smart-valleys* approach in other lowlands of sub-Saharan Africa, to serve as a viable alternative to high-cost traditional approaches.

Smart-valleys is a lowland development approach for rice production systems in sub-Saharan Africa. The approach is participatory, low-cost and sustainable. The *Smart-valleys* approach was developed by scientists at the Africa Rice Center (AfricaRice) in collaboration with the *Cellule bas-fonds* [lowlands unit] of the *ministère de l'Agriculture, de l'Élevage et de la Pêche du Bénin* [Benin Ministry for Agriculture, Livestock and Fisheries] and the *Institut togolais de la recherche agronomique* [Togolese Institute of Agronomic Research].

The *Smart-valleys* approach can help double rice yields through better water management, and with little or no additional production costs.

In contrast to the traditional approaches that demand costly topographical surveys and investments in water management infrastructure, *Smart-valleys* lowlands offer sustainable solutions within the reach of farmers, as they are developed and built by the farmers themselves.

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