

Understanding interdependencies: Stakeholder identification and negotiation as a precondition to collective natural resource management

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1. Introduction

Intensified cultivation of river banks and valley bottoms cause problems of erosion, water depletion and pollution further downstream; crop damage caused by crop pests and diseases suddenly escalates either due to the occurrence of new pests and diseases or due to the sudden escalation of already known ones. These are just some examples of the spatial and temporal interdependency that characterises many natural resource management problems and thus makes them ‘transboundary’, that is make them transcend farm boundaries.

The complex and subtle nature of the biophysical interdependencies at play in determining many natural resource management problems is, however, not the only factor complicating improved natural resource management. Particularly in hillside regions, agricultural landscapes are fragmented among numerous farmers and other resource users, that is among numerous individual decision-makers. In addition to the recognition of the bio-physical interdependencies, improved natural resource management therefore requires the individual farmer or resource user to co-ordinate his or her resource management with that of neighbouring farmers.

This brings into play the diverse and potentially conflicting perceptions and interests which shape farmers’ resource management strategies as well as the social and economic

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interdependencies which exist between them. Hence recognising and understanding not only the interdependencies which exist between different parts and resources within the landscape, but also the perceptions of and social interdependencies between the individual resource users is crucial to solving transboundary natural resource management problems.

This paper presents a learning process – *the stakeholder identification and negotiation* – which enables the identification of and negotiation between stakeholders within an area, such as a micro-watershed or a (part of) community. Through this process, resource users of a particular area are stimulated to appreciate the existence of both bio-physical and social interdependencies related to the natural resource management problems they – or some of them – face, to analyse these, and to engage in negotiations on how to solve or ameliorate these problems. As indicated by its name, the learning process consists of two parts or phases of which one – the stakeholder identification – is embedded in the other – the stakeholder negotiation. Viewed in isolation, the stakeholder identification phase, which consists of interviews with individual resource users undertaken by the facilitator or researcher, almost resembles a classical research process in which the role of the resource user is merely that of a respondent. However, it provides an indispensable input to the stakeholder negotiation which is where the ‘learning’ goes on. In the stakeholder negotiation, the resource users are encouraged to jointly appreciate the existence of diverging perceptions and interests with respect to natural resource management and the bio-physical and social interdependencies involved, and to negotiate how to achieve a more co-ordinated natural resource management.

The paper is illustrated by examples from fieldwork carried out in Colombia (1996-1998) and Nicaragua (1999) and falls into six sections. The following section describes the practical, theoretical and methodological background which led use to the development of the stakeholder identification and negotiation method. The next two sections (section 3 and 4) describe the stakeholder identification process and the stakeholder negotiation process, respectively. Section 5 provides an example of a practical outcome of the stakeholder identification and negotiation process. Finally, section 6 provides a status of the use of the method today.

2. The practical, theoretical and methodological background for stakeholder identification and negotiation

The practical background

In August 1994, a fire partly destroyed a buffer zone which the Río Cabuyal watershed user association (ASOBESURCA) had created earlier that year to protect some important water sources. Figure 1 shows the location of Río Cabuyal and the two micro-watersheds *Los Zanjones* and *Guadualito*, nested within it. Speculations suggested that the fire had been set as a protest against the creation of the buffer zones. This incident became an important part of the practical background for developing stakeholder identification and negotiation. Many people in the Río Cabuyal watershed are in search for land and therefore perceive buffer zones of 10, 30, or sometimes 50 meters as a waste, “*only serving to invite more snakes.*” The fact that the benefits of such sacrifices are more likely to accrue to downstream populations than to people living close to the buffer zone only reinforces this perception. When analysing the incidence, it soon became clear that important stakeholders, such as people in search for land, and the indigenous people (the Paeces), who initially had expressed strong opposition to the creation of buffer zones, were not represented in ASOBESURCA. Thus it made it clear how failing to identify and ensure the participation of all stakeholders in the negotiations about desired resource use might prove detrimental to the efforts of others to improve watershed management.

