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Participatory solution of land use conflicts in protected area management in the Brazilian Atlantic Forest

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Abstract
Conservation of biodiversity in tropical countries often differs from development interests of local communities. Participatory approaches and tools are increasingly suggested and implemented to solve emerging conflicts. The use of participation as a solution for conflicts in management of protected areas is new in Brazil. This paper describes different participatory strategies of three different Brazilian institutions (Federal Environmental Administration, a State Forest Institute and a non governmental organization) in protected areas in the Rio Doce River Basin. The conflicts occurring in the buffer zones are mostly related to unsustainable land use, such as burning to clear new areas and use of agrochemicals. The solutions sought by the institutions involve agricultural alternatives, like organic farming and agro-forestry as well as environmental education. While the NGO is using methods adapted from the participatory rural appraisal to guide changes, the two government organizations are collaborating with buffer zone institutions in different ways. The national park administration involves different buffer zone institutions to promote land use changes, while the state park implemented an integrated fire management.

1 Protected areas and participation

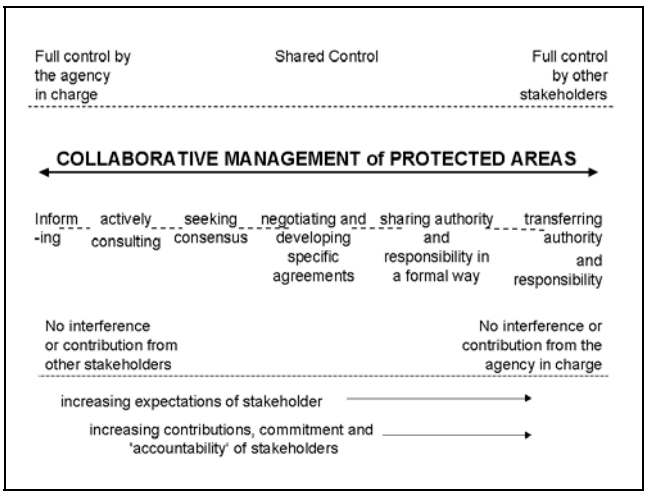

Fig. 1: Levels of Participation (adapted from Borrini-Feyerabend 1996, Pimbert & Pretty 1997)

Protected areas play an important part in conserving tropical diversity and ecosystems (Bruner et al. 2001). Due to lack of trained personal, financial resources and executable management plans, management of most South American Parks is ineffective (Prado 1994, WWF 1999). Protected areas are often implemented without consulting local stakeholders and conflicts arise from different development interests of communities nearby (Ghimire & Pimbert 1997). Therefore effective management not only of the protected areas, but also of the adjacent areas, is getting increasingly important. Participatory approaches, trying to improve relationships between protected area management and local stakeholders, are recently discussed and employed (Gurung 1995). Methods vary from passive participation,

consultations or negotiations, to the transfer of authority and responsibility (Ghimire & Pimbert 1997, Borrini-Feyerabend 1996). Fig 1 shows the different approaches and interests. This paper describes different participatory strategies concerning land use management implemented in the buffer zones of three protected areas in the Brazilian Atlantic Forest.

2 The Brazilian Atlantic Forest

The Brazilian Atlantic Forest, once occurring along the whole coastline, is one of the most endangered ecosystems worldwide (Fig. 2). With high numbers of endemic species, a high diversity and increasing human pressure, it is on of the eight most important hotspots for biodiversity conservation of the world (Meyers et al. 2000). Brazil's biggest cities and most of the industry are settled in the coastal region, intensifying human pressure on the resting forest (CI-Brasil et al. 2000). Only 3% of the original forest cover still exists in the state of Minas Gerais, where this study is carried out (Fundação-SOS-Mata-Atlântica et al. 1998).

2.1 The survey areas and existing land use conflicts

Fig. 2: The Brazilian Atlantic Forest, adapted from Fundação-SOS-Mata-Atlântica et al. (1998)

To protect the last remaining forest patches in Minas Gerais in a participatory and sustainable way, three different Brazilian institutions cooperate with the technical and financial support of the German Agency for Technical Cooperation (GTZ). The three institutions working together since 1995 are: The Federal Agency for Environment and Renewing Natural Resources IBAMA (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis), the State Forest Institute of Minas Gerais IEF (Instituto Estadual de Florestas) and the non governmental organization (NGO) Fundação Biodiversitas. Along with enhancing inter- and intra-institutional cooperation, the project is working in three protected areas in the Rio Doce river Basin (Fig. 2) to implement participatory management. The three protected areas, each one administered by one of the institutions, are described in Table 1.

All three areas are isolated forest patches suffering high human pressure from the adjacent area, the buffer zone. Coffee monoculture with frequent use of agrochemicals and high erosion, is expanding in the two mountain regions (National Park and Private Reserve). Fires are used frequently to clear land illegally for new plantations. Spreading fires are the main threat for these protected areas. Same holds true for the lowland State Park, where pastures are often burned for grass regeneration. Illegal use, such as poaching and palm heart extraction, occurs in all three protected areas. Each Park has specific conflict areas like expropriation in the National Park area and urban encroachment in the State Park.
Field research for this project is carried out since October 2000 in cooperation with the social science department of the Federal University of Minas Gerais in Belo Horizonte[1]. Qualitative

[1] Field research for this project is funded by the Tropenökologisches Begleitprogramm of GTZ.

methods, such as semi-structured interviews and participant observation, are used for data collection.

