



Bundesministerium
für Bildung
und Forschung



NACHHALTIGES
LANDMANAGEMENT



FONA
Forschung für nachhaltige
Entwicklungen
BMBF



Participatory research to support sustainable land management on the Mahafaly Plateau in south-western Madagascar

Participatory Gaming for Sustainable Land Management in the Mahafaly Region

A Practical Guide for Researchers and Practitioners



This guide was written in the frame of the Sustainable Land Management in Madagascar (SuLaMa) project by following authors

Maren Wesselow
Regina Neudert
Katinka Thielsen
Hémery Stone Tahirindraza
Miandrito Mampiray Mbola
Nadine Fritz-Vietta
Susanne Stoll-Kleemann

September 2015

If you would like to use this methodology in your work, please get in contact with:

Maren Wesselow
Ernst-Moritz-Arndt University of Greifswald/ Germany
Email: maren.wesselow@uni-greifswald.de

Contents

I Introduction	3
II Participatory Gaming	4
___ 2.1 Why participation in sustainable land management?	4
___ 2.2 Why gaming?	6
___ 2.3 Why NOT gaming?	9
___ 2.4 The Mahafaly region	10
III The Livelihood Game - Methodological Guidelines.....	13
___ 3.1 Game Elements.....	14
___ 3.2 Playing the Game.....	20
IV The Livestock Game – Methodological Guidelines	24
___ 4.1 Game Elements.....	24
___ 4.2 Playing the Game.....	27
V Preparation and Wrap-up	29
___ 5.1 Team formation and training.....	29
___ 5.2 Materials and tools.....	29
___ 5.3 Documentation of workshop process and results.....	30
___ 5.4 Evaluation and crosschecking.....	31
VI References	32
VII Contact and Copyright	34

List of tables:

Table 1: Role composition for the Livelihood Game 15
 Table 2: Activity options and follow-up questions for the Livelihood Game 19
 Table 3: Role composition for the Livestock Game 24
 Table 4: Activity options and follow-up questions for the Livestock Game..... 27

Photographic credits:

- Christina Lechtape May, Sulama
- Jacques Rakotondranary, Sulama
- Maren Wesselow, Sulama

List of pictures:

Picture 1st cover: SuLaMa Village Workshop 2014..... 0
 Picture 2: Explaining the workshop methodology to the participants..... 14
 Picture 3: Household Cards for the Livelihood Game 14
 Picture 4: Participants explain their decisions using visualization tools 16
 Picture 5: Simulating household decisions on a spatial scene 16
 Picture 6: Group discussions evolve easily 21
 Picture 7: The facilitator subsequently steps back and lets the participants discuss 22
 Picture 8: Participants recognize their daily surroundings easily..... 23
 Picture 9: Household Card for Livestock Game 24
 Picture 10: Grazing paths were marked with colored ribbons (Jacques Rakotondranary. July 2014)..... 25

I Introduction

This practical handbook is designed to guide and support practitioners and scientists who plan to organize participatory workshops in the Mahafaly region, southwest Madagascar. The handbook was developed based on the experiences of the “Village Workshops” which were conducted in 2014 in the course of the research project SuLaMa (Participatory Research for Sustainable Land Management in Madagascar). To validate their land-models of the Mahafaly region, the scientists used their expert knowledge and created two participatory role playing games which were tested in four local villages.

The workshops were held by a Malagasy team during four weeks in July 2014 in four villages in the littoral and on the plateau of the Mahafaly region. Participant groups were determined by the community itself and composed of people mixed in age, gender and lineage. Two groups with 12 participants respectively worked simultaneously so that a total of 96 people participated in all four villages. Structured participant observation was conducted in each of the workshops and direct feedback on the method was asked from the participants. In some cases, additional interviews were carried out after the workshops. The feedback of the participants on the methodology is transcribed, coded and analyzed.

The participatory “Livelihood Game” and “Livestock Game” were designed in accord with both the specific research needs and local conditions. It was assumed that household decisions depend on environmental conditions (climate, availability of natural resources, soil quality, etc.), economic resources (cash, manpower, cattle, etc.) and education level (alphabetization). Furthermore, cultural influences like taboos, relations to ancestors and supernatural beings, cultural meaning of certain resources and places, etc. as well as security concerns (cattle raisers) and social interactions (clan/ lineage/ family cohesion, social events and community compromises) and were consequently included in the game. The essence of both games is that participants assume roles and act out their real-life decisions on maps of their familiar surroundings.

During the *Livelihood Game*, participants assume the role of one of the typical household types in the village. A satellite map of the village proximity with mapped field contours allows participants to localize their houses and fields. The fictive households are asked to plan their annual subsistence decisions and social activities in the course of one year. They locate their fields on the map and decide how to cultivate them. According to the households’ resources, additional activities are available to them, e.g. livestock keeping, trade, charcoal making, or sending children to school. Each decision is visualized by pictured cards, colors and symbols. “Destiny cards” symbolize the influence of socio-cultural events. Regular “Reflection rounds” are held to reflect on the life quality and well-being of the households. After each year, participants discuss their investment costs and revenues and decided upon consequences for the following year. The game covers “good” years and drought years.

The *Livestock Game* is fairly simpler than the *Livelihood Game* and primarily seeks to understand and discuss the herders’ decisions on grazing grounds, fodder and water supply. The roles in this game only differ in the number of livestock people own. As decisions on

grazing grounds vary throughout the year, the game covers the time span of one single year, as well as one cattle raider (malaso) risk scenario. As this game focusses no longer on fields and crops, it is played on a smaller scale so people can localize their grazing grounds.

The workshops showed that the methodology was easily understood and well-accepted by the local communities and Role Playing Game (RPG) was found to be a promising interactive methodology that called for further development.

The aim of these guidelines is to present the principal steps and elements of the game. Chapter 2 of this handbook exposes why researchers and practitioners in the Mahafaly region should (or should not) opt for this peculiar form of stakeholder participation and which regional peculiarities are to be kept in mind. In the next part of this handbook, the *Livelihood Game* (chapter 3) and the *Livestock Game* (chapter 4) are introduced. Sample material and game instructions are given in great detail, so practitioners can understand and adopt the concept easily. Chapter 5 gives an overview of practical considerations on team composition, resources and documentation of the workshops. Furthermore, chapter 6 provides an overview of possible applications in natural resource management. According to the specific purpose and application, the game can be modified or amplified.

II Participatory Gaming

2.1 Why participation in sustainable land management?

Over the last decades, researchers and practitioners subsequently realized that natural resources can neither be analyzed nor managed without considering the human factor (Bousquet/ Le Page, 2004) Environmental problems such as deforestation, water scarcity, overexploitation of natural resources, and loss of biological diversity can neither be traced back to one specific cause nor is there a blueprint solution to face them. As humans remain the main driver of environmental degradation, it is indispensable to understand people's livelihood strategies, their socio-cultural conventions and individual perceptions.

Even though many rural communities are very aware of environmental interrelations and strongly rely on natural resources, their livelihoods largely depend on economic, political or social factors (Adger et al., 2009). Holloway (2014) and Horning (2008) describe the cleavage between between rural Malagasy communities and outside conservation and development actors. Hanson (2012) comes to the conclusion that externally imposed conservation efforts barely meet rural communities' needs and expectations.

Especially in the Mahafaly region, where a large number of organized actors like NGO's, development agencies, research projects and private companies interact, rural communities find themselves exposed to top-down development projects. As rural communities may have difficulties to formulate their own visions and ideas, they bear the brunt of unintended consequences from decisions made without sufficiently taking account of their needs (Evans et al., 2006; Mosse, 2001). At the same time, rural communities are remote and small, people lack formal education and have low organizational capacity. These factors make it hard for them to articulate and negotiate interests with other stakeholders (Chambers,

1994(c)). As it is the rural population who lives upon the natural resources at stake, they should be empowered to manage and conserve their environment independently (Evans et al., 2006; Evans et al., 2010).