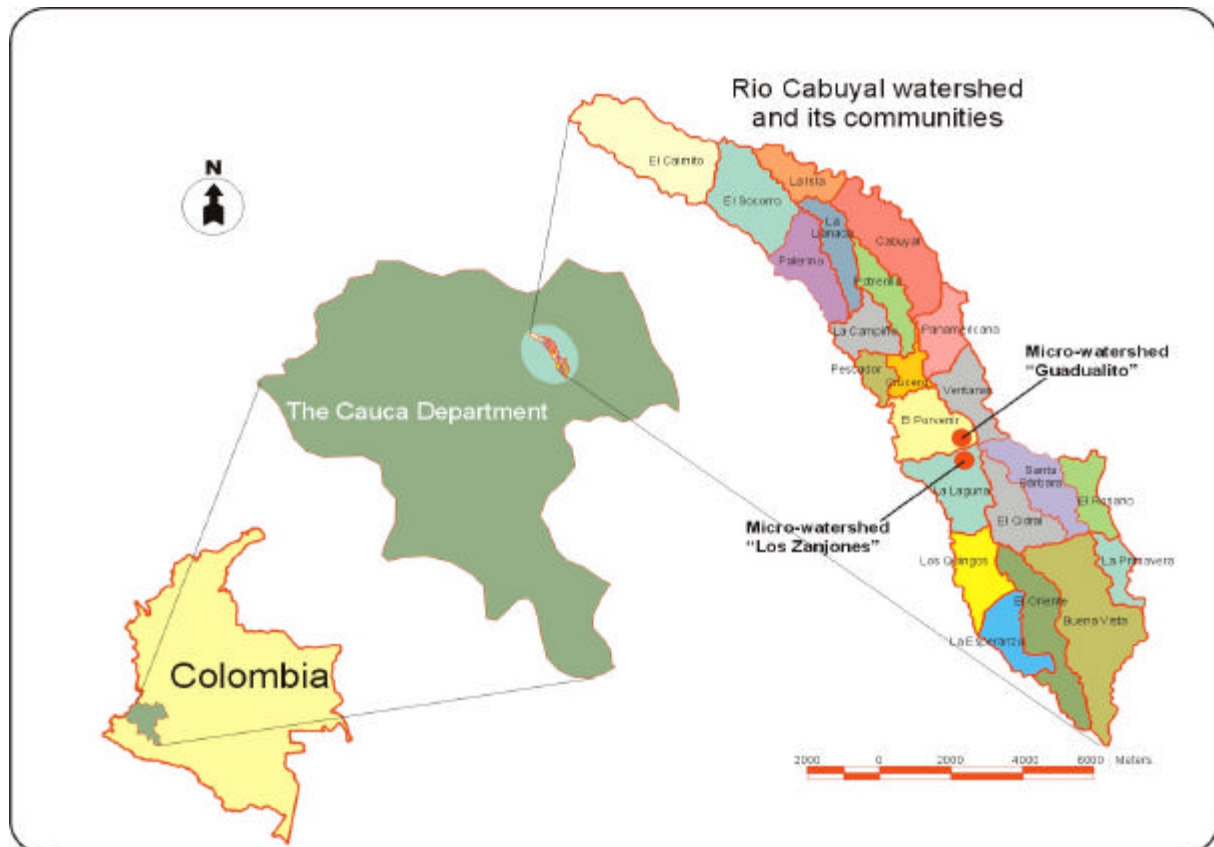


Figure 1. Location of the Río Cabuyal watershed and the micro-watersheds *Los Zanjones* and *Guadualito*, Cauca Department, Colombia.

The theoretical background

From the theoretical point of view, the development of the stakeholder identification and negotiation departs from an actor-oriented and social constructivist approach (Long and Long, 1992; Long and van der Ploeg, 1994). Farmers' resource management is not determined by external structural forces such as the market or the state, or by farmers' belonging to a specific ethnic group, class or community. Rather, it is shaped in the interplay between such factors and relationships, and individual farmers' own experiences and perceptions. This implies that it is important to recognise the often diverse experiences and perceptions that shape individual farmers' resource management strategies as a starting point – a platform – for negotiating a co-ordinated or collective management of natural resources.

The methodological background

In consequence, from a methodological point of view, the stakeholder identification and negotiation distinguishes itself from the tendency which has emerged within community-based natural resource management initiatives (Mosse, 1994) to collect information 'with the community' 'about the community' through the application of various PRA techniques. Examples of such techniques are the drawing of community resource maps, diagramming the relative importance of various institutions to the community, etc.

Underlying these initiatives and the way of applying PRA techniques is the assumption of the community as a homogenous group of people, sharing a common interest (Agrawal and Gibson, 1999; Leach *et al.*, 1997, 1999, Mosse, 1994). But resource users differ. Even in the 44 hectare watershed, *Los Zanjones* situated in the Andean foothills in Southwestern Colombia (see figure 1), many different types of resource users and uses are found. Farmers who have come from other parts of Colombia to grow beans on a contract basis using the high levels of inputs, prescribed by their contractors and who may just move on once yields become unacceptably low, live side by side with Indian Paez farmers who claim to be indigenous to the area but have only recently (re)gained access to their small plots of land through a combination of armed struggle and agrarian reform and still, they earn most of their livelihood by hiring out their labour to neighbouring farmers.

The often conflicting resource management strategies that such different experiences and perceptions are likely to lead to, are, however, rarely disclosed in a public, community-level meeting. In many rural settings, the overt display of conflict or disapproval of the resource

management practices of neighbours is not socially acceptable. The fact that resource users of a particular area are not only bio-physically but also socially and economically interdependent, e.g. through hiring in/out labour or through the need for informal credit, further limits the overt expression of conflict and disapproval. As observed by Mosse (1994: 508), "...public and collective events ...? tend to emphasise the general over the particular (individual, event, situation etc.), tend towards the normative ('what ought to be' rather than 'what is'), and towards a unitary view of interests which underplays difference ... ? These 'rhetorical expressions of integrity of the community' are not to be mistaken for the absence of distinct and perhaps conflicting interests".

It was exactly such experiences of unitary views of the community which we at first were presented with in Los Zanjones. Despite having had several meetings with the attendance of close to all watershed users and, in these meetings having encouraged the identification of different interests and strategies with respect to natural resource use, claims were repeatedly made of agreement and of unhindered communication in case of minor disagreements. It was not until we engaged in individual conversations with farmers that they started telling us about conflicts existing in the area. As an example, a contract farmer had – against all established norms of land use in the area – indiscriminately cleared land all the way down to one of the streams of the watershed and the neighbours faced great difficulties in finding appropriate ways to approach this farmer.

Taught by these observations, we concluded that only through individual interviews, it would be possible to gain insight into the diverse perceptions and interests which shape the specific resource management strategies pursued by the individual farmers and hence enable the inclusion – the 'participation', if you wish – of these perspectives and interests in the subsequent negotiation of efforts to improve natural resource management. It was thus ironic when in an international workshop on participatory action research, where we presented the first steps towards what is today the stakeholder identification and negotiation method, someone asked us why we hadn't chosen to use a more 'participatory' method than the individual interview, meaning a group or a public event. All too often 'participation' is superficially understood as the nominal attendance of people, overlooking the absence of their perceptions and interests.

3. The stakeholder identification process

A major methodological inspiration for our development of the process of stakeholder identification was the work of Egon Guba and Yvonna Lincoln (1989) in which they outline what they term a ‘hermeneutic dialectic’ or ‘constructivist’ process of inquiry. The purpose of this process is “...to tease out the constructions that various actors in a setting hold and, so far as possible, to bring them into conjunction – a joining – with one another and with whatever other information can be brought to bear on the issues involved” (Guba and Lincoln, 1989: 142).³

Since our aim of undertaking individual rather than group interviews is to gain insight into farmers’ personal experiences and perceptions, i.e. their constructions, the themes which we have formulated to serve as a guide for the interviews (see box 1) take their point of departure in the individual farmer’s own resource use rather than in the resource use which takes place more generally in the area.

1. How do you and your family use the natural resources in this area?
2. What problems have you and your family experienced with respect to the natural resources?
3. From working in other areas, we have seen that conflicts over the use of natural resources can be common among people living in the same area. Would you give some examples of such conflicts in your area?
4. What do you think is needed to solve these problems?
5. Thank you for telling us all this. It is very useful indeed. However, probably other people in this neighborhood have different opinions to yours. Will you give us the names of one or two persons who you think might have a different viewpoint?

