Reports from the Three Working Group Sessions

Regional Level

- Chairman: J. Rais
- Secretary: H. Huizing

Project Level

- Chairman: J. Comerma
- Secretary: D. Rossiter

What is a Project ?

- Map scales from 1:10.000 to 1:100.000
- Land area from 100 to 1,000 km²
- Communities, not individual farms
- Limited time frame for project execution (typically less than 10 years)

Farm Level

- Chairman: F. Muchena
- Secretary: K. de Bie

Notes

- Not what the land user “thinks” but what he “does”.
- The keys are “development” and “capital”.
- Options exist to obtain and validate indicators with explicit cooperation of farmers.
- Use farmers to support data-warehousing.

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1. Major Issues in Land Use Planning

1.1 Question 5

Are we in agreement on principles, criteria and indicators for sustainable land management (including both biophysical and socio-economic sustainability)? If not, is agreement in sight?

Regional level:

- Both bio-physical and socio-economic indicators are required. These indicators should enable us to monitor progress towards or away from sustainability. A lot of work has already been done on the identification of biophysical indicators in an international context. International agreement on economic and social indicators for sustainable land management is still lacking, however.
- Economists have their own indicators, but these indicators do not specifically refer to sustainability.
- Agreement is possible by taking into account not only diversity but biodiversity in socio-economic circumstances in the objectives of sustainable land management.

Project level:

- Principles: The “5 pillars" of the FESLM are satisfactory, but it is important that all pillars be given the same attention in practice.
- Criteria and indicators: These are defined for each specific project; there can be no general list. There are plenty to choose from. Some may be conflicting, which leads to the problem of how to combine contradictory indicators into a single scale of “sustainability”? Maybe this is impossible or undesirable; instead just list values for all the indicators.
- Indicators are currently biased towards agricultural sustainability. We may need to use indicators at more macro levels, such as the political and macro-economic context (e.g. “Is the agricultural sector as a whole sustainable?”). We also need greater emphasis on developing indicators for non-agricultural uses (rangeland, forestry, tourism, etc).
- A project requires some short-term indicators (project “milestones”) so that stakeholders and implementers can see that the project is going in the right direction. However, these indicators must be compatible with long-term indicators, where “sustainability”is measured.

Farm level:

- Principles, criteria and indicators for SLM in sight and possible? Yes … given time.
- Developing indicators must remain a continuous ongoing process.

1.2 Question 3

Can we identify the physical and economic processes pertinent to sustainable land management?

Can we identify the levels of spatial and temporal resolution and the corresponding data needed to characterize these (physical and economic) processes?

Regional level:

- Homogeneous areas such as agroclimatic/agroecological zones and land cover or cropping pattern zones are needed to identify biophysical and socio-economic processes at the regional level. Within these zones, areas designated for development (agriculture, forestry, mining) and preservation need to be considered separately.
- Policies, institutions and economic/market forces determine the extent to which land management issues can be addressed through interventions. Strategic indicators that can steer biophysical and socio-economic processes are therefore more important than the processes themselves at the regional level.
- As a first step, the minimum data requirements must be identified at regional level.
- First, the phases that are part of the land management process should be identified, e.g. planning, organizing, coordinating, evaluating, controlling, monitoring, etc. Then, the relevant important biophysical and socio-economic processes should be identified for each phase.
- Socio-economic and physical processes (and their constraints to development) need to be considered separately.
- Integrated, interdisciplinary studies are essential.

Project level:

- Yes; we usually have the scientific knowledge (sometimes supplemented by on-site research).
- It is important to set priorities and limit the scope of the project to a manageable size. A project doesn’t generally have a pure research component, so we must use or adapt existing methods of analysis.
- The project should have already identified the important problems; the research can then be focused on these (the demand-driven approach).
- Some processes can only be understood by listening to the local people, and some can only be understood by disciplinary observation.
- Projects last less than 10 years, but sustainability is measured over the long term.

1.3 Question 4

How can we build bridges between the disciplinary models of natural phenomena and the practical integral land use planning models for management and decision support?

Regional level:

- First, objectives should be defined; then verifiable biophysical and socio-economic (scenario) models should be developed.
- Key issues of integration of physical and socio-economic information have not yet been solved, however. A solution may be to integrate physical models into an economic model. An example is the interregional and intersectoral economic input/output model developed in Indonesia for spatial planning purposes.
- Disciplinary models should be simplified. These simplified models, or the knowledge extracted from them, should be made part of interdisciplinary planning, decision-support or dynamic assessment models that can answer questions posed by policy makers and/or scientists.
- The development of “integrated environmental assessment models” based on a scenario approach and their use in “dialogue workshops” with policy makers has been successfully applied by RIVM in The Netherlands.
- “Systems thinking” is a tool that makes it possible to build bridges between models, but it needs to consider and include “soft systems” for information that is difficult to quantify.