To channel rural development into more sustainable pathways, it needs human interaction and agreement (Evans et al., 2006; Chambers, 1994(c)) Interactive Participation tools (as described by Pretty, 1995) tools aim at:

- facilitating mutual learning, and understanding of different parties
- providing platforms and processes for strategic planning which might lead to collective action
- triggering dialogue, minimizing conflicts and maximizing equitable benefit-sharing
- raising acceptance for nature conservation activities and understanding for environmental interrelations
- Improving opportunities for local people to influence other stakeholders' planning, decision making or project implementation
- encouraging rural communities to claim their rights and take over responsibility
- valuing the people's knowledge and raising self-esteem
- motivating people to act pro-actively
- empowering rural communities by developing skills such as
 - articulating views and needs and communicate them to local authorities and private stakeholders within formal channels
 - arriving at decisions transparently and democratically
 - mediating conflicts and developing consensus
 - developing ideas, and creating innovations
 - planning strategically, in an informed an long-term oriented way

However, it cannot be denied that participatory methods have their pitfalls. Some development and conservation projects have lately been accused to outwardly embrace participatory methods but continue to validate top-down planning under the cloak of "warmly persuasive" participatory methods (Hildyard et al., 2001).

Therefore, a critical self-assessment is needed before the participatory process is initiated (Leewis, 2000). It should be guaranteed that organizations, scientists and facilitators, who want to apply participatory methods

- accept that there is no blueprint for sustainable development and that outcomes of participatory processes might contradict western concepts of development
- respect traditional knowledge and local belief-systems as alternative truth to own convictions
- acknowledge the importance of soft-skills like negotiating interests and strategic future planning
- are willed to listen and to give participants real opportunities to raise their voices and express their opinions

- take concerns and issues of the people seriously: do not judge statements and treat data in a confidential way
- do not have too high expectations:
 - Participation is a slow process: be aware that participatory approaches do not necessarily induce visible change or leads to solutions
 - also within participatory processes manipulation and persuasion may reproduce power inequalities. Participatory methods may even give stage to the voices of those who already express them loudly (Mosse, 2001), while marginalized groups such as women or the poorest are sidelined (Barnaud, 2013; Edmunds, 2002).

2.2 Why gaming?

The participatory methodology “Role Playing Games” (RPG) permits to simulate the multi-actor land-use processes at regional scale in an interactive and playful way. Participants simulate real-life decisions on maps and make use of visualizing material to symbolize resources, activities or ratings. Assuming roles with specific assets and preconditions, the stakeholders interact and debate on actual issues. In a communicative and stimulating atmosphere, their very heterogeneous needs, interests and priorities come to light. Various authors describe how games may serve various purposes in sustainable land management (Dieleman, 2006; Fabricatore, 2012).

"I think this game works well because the questions are clear to us, so we hope that our answers are also clear to you. The conversation evolves well and there are no communication problems between us."

(participant evaluation, group B Ankilibory)

Participatory land use research

RPG can serve to develop and validate multi-agent system models that are hyped as a tool for informed decision making and long-term planning. The data obtained serve to validate the researchers' assumptions on the agents' decision patterns and their underlying criteria. Models are either constructed previously to RPG or in the course of an on-going cooperation process with participants (Matthews et al., 2007). In this case, RPG fosters mutual understanding, science-practice communication and two-way learning when developing these models.

Social scientists also use the methodology in a more process oriented way, e.g. to detect differences gender specific behavior patterns (Villamor et al., 2012; Johnson et al., 2004). Speelman et al. (2014) found that within the RPG, land use decisions are not only taken on the base of rational criteria, but are also analyzed in group processes. Communication, leadership and relatedness among participants were determined as influential factors in the participatory process. These findings show that RPG can not only give conclusions on scientific “hard facts”, but also on “soft factors” that influence the decision making process.

Learning and understanding each other

RPG can be considered a form of Experience Learning as they foster a more interactive and experimental learning process and more complex outcomes than conventional one-way learning processes. Gaming addresses cognitive as well as affective learning issues; and thus facilitates active learning. Participants simulate certain realities, play, and experiment and experience what the consequences of their actions are or what they might be. People literally ‘learn by doing’ and ‘learn by failing’ without causing any negative consequences for the real world.

The advantage is that participants ‘take the role of others’ and develop an emotional understanding why others act as they do. That is why, some authors find that shifting roles may change and synchronize mental models as they learn about their own role and learn about other participants (Scholz et al., 2014).

« For us this game is like a real chance to understand what happens in our lives. It is a game of reflection because it makes us reflect our way of life with our substance activities and income sources »

*(participant Evaluation, group B
Andremba)*

The *Livelihood Game* serves both the participants and the researchers or practioners as they learn together how the people in the Mahafaly region take their decisions and which consequences their strategies induce. The methodology understands land use system holistically and permits cautious outlooks to the future. For policy makers, it might be interesting to learn about the specific incentives and restrictions for different land use strategies. To be able to assess the acceptance and

outcome of one specific project, it is advisable to first play the action scenario through with the village communities. When applied in a cooperative and process-oriented way, the method may generate in-depths learning for all stakeholders involved.

Strategic and long-term planning

The complexity of land-use interactions makes it difficult to predict the outcome of any kind of interventions in the real world. Within RPG, participants ‘learn by doing’ without negative consequences for the real world. They can simulate diverse realities, manipulate reality and experience the resulting consequences, within the safety of the simulation. Simulations may help the participants to consider cons and pros of possible action strategies. While playing through future scenarios, participants can test alternative solutions and discuss the benefits and risks of different land use practices. Including scenarios and action strategies may also help to clarify people’s visions of development. This builds the condition for formulating objectives, articulating interests and negotiating interests within the community or vis-à-vis outer stakeholders and may be an instrument to work out commonly accepted action strategies and management plans.

Mediating conflicts

In land use management, people often share common resources which may result in overexploitation and resource conflicts. In the Mahafaly region, where resources are scarce, conflicts on fodder resources are likely to occur. Here, RPG helps to gather different stakeholders around one table and raise understanding of the impacts of their own decisions on the others and on the environment (Matthews et al., 2007). The methodology makes all stakeholders to see the overall systems from different perspectives and to discuss development objectives and mediate where conflicts occur (Matthews et al., 2007). Although the methodology will not necessarily solve all discrepancies, it initiates a process of dialogue and negotiation between people with seemingly contrasting views and interests. By providing a platform for communication, shared problem definition and analysis can be achieved. This step may even help to detect and focus on synergies and common interests between different stakeholders and create shared views of solutions.

Team building

Since playing games creates shared experiences, RPG can trigger the process of team-building. As the process facilitates communication and collaboration among the players, the game has the potential to make people work together and create a sense of belonging to a team. Soft skills like arguing and negotiating should not be underestimated.

This shared experience can be used as the point of reference to facilitate mutual understanding and will help the workshop facilitator(s) to engage and empower her/his/their audience during the use of other games. By empowering the whole group, no rules are necessary to structure the game.

Give rural communities a say

The “Livelihood Game” demands that every team has a speaking part and every participant has a say in the household’s decisions. People seemed to feel comfortable in their roles and spoke freely about their household decisions. They could actively take part in the game not only by answering to the questions but also by manipulating the game materials on their own.

In this methodology, participants are considered as experts who explain their daily livelihood decisions to researchers. They develop their roles’ strategy and story on their own, while the facilitators subsequently step back. For the most part, the facilitators remain rather passive observers of the scene and only act to keep the discussions structured. Participants had the most shares in speech.

“ It helps us a lot to understand how to manage our life and to solve the various problems we face and to develop adequate solutions.”

(participant evaluation, group B, Miarintsoa)

Self-awareness

While playing the game, participants gain insight into their own attitudes, values and thinking processes. In a playful surrounding, participants may discover that they presume

implicit assumptions that which may not necessarily be shared by others. Role Playing Games helps participants to reflect their own way to approach others, to deal with problems or encounter obstacles.

