Environmental Modelling & Software 25 (2010) 1302–1321

Contents lists available at ScienceDirect

Environmental Modelling & Software

journal homepage: www.elsevier.com/locate/envsoft

Modelling with stakeholders within a development project

P.C. Campo [a,*], F. Bousquet [b], T.R. Villanueva [a]

[a] Levelling the Playing Field Project: Philippines, IRNR, College of Forestry and Natural Resources, University of the Philippines Los Baños, College 4031, Laguna, Philippines
[b] Centre de coopération internationale en recherche agronomique pour le développement, CIRAD-TERA, CIRAD-Campus international de Baillarguet, TA 30/F, 34398 Montpellier Cedex 5, France

ARTICLE INFO

Article history:
Received 10 January 2008
Received in revised form
25 October 2009
Accepted 21 January 2010

Keywords:
Participatory modelling
Organisational learning
Role-playing games
Simulation
Evaluation

ABSTRACT

This paper brings forth the experiences and lessons of implementing a participatory modelling process, the Companion Modelling (ComMod) approach, to a natural resource management system in the province of Palawan, Philippines. In this study, we explore the added value of using ComMod in a research and development project, and then we describe the actual modelling process, which includes the use of multiple methods for its evaluation, namely, workshop evaluation exercises, criteria & indicators for the project and the ComMod evaluation protocol. We use the lessons of this evaluation to assess the organisational learning and discuss the role of the modelling process within the development project.

1. Introduction

The province of Palawan in the Philippines is one of the last bastions of untouched forests and one of the major eco-tourism sites in the country. As a result the national and local governments are very active in protecting the environment and rehabilitating degraded areas. The continuing efforts to protect the environment lead to more rules on access and extraction of resources. Some of the new rules tend to undermine the impacts of community-based natural resource management schemes, such as, the community-based forestry management (CBFM) program and ancestral domains.[1] In fact, these new rules revert the control and management of resources back to the local or national government. Without alternative livelihood activities (means of living) in the area, the local communities see this strategy of environmental protection and management as a threat to their subsistence and livelihood. Realizing the grave impacts of human activities on the environment and recognizing the need for sustainable natural resources, the local communities want to protect the environment for their short and long-term survival. Thus, they face the dilemma of having to protect their environment while at the same time, being able to provide for their daily needs.

The Levelling the Playing Field[2] (LPF) was a research and development project which sought to expand the scope of collaborative management of natural resources to encompass three landscapes, namely, the uplands, the lowlands and the coastal areas in three villages in Palawan. The site was selected because the management of its renewable resources was characterised by multiple stakeholders who have different and competing interests, objectives and motives. The community groups and government and non-government institutions also had different positions of power that made collaborative management difficult. Laws and environmental policies often lead to confusion and conflicts among the stakeholders for forest, land and water management. Although all stakeholders (i.e. local government units, NGOs and local communities) acknowledged the need for sustainable natural resource management (NRM) and were willing to sacrifice for its improvement, there was, however, a gap in understanding of the roles of different parties and expectations for sustainable NRM were very different. Communication and coordination among stakeholders have therefore been difficult. LPF approached the situation with the assumption that, aside from capacity-building, to be able to achieve sustainable NRM it is crucial that the stakeholders are involved equitably in the planning and implementation

* Corresponding author. Fax: +63 (49) 536 2557.
E-mail address: paoloppa@yahoo.com (P.C. Campo).

[1] According to the Indigenous People's Rights Act or (Philippine) Republic Act 8371, ancestral domains are areas in which indigenous cultural communities or indigenous peoples have been granted special rights to access, occupy and use these areas to preserve their way of living.

[2] LPF Website: http://www.cifor.cgiar.org/Research/Governance/MainActivities/lpf.htm

1364-8152/$ – see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.envsoft.2010.01.005

process of management schemes. Improved communication and coordination among stakeholders, as well as equitable opportunities for negotiation, would lead to more sustainable management schemes that are acceptable to all involved.

To improve the communication process the LPF project turned to modelling of complex systems using the Companion Modelling (ComMod) (Bousquet et al., 1999) approach. The use of models in policy formulation has been limited partly due to challenges in proper representation of the different perspectives of the stakeholders (Verburg et al., 2006). As Vennix (1996) stated, it is during the model-building process where most insights are gained and, thus, the model-builders stand to learn most from it. Therefore, it has been strongly recommended that the stakeholders, or end users of models, be involved in the modelling process throughout its entirety whenever possible (Verburg et al., 2006; Gonzalez, 2002; Castella et al., 2005). The position of ComMod is that stakeholders, in most cases, have different viewpoints of the world and each of these viewpoints should be properly represented when building the model to make it meaningful to all the stakeholders (Bousquet et al., 1999), and more importantly, to gain the confidence and trust of the stakeholders in the model in order for them to use it. The stakeholders collectively sort out the knowledge which is relevant for the social interactions and the problem at stake. Depending upon the objectives of the modelling exercise, the modelling process and results, e.g. the model, have many uses such as a tool for understanding, simulation and prediction and as a virtual laboratory to support research and as decision support systems (Wainwright and Mulligan, 2003; Barreteau et al., 2001).

