Negotiation-support toolkit for learning landscapes

Editors
MEINE VAN NOORDWIJK
BETHA LUSIANA
BERIA LEIMONA
SONYA DEWI
DIAH WULANDARI

WORLD AGROFORESTRY CENTRE
Southeast Asia Regional Program

Hoang MH, Joshi L and van Noordwijk M. 2013. Participatory landscape appraisal (PaLA). *In:* van Noordwijk M, Lusiana B, Leimona B, Dewi S, Wulandari D (eds). *Negotiation-support toolkit for learning landscapes*. Bogor, Indonesia. World Agroforestry Centre (ICRAF) Southeast Asia Regional Program. P. 16-21.

1 | Participatory landscape appraisal (PaLA)

Hoang Minh Ha, Laxman Joshi and Meine van Noordwijk

Participatory Landscape Appraisal (PaLA) can be used as an early diagnostic tool of the issues in a landscape. It can help document a process of participatory appraisals of issues of local concern, such as changes in water flows, soil erosion, slope stability or agrobiodiversity. It combines Rapid Rural Appraisal and Participatory Rural Appraisal (RRA/PRA) tools and methods with agroecological analysis to capture local knowledge at relevant temporal and spatial scales. PaLA can be used in scoping studies that can inform more detailed, subsequent analysis of specific functions and issues.

Introduction: multifunctional landscapes and their stakeholders

When people first settle in a landscape, they tend to select the most suitable places, generally where water availability and soil fertility are most favourable (Figure 1.1.A). Landscapes change in response to how the people inhabiting them earn their living and lead their lives.

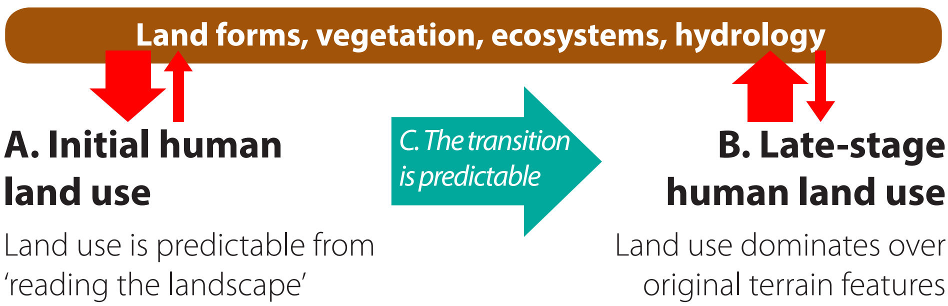

Figure 1.1. Land use is both dependent on the landscape (stage A) and influences it (stage B)

Drastic change tends to come from outside, such as logging or mining concessions and the associated migrants, who may stay behind when the extraction frontier moves on. Change also derives from the step-by-step process of intensification if the sum of local population growth and migrants exceeds the number of people leaving to seek their fortune elsewhere. Roads bring opportunities to participate in external markets and their demand for products that can be produced at competitive prices. Specialization of a few commodities is a logical consequence, often stimulated by development agencies and governments. The result is that parts of the landscape that are sensitive to degradation get used and indeed start to degrade. In a later stage of human land-use, the underlying structure of the landscape may be masked and land use dominates the vegetation, ecosystems and hydrology (Figure 1.1B).

Farmers' knowledge of landscape relationships and their perceptions of an underlying logic to these relationships play an important role in their management decisions. The way farmers understand the landscape and interact with it may differ from the way government land allocation and land-use policies classify land and understand interactions with water flows and other landscape functions. Government land-use planning may only partially match local regulations, determining who is allowed to do what and where. It is safe to assume that development of sustainable land-use practices at farm and landscape levels depends on bridging the gaps between the perceptions and concerns of the multiple stakeholders of landscape functions. This is an important step towards involving them in the analysis of trade-offs between the short- and long-term benefits of sustainable land use, drawing on their knowledge and perspectives.

Two concepts that are important in the way landscapes are more than the sum of plots are buffering and filtering (see van Noordwijk et al 2011). What happens in one plot has an impact elsewhere, influencing flows of water, moisture in the air, sediment, organisms (beneficial, detrimental and neutral), fires and ensuing smoke or haze. The pattern of land use and its relation to the underlying structure of the landscape determine the overall availability of goods and services.