Table 1: Description of the study areas

Protected Area	**National Park**	**State Park**	**Private Reserve**
Name	*Parque Nacional do Caparaó*	*Parque Estadual do Rio Doce*	*Reserva Particular do Patrimônio Natural Mata do Sossego*
Institution	Federal Conservation Agency IBAMA	State Forrest Institute IEF	NGO Fundação Biodiversitas
Established	1961	1944	1998
Area	31.800 ha	36.000 ha	180 ha
Description	• mountains (Pico da Bandeira - 2.980 m above NN) • spring of important rivers • attraction for tourists from other Brazilian regions	• lowland lake system • largest continuous preserved area of Atlantic Forest in Minas Gerais • recreation area for industrial centres	• mountains • last retreat for endangered species • drinking water well • regional initiative to protect area
Buffer zone	• mountain region • two states (Minas Gerais and Espirito Santo) • coffee monoculture • tourism • few pastures	• rivers as natural boundaries on two sides • eucalyptus plantations • steel industrial area • big cities • cattle farming	• mountain regions • total of 800 ha continuous forest cover • coffee monoculture • small rural communities

3 Participatory Approaches

All three institutions involved in the project are implementing different measures to minimize impacts of the conflicts described. While at the beginning of the project in 1995 management was mostly concerned with issues related to the area itself. Today many activities are carried out in the buffer zone area in cooperation with local stake holders. While the two governmental institutions are implementing advisory councils, the NGO is working more directly with farmers from the surrounding communities. All three institutions are working with environmental education and trying to improve land use in the surrounding area to more sustainable techniques. The following gives a short overview of the different approaches concerning land use.

3.1 PRA and participatory monitoring in buffer zone communities - Private Reserve

Adapted methods form participatory rural appraisals (PRA) are used by the NGO to establish contact to the surrounding communities and promote local sustainable development. Since 1997 two PRAs have been realized in different communities together with local organizations, like environmental movements, schools, churches, labor-unions and local government representatives.

First community maps and activity calendars are created in groups, while discussion about the problems among participants is encouraged. Later the information is completed while walking transects or with flow charts about causes and consequences of the problems identified. After organizing the information they were returned to the communities and together possible solutions were discussed. Working groups formed and started to meet on a regular basis to solve the most pressing problems (such as transport, school, health, water quality and quantity, low crop productivity). The NGO accompanied the working groups concerned with land use and environment more closely. Due to lack of personal resources it was not possible for the NGO to give all groups the same attention. The local organizations that participated in the process did not follow up on the working groups.
In the first community the PRA was carried out in 1997. One working group developed together with the NGO staff solutions for the high erosion rates in the coffee plantations. Legumes were planted between coffee lines and organic fertilizers used to substituted chemical products. After two years of experimenting the NGO suggested monitoring of the experiments to document the results achieved. Together with the farmers they established indicators to measure impacts of methods adopted. During one year farmers observed changes in plant cover, weeds occurring and soil fertility in areas with and without legumes to compare changes. During the year farmers met regularly to discuss the ongoing of the observations. They founded an association to facilitate joint commercialisation of the coffee and started the process of certification for organic coffee production. The NGO is still accompanying the group, but responsibilities and ownership for the process is now with the farmers.

3.2 Partnerships for land use changes – National Park

As described above, problems concerning land use are similar in the National Park buffer zone an as in the Private Reserve, but the management adopted other measures. Due to the great dimensions of the Park's buffer zone (60 rural communities along the park boundaries), lack of personal resources and difficult access to most communities during rainy season, park staff is not working directly in the rural communities. Partnership with the state rural extension service, labor-unions, local non governmental organizations and church groups are sought to spread more adapted land use techniques. Frequent meetings of this group, where methodologies are discussed and the joint work is planed, are promoted through the cooperation project. This enables the park administration to spread alternative land use methods in a most efficient way, establishing frequent exchanges with some of the buffer zone institutions and thus improving relationships. On the other hand, there is little direct contact to the local farmers and most of the collaboration is still restricted to this topic. Most of the work depends on the individuals in charge in the respective organizations and there is little institutional compromise to conservation and alternative land use. The state rural extension service for example has advisors in close cooperation with the park administration and others cooperating more closely with the chemical industry, promoting the use of agrochemicals. A higher institutional involvement of the respective organizations is often missing.

3.3 Integrated fire management – State Park

Forest fires destructing large parts of the park in the 60ies and early 90ies, led the park management to establish an integrated fire management in collaboration with different buffer zone stake holders. Steel industries hold large areas of eucalyptus plantations in the buffer zone and thus have an interest in preventing fires as well. Together with the fire and police department as well as the local governments they implemented a fire prevention system. This includes training in fire fighting as well as techniques how to advise the communities concerning use and dangers of fire. During the dry season a monitoring system is installed with watch towers and

radio system for fast alert in case of accidental fire in the vicinity of the park. Trained fire fighters and material are always ready in case of emergency, to fight fire in early stages before spreading. Cost are shared between the different participating organizations. The system involves different stake holders, thus improving the relationship between the park administration and other institutions. It is an effective control of forest fires, with low financial costs. On the other hand, direct contact of park administration with local farmers is not emphasized and the collaboration is restricted to this topic, which does not include changes in land use management in the buffer zone.

4 Conclusion

The different strategies adopted by the involved organizations already led to changes in the buffer zone, such as decline of fires in the buffer zone, higher demand on agricultural alternatives (such as organic farming) and an higher motivation of park staff. Although these changes cannot be attributed only to the participatory work of the institutions, it certainly plays an important role. More and more people living in the buffer zones get to know the protected area close to them and might be important alleys to conserve the areas in long term.

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