Project level:

- There has been some success in combining disciplines (bridges between different physical models). Certain (quantitative or qualitative) models can help make explicit the differences between views of related natural phenomena, thereby leading to better communication and a unified approach.
- Social and cultural aspects are difficult--in fact may be impossible--to model. There may be some useful indicators, however, even if causes cannot be modelled.
- The FAO *Framework for Land Evaluation* is still a good basis for the integration of disciplines, using land qualities to separate the contributions of different disciplines (e.g. production agronomist, plant protection specialist, soil & water management specialist, etc.).
- Integrated (“system”) models of the biophysical processes are a good framework for interdisciplinary collaboration, since various specialists must agree on the modelling framework and the model components.

2. Geo-Information Needs

2.1 Question 11

Is geo-information currently adequate for planning sustainable land management?
How can it be collected in a cost-effective and timely manner?

Regional level:

- The spatial and temporal resolution of remotely sensed data that are currently acquired is, in many cases, insufficient for planning purposes. Remotely sensed data may be cost-effective, but not all factors needed for sustainable land management can be obtained from these data.
- Existing data (e.g. remotely sensed data, census, thematic surveys) are often adequate for land use planning purposes. Required information can be inferred from these data, e.g. through (pedo-) transfer functions. Optimum use of existing data is crucial. Often in practice, existing data are not used because of access problems or, simply, because of a lack of awareness of their existence. Existing data are generally not sufficient for scientists and modellers.
- The quality of the information provided is important. Quality is related to costs (expressed in $\$/km^2$) and available budgets. Decisions should, therefore, be based on a minimum data set.
- The adequacy of information should be made explicit by estimatiing the costs of making a wrong decision on the basis of the information.

- More attention should be paid to quantifying the dynamics of waste lands and their possible conversion to useful lands.

Project level:

- It is not always possible to obtain existing data sets (paper or digital), even if they exist. Sometimes the source is unknown; maps are lost or misplaced. Much information is not properly georeferenced, so cannot be matched with other information. Monitoring (an important component of most projects) is impossible without accurate georeferencing of the time series of samples.
- Existing data are unlikely to be at the appropriate scale for a particular project. In particular, reliable time series of climate and hydrology at sufficient resolution are often lacking. Similarly, the scales of existing soil maps may be too small. It may be possible to use surrogate observations and professional intuition to compensate for these deficiencies.
- At very local scales, we can use unrectified aerial photos or local sketch maps; this is unlikely to be satisfactory at project scales.
- Projects produce data, all of which should be geo- and time-referenced to contribute to a unified database. The original data should be kept in raw (dis-aggregated) format for later use in unforeseen ways.
- Projects can pressure national mapping agencies, meteorological services, soil survey organizations, etc., to provide basic data to all users in an impartial, timely and inexpensive way. In practice, this has not had much (any?) effect.

Farm level:

- There is a large gap between “advanced” farmers and “subsistence” farmers in terms of their SLM knowledge. SLM technologies also differ accordingly, e.g.: “precision farming” versus “rural planning”. 3D models made of topomaps glued on cardboard may help in the latter case, while at a later stage farmers may become involved through indentifying their plots on hard copies of remotely sensed images.
- To bring SLM technologies to farmers, training and placement of equipment is best carried out at “farmers' association” level.
- Participation by land users must be treated as a demand–supply approach.

2.2 Question 10

How can local people be provided with the knowledge required to collect by themselves some of the detailed field information that is so often lacking for the support of local management--thus mobilizing the local manpower and knowledge available, and freeing expensive specialist time for data analysis and modelling?

Project level:

- Our job is to produce or identify such simple methods, but the results should tie in with generally accepted “professional” disciplinary results. An example: simple soil test kits, which give measurements in the same scale (even if at coarser resolution) as "professional" measurements.
- An example from Costa Rica: The National Biodiversity Institute has started a programme to train local farmers to collect georeferenced biological data. There are plenty of examples of local data collection; the problem is to identify the possibilities and design a training programme in each case.

Farm level:

- Land users can collect information by themselves, depending on the type of data required.
- “Supported” group discussions can increase motivation in respect of the above.
- However, land users may be requested to collect only limited “key” SLM information; it must remain realistic (keywords: trust and no promises!). This may already help SLM planning quite considerably.

2.3 Question 9

How can we overcome institutional and administrative problems such as standardization, legislation and quality control, which are presenting major bottlenecks in the working of information technology?