Box 1.1 Buffers and filters

The concepts of 'buffers' and 'filters', as used here, are related. Buffers reduce variability, filters (selectively) reduce transmission. The technical definitions of 'buffer' are indeed based on variance reduction: rainfall is highly variable (being zero much of the time and having high values a couple of hours per year); stream flow is buffered, although still variable: if it would be the same amount every day buffering would be 100%. The concept of buffering applies to anything that varies and where variation matters: prices, rainfall, temperature, politics, human health in the face of diseases, crop health in the face of pests, soil water content etc. Buffering cannot, however, shift the means over a longer time period. Filters can. Filters separate particles from their carrier, as a coffee filter does. Landscape filters can intercept part of the soil particles in the overland flow of water by allowing them to settle. Filters intercept monetary (or budget) flows, preventing funds from reaching downstream stakeholders. Filters lead to selective transmission of information. The concepts are further discussed in van Noordwijk et al 2011a. In the context of PALA, the buffers and filters relate mostly to water flows and erosion/sedimentation processes. The strips of land along rivers, or in other strategic positions in a landscape, that have a filter function can be called 'filters' themselves. The term 'buffer' is often used as shortening for 'buffer zone', an area in between intensive agriculture and conservation of natural habitat and associated biodiversity. The buffer zone buffers human influence on wildlife and wildlife influence on humans.

Objectives

The objectives of PaLa are to:

- articulate and study farmers' perceptions of the relationship between land use and landscape functioning;
- understand farmers' management options and the choices they make, interacting with the buffering of externally imposed variability;

- understand the flows of water, sediment, nutrients and organisms and the internal filter functions that determine landscape functioning, on the basis of land-use practices and the interactions between landscape units; and
- raise awareness among community members and government officials of issues connected to ecological and administrative boundaries.

Steps

The methods are derived from several decades of experience with RRA/PRA. PaLA consists of eight steps, which are evenly distributed between indoor sessions and fieldwork.

1. Identification of ecological and administrative domains with clear boundaries (indoor sessions and observation). This includes reviewing existing maps and reports (biophysical, ecological socioeconomic and policy). Relevant documents include topographical, land-use, soil and administrative maps. An Internet search can uncover hidden gems of information that are relevant for understanding the landscape.
2. Sampling the stakeholders to be interviewed, using questionnaires and/or ranking methods (indoor sessions and observation). The selected set of stakeholders should be broadly representative of the study area and the selection should be based on criteria including the locations of their fields (for example, in the upper, middle or down slope areas), income, gender, social status, age, experience and education. The criteria should be based on the goals of the project. It will be important to discuss them at the start of the PaLA process, and report them along with the results. Representativeness is easily claimed but hard to prove.
3. Forming an interdisciplinary survey group and planning and designing PRA tools (indoor sessions and observation). The concepts behind PaLA and the steps that need to be taken to implement it should be agreed on by the team.
4. Making a village sketch or model that identifies the land-use patterns and the landscape focus points (fieldwork). The methodology consists of semi-structured interviews with male and female groups. The expected model should show the local names of different areas, the distribution of land-use plots, and the main features of the landscape, such as rivers, streams, mountains and roads.
5. Going on a transect walk in order to gain an understanding of the soil–plant–water interactions in a landscape (fieldwork). The selected transect/s should cover most of the land-use types found in the study area/s. The methods used for this activity are simultaneous transect walks and semi-structured interviews. The expected outputs are representative transects and sketches of the areas, with the locations of transects entered on a map. During the transect walk buffers and filters are specifically noted and discussed as to their function, management and limitations.
6. Drawing up a timeline for each land-use type along transects and/or for the fields situated in the representative areas of the study catchment or village (fieldwork). The timeline can be used to study land-use changes over time. This activity will involve semi-structured interviews and timeline drawing.
7. Gathering feedback in order to report findings to the farmers and other stakeholders and to get their input (indoor sessions). The methods used for this activity are posters and other communications tools and group meetings.
8. Data analysis using teamwork (indoor sessions). Qualitative data resulting from the PRA tools, such as sketch transects, timelines and secondary data, is analysed by different team members. All findings are then compared and cross-checked in order to get a complete picture of landscape patterns and issues.

PaLA case study: Dong Cao catchment, Hoa Binh province, Viet Nam

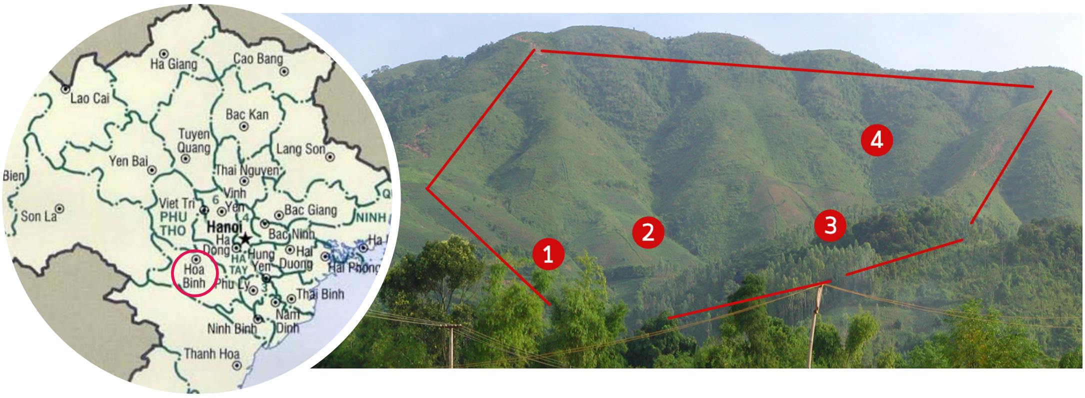

Figure 1.2. Location of Dong Cao catchment, Hoa Binh province, Viet Nam; numbers mark places of specific interest. Photo: Tran Duct Toan