Box 1. Themes used as interview guide for individual interviews

The first resource user to be interviewed, R1, is selected for any convenient reason. He or she might hold a key position in the community or simply already be known to the interviewer. The first question or theme establishes the base for the rest of the interview by relating to the respondent’s own use of the natural resources. The second theme then inquires into the respondent’s concerns and perceptions with respect to the specific resource use. Through the

³ The following description of the interview process – though not the themes – draws heavily on Guba and Lincoln (1989: 151-155).

third theme, the issue of the biophysical interdependencies is introduced by asking how the respondent perceives his or her own resource use affected by the resource use taking place in other parts of the area. Inspired by the experiences from Gal Oya (Uphoff, 1994; 1996), the fourth theme seeks to stimulate the respondent to think about the potential need for collective action to solve the perceived problems. Finally, the fifth theme or question serves to ensure the identification of, if not all, then a wide range of perspectives. The respondent is asked to nominate another person, R2, who in R1's view is likely to provide a different or contrasting construction from that of R1. By subsequently interviewing the nominated person, the respondents are eventually 'sampled' according to what can be called 'contrast' or 'maximum variation sampling'. However, before proceeding to interview R2, the central themes, concepts, ideas, values, concerns and issues proposed by R1 are analysed by the inquirer into an initial formulation of R1's construction. After the next resource user, R2, has volunteered his or her account with respect to the first four themes, the central ideas from R1's construction are introduced, and R2 is invited to comment on those ideas. In order not to compromise R1, phrases such as "we have heard that..." are used to introduce ideas from previous respondents. After soliciting a nomination for R3, the inquirer formulates a construction based not only on the concepts and ideas volunteered by R2 but also based on R2's reaction to the construction formulated on the basis of the interview with R1. This process of interviewing and soliciting nominations for new respondents is repeated until the information being received either becomes redundant or falls into two or more constructions that remain at odds in some way.

To illustrate this continuous and iterative process of eliciting, confronting and analysing resource users' perceptions and interest with respect to natural resource management, we will use the case of Puertas Azules, a community situated in the upper part of the natural reserve called Miraflores in the district of Estelí in Nicaragua.⁴

Stakeholder identification in Miraflores – an example

Farms have names in Miraflores, but not only that. Most of them also have uniform signboards along the road which in addition to the name convey a little 'environmental' message like

⁴ The stakeholder identification undertaken in Puertas Azules was not part of a process of stakeholder negotiation. Rather the purpose of undertaking the stakeholder identification was to provide a demonstration of the methodology as well as an actual input to a development programme which was about to start up activities in the area to support agricultural production and environmental protection. The work was carried out in November 1999.

“let’s avoid the use of fire” and signed by the ministry of environment and natural resources (MARENA) jointly with either the co-operative, UCA-Miraflor, or by the new farmer association, APROAMI⁵. Our first encounter in Puertas Azules was with a group of seven farmers who had stayed on from another meeting they had had just as we came. They told us how, on initiative from the co-operative, UCA-Miraflor, they had managed to get Miraflor declared a natural reserve, and how they with support from MARENA had formed a network or an organisation of forest guards. Being a natural reserve implies that existing forest cannot be cleared to give way for agriculture, that only dead wood can be collected for firewood, and that to cut down a tree to use e.g. for construction, a special permission has to be obtained from MARENA. In an area marked by poverty and where many families are close to or absolutely landless,⁶ we were puzzled by the claim made in the meeting of no or only little resistance to having the area declared natural reserve as well as by the almost universal contradiction of farmers wishing to have their land declared a natural reserve. These queries and the precise role and organisation of the forest guards were some of the themes we brought into the subsequent interviews. The interview process and the themes emerging from the interviews are illustrated in figure 2.

⁵ APROAMI stands for Asociación de productores ambientales.

⁶ From a well-being ranking which we conducted in Puertas Azules during the process of conducting the individual interviews, we learned that more than half of the 47 families living in Puertas Azules