Recognizing one's own place in society may be the first step to take on responsibility and stand in for one's rights and interests. One of the objectives of participatory approaches is to increase people's self-confidence and self-esteem.

Motivation, encouragement and acceptance

Playing games is fun and entertainment and creates a dynamic, interactive and lively atmosphere. This enthusiasm may raise interest in the topics of sustainable land management and livelihood strategies which are often considered 'heavy,' 'serious,' 'negative' or 'depressing' topics. Experiences showed that participants generally appeared interested, cooperative and talkative so that group discussions evolved easily. These dynamics might trigger motivation and proactive behavior and encourage creativity and innovation.

Communication through visualization

"What you created is our daily life, not a game. It is the reality of our daily lives. For example the agriculture, the cultivations, everything that was in this game."

(participant evaluation, group B, Andremba)

When the "Livelihood Game" was conducted first, participants understood and generally accepted the game rapidly.

As all the activities refer to people's everyday life, no long introduction or explanation is necessary to start the game. Complex decisions on the land use system can be explained with the help of pictures and symbols from people's daily life which discussions become vivid and lively. They also help to synchronize different agents' perceptions and to achieve a common understanding beyond language barriers. In a region

with a high illiteracy rate, these visualization tools can be regarded as measures for empowerment as no writing or reading skills are necessary to participate in the game.

Spatial decisions were simulated on maps. Participants recognized their neighborhood taking the vegetation cover and peculiar landscape elements as reference. During Sulamas workshops, participants even corrected the location of water holes as mapped by the researchers.

2.3 Why NOT gaming?

Even though these guidelines aim at promoting the methodology Role Playing Games for long-term land management, we cannot deny that the methodology might bear risks and problems. If not applied adequately, it may cause frustration and disappointment. Thus, researchers and practitioners should consider thoroughly whether they have sufficient resources and capabilities to develop and conduct a RPG.

High facilitation skills needed

Even though the method proved to be easily understandable for participants, it can be fairly challenging for facilitators and documenters. As the participatory process is supposed to be kept flexible and open, group dynamics depend to a high extent on the facilitators' capability and motivation. It requires high communication skills, empathy for local conditions and the willingness to listen to the peasants in order to build trust among the group.

High demands in resources and time

A lot of investment and preparation is needed for conducting the workshop successfully (see chapter 5). The Role Playing Game not only requires very specific material and tools, but also a lot of time for development, preparation, team training, testing and on-site execution is required. If the time needed for carrying out the game cannot be planned and tested carefully in advance it may lead to putting pressure on the participants and have negative effects on the participatory performance. Thus, in contrast to RRA and PRA techniques (see Chambers, 1994 (a), (b), (c)), Role Playing Games cannot be considered a rapid, spontaneous and resource gentle method and should only be carried out when enough time and team communication are given.

Bias and distortion

When working with people, one can never fully protect against bias. The workshops revealed group dynamics such as copying another households' behavior that might have distorted the workshop results. Therefore, it is recommended to conduct the workshops with two simultaneous groups so that the results can be crosschecked and compared among the groups. Especially when it comes to distributing revenues and expenses, the results cannot be regarded a valid representation of the reality. Therefore, the methodology might not be adequate when accurate or quantitative data is needed.

Inaccuracy and simplification

The *Livelihood Game* represents a very simplified version of rural livelihoods. In order to make the methodology applicable, some important factors of peoples' lives such as seasonal changes, field size, additional off-farm activities, transhumance patterns etc. are consciously neglected.

In some cases, oversimplification and inaccuracy might lead to definition problems and distort the results (e.g. the definitions of a "good year"). Researchers and practitioners should be well-aware of these inaccuracies and definition problems that render comparison of results difficult.

2.4 The Mahafaly region

The Mahafaly Plateau in south western Madagascar is a marginalized region in various respects: People have to deal with low human development, poverty, and environmental

threats such as cyclones, droughts and locust invasions. More than 88 % of the rural households are classified as poor with an income below 468,800 MDA or 200US\$ per capita and year (Neudert et al., 2014). With 86.97 % of the population over 18 years lacking formal education and 72.64 % being illiterate (Neudert et al., 2014), the region is one of the most educationally disadvantaged regions in Madagascar. Rural communities widely lack access to electricity, running water or sanitary facilities.

At the same time, the dry spiny forests on the Mahafaly Plateau represent an extremely rich biological ecosystem (Brinkmann et al., 2014: 231). With its large number of endemic plants and animals, the dry spiny forest ecoregion is listed as one of the 200 most important ecological regions in the world (Olson, 2002). The Mahafaly region is characterized by three distinct ecological zones starting at the coastal plain (littoral) and moving inland to the plateau (Mamokatra, 1999) and includes the vast Tsimanampesotsa National Park (with a size of 203,400 ha) which is managed by Madagascar National Parks [MNP] (ANGAP, 2001).

The climate in south-western Madagascar is semi-arid with a mean temperature between 23 and 26 °C (von Heland, 2013). Annual rainfall reaches 300–350 mm in the coastal zone and 400–600 mm on the Mahafaly Plateau to the east (UPDR, 2003). The climate is highly seasonal, with most rain falling between November and April (CNRE, 1992). The dry season usually lasts eight to nine months, can locally extend over several years. Being a cyclical phenomena that hit the region several times every decade (von Heland, 2013), drought periods constitute a major threat to rural livelihoods.

Water scarcity increasingly limits the agricultural production so that people search for alternative activities like charcoal making, hunting or fishing. The various pressures have led to extensive animal husbandry, slash-and-burn techniques and the over-exploitation of natural resources. Both the overuse of natural resources and unsustainable land use techniques induced a deforestation process and the loss of biological diversity in the region (Brinkmann et al., 2014: 232). As the annual precipitation is predicted to decrease (Vololona et al., 2013) rural communities will have to develop adaptation strategies.

People distinguish three major seasons: (1) the rainy season locally called “asara” or “lohatao” which last approximately from December to March, (2) the early dry season, locally denominated “asotry”, from April to July and (3) the late dry season, “faosa” in local language, which last approximately from August to December. To date, agriculture and livestock keeping are the most important activities which assure the livelihood of rural communities in the Mahafaly region. Depending on the field age and location, people cultivate mostly cassava¹, maize², and sweet potatoes³, in some cases also beans, sorghum, millet, peanuts and melons. To face unexpected harvest failures, people developed coping strategies which may be related to farming activities, livestock keeping or other income sources.

Besides, zebu husbandry plays a central role in rural livelihood strategies and herding activities have a big ecological impact in the area. For local inhabitants zebu cattle are

¹ scientific denomination: *Manihot Esculenta*

² scientific denomination: *Zea Mays*

³ scientific denomination: *Ipomoea Batatas*

economically and culturally the most valuable species. Herdsmen from the coastal area traditionally go on transhumance to the plateau in the end of the dry season. In the past years, attacks from so-called *malaso* (cattle raiders) have become an omnipresent threat for people's security and economic stability. Apart from agriculture and animal husbandry, people's subsistence activities are highly flexible and diverse. According to a previously conducted household survey in the region, there is a large number of potential activities that people carry out more or less continuously besides their agricultural commitments. Among the activities, salaried work, employment, trade, charcoal production, handicraft, migration, collection of forest resources, and ocean products are the most commonly practiced all over the Mahafaly region (Neudert et al., 2014).

Although their livelihood strategies depend on environmental conditions (especially climate) and the households' resources, socio-cultural factors have notable impact on the household decisions: As for most parts of Madagascar's society, cultural conventions and traditional belief-systems such as kinship, supernatural beings, traditional hierarchies, and taboos play a dominant role in the Mahafaly region. The traditional animist religion is widespread with 64% of the household heads dedicated to these belief systems. 14% of the households state that their head follows Christianity, 21% of the household heads consider themselves as non-religious (Neudert et al., 2014). In Malagasy culture so-called *fadys* (taboos) regulate what is allowed or not allowed in the community. These *fadys* may refer to places, food, or times for agricultural activities and cultural events (Fritz-Vietta et al., 2011). When working in the Mahafaly region, it is important to know that taboo breakers are regarded a disgrace and threat to the whole community (Dahl, 1993).