Dong Cao catchment (20° 58′ N, 105° 29′ E) is located in the Tien Xuan commune, Luong Son district, Hoa Binh province, 60 km south of Hanoi. The area receives a mean annual rainfall of 1500 mm, which falls mainly between April and September. Ferralsols and Acrisols soils consisting of clay loam and clay dominate the area. Most of the area has been converted to agricultural uses. Patches of secondary forest exist, mainly at higher altitudes. Cassava, corn, arrowroot and soybean are the major annual crops grown in the uplands and rice cultivation dominates the lowlands. The slope gradient in the area is between 15 and 60%. Situated at an elevation of 200–600 m, the low mountain zone of Viet Nam's northern mountain region is home to 39% of ethnic minorities. Two ethnic groups—the Muong and the Kinh—live in the study area.

PaLA was used as a scoping study for the Dong Cao catchment. During the PaLA survey, farmers' perceptions about current land use and their visions of how land use would change in the future were investigated using a 3D village model, a village sketch, transects and timelines. The results were used to develop hypotheses for the local ecological knowledge (LEK) survey and simulation work.

We started at the plot level with current land use (village sketch/model) and continued at the landscape level (transect). For each plot, we looked at the history of the land and at its future, to uncover farmers' ideas of how land use would change. We started with simple questions covering what, why, when and how, and followed these with open-ended, in-depth interviews.

The research team consisted of three Vietnamese and three Swedish researchers and students working in parallel for nine days. Five of those days were spent in the field together with 14 selected local farmers, while the remaining four days were used for indoor work (see figures 1.2 and 1.3). Brainstorming was the main tool used for team interactions. All concepts, definitions and methods were discussed and agreed to by the team members. Rapid reports—in which all of the information obtained during the day is written in a structured form—were completed at the end of each day of fieldwork to ensure that the information was properly documented. The method and the checklist to be used the next day were also agreed upon. The open-ended interviews aimed to establish an equal partnership between the farmers involved in the study and the team members. Farmers were asked for their feedback throughout the research process.

Figure 1.3. Team dynamics during the indoor session (Photo: Dan Olsson); the outdoor transect walk (Photo: La Nguyen) and village model (Photo: Johan Iwald)

The focus points in the landscape, including the points where buffering is weak and sensitivity to erosion high and the filters that intercept overland flows of water and sediment were identified both in the field and on maps. The characteristics of the filters and the points with weak buffering were described in a simple Geographic Information System (GIS) map (Figure 1.3) and on a timeline.

Farmers' knowledge expressed during the PaLA process indicated that the presence and abundance of trees in the upper sub-catchment was associated with higher stream flow, especially in the dry season. A more in-depth study as part of the LEK survey helped to formulate hypotheses and explanations for the outputs of the modelling work. The modelling, along with discussions with farmers, helped in identifying tree-based, land-use options for low-cost soil and water conservation.

For the weakly buffered points in the catchment the tentative conclusions were that:

- bamboo hedgerows prevent erosion better than *Acacia mangium* and *Tephrosia candida hedgerows*; and
- improved fallow of *T. candida* (two years) in rotation with cassava (two years) prevents erosion better than bamboo hedgerows intercropped with cassava.

For enhancing buffering and filtering functions in the catchment, it was clear that

- trees conserve water for the whole catchment; and
- *Acacia* and bamboo species are better for water conservation than are weeds/short natural fallow and monocropping.

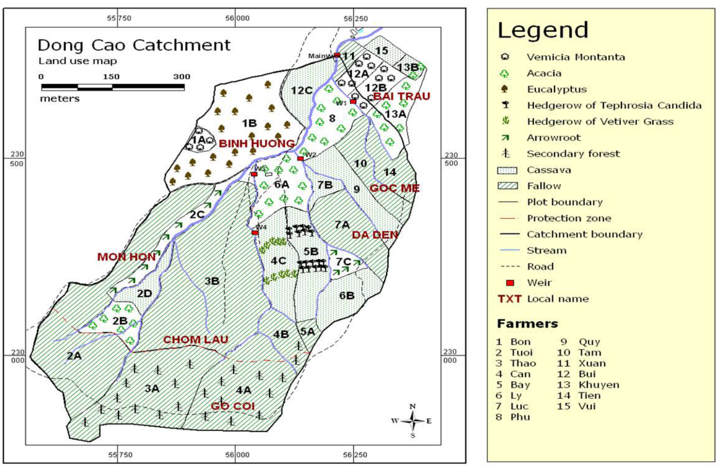

Figure 1.4. Simple GIS map of the Dong Cao catchment with local names of the fields and list of owners

Further reading

Hoang Fagerström MH, van Noordwijk M, Nyberg Y, eds. 2005. *Development of sustainable land-use practices in the uplands for food security: an array of field methods developed in Viet Nam*. Hanoi: Science and Techniques Publishing House.