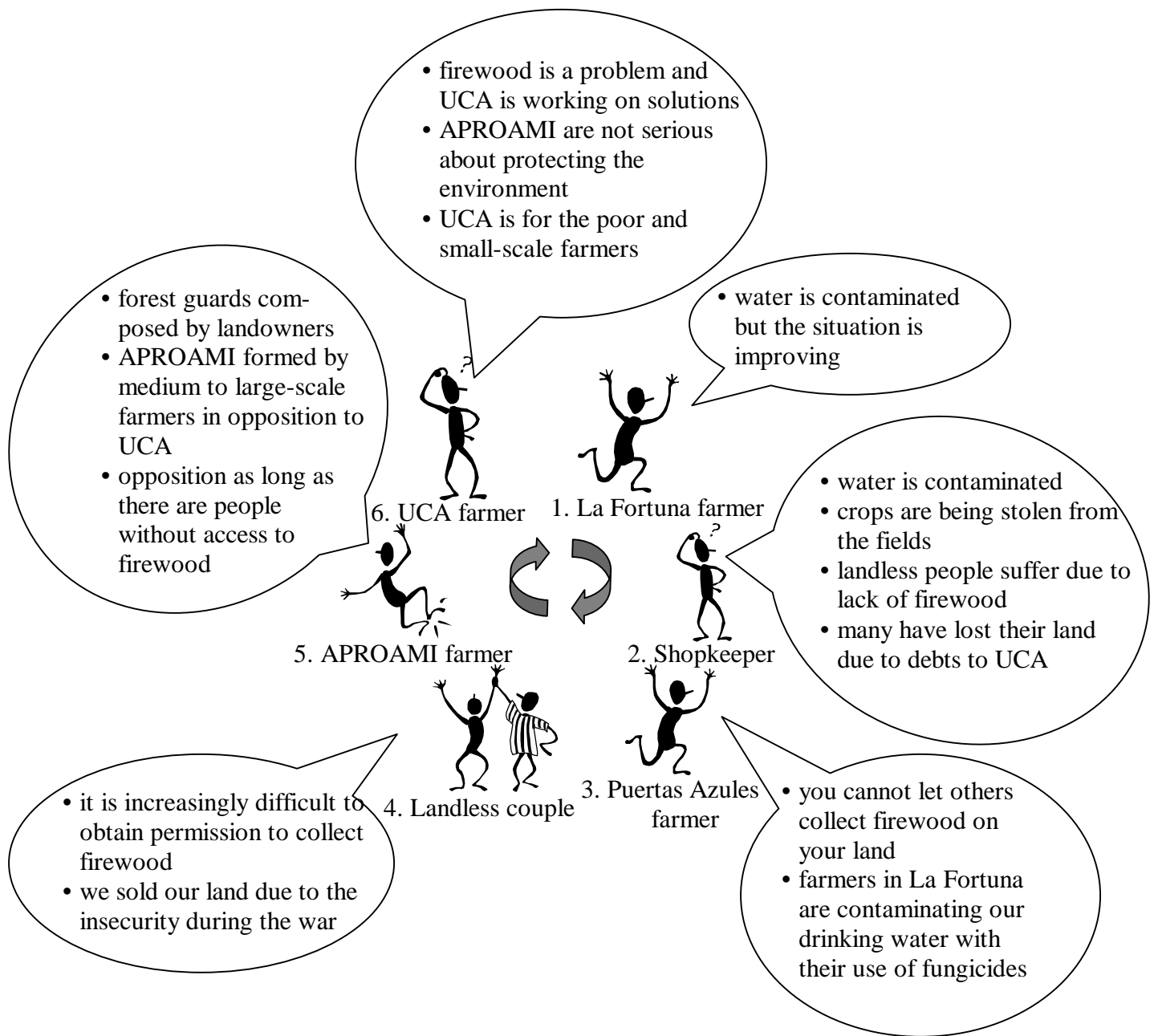


Figure 2. The process of stakeholder identification in Puertas Azules, Estelí, Nicaragua

The first individual interview was with one of the farmers who had participated in the meeting. He had his land in La Fortuna just outside Puertas Azules a bit further up in the mountains from where Puertas Azules gets its drinking water. In addition to coffee, the most important crop in the area is potato, which involves regular sprayings with fungicides. The farmer explained how they tried to avoid growing crops like potatoes close to springs and

does not own land.

streams to avoid the fungicides to drain into the water. He also described how the drinking water in Puertas Azules had been contaminated “at 100 percent”, but that now it was much less “at about 50 percent”, as he expressed it. After the interview we were left with the impression of an area which of course had its problems, but at the same time exhibited an ability to identify flexible solutions, such as devising more appropriate ways of cultivating land close to water sources rather than prohibiting cultivation altogether.

The La Fortuna farmer nominated a shopkeeper in Puertas Azules as the next person to interview, and indeed this interview revealed a very different perception from that both of the initial meeting and the La Fortuna farmer. “You cannot drink the water in Puertas Azules”, he told us and moreover he told us how many of the farmers who had got land during the agrarian reform had now had to sell it, many of them because they were indebted to UCA, and how landed farmers had crops stolen from their fields just before harvesting. Many people suffer due to the difficulties of obtaining firewood, particularly those who do not have land, and it happens that they circumvent the rules of the natural reserve by carving in the trees so that they will die.

The next person to be interviewed was a farmer who had managed to increase his landholding over the past decade. Though viewing the issues from a different angle, namely from the angle of a farmer, he largely confirmed the themes suggested by the shopkeeper. Thus, he explained how it was important to live very close to your fields in order to avoid thefts at the time of harvesting and how you cannot allow others to enter into your land to collect firewood because they might cause damage. He also told that farmers in La Fortuna were responsible for the contamination of the drinking water in Puertas Azules, in part because of their use of fungicides for potato cultivation.

The next interview was with one of the families⁷ who had lost their land, however not because of being indebted to UCA, but because the general state of insecurity during the war had made him sell. Today they were earning their livelihood through hiring out their labour. Though starting off their account by repeating the dominant discourse about the importance of protecting nature, they told about how it had become increasingly difficult to obtain

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Both the husband and wife participated in the interview.

permission from landowners to enter into their land to collect firewood and how, at times, they had to buy firewood.

The fifth individual interview was with an APROAMI farmer who was also one of the leaders of the organisation of forest guards. The forest guards is an organisation formed by landowners, he explained, and he confirmed that as a landowner you cannot allow others to enter into your land to collect firewood. “Until a solution is found to the problem of access to firewood for the landless families, there will always be opposition against the idea of Miraflores as a natural reserve”, he explained. This led us to wonder whether, in fact, the network of forest guards, had been formed to overlook and protect not only the forest but also the property of the landowners against landless intruders. Finally, he described how APROAMI had been formed a couple of years ago as an association of the emerging middle and large scale farmers, in opposition to UCA which he saw as a totally corrupt organisation. MARENA which had collaborated with UCA when establishing the natural reserve of Miraflores and had channelled project money e.g. from Finland into Miraflores, now collaborates with APROAMI. Thus the interview suggested to us that farmers – both those organised in APROAMI and in UCA – were using the status of natural reserve to tap on to the ‘environmental’ discourse dominant in many government and donor agencies and thereby get access to external project funding not available for agricultural production per se.

The last interview was with one of the leading figures in UCA who had been nominated by several of the respondents. She confirmed the difficulties of allowing other people into your land to collect firewood, giving accounts of incidences of such people entering into her land, causing damage to trees and subsequently accusing her of illegal forest use. UCA is, however, aware of this problem and is trying to find solutions for landless families. With respect to issues of the forest guards and the fact that MARENA is now collaborating with APROAMI, she furiously questioned the intentions of APROAMI: “How can they call themselves environmental farmers when they use chemicals in their coffee cultivation, something which is absolutely unnecessary?” Her interpretation was that MARENA had taken the side of the rich farmers whereas UCA continued to be an organisation for poor farmers. “Many people are starting to see this”, she said, and she described how UCA had recently got many new members particularly among young people.

To summarise, in addition to the upstream/downstream divide which emerges with respect to the issue of the contaminated drinking water, there seems to be three major stakeholder groups in Puertas Azules with respect to natural resource management. The first group consists of the landless families who in addition to being landless face increasing difficulties in getting access to firewood and who see the declaring of Miraflor as a natural reserve as a major reason for this difficulty. The second group is that of the small farmers who, through UCA, were the pioneers for declaring Miraflor a natural reserve on the expectation that this would give them access to external project funds but who now see this possibility captured by the third group, namely medium and large-scale farmers organised under APROAMI who, with the support of MARENA, have formed the network of the so-called forest guards.