On local level, the *fokontany* is the smallest governmental administrative unit, which is composed of one or more villages and their related hamlets. The major ethnic group, the Tanalana, historically originating the regions *Androy* and *Anosy* from in south Madagascar. They populated first the littoral on the Malagasy side of the Mozambique Channel south of the Onilahy River and settled on the limestone plateau afterwards. The Tanalana define themselves as agro-pastorals whereas the ethnic group of Vezo on the coast are characterized by their fishing activities. On the plateau, the Tanalana share the territory with another ethnic group which is officially (yet contestedly) denominated "Mahafaly". The *Mahafaly* live on the limestone plateau and, like the Tanalana, live from agriculture and livestock keeping. The Tanalana consist of several clans, which are composed of different lineages headed by traditional chiefs⁴ who form part of the elders⁵ in the village or *fokontany*. The administrative head of the *fokontany* (usually called *chef de fokontany* or *président de fokontany*) is should be addressed first when outsiders first come to the villages.

The ancestral land is the family's place on earth where descendants are expected to accumulate cattle in honor of the lineage (Dove, 2007: ch. 2). Up to now, the number and state of zebu cattle are regarded as indicators for human well-being and societal esteem

⁴ Malagasy denomination: mpitan-kazomanaga

⁵ Malagasy denomination: olobe antana

(von Heland, 2014). The value of plants, animals and places may be linked to their meaning for natural spirits, ancestors or their role in rituals and ceremonies (Tahirindraza, 2014).

These worldviews and traditions are deeply rooted in the Malagasy society and influence on people's behavior and vision. That is why in some cases people's decisions contradict the western concepts of sustainability, efficiency or optimization. Nevertheless, the manifold challenges in the region cannot be addressed without including rural communities and respecting their needs, preferences and interests. RPG is ideal to do so.

Following, two different RPG which were designed to facilitate participatory land use management in the Mahafaly region are presented: The "Livelihood Game" and the "Livestock Game".

III The Livelihood Game - Methodological Guidelines

The first one of both Role Playing Games concerns various subsistence activities and was thus denominated "*Livelihood Game*". The purpose of the participatory *Livelihood Game* is to discuss the participants' decision criteria with respect to their major subsistence activities *agriculture, livestock keeping and off-farm work*. The game elucidates how different types of households react and decide in terms of their land use activities, and investment decisions. The simulation also includes risk scenarios and unpredictable socio-cultural events, and can be expanded and complemented.

During the game participants use little figures as agents, they are thus encouraged to act on real-life decisions with the distance of their given role. Not to reveal the participants' actual social status may avoid intimacy barriers and facilitate the discussion. Nevertheless, a high degree of interactivity and flexibility is required to capture the complexity and interdependences of the decision-making process. The methodology relies to a large extend on group dynamics. Small groups of three people per role (household) discuss their choices among each other. Afterwards, the whole group is used as control mechanism by asking whether the choices made by the household are reasonable and realistic.

Information and voluntariness

Regardless of the purpose of the workshop a crucial precondition for the functioning of the method is that local communities are well-informed about the workshop and that participation is voluntary. It is advisable to conduct an announcement tour prior to the workshop to explain objectives, plan contents and make sure the schedules are in accordance to social, cultural and labor compromises of the people. Prior to the workshop the *Chefs de Fokontany* and the elders of each village should be informed personally. They should be explained the criteria for the composition of the workshop groups, and discuss the dates and schedules for the workshop sessions. To avoid disappointment, the conditions offered by the organizing institution (such as paying remuneration for the community (*fafa aloka*)) should be made clear. Besides, it is recommendable to consider an adequate location (ideally class rooms) to conduct the workshops. After the announcement of the workshop,

the community should be given some time to discuss their participation in the workshop among the community and conjointly pick workshop participants.

Participants

Generally, no special criteria must be met to participate in the *Livelihood Game*. Participants do not have to be literate or alphabetized but may well originate from rural communities. In fact, it is recommended to play the game with people who actually live the local culture, practice typical livelihood activities (agriculture and livestock keeping) and contribute to the real-life decision-making processes in the household. To avoid the manifestation of marginalization, organizers should make sure to include voices from people of different gender, age and lineages. Depending on the workshop purpose, it is also thinkable to consciously conduct the game with special groups of stakeholders such as policy makers, MNP rangers or community heads. For communication reasons, it is recommended that all participants of one group gather around one big table.

3.1 Game Elements

Picture 2: Explaining the workshop methodology to participants



(Jacques Rakotondranary, July 2014)

Roles



Picture 3: Household Cards for the Livelihood Game

Before the Game starts, participants receive cards with their roles. To facilitate reflected decision making, each role is played by a team of three participants who discuss their decisions among their team. The household cards show the number of household members, as well as fields and livestock they own. Furthermore, the household members are characterized through their age and gender. The agricultural land differs in age while there is no distinction in the size of the field. Herds of zebus and small ruminants are symbolized by one livestock symbol (= 10 animals per herd). In the course of one year, the annual household consumption is symbolized by twelve red beans which equals one bean

per month.

According to previous analyses, four typical household categories could be determined by the researchers for the Mahafaly region:

Table 1: Role composition for the Livelihood Game

	Household 1: Rich in Livestock and Fields	Household 2: better endowed, especially the household head has a good education	Household 3: just normal household in the village with a few livestock and average sized field	Household 4: household head and his wife are young (approx. 18 years), but did not get livestock from father and have comparably few fields
Household composition	1 adult woman 2 adult men 1 adolescent boy (7-16 yrs) 1 adolescent girl (7-16 yrs) 1 small child (0-7 yrs)	1 adult woman 2 adult men 1 adolescent boy (7-16 yrs) 1 adolescent girl (7-16 yrs) 1 small child (0-7 yrs)	1 adult woman 2 adult men 1 adolescent boy (7-16 yrs) 1 adolescent girl (7-16 yrs) 1 small child (0-7 yrs)	1 adult woman 1 adult man 1 adolescent boy (7-16 yrs) 1 adolescent girl (7-16 yrs) 2 small children (0-7 yrs)
Livestock	30 zebus 30 small ruminants	10 zebus 10 small ruminants	10 small ruminants	No livestock
Fields	3 fields: 1 field < 5 yrs 1 field 5-10 yrs 1 field > 10 yrs	2 fields: 1 field < 5 yrs 1 field > 10 yrs	2 fields: 1 field < 5 yrs 1 field 5-10 yrs	2 fields < 5 yrs

(Maren Wesselow, 2014)

Spatial setting and time frame

Next, a big satellite map of the village proximity (municipal boundary) with mapped field contours (deriving from geographical mapping) is introduced to the participants. The map constitutes the spatial scene for the households' activities and helps to visualize the location of fields and grazing grounds. In addition, soil maps could be provided to back up field and crop decisions. The *Livelihood Game* usually covers a period of four years while each "move" represents the households' annual subsistence decisions. To simplify the game sequences, no distinction is made between dry and rainy season. Every round starts with the cultivation of fields when the rainy season begins (November/ December). Depending on the games purpose, all these settings can be changed respectively (see chapter 4).

Picture 4: Participants explain their decisions using visualization tools



(Jacques Rakotondrany, July 2014)

Materials and tools

The extensive use of visualizing tools facilitates both the common understanding during the workshop and the workshop documentation. In consideration of the high illiteracy rate, pictures and symbols synchronize different stakeholders' perceptions and serve as a crucial communication medium. The use of quotidian pictures bridges between science and practice and triggers the participatory process.