Following a two-week training and workshop on Companion Modelling in Bangkok, Thailand in December 2004, the researchers and some of the stakeholders decided that the ComMod approach would be appropriate to meet the challenges of building and using models together with the stakeholders and, in general, meet some of the project objectives to improve the communication and coordination among the stakeholders. Therefore, it is through ComMod that the LPF project aimed to:

1) Develop a model together with the stakeholders to collectively learn more about the NRM and livelihood situation in the light of existing and impending rules of access and use of resources.
2) Use the tools that have been developed in the modelling process, i.e. role-playing game and computer simulation, to initiate and stimulate discussion among the stakeholders in finding a balance between sustainable NRM and livelihood.

In the case of the LPF project, it is posited that modelling the complex system of NRM of the stakeholders may help them gain better understanding of their situation; thereby laying the foundation for discussions on NRM issues. Collective learning is the first research question we will address in this paper.

Implementing ComMod in a project, such as LPF, does present a unique set-up, however. Normally, the approach is implemented from the ground-up, beginning without any *a priori* implicit experimental hypothesis (Barreteau et al., 2003). Moreover, a review of previous ComMod applications suggests that the approach is implemented exclusively, i.e. not being directed under any project. This was not the case for a ComMod process within the LPF. Therefore this research will determine the implications of such set-up and analyse the consistency of principles behind ComMod and that of a development project, using LPF as an example. This is the second research question we address in this paper.

This paper begins with the context of the study, which includes a social and physical description of the site. After which, the methods used in this study will be described in terms of principles and then the actions taken in the field. This is followed by the results and discussion wherein the impacts of the participatory modelling process for the stakeholders, for the LPF project and for the ComMod approach in general will be presented. The discussion will also focus on the implications of employing the ComMod approach within the context of a project. The paper is concluded with an assessment of the results of the ComMod process, as well as recommendations on improving its implementation.

2. Context of the study

This study was done within the context of the Levelling the Playing Field project (LPF), which was also implemented in Indonesia and Malaysia. It had the objective of improving renewable resource management through capacity-building and improving communication and coordination among stakeholders.

The project was co-managed by the Center for International Forestry Research (CIFOR) and Centre de coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) in collaboration with local universities. In the case of the Philippines the project was done in partnership with the University of the Philippines Los Baños. The LPF project in the Philippines continued the efforts of the Adaptive Collaborative Management of forests project (ACM) of CIFOR in the villages of San Rafael, Tanabag and Concepcion. ACM in Palawan, Philippines, which was conducted from 1999 to 2002, aimed towards improving the implementation of the CBFM program through capacity-building and facilitation of the stakeholders (Devanadera et al., 2005). Significant improvements in skill and capacity of the stakeholders were reported, such as in documentation and in communicating their opinions to others (Hartanto et al., 2003). Most of the stakeholders involved in the ACM project have also been identified as stakeholders in the LPF project, with the addition of the stakeholders for the different landscapes of the three villages, namely, upland, lowland and coastal areas. Subsequently, the range of stakeholders needed to be involved became larger, involving government and non-government organisations and the local communities of the three landscapes.

The study site (as seen in Fig. 1) is composed of three contiguous villages, San Rafael, Tanabag and Concepcion, located in Puerto Princesa City, in the province of Palawan, Philippines. Their combined area is approximately 19,000 ha. The upland contains the forest areas where the villagers usually extract non-timber forest products (NTFPs) for livelihood such as honey, almaciga resin, rattan and fallen branches for charcoal. Swidden farms are also located in this area. Coconut plantations and rice paddies are in the lowland areas, as well as backyard vegetable and ornamental gardens of the villagers. Livelihood activities found in the coastal area are fishing and gathering of milkfish fry. There are two types of seasons, the wet season from May to October and the dry season from November until April. The type and frequency of livelihood activities performed during the year are heavily dependent on the seasons. Wind patterns affect fishing, with the Northeast monsoon attaining its peak from December to February, making the open seas difficult and dangerous for fishing. The villagers, estimated at about 3600 in 2000,[3] are composed of a small community of indigenous people called Bataks and migrants coming from other parts of the Philippines. Livelihood-based people's organisations (PO) have been formed within and among the three villages, most notably the San Rafael, Tanabag, Concepcion Multi-purpose Cooperative (STCMPC), which was formed to manage the 5000 ha CBFM area awarded to the cooperative. Another 1750 ha CBFM area awarded to the Bataks, is being managed by the Samahan sa

[3] From the census data of the National Statistics Office of the Philippines, http://www.census.gov.ph/census2000/index.html.