4. The stakeholder negotiation process

Whereas proper stakeholder identification is a potentially important input to the identification, design and planning of a wide range of activities, the rationale for initiating the stakeholder negotiation process is more narrowly related to cases which exhibit biophysical and social interdependencies. In cases where the outcome of natural resource management practices employed at one point or time in a landscape depend on and/or affect what happens elsewhere or at other times, and where resource users are tied together by complex social interdependencies, efforts to improve natural resource management have to be negotiated in the context of the perceptions and interests and the existing biophysical and social interdependencies shaping individual resource management practices. This is the purpose of the stakeholder negotiation process.

The process consists of five steps or phases, of which the stakeholder identification process is one (see figure 3). (For a detailed description of each step, please refer to Ravnborg *et al.*, 1999a.). As a learning process, the intention is to guide participants, i.e. the resource users from a particular area, beyond a situation in which the biophysical and social interdependencies are not addressed as part of the resource management strategies pursued, either because they are not at all recognised or because the social and organisational difficulties associated with addressing them are too great to overcome.



Figure 3. The stakeholder negotiation process

Having identified the area of work and the corresponding resource users (step 1), the second step of the stakeholder negotiation process is to plant the notion of interdependencies with resource users. This is done in a meeting to which all resource users are invited. Rather than explaining the notion of interdependencies, participants are invited to analyse a drawing of a hypothetical landscape with a number of ongoing natural resource management activities (see figure 4). Questions like “what is happening in the landscape on the drawing?”, “what do you think the individual resource managers think about what is happening? – And why?” and “what would be needed for everyone to be satisfied?” are used to guide participants through the analysis. Following the analysis of the hypothetical landscape, participants are asked if there are any parallels between the hypothetical landscape and their own. The purpose of the question is *not* to develop a list or an inventory of ‘transboundary’ natural resource management problems in the area, but rather to encourage farmers to start thinking about the notion of interdependencies in the context of their own situation. This point is emphasised to the participants and permission is solicited from the participants to visit some of them on an individual basis to talk in more detail about their resource use and the problems faced, i.e. the individual interviews used for the stakeholder identification.



Figure 4. Drawing of hypothetical landscape

One of the most critical moments of the stakeholder negotiation process is the second meeting held with the resource users (step 4). Based on the interviews undertaken as part of step 3, this is the moment when the facilitators should present their construction or interpretation of who the stakeholders are with respect to natural resource management in the area and in particular, of their perceptions and interests, and how these might be in conflict with one another. Exploiting the fact that as outsiders, the facilitators are not to the same extent subjected to the social norms or tied up by complex social interdependencies, as are the resource users themselves, the facilitators thereby assume the unpopular role of making explicit the conflicts that exist in the area. This, however, should be done without compromising the persons interviewed. Therefore, a drawing like the one presented in figure 2 from Miraflores should be avoided when presenting the construction in the meeting.

When presenting their construction, the facilitators should strongly emphasise that it is *their* interpretation, and that there very well might be things which they have misunderstood or misinterpreted. Participants are therefore invited to discuss and modify the facilitators' construction. To the extent that participants identify themselves with the stakeholder groups

presented as part of the facilitators' construction, they are invited to split up according to stakeholder group (based on auto-categorisation) in order to modify and further elaborate the construction in these stakeholder-based working groups.

The ultimate aim of step 4 is, however, for the participants to be able to develop a joint or a shared construction which involves the appreciation of the perceptions and interests of others, rather than the development of stakeholder-based constructions of natural resource management in the area. As described by the Simmons Institute for Leadership and Change (1999), 'a shared vision as well as shared ownership of problem and outcome definition is fundamental to collective action. Commitment and time should be set aside to learn and to make an effort to understand the problems from the other partners point of view'. Often it will not be possible to arrive at a joint construction in a single meeting, and a third meeting therefore might be needed. Also in order to enable a better understanding of the interdependencies involved, there might be a need to undertake inventories of certain problems or for people from one part of the area to visit people from another part to better appreciate their perceptions, etc. Examples of this are given below.

The joint or shared construction of natural resource management and problems in the area constitutes the starting point – the platform – from which to develop action plans for how, in a co-ordinated fashion, to improve natural resource management, as is the purpose of step 5. During this step various options for solving the resource management problems at stake – technical as well as organisational options – have to be explored, information and experiences from outside might need to be collected, and experimentation might be needed to test the various options.

Stakeholder negotiation in Guadualito – an example

Guadualito is, and has long been, a contested area. In July 1975, a group of Paez Indians invaded – or 'recuperated', as the Paeces express it – the lower part of Guadualito watershed. Some of the Paeces were living in the area already, working as day-labourers or caretakers on the bigger farms; others came from further up the mountains. Today the invaded area is recognised as part of the indigenous reserve of the Cabildo La Laguna. About half of Guadualito's 29 families are Paeces, whereas the rest are Mestizos, born in the area, or

Caleños,⁸ that is families from other parts of Colombia, who have settled in Guadualito over the last 10-20 years. Guadualito covers an area of approximately 150 hectares, and small-scale farming combined with day labouring on neighbouring farms are the dominant economic activities. Almost all of the 29 families own land and the majority own between 1 and 3 hectares.

In the first meeting where the notion of interdependencies between resources and resource users was introduced, participants made comments in favour of initiating a process facilitating co-ordinated natural resource management. As one participant put it: “*Meetings are important because you don’t know what might be happening to your neighbour*”. In subsequent informal conversations with persons who had participated in the meeting, we learned that one of the expectations was that we, as an external party, would be able to facilitate a non-existent but strongly needed dialogue, primarily between the Paeces and the so-called Caleños.

One of the transboundary natural resource management problems, which emerged as important during the stakeholder identification, was that of water supply and contamination. Whereas all the Mestizos and Caleños in Guadualito have piped drinking water, more than half of the Paez families get their drinking water from the local springs and streams. The Paez families interviewed claimed that this water is becoming increasingly contaminated and scarce and, in their view that the Caleños are to be blamed. Some were said to discharge sewage water from their toilets or water used for washing coffee beans, which subsequently drained into the spring water; others were said to use insecticides and fungicides, some of which reached the spring water. Some Paeces complained that the Caleños had cleared land all the way down to one of the springs in order to establish pasture. This is believed to reduce the amount of water available, due to lack of shade and deep roots on the pasture to keep the water close to the surface. Finally, in the rainy season, a culvert designed to drain the road running along the upper rim of the watershed empties huge amounts of water, full of silt, which gets mixed with the spring water as it flows.