Box 1.2: Land Use Fertility Effect Predictor

Researchers who want to know the impact of land use practices on soil conditions, often sample the land use systems as they are found in the landscape (what else could they do?) and infer from differences between soil measurements what impacts the land use systems have on the soil. That's where it can go wrong badly.

The LUFEP (Land Use Fertility Effect Predictor) worksheet explores the bias in such a procedure that is caused by a combination of:

1) farmer knowledge of fertility conditions of soils in the landscape,
2) farmer preferences to allocate specific sites for specific uses,
3) farmers' ability to implement such preferences,
4) the proportions of different land uses in the landscape.

As a result we may find that land uses with the strongest negative effect on soil fertility are still found on the most fertile sites, and soils under land use systems without negative effects occur on infertile soils. Such reversals mean that estimated effects of land use on soil fertility have a strong bias, unless there is a way to estimate the effects of farmer site selection.

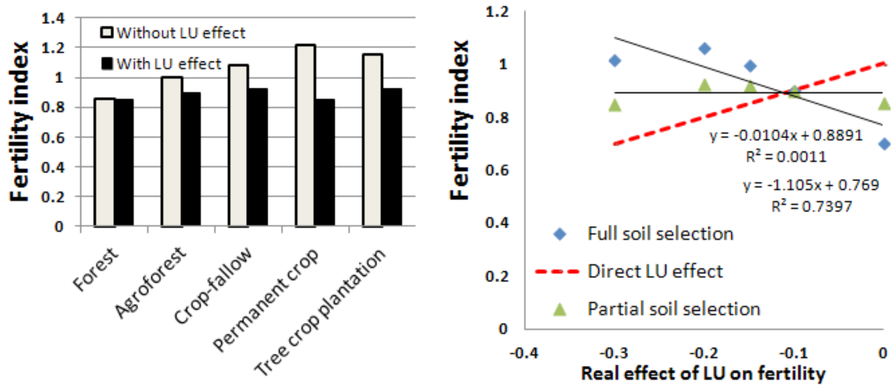

Figure LUFEP.1. A. Soil fertility index of soils used for five different land use systems with and without the effects of land use on soil fertility being expressed; B. Measurements in various land use systems in relation to the direct land use effect, showing the effect of soil selection on effect estimates

Figure LUFEP.1 shows an example for the default version of the model. In the "active model" sheet you can change the names of the land use systems and provide a number of numerical estimates of properties of the LU systems, the landscape's soil, farmer knowledge, implementation of LU preferences, and LU fractions in the landscape, to explore the discrepancy between what the innocent researcher observes and the real effect of LU systems on the soil.

The spreadsheet can be found at http://www.worldagroforestry.org/downloads/wanulcas/lufep.xlsx

The landscape scale is a meeting point for bottom–up local initiatives to secure and improve livelihoods from agriculture, agroforestry and forest management, and top–down concerns and incentives related to planetary boundaries to human resource use.

Sustainable development goals require a substantial change of direction from the past when economic growth was usually accompanied by environmental degradation, with the increase of atmospheric greenhouse gasses as a symptom, but also as an issue that needs to be managed as such.

In landscapes around the world, active learning takes place with experiments that involve changes in technology, farming systems, value chains, livelihoods' strategies and institutions. An overarching hypothesis that is being tested is:

> Investment in institutionalising rewards for the environmental services that are provided by multifunctional landscapes with trees is a cost-effective and fair way to reduce vulnerability of rural livelihoods to climate change and to avoid larger costs of specific 'adaptation' while enhancing carbon stocks in the landscape.

Such changes can't come overnight. A complex process of negotiations among stakeholders is usually needed. The divergence of knowledge and claims to knowledge is a major hurdle in the negotiation process.

The collection of tools—methods, approaches and computer models—presented here was shaped by over a decade of involvement in supporting such negotiations in landscapes where a lot is at stake. The tools are meant to support further learning and effectively sharing experience towards smarter landscape management.

World Agroforestry Centre
ASB Partnership for the Tropical Forest Margins
AARD
Federal Ministry for Economic Cooperation and Development
Norad
IFAD Enabling poor rural people to overcome poverty
CGIAR Research Program on Forests, Trees, and Agroforestry