Picture 5: Simulating household decisions on a spatial scene








(Jacques Rakotondrany, July 2014)





Materials for different roles are distinguished by their color (household 1 (hh1): green, hh2: red, hh3: blue, hh4: yellow). The symbols and pictures remain the same for all the roles and throughout the whole game though. During the Sulama workshops 2014, the material was printed, laminated and attached to a cord table by little drawing pins.

Household symbols

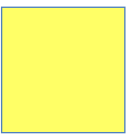
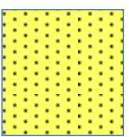
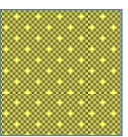
Symbols for household composition

				
adult man (over 14 yrs)	adult woman (over 14 yrs)	adolescent boy (7-14 years)	adolescent girl (7-14 years)	baby/ small child (0-7 years)

Symbols for resources and investments

			
herd of 10 zebus	herd of 10 small ruminants	charrette	house

Symbols for agricultural land

		
new field (under 5 yrs)	medium aged field (between 5 and 10 yrs)	old field (over 10 yrs)

Symbols for agricultural crops

The crop symbols are printed very small and glued on top of a drawing pin

		
beans, sweet potatoes	maize, sorghum or millet	mainly cassava

Activity cards



Artisanry and Handicrafts



Trade



Migration



Make Charcoal



Send children to school



Salaried work



Cultivate field



Nature products

(alimentary plants, hunted animals, ocean products)

Other materials

- pictured destiny cards with photos and symbols of social events (see chapter 3.2 paragraph “destiny cards”)
- cork tables and pins to attach the material⁶
- grains/ beans to symbolize expenses and revenues

“You used local materials like corn, beans, [symbols for] zebus and goats.”

(participant evaluation, group B, Miarentsoa)

Activity options

The following activity options are given to all households by providing activity cards. Depending on the participants’ answers, the facilitator asks respective follow-up questions.

Table 2: Activity options and follow-up questions for the Livelihood Game

Activity options		Follow-up questions
Agriculture	Cultivate one or more existing field(s)	<i>Where? (localize on map) What kind of crop do you cultivate and why? Who is the person in charge?</i>
	Create a new field	<i>Where? (localize on map) For what reasons? Who is the person in charge? How?</i>
	Abandon field	<i>Why? At what age? For how long (years)?</i>
Livestock	Select grazing ground	<i>Where? (localize on map) For what reasons? Who guards the herd?</i>
Off Farm	Salaried work	<i>Who is the person in charge? Why exactly this activity and not another? What are the advantages/ disadvantages of this activity?</i>
	Trade	
	Produce Charcoal	
	Handicrafts/ Weaving mats	
	Migration	
Investments/ Revenue	Alimentary plants, hunt animals, ocean products	
	Employ somebody	
	Send child to school	
	Buy/ Build house	
	Buy/ sell charrette	
	Buy/ sell zebus	
	Buy/ sell sheep/ goats	
	Buy/ sell chickens	
...		

(Maren Wesselow, 2014)

⁶ The advantage is that the game can be paused at any time with the material documenting the last state of the game.

3.2 Playing the Game...

Orientation on the map

Before starting the game, all participants watch the satellite map of their village. Together with the facilitator they recognize their familiar surroundings by localizing remarkable landscape elements such as water holes, coast lines and settlements. Afterwards, the four household roles are presented by the facilitator and four teams are formed. Teams can be composed randomly among people sitting next to each other. Yet, the facilitators may interfere when he fears that the group composition might cause bias (e.g. in terms of gender and lineage, and age).

The first year - understanding the game

One after the other, the teams of participants are asked to think about what they would realistically do to satisfy their household's needs over the year. First, each team localizes their houses and fields on the map using the indigenous soil maps as reference. Participants discuss which types of crops they grow on which kind of field and which work force is charged with the cultivation of the field. Then, participants decide where they keep their cattle and which household member will take charge of it. In addition, the household can opt to carry out off-farm activities or make investments. The participants make use of the activity cards and household symbols to visualize their choices. After each move, the team of participants is asked to explain why they chose exactly this activity and not another. To make sure that choices are realistic and plausible, the whole group is asked to judge whether the choices made by each household actually correspond to the household's assets and limiting factors such as work force, time and economic resources. When all households made their choices, the annual revenues and expenses of each activity are discussed (see 3.3.7) and each team picks a *Destiny Card* (see 3.3.8).

The second year - accumulation and investment

As yields in the first year are good, the households can invest the beans they have received in new activities or goods. Just like the first year, one team after the other, determines their subsistence strategy according to their resources and workforce. The game facilitator asks follow-up questions to understand the reasons, incentives and restrictions behind the household's decisions. As yields are assumed to be regular, the year ends with a remuneration of the activities and the *Destiny Cards*. After the first two years, a reflection round on the households' life quality is held.

"This game is clear and comprehensive; it is not difficult because it relates to our life. It is the reality of our daily life. We grow cassava, corn, lentils. Everything in the game is our way of life"

(participant evaluation, group A, Miarintsoa)

The third year - drought

In the beginning, the third year proceeds like the years before. All teams choose the activities of their household and specify the workforce needed to conduct them. When all

participants made their choices, the facilitator forecasts a drought announcing *“Imagine, you cultivated your field but are still waiting for rain. Your household comes to fear that the harvest will be low this year. What do you do?”*

All participants have the chance to re-discuss their household decisions and respectively rearrange their workforce. Afterwards, the facilitator confirms that the drought continues for the rest of the year and asks the participants which coping measures they take into account. After the year, there is hardly any revenue from agricultural and livestock activities.

The fourth year - persistent drought

Without knowing if the drought will continue or not, participants proceed with their household strategies. As there has been only little revenue the year before, the teams have to make their livings with very little economic resources. The team discussions show whether they look into future with hope or desperation. After the households made their choices, the facilitator predicts that the drought will persist and the harvest is likely to fail this year. The participants have time to discuss how they can rearrange their workforce to tide their households best over this extreme event. After these two “bad” years, another reflection round on the households’ life quality is held.

During the whole “Livelihood Game”, the group also serves as control mechanism: Once, one household takes a decision, the entire group is asked to assess whether the decision taken is realistic or not. In a group process, participants discuss over- and underestimations and validate the single household’s decision.

Picture 6: Group discussions evolve



(Jacques Rakotonanary, July 2014)

Revenues and expenses⁷

In the end of each year, facilitators and participants discuss about the revenues and the expenses of their household activities. To symbolize these revenues and expenses, red beans

⁷ Since people do not necessarily use common or stable entities for measuring their production and consume, it is difficult to quantify their income and investments with beans. The quantitative results can be easily manipulated by under- or overestimation. It is up to the practicing organization to decide whether it is necessary to introduce some kind of economic measure for the sake of game logic.

were used. Furthermore, single entities of livestock (zebu, small ruminants, chickens) are respectively symbolized by corn, or different types of beans.

Given that each household has a monthly consumption of one bean, all households compulsory have to spend twelve beans for their own consumption in every round. When determining the revenues of their production, each team is asked to specify the length of the period that can be tided over by the production deriving from a specific crop, field or activity.

Example: One medium aged field of cassava has a production of three charrettes which equals three months of subsistence for the family = 3 beans.

As people have their own system to define entities and units, the following guiding values were conjointly determined by the participants and workshop team during the 2014 workshops.

- The value of 5 castrated goats equals the value of 1 small zebu (approx. 600,000 MDA)
- The value of 15 goats equals the value of 1 big zebu
- The value of 5 chickens equals the value of 1 goat
- The annual production of 1 old field of cassava is 15 to 20 charrettes of harvest
- The annual production of 1 old field of maize is 8 to 10 charrettes of harvest

Picture 7: The facilitator subsequently steps back and lets the participants discuss



(Jacques Rakotondrany, July 2014)

Destiny cards

After expenses and revenues are discussed and determined by the participants, each household picks randomly one out of several destiny cards. Each *Destiny Card* shows or describes an unplanned event that occurs to the households by chance. Most of these events are of socio-cultural nature which may cause expenses or require social engagements

and cultural procedures. Some of these events were “Birth”, “Wedding”, “Sacrifices”, “Funeral”, and “Livestock falls sick”.