⁸ Literally, *caleños* refers to people from Cali, but in the local terminology it is used more loosely to refer to people coming from the area around Cali, as well as from the coffee zone, i.e. the departments of Risaralda and Caldas.

In contrast, some of the Caleños living along the road were not well aware of where the springs were located and even less of the extent to which some of the Paez neighbours depend on these springs for drinking water. Instead the Caleños raised issues related to the control of crop pests and diseases and to the use of burning for land preparation, a practice which they ascribed mainly to the Paez families living in the lower part of the watershed.

Although the individual resource managers might not explicitly be aware and take into account the transboundary implications of his or her resource management, the interviews undertaken as part of the stakeholder identification showed that the biophysical interdependencies related to water management overall are well recognised. However, dealing with these biophysical interdependencies was perceived to be difficult, not only due to technical and economic constraints such as insufficient knowledge of technical alternatives or the costs involved e.g. in diverting the run-off from the road. Also the social interdependencies which exist among the resource managers make it difficult. As a Paez farmer explained with reference to the Caleños: “If one day we need something – some help or something – and if they also need help, we help them and they help us”. He further explained that the Caleños typically asked the Paeces and their organisation, the *Cabildo*, to keep order, e.g. to protect against crop thefts etc., whereas the Paeces typically would ask the Caleños for employment. He continued to explain that they had not tried to raise the problem of water contamination with the Caleños, because “it was not really worth the effort”: Some Caleños do not stay permanently in Guadualito but only come once a week or fortnight and moreover, “they buy and sell their property so often that you never know who your neighbour is”.

Rather than reinforcing the ethnic dimension of the water problem, we chose to present our construction of the water problem in the second meeting (step 4) as a problem related to location. Using a sketch map, we explained how all families living in the upper part of the watershed (who happen to be Caleños and Mestizos) have access to piped drinking water at the same time as being more involved in coffee growing – and washing – and the use of fungicides. Thus, the causes of the water problem appear to be found in the upper part of the watershed whereas the problems are felt in the lower part which is not reached by the piped water supply system and furthermore happens to be where most of the Paeces live.

Presented with this construction, a Caleña woman suggested that perhaps the Paeces did not *want* piped water supply or were *unwilling to pay* for it. In his response to these accusations, one of the local Paez leaders chose to refer to a legendary Mestizo woman who at the time of the recuperation and when the piped water supply was established was the president of the local village government. Allegedly, she had been responsible for the decision that the piped water supply should not be extended to include the indigenous families who had just recuperated their land. He explained how this Mestizo woman had been a racist, and stressed how she eventually had been forced to leave the area, as if wanting to remind the Caleña in the meeting of what *could* happen and of who holds the key to peace in the area. Another indigenous leader stepped in and tried to calm down the somewhat heated atmosphere by proposing that it was time to put aside old conflicts and that Mestizos, Caleños, and indigenous should collaborate in order to solve important problems. This negotiation, essentially about the history of Guadualito, confirmed the Paeces' right to access to clean drinking water. The following stakeholder-based groups (people living in the upper part of Guadualito in one group and people living in the lower part in another) thus consolidated the construction presented with respect to the water issue.

In a third, continuing meeting held shortly after, the discussion of which actions should be taken to improve resource management was initiated. With respect to the water problem, it was decided to make an inventory of the springs in the area. In order to foster cross-locational and cross-ethnic learning, we, as facilitators, proposed to sub-divide Guadualito into two parts from the top to the bottom of the watershed and that for each part of the watershed, a mixed group of watershed users, i.e. comprising people from the lower as well as the upper part, would be given the task of visiting all the springs. Each spring should be located in a map and observations should be made about what was happening around and particularly upstream of the spring, which could influence the quantity and quality of the water. Also the number of users was estimated for each spring.

Using this inventory as the basis, farmers were asked, in a subsequent meeting, to prioritise the springs according to their importance to people, and more concrete action plans were developed for the three most important springs. The plans⁹ had three elements: (1) to

⁹ These plans have been implemented to varying degrees. With respect to the negotiation with persons discharging sewage water from toilets or from the washing of coffee beans, some progress has been made in terms of placing the legal responsibility for any harmful effects caused by such action. On the

negotiate with the persons whose actions affect the quality and/or quantity of water; (2) to identify and implement a technical solution to divert run-off water, primarily from the road; and (3) to reforest and protect the area immediately around the springs.

5. The transboundary nature of ant control – an example of learning

Both in Los Zanjones and in Guadualito, crop damage caused by leaf-cutting ants (*Atta cephalotes*) and the inadequacy of common control practices was identified as a transboundary natural resource management problem. In Los Zanjones, it was raised as a problem in its own right, whereas in Guadualito, in addition, ant control was raised as a problem due to the contamination of water sources caused by the use of the insecticide, *chlorpyrifos*, available in the area under the commercial name *lorsban*.

The inadequacy of the ant control practices in Los Zanjones and Guadualito had two causes. First, it had to do with the way in which most farmers were applying *lorsban*. Instead of pumping *lorsban* directly into the anthill as recommended, most farmers were pouring *lorsban* around the entrance and exit holes of the anthill, either directly from the bag or using a spoon. The reason for this sub-optimal practice was essentially lack of resources. Very few farmers owned or had access to a pump and even if they had, they could not afford the much larger quantities needed to have immediately visible effect when pumping, than when pouring *lorsban* directly on the ants. Second, the inadequacy of the ant control practice had to do with the transboundary nature of the ant control problem. Ants do not respect farm boundaries. Therefore, farmers who control the anthills in their own fields might still face damage on their crops caused by ants coming from neighbouring fields where no or inadequate control measures were taken. In that sense, crop damage caused by leaf-cutting ants constitutes a transboundary natural resource management problem.

suggestion of one of the coffee growing (and washing) Caleños, an ecologist from the Coffee Federation (*Federación de cafeteros*) which is the institution with the strongest presence in the area, was invited to tell about alternative ways to wash coffee beans. Apart from doing this, he emphasised that according to Colombian law, those who cause environmental pollution are to be held responsible. He referred to a case where a young girl died as a consequence of drinking water contaminated from upstream tomato cultivation and the associated use of fungicides, and subsequently the tomato grower had been held economically responsible for her death. Still, however, people hesitate towards actually reproaching others of their resource management if improving the resource management involves costs for the person responsible. After having developed various technical designs, Guadualito farmers organised a *minga* (a work party) towards the end of 1999 to lay down a culvert which would divert run-off water from the road and sewage water from coffee washing so that it would not drain into the spring supplying the local indigenous school and some families in the lower part of the watershed.