Regional level:

- How? Sit together and build bridges.
- By proving that information technology applications will benefit all institutions and administrative units. Digital geo-information may improve communication and inter-institutional linkages, e.g. through the use of GIS databases and by networking within and between countries.
- Donor-driven projects based on GIS often compound the bottlenecks of inadequate standards and quality control because they create their own GIS infrastructure without complying with national standards.
- A great problem is the power and prestige associated with data ownership.
- Quality control is a separate issue (garbage in vs. garbage out).
- Additional bottlenecks are infrastructure and know-how.
- Let's invite politicians to conferences like this one.

Project level:

- Yes, it is very important. Projects must share (digital) data in a common spatial data infrastructure. The ideal structure is a decentralized network, each node with defined responsibilities.
- Quality control is achieved by consistent use of metadata standards. These already exist and are more or less satisfactory.
- Legislation and intellectual property must be well defined; this is in fact a bottleneck in many cases. Many agencies have been slow to develop procedures, so that existing data are not available at any price.
- Standardization is not so much a problem because data can be converted without too much difficulty as long as the correct metadata are provided.
- Local people must be allowed access to data in a transparent manner. With GPS, they may be producing their own data, which can then be "traded" for other data.
- Sharing data is the ideal situation; in the present situation, however, with poorly-defined rights and procedures, trading and other informal agreements predominate. This is inefficient, a waste of time, and can lead to misunderstandings and bad feeling.
- Project design should include links between data providers from the very beginning. However, even projects with such links can suffer information-availability bottlenecks if there is no overriding control or established policy.

3. The Planning Process

3.1 Questions 1 and 2

Where should top-down and bottom-up land use planning processes meet (if at all)? How do we incorporate the perceived needs of stakeholders (including farmers) in our sustainability criteria?

Regional level:

- An institutional planning approach at a reasonably decentralized level where top-down and bottom-up can meet is desirable.
- In Indonesia, top-down (local government) and bottom-up (representatives of the people) meet in the process of district level land use and spatial planning.
- In regional land use planning, it is not possible to deal with individual farmers. It is necessary to identify groups (types) of farmers who share the same needs and interests. Representatives of these groups should take part in the land use planning process.

- The needs of non-agricultural activities should also be considered.
- "Top-down versus bottom-up" is a continuum. Land use planning is a cyclic and continuous process (from local to regional scale) driven by policies that will have benefits and consequences for (groups of) citizens, in which both local people and policy makers should be involved.

Project level:

- These needs are (supposedly) part of the project rationale. Different stakeholders have different needs, and these may be in direct conflict. How to harmonize the needs of different stakeholders? This is essentially a politico-social exercise.
- Perhaps we could design a "stakeholder satisfaction index'" (SSI) to check the progress of the project.
- One way to avoid much of the conflict between stakeholders is to decentralize projects to the local level, each locality having its own set of stakeholders and criteria for success.
- But, regional, national and donor project objectives must be met. What happens when local stakeholders and powerful "metropolitan" interests are in conflict?

Farm level:

"Perceived needs" of stakeholders relates to the fact that "we" have to learn how land users think. It is "their reality", and learning it might never be achievable. We need to know land users' perceptions regarding decision-making processes related to profit maximization, cost minimization, labour optimization, natural resources conservation, etc. Linked to this is the question of whether the "perceived needs" are (generally or completely) socio-economically acceptable. The problem is that human behaviour cannot be economically defined or quantified; behavioural patterns, however, must be recognized. Land users have their own thresholds and reasoning; thresholds may translate into "tension" indicators based on conflicts, juridicial processes, health status, addictions, etc.

3.2 Question 8

How can we bring geo-information and the results of land suitability assessments, etc., "the last mile to the farm" (i.e. to the farmer)?

Project level:

- In countries with fully commercial agriculture and a sound information infrastructure (e.g. Canada), "all" farmers have their own computer and Internet access; just put the results on the Web and publicize the URL. Farmers and other stakeholders are used to looking for, evaluating and using information.
- In developing countries, it is impractical for all farmers to access information. A possible compromise is to train farmer organizations to access the data in a central location at the local level. Information infrastructure (including basic telecommunications) remains a serious problem.

Farm level:

- *Note*: The information flow is intended to "influence" the behaviour of land users so that actual land use practices change.
- The information flow to and from land users can be measured (ref. Roling); a precondition of such a flow is mutual trust between parties.
- It is important to build "bridges" towards land users (last mile) so that actors have "direct" contacts with the actual farmers (possibly through representatives, events, etc.)
- A network of "connectivity" makes the "bridges" more resilient; "connectivity" must start at the grassroots level.