In response to the event picked by each team, the households explain how this event influences their family life, their expenses and their future strategies. The *Destiny Cards* serve to include socio-cultural elements and unforeseen events in the modelling process.

Reflection round

Every other year, households are asked to reflect on the consequences of their decisions on the well-being of their family. The questions aim at facilitating a reflection on human development aspects resulting from household’s agency and opportunity structure. These aspects include the nutritional state of household members, education decisions and their general life quality.

“For us, this game is like a real reflection and makes us to think out our life and our daily activities.”

*(participant Evaluation, group A ,
Andremba)*

- *Are the resources you have sufficient to make a living?*
- *Do the given resources allow you to send your children to primary school/ secondary school/ higher education? Would you wish to send your children to school?*
- *Are the members of the household satisfied and happy?*
- *Do they have enough time for leisure, having a rest, social interactions/obligations, and domestic work? Do they like the activities they do?*

Ideally, the game ends not only with a reflection of the game issues (activities, strategies, livelihoods) but also with a feedback on the methodology itself. The facilitator may ask the participants:

- *Which questions were easy, which were difficult to answer?*
- *Were your answers realistic?*
- *What did you learn from the game?*
- *Do you have suggestions how to improve or change the game?*

Picture 8: Participants recognize their daily surroundings



(Maren Wesselow, July 2014)

IV The Livestock Game – Methodological Guidelines

While the *Livelihood Game* allows for a consideration of subsistence decisions in a holistic way, the “Livestock Game” primarily focusses on zebu husbandry. While herding and feeding systems have great impact on land use systems, they may also be a source of conflict in the region.

Considered from an agent’s point of view, the overall game rationale is to understand how people nourish their cattle throughout the year.

As the availability of water and fodder changes during seasons, the selection of grazing grounds is a crucial factor for assuring the cattle’s well-being over the year. By the late dry season (“faosa”), people face periods of water scarcity on the Mahafaly Plateau and scarcity of fodder plants in the littoral. Thus, the game focusses on spatial decisions (localization of corrals, grazing grounds, water holes) as well as to the choice of fodder types (gras, samata, raketa) and fodder access conditions (private/ common) which might influence the condition of the livestock. Unlike the *Livelihood Game*, the *Livestock Game* does not contain any economic component, thus expenses and revenues are neglected. As cattle raiders are perceived as major threat in the study region, the *Livestock Game* implicates this *Malaso Scenario*. Here, the leading question is if peoples’ strategies to cope with this pressure lead to land use changes in the region.

4.1 Game Elements

Roles

Similar to the *Livelihood Game*, the participants receive cards that symbolize their household’s resources in livestock and fodder resources. There are only three different roles which vary in herd size. As before, one zebu symbol stands for a small herd of 10 zebus. This time, each role is played by a team of four participants. As fodder conditions are different in the littoral and the plateau region, the roles may vary slightly according to the village.



Picture 9: Household Card for Livestock Game

Table 3: Role composition for the Livestock Game

Roles	Herd size	Private fodder littoral	Private fodder plateau
Household 1	30 zebus	Samata + raketa	Raketa
Household 2	20 zebus	Samata + raketa	Raketa
Household 3	10 zebus	Samata + raketa	Raketa

(Maren, Wesselow, 2014)

Spatial setting and time frame

To simulate grazing decisions, a satellite map with 5 km radius around the village is used. The map shows all water holes and vegetation covers. With the help of coordinate grids, corrals, grazing zones and water holes can be localized by the participants.

To capture the annual livestock routine in a reasonable way, each game sequence represents one yearly season as described by the people in the Mahafaly region. Each season lasts for a time period of several months.

- Sequence 1: Rainy season (asara/ lohatao), approx. December to March
- Sequence 2: Early dry season (asotry), approx. April to July
- Sequence 3: Late dry season (faosa), approx. August to December

Game elements and materials

Materials for different roles are distinguished by their color (hh1: green, hh2: red, hh3: yellow). The symbols and pictures remain the same for all the roles and throughout the whole game though. During the Sulama workshops 2014, the material was printed, laminated and little drawing pins were used to attach it to a cork table.

In addition to the Zebu symbols from the livelihood game, the following additional material was developed for the *Livestock Game*:



Kialo in/ near the village

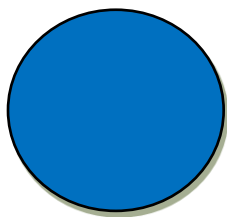


Kialo outside village

Kialos

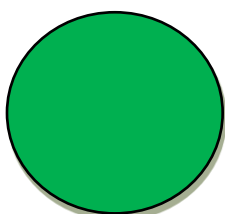
In the Mahafaly region, herds stay during the night in corrals, in Malagasy *kialo*, *valan'aombe* or *kialon'aombe*.

Water holes



As zebras need to have water at least every 2-3 days, going to the water source is part of their typical herd movements. On the plateau, where water holes and wells are scarce, water access is a more important factor for herd movements. Especially in the seasons *asotry* and *faosa* temporary water holes dry up, and only few permanent water sources remain. For the *Livestock Game*, water holes are symbolized by round blue cards.

Picture 10: Grazing paths were marked with colored ribbons



Grazing grounds and paths

Grazing grounds may be very small places and often have locally known names. The choice for a grazing ground may vary in the three different seasons. During the day, zebu herds normally do not walk longer than 5 km maximum outside the



(Jacqu

village. The longest daily herd movements were recorded during asara, while in asotry and faosa the walking distance is shorter. While the grazing grounds are symbolized by round green cards, colored ribbons (according to role color) and pins are used to symbolize the herd movements.

Zebu herds from the littoral may go on transhumance to villages on the plateau and a few zebu herds from the plateau may go on inverse transhumance to the littoral in faosa. The transhumance destinations are not localized on the map (as they are too far away) but still asked in the course of the game.

Forage

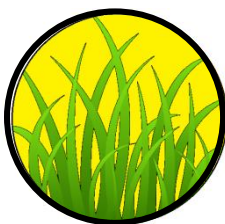


Private and common samata (littoral): Samata is a fodder tree whose branches are cut in small pieces and given to the zebu. There is common samata (which all villagers and guests can use) and people normally have private samata stocks (which only they can use or they can sell the right to use to somebody else).

Private samata can be (1) samata around the *vala n'aombe* (eventually also *vala n'aosy/n'aondry*⁸), (2) samata in the vala or (3) samata marked as piquet, which means an area in the grazing area (*monto*) which is not fenced, but marked with signs of private ownership, like cactus-plants.



Private Raketa/viro (littoral and plateau): Raketa is a kind of *Opuntia* cactus fed to the zebus. However, not all kinds of *Opuntia* are used for livestock fodder. The most important kind of raketa for livestock is *notsoke*. Raketa is normally privately owned since it grows on abandoned fields or in fences of valas. Raketa can be sold, as well.



Private grass/vala n'boka: grows in valas (e.g. on fallow areas of the vala or under samata trees) and only the owner of the vala or his family can use it. Private grass is of larger importance on the plateau than in the littoral.

Other fodder resources (agave, crop residues): As these fodder sources are of minor importance and cannot feed a zebu herd over a longer period, they are not symbolized in the game. *Agave* grows normally in fences. Crop residues are the stems and leaves of manioc, sweet potatoes, maize or leftovers of other crops.

⁸ Malagasy denomination: Vala n'aombe is a zebu corral, vala n'aosy a sheep corral and vala n'aondry a goat corral.

Activity options

Zebu herds from the littoral traditionally go on transhumance to villages on the plateau in December when rain on the plateau is expected. Due to security concerns, zebu herds from the plateau recently started to practice inverse transhumance to the littoral in *asotry* and *faosa* (April-July to August-December). When choosing the daily grazing ground, households consider a range of factors, such as quality and quantity of fodder, distance from village and to water point, shade or security issues. Herders have special names for different grazing grounds. As the quality and quantity of forage changes during the year, herders may have different reasons for choosing grazing grounds in the three different seasons.