None of this was of course new to farmers in the sense that they were well aware of not following the instructions for the use of *lorsban* and that they had all seen ants crossing from one field to another. Whereas the first cause was something that could be and was openly addressed by farmers, e.g. through individually testing out new products (including local ones) and alternative methods of application as well as exchanging information in that respect, nothing was done to address the second cause of the ant control problem. Dealing with the transboundary nature of the ant problem would require what was perceived as ‘interfering’ with the neighbours’ decisions of whether, when and how to control the anthills on his or her land – something which would not be readily accepted, particularly not if a day-labouring farmer would raise the problem towards one of the more well-endowed farmers providing both employment opportunities and other services to the community.

Hence, rather than, on an individual basis, making farmers aware of the transboundary nature of the ant control problem, the achievement of the learning process was first of all to facilitate the *collective* recognition of the transboundary nature of the ant control problem. Second, from being regarded as ‘interfering with the management decisions of a sovereign neighbour’, the learning process facilitated a change in perception so that co-ordinating whether, when and how to control the anthills within the area have come to be regarded more as a legitimate part of the ant control practice.

A map was developed to facilitate the collective recognition of the transboundary nature of the ant control problem (figure 5). For each of the watersheds, an inventory of the major anthills was made together with farmers by walking through the watersheds and indicating the location of the anthills and the farm boundaries in an ortho-photograph (like an aerial photograph). Also the number of entrance and exit holes was noted for each anthill as an indication of its size and level of activity. Subsequently, together with farmers the average action radius, that is the distance from the nest that ants move to forage, was estimated at 80 meters¹⁰. A circle with a radius corresponding to 80 meters was therefore drawn around each anthill in the map to indicate its respective area of influence. Thus, the map allowed the calculation of the number of plots potentially affected by each anthill. This number ranges

Finally, reforestation of the area immediately around the important springs is on the agenda of one of the newly formed groups in the area called *Convivencia agroforestal*.

¹⁰

It should be noted that the 80 meters action radius is a conservative estimate since leaf-cutting

from 1 to 6 plots per anthill with an average of 2.8 plots. Hence, in addition to the damage caused by ants having their nest within the farm boundaries, this means that farmers can expect crop damage to be caused by ants coming from nests located on two (1.8) other farmers' plots. The development and joint analysis of the information presented in this map turned out to be very effective in stimulating the joint recognition of the transboundary nature of the ant control problem and subsequently, of the need for co-ordination as an essential element of any attempt to effectively control ants within an area.

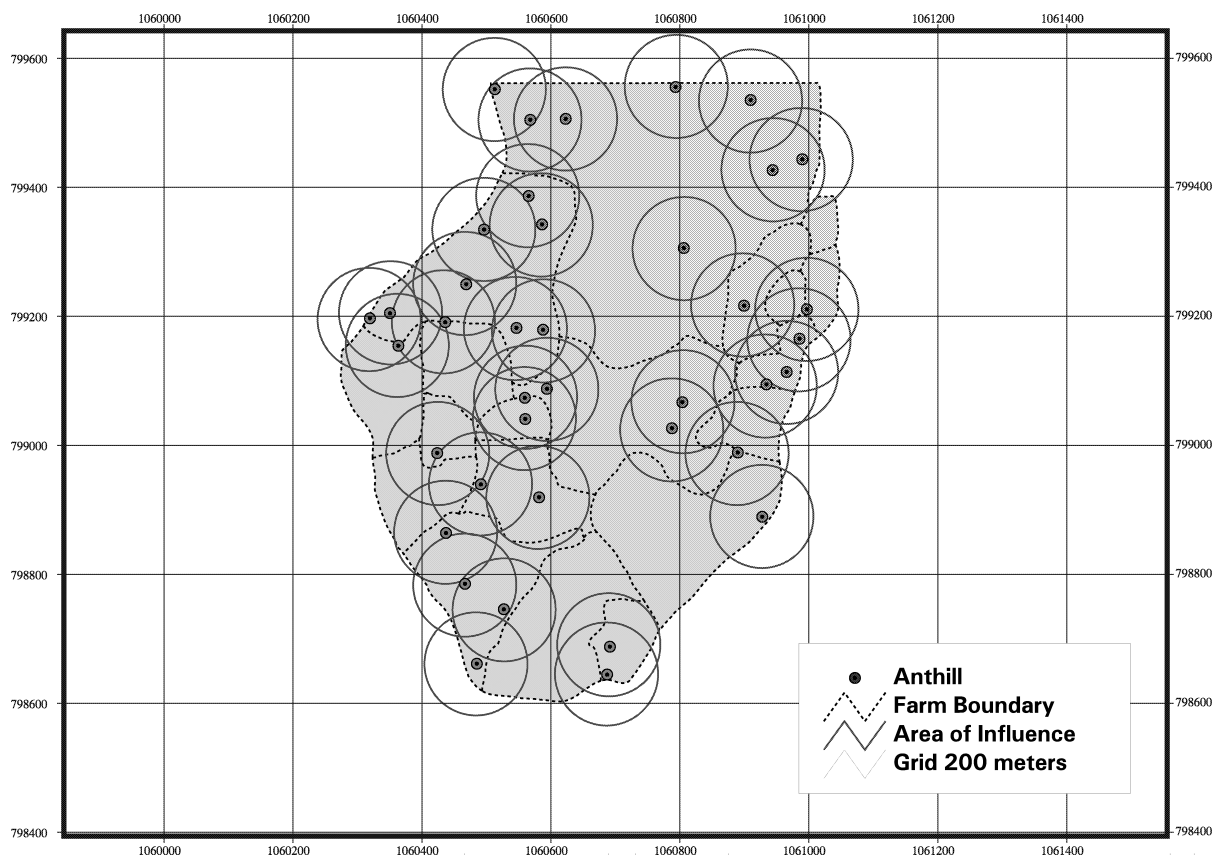


Figure 5. Location of anthills, their radius of action and farm boundaries, Los Zanjones, La Laguna, Colombia

Also a search was made to identify alternative ant control practices to that of the application of *lorsban*, and both CIAT researchers and farmers suggested techniques to be tried out. In Guadualito, for instance, an experiment was designed in which 15 farmers participated, each with one anthill. Four different potential control practices or treatments¹¹ were tried out. The

ants are known to cut leaves at distances up to 200 meters from the nest (Cherrett, 1986: 179).