The following activity options are given to all households in the *Livestock Game*. The facilitators asked follow-up questions respectively.

Table 4: Activity options and follow-up questions for the Livestock Game

Activity options	Follow-up questions
Stay in Village	Why do you stay in the village and why do you not go on transhumance? Where does the cattle stay at night? (Do you have a second kialo?) Why? Where? Select Grazing Ground: Where is the cattle in the morning/ around midday/ in the afternoon? Why especially there and not elsewhere? On the plateau there are places which are hardly used as grazing ground: What are the reasons? Show grazing Path: How do you get there?
Transhumance	Who takes the herd on transhumance? Where do you go?
Water	How often do you go to a water hole? Which water hole do you prefer in which season? Why do you prefer this specific water hole?
Samata (private/ common) (only in littoral) Private raketa Common grass Crop Residues Buy supplementary fodder Other fodder resources (private grass, agave,..)	Which kind of fodder? Why exactly this type of fodder? Where do you find this type of fodder and what do you have to do to have access to use it? Who is in charge of providing supplementary fodder?

(Maren Wesselow, 2014)

4.2 Playing the Game....

Orientation on the map

On the large-scale map (5 km radius around the village), the facilitators and participants recognize vegetation covers, different landscape elements and localize grazing grounds, water holes and fodder sources. As first orientation exercise, each household places their corral (*Kialo/ Vala/ Vala na aombe*) in or near the village.

Asara Season

One after each other, the teams are asked to think about what they need to do in order to nourish their cattle in this season. Usually, there is enough grass available in the asara season and no supplementary fodder is needed yet. The households use colored ribbons to visualize the herd movements between corrals, grazing grounds and water holes. Further, the teams specify how often they perform these movements and explain why they chose to use especially those locations and not another. After each round, the whole group is asked whether the household's decision is realistic in terms of walking distance, fodder availability and workforce.

Asotry Season

In the asotry season, fodder and water resources usually become more and more scarce. People might be forced to take their cattle to grazing grounds and water holes further away. The teams rearrange the symbols and ribbons on the map to visualize these changes. In addition, it might be necessary to make use of supplementary fodder resources to nourish the herds. In this case, participants explain which fodder they use, where they find these resources and under which access conditions (e.g. pay for private fodder).

Faosa Season

In the faosa season, fodder resources in the plateau region become so scarce that households might decide to take their cattle on transhumance to the plateau. Furthermore, people on the plateau have to face decreasing water resources. The close-by water holes might already be dried out. Due to the long walking distances to water holes, people might reduce the drinking frequency of their cattle and try to find hydrous fodder resources like raketa. In any case, each team explains their strategies to cope with the fodder scarcity in the late dry season.

Scenario - Malaso risk

In the last years herders experienced phases of high *malaso* (cattle raiders) risk, which had already an impact on their decisions on how to graze and feed their animals. The *malaso* threat is greatest on the plateau during *asotry* and *faosa*, while the littoral is somewhat safer. Once, livestock decisions for the three seasons of a calm year have been simulated, the facilitators announce an elevated risk of cattle raiding for the following year. The facilitators ask the participants how they react in case of *malaso* attacks in the region. According to herd size, social relationships and the economic resources, herders may have different strategies to encounter the risks of animals being stolen. These strategies may vary between seasons and regions. The participants mark their livestock strategies in response to this scenario on the map and explain their choices.

Reflection round

After one year, each team is asked to reflect on the condition of its herd. The question is whether the cattle are well-nourished, healthy and safe. Questions posed by the facilitator also aim to reveal whether the livestock were exposed to any pressures or risks and how do people predict and avoid them. The Game can also be extended by further scenarios or events. In the end, participants are invited to give their feedback about the methodology.

V Preparation and Wrap-up

5.1 Team formation and training

The size of the team should be adapted to the methodological needs. In Sulama's workshops, two facilitators and two documenters were needed per group. When more than one group work simultaneously, it is essential to make sure that facilitators synchronize their approaches so that the results are comparable. Ideally a workshop team has an experienced facilitator. As the success of the method stands and falls with the facilitators, intensive team training is required prior to the workshops. Experience showed that it is worth to plan with some buffer time and reserve a whole week for the team training. To make sure, the team pulls together, the workshop goals and the agenda have to be clarified from the outset.

It is recommendable to play the simulation a couple of times and hold reflection rounds to discuss difficulties and challenges. Thus team members can contribute their ideas and complements to the game.

5.2 Materials and tools

The tool kit with materials should be prepared with the whole team prior to the workshops. Depending on the game variation, it might be necessary to create additional tools. In any case, **the tool kit must me checked and organized by the team before every workshop**

Checklist: Livelihood Game Material

- ✓ 1 big village map
- ✓ If possible: soil maps
- ✓ 4 role card envelopes containing each :
 - 1 role card in respective color (1, 2, 3, 4)
 - Small laminated cards with family members (men, women, adolescent boys, adolescent girls, babies)
 - Small laminated cards with Livestock (zebus, small ruminants)
 - Small laminated cards with Fields (old, medium aged, new)
 - Small laminated cards with Charrettes and other material goods
 - Activity cards (e.g. charcoal making, trade,...)
- ✓ 1 envelope with pictured cards for the facilitator
 - Destiny cards (e.g. wedding, funeral,...)
 - Small pins with crop symbols
 - Beans (expenses and revenues)

session.

Checklist: Livestock Game Material

- ✓ 1 big regional map (min. 5 km village surroundings)
- ✓ 3 role card envelopes containing each:
 - 1 role card in respective color (1, 2, 3)
 - Livestock (zebus)
 - Private fodder resources (raketa, samata in respective color of the role)
- ✓ 1 envelope with pictured cards for the facilitator
 - Water holes
 - Grazing grounds
 - Common fodder resources (white raketa, samata, gras)

5.3 Documentation of workshop process and results

Participatory workshops should not only be held for the personal growth and fun of the participants, but ideally aim for greater impact. Before the workshops are conducted, the organizing team should plan what they want to do with the results of the workshops. How are results going to be documented and stored? Whom will they serve? How can they be communicated and made accessible to the target groups?

The output of workshops could be: (1) recommendations for policy makers, (2) a basis for a stakeholder conference to discuss workshop results, (3) a workshop series under different conditions or with methodological adjustments. While a well-organized documentation will help to conserve the learnings generated and also help to decide on the follow-up measures to be taken on the basis of the workshop results. Therefore, the process and the results should be documented thoroughly. The documentations should be elaborated in an understandable and usable way and be stored so it remains persistent, searchable, and accessible.

In spite of the need for neat documentation, personality rights should be respected: Participants should be informed about the documentation requirements (what is the purpose of the documentation? who will have access to it?) and they should be given the chance to make objections. In case participants ask the team to not to take photos of them or to not mention their names, these wishes should be respected.

Written records

Written records may help to have quick and coherent overview of the workshop results. Thus, one or two observers from the team should be in charge of taking notes. Due to the workshop purpose, observation forms can facilitate the documentation. However, well-structured minutes may also suffice to ensure that relevant information, different viewpoints and agreements are written down. To make sure that the information is not misinterpreted by single team members, it is recommendable to discuss and clarify the notes

after the workshop sessions among the team (together with other documenters and facilitators).

Audios

Dictaphones can be used to capture the details of the group discussions. In Sulama's workshops, one high-quality dictaphone was used to record the group discussion. Additionally, each documenter had small dictaphones for revising his notes in case he could not follow.

Visuals

Photos serve to document particularly spatial decisions like the choice of fields or the localization of grazing paths. While visualization material serves as communication instrument, it can also be used for documentation and analyses. Photos of the game board can be taken at different game sequences. If participants agree, videos can also be shot both from the game board and from the entire scene.