¹¹ These included 1) washing powder applied around the entrance/exit holes; 2) the use of gasoline to explode the anthill; 3) pumping agricultural lime into the anthill; 4) pumping agricultural lime mixed with

aim of this search was to identify practices which would be less environmentally damaging than the use of *lorsban* and thus involve less risk of water contamination. In the subsequent evaluation of these alternatives, the use of lime mixed with gradually decreasing amounts of *lorsban* was assessed as the best option, because i) it is effective, ii) involves less cash outlays for inputs than for instance the use of *lorsban* only, and iii) is beneficial to the soil due to the application of lime.

After having collectively recognised the transboundary nature of the ant control problem and having identified a feasible ant control practice, a long and at times cumbersome process began towards finding ways of achieving co-ordinated ant control within the watershed. Neighbours who perhaps had their land under fallow and therefore were not affected economically by leaf-cutting ants had to be convinced or persuaded to undertake ant control in co-ordination with their neighbours. Initially, farmers were a bit reluctant to try to convince their neighbours and some who were affected by ants coming from neighbouring, non-participating farms decided instead to trespass into these neighbouring farm to undertake the control themselves. However, gradually the group gained confidence in itself as well as in the arguments for the 'biophysically founded' need for co-ordinated ant control, and it also developed mechanisms for encouraging the convincing of neighbours e.g. through the launching competitions. This provided its members a platform – an institutional mechanism – from which to approach their non-participating neighbours rather than having to do this as individuals.

6. The stakeholder identification and negotiation today

Activities in Colombia

As already indicated the stakeholder identification and negotiation process was developed through work carried out in the Andean hillsides of Colombia as part of a participatory action research effort to facilitate and improve collective natural resource management. Since late 1998, the participation of CIAT researchers in the ongoing activities has, however, been made virtually impossible due to the complex and tense security situation caused by the presence of both guerrilla and paramilitary groups. Some of the activities initiated as part of the process have, however, continued. Most notably perhaps, the efforts to achieve collective ant control have spread from the initial micro-watersheds to the municipality of Caldon,

gradually decreasing amounts of *lorsban* into the anthill.

facilitated by extension workers from the governmental and non-governmental organisations working in the area (Ravnborg *et al.*, forthcoming). In Los Zanjones, farmers continue to meet and after having achieved effective control of all major anthills, they have decided to address other transboundary natural resource problems.

Capacity building

Alongside its research, CIAT's hillsides project has initiated a capacity-building process in order to disseminate some of the tools or methods developed to improve decision-making in planning, design and implementation of natural resource management initiatives. The stakeholder identification and negotiation is one of these tools and has been presented at courses in Nicaragua, Honduras, the Dominican Republic and Colombia. The aim of the capacity building process is twofold. The first aim is to train trainers or to build national training teams and thus enable them to train others in the methods in their country. The second aim is that each institution participating in the training event should develop an action plan for how they would like to incorporate some or all of the decision support tools into their ongoing or planned activities.

With respect to the stakeholder identification and negotiation method, the material used in the capacity building (Ravnborg *et al.* 1999a and 1999b) is available in Spanish and is currently being translated into English to be used in similar training events to be held in Africa and Asia during 2000.

So far, systematic feedback on the detailed action plans developed by the participating institutions has been collected from the last two workshops held in Honduras and Nicaragua. In Nicaragua, six organisations¹² have decided to incorporate the stakeholder identification and negotiation method into their activities, and in Honduras, this is the case for seven institutions.¹³ In both countries, these institutions comprise universities, government agencies

¹² Escuela Internacional de Agricultura y Ganadería de Rivas, Escuela Internacional de Agricultura y Ganadería de Estelí, Asociación para la Diversificación y Desarrollo Agrícola Comunal, Centro de Promoción del Desarrollo Local, Instituto Nicaragüense de Tecnología Agropecuaria, Universidad Nacional Agraria.

¹³ Instituto Hondureño de Café, Fomento Evangélico para el Progreso de Honduras, Departamento de Manejo de Bosques - Sección de Manejo de Cuencas Hidrográficas, Universidad Nacional Autónoma De Honduras y Centro Universitario Regional del Litoral Atlántico CURAL, Proyecto de Desarrollo del Sur de Lempira, Secretaria de Recursos Naturales y Ambiente, DICTA/SAG, Proyecto de Desarrollo Rural en el Centro Oriente de Honduras.

and NGOs. Some of the objectives the organisations have given for the incorporation of the stakeholder analysis into their projects are:

"..to motivate the neighbours in the middle part of the Rio Cangrejal to organise and plan actions which leads them to a better use of the natural resources in the watershed taking the participation of all present institutions into account".

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Litoral Atlántico (CURAL)*

"...participatory identifications by community informants from the five critical areas of conservation (micro-watersheds) of different stakeholder groups in the collective management of soils.... to confront the community with the results [of the analysis], generating among them the analysis of the current situation, problems and possible actions to improve the management of their natural resources".

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It is still too early to say something conclusive about the impact of the use of the methodology, but the feedback will definitely be important for *our* learning process and for the further development of the methodology. However, among the needs, which have been identified for the further development of the methodology, are the organisational aspects of the implementing the stakeholder identification and negotiation as well as conflict resolution mechanisms. These issues will be addressed as part of research planned to be conducted in Nicaragua with specific focus on the shaping and negotiation of diverse perceptions of landscape management as the platform for collective action and on the formation and importance of social capital.

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