5.4 Evaluation and crosschecking

Regular evaluation and crosschecking sessions among the team help to discuss and contextualize the results on-site. If there are several groups, crosschecking sessions serve to optimize the facilitation and documentation techniques and to synchronize the participatory processes in all groups. During these sessions, the team recapitulates how they perceived and understood the participants' statements. In order to understand the results correctly, it is essential to crosscheck results from different roles, different groups and at different research sites.

Moreover, these sessions may also help to reveal problems, to detect data gaps, and to agree on the further proceeding. For example, group composition, bias or group dynamics can potentially distort the workshop results. Regular evaluation and crosschecking sessions among the team will help to improve conjointly the facilitation strategies or choice of participants.

VI References

- Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., Naess, L. O., Wolf, J. and Wreford, A., 2009. Are there social limits to adaptation to climate change? *Climatic Change* 93 (3-4), 335-354.
- ANGAP (Association National de Gestion des Aires Protégées), 2001. Plan de Gestion de Conservation du Parc national de Tsimanampetsotsa. ANGAP, Toliara.
- Barnaud, C., Van Paassen, A.-M., 2013. Equity, Power Games and Legitimacy: Dilemmas of Participatory Natural Resource Management. *Ecology and Society* 18 (2), 21.
- Bousquet, F., Le Page, C., 2004. Multi-agent simulations and ecosystem management: a review. *Ecological Modelling* 176 (3-4), 313-332.
- Brinkmann, K., Noromiarilanto, F., Ratovonamana, R Y, Buerkert, A., 2014. Deforestation processes in south-western Madagascar over the past 40 years: what can we learn from settlement characteristics? *Agriculture, Ecosystems and Environment* 195, 231–243.
- CNRE (Centre National de Recherche sur l'Environnement), 1992. Développement, désertification et protection des ressources dans le sud. CNRE, Antananarivo.
- Chambers, R., 1994(a). The Origins and Practice of Participatory Rural Appraisal. *World Development* 22 (7), 953-969.
- Chambers, R., 1994(b). Participatory Rural Appraisal (PRA): Analysis and Experience. *World Development* 22 (9), 1253-1268.
- Chambers, R., 1994(c). Participatory Rural Appraisal (PRA): Participatory Rural Appraisal (PRA): Challenges, Potentials and Paradigm. *World Development* 22 (10), 1437-1454.
- Dahl, Ø., 1993. Malagasy meaning – an interpretive approach to intercultural communication in Madagascar. Misjonshøgskolens forlag, Stavanger, Norway.
- Dieleman, H., Huisingsh, D., 2006. Games by which to learn and teach about sustainable development: exploring the relevance of games and experiential learning for sustainability. *Journal of Cleaner Production* 14, 837-847.
- Dove, M., Carpenter, C., 2007. *Environmental Anthropology: A Historical Reader*. Wiley-Blackwell, New Jersey and Oxford, USA and UK.
- Edmunds, D., Wollenberg, E., 2001. Strategic Approach to Multistakeholder Negotiations. *Development and Change* 32(2), 231-253.
- Evans, K., et al., 2006. Guide to participatory tools for forest communities. Center for International Forestry Research (CIFOR), Bogor, Indonesia.
- Evans, K., de Jong, W., Cronkleton, P., Nghi, T. H., 2010. Participatory Methods for Planning the Future in Forest Communities. *Society & Natural Resources* 23 (7), 604-619.
- Fabricatore, C., Lopez, X., 2012. Sustainability Learning through Gaming: An Exploratory Study. *Electronic Journal of e-Learning* 10 (2), 209-222.

Fritz-Vietta, N.V.M., Ferguson, H.B., Stoll-Kleemann, S., Ganzhorn, J.U., 2011. Conservation in a Biodiversity Hotspot: Insights from Cultural and Community Perspectives in Madagascar. In: Zachos, F., Habel, J.C. (Eds.), *Biodiversity Hotspots - Distribution and Protection of Conservation Priority Areas*. Springer, Heidelberg, 209-233.

Hanson, P.W., 2012. Toward a more transformative participation in the conservation of Madagascar's natural resources. *Geo-forum* 43, 1182–1193.

von Heland, J., Folke, C., 2014. A social contract with the ancestors - culture and ecosystem services in southern Madagascar. *Global Environmental Change* 24, 251-264.

Hildyard, N., Hegde, P., Wolvekamp, P., Reddy, S., 2001. Pluralism, Participation and Power: Joint Forest Management in India. In: Cooke, B., Kothari, U. (Eds.), *Participation: The New Tyranny?* Zed Books, London.

Holloway, G., Short, S., 2014. Towards a more adaptive co - management of natural resources - increasing social – ecological resilience in southeast Madagascar. *Madagascar Conservation & Development* 9 (1), 36-67.

Horning, N.R., 2008. Strong support for weak performance: Donor competition in Madagascar. *African Affairs* 107(428), 405–431.

Johnson, N., Lilja, N., Ashby, J.A., Garcia, J.A., 2014. The practice of participatory research and gender analysis in natural resource management. *Natural Resources Forum* 28, 189–200.

Leewis, C., 2000. Reconceptualizing Participation for Sustainable Rural Development: Towards a Negotiation Approach. *Development and Change* 31, 931-959.

Mamokatra, A., 1999. Etude pour l'élaboration d'un plan d'aménagement et de gestion au niveau de la Réserve Naturelle Intégrale de Tsimanampetsotse. Diagnostic physico-bio-écologique. In: Deutsche Forstservice GmbH, Feld-kirchen et Entreprise d'Etudes de Développement Rural "Mamokatra", Antananarivo Madagascar.

Matthews, R., Gilbert, N., Roach, A., Polhill, J., Gotts, N., 2007. Agent-based land-use models: a review of applications. *Landscape Ecology* 22, 1447-1459.

Mosse, D. 2001. People's Knowledge, participation and patronage: operations and representations in rural development. In: Cooke, B., Kothari, U. (Eds.) *Participation: The New Tyranny?* Zed Books, London.

Neudert, R., Götter, J., Andriamparany, J., Rakotoarisoa, M., (submitted). Income diversification and wellbeing of rural households in the Mahafaly region, south-western Madagascar. *Development Southern Africa*.

Olson, D.M., Dinerstein, E., 2002. The Global 200: Priority ecoregions for global conservation. *Annals of the Missouri Botanical Garden* 89(2), 199-224.

Pretty, J. N., 1995. Participatory learning for sustainable agriculture. *World Development* 23(8), 1247-1263.

Scholz, G., Dewulf, A., et al., 2014. An Analytical Framework of Social Learning Facilitated by Participatory Methods. *Systemic Practice and Action Research* 27 (6), 575-591.

Speelman, E.N., García-Barríos, L.E. et al., 2014. Gaming for smallholder participation in the design of more sustainable agricultural landscapes. *Agricultural Systems* 126, 62-75.

Tahirindraza, S. H., 2014. The cultural and medicinal role of plants in the Tanalana society in the Beheloke district. Report WP5/ SuLaMa, Greifswald, Germany.

UPDR (Unité de Politique pour le Développement Rural), 2003. Monographie de la Région Sud-Ouest. Ministère de l'agriculture, de l'élevage et de la pêche, Madagascar.

Villamor, G.B., et al., 2012. Human decision making for empirical agent-based models: construction and validation. *International Environmental Modelling and Software Society*.

Vololona, M.R., Kyotalimye, M., Thomas, T.S., Waithaka, M.M., 2013. Madagascar. In Waithaka, M., Nelson, G.C., Thomas, T.S., Kyotalimye, M. (Eds), *East African agriculture and climate change*, International Food Policy Research Institute, Washington, DC, 213-246.

VII Contact and Copyright

If you are interested in using, modifying and implementing the methodology in your work, please contact:

Sulama Work Package 5, University of Greifswald/ Germany

Maren Wesselow

Tel.: +49 (0)3834 86-4682

Fax: +49 (0)3834 86-4683

Email: maren.wesselow@uni-greifswald.de

