

## Improving the environmental conditions in intensively used rural areas

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**Abstract:** The rural area of Brotas in the southeast of Brazil was national pioneer in the development of intensive adventure tourism, based on enjoying nature. The exploitation of the boundary-areas of the rural properties offered a new income base for the town and improved the working opportunities for the local youth. But there is a setback. There are signs that the fast growing flux of tourists in the town is provoking lesser satisfaction for the visitors and causes damage to the natural environment. This is of great concern for all parties, especially for the local government, as most of the trails and natural attractions lie within Permanent Protected Areas. These areas are often the only pristine settings with potential for recreational use. They are seen as very sensitive areas, protected by the Forest Code of Law, but in reality are managed by private landowners. The Local Government Policy Plan for The Development of Sustainable Tourism (2002), using the input of underlying research project, confronts this dilemma. It was the focus of this research to combine governmental restrictions with new regulations, defined by private landowners, tourism agencies, non-governmental organizations and the municipality. Brotas has introduced measures to maintain or improve the environmental conditions of the rural properties. One of the measures is monitoring the existing conditions in order to control the visitors' impacts to a maximum. In this research project, we used indicators on the trails and waterfalls of Brotas in order to discover and evaluate if the set of goals for the preservation of vegetation, soil and visitor-satisfaction were reached. The selection of the indicators and the standards for desirable conditions were based on the objectives established by Brotas Municipality Council for Tourism – COMTUR.

### Introduction

The development of tourism activities based on the natural environment of the municipality of Brotas (Brazil) has increased enormously in the last few years, following the worldwide tendency. The owners of rural properties that possess natural attractions like waterfalls, springs and rivers with rapids, are profiting from this. Amongst others, the crises in the agricultural sector led these agriculturists to open up their properties to the development of tourist adventure activities.

We have followed the process of implementing tourism activities in new destinies where the natural environment is the main attraction for visitors. Nature tourism classified as an important incentive for environmental protection and has been implemented in places with a great conservation potential. This whole new business has actually been able to contribute to the development of some municipalities.

Our concern is focused on the implementation and guidance of the tourism process in sensitive areas, those areas that have fortunately resisted or were spared from other land uses, but could be damaged by this new purpose.

Following this process means evaluating and monitoring the effects on the environment in order to propose suitable forms of control. This should lead to reasonable results for the environmental quality and help to maintain an economically sustainable tourism flux.

In addition, monitoring rural properties with an intensive use is important because once the quality of the resources has been reduced a great deal of the local economy will be harmed.

In most cases, the existence of a diverse range of activities implemented in the natural environment of rural properties is the result of pressure from the adventure tourism agencies. This occurs due to the few natural areas available for adventure sports and the necessity of variety in the visited attractions. Another reason is the fact that Brazilian Federal and State Conservation Areas have clear standards for the development of activities. If potential impacts are expected the activity will not be implemented. In this way, the tourism agencies and operators aim for the potential brought forward by private properties. Due

to the characteristics of these areas, there are fewer restrictions for use (Magro 2001).

It is interesting to note, that in the discussion about the implementation of sustainable tourism in Brazilian rural properties, there seems to be a change in thoughts. The environmental quality is becoming one of the most important objectives, when one wants to provide a quality experience for the tourist and maintain the earning-capacity of the business.

The tools to reach the conservation goals and the goals related to the public use are available in different publications. These tools can be very useful for planning purposes, but were developed for public protected areas. The owners of private properties do not always accept management suggestions, which involve restrictions for use and changes in the relationship between the tourist and the visited area, as a feasible solution.

The focus of this research project is to insert the monitoring of the public use, with acceptance of governmental restrictions, into a new set of regulations, defined by private landowners, tourism agencies, non-governmental organizations and the municipality.

## Study area

The City of Brotas lies 240 kilometres from the City of São Paulo (the capital of the State of São Paulo) in Brazil. The population is 20,000 habitants.

The municipality of Brotas received most of its inhabitants at the beginning of the 20th century. The majority of these inhabitants were Italian and Portuguese descendents. With their efforts during the Coffee Cycle, an important economic period for Brazil, they brought prosperity to Brotas (Mata'Adentro 2003). The cultivation of coffee caused the expansion of Brotas but unfortunately also her decline, when the coffee price dropped as a reaction to the economic crisis on Wall Street, New York, in 1929.

The landscape of Brotas is intersected by valleys and mountains ranges with forest vegetation. Agriculture, livestock and especially sugarcane plantations are predominant in this landscape.

Neither the cattle breeding nor the agriculture were sufficient to sustain the local economy. Due to the low labour expectations many younger inhabitants moved to larger urban centres. This situation changed in 1992 when the NGO "Movimento Rio Vivo" impeded the construction of a tannery and helped creating a municipal law that prevents the establishment of any kind of polluting industry.

On the other hand (as compensation) a development proposal was presented based on adventure tourism. Tourism expanded and gave Brotas the national status of "adventure tourism capital". Brotas was the first Brazilian municipality to have a specific legislation for sustainable tourism.

Table 1 indicates the economic and touristic growth of the municipality in a 10-year period.

Table 1. The evolution of eco-tourism in Brotas (Brotas 2004).

	Before 1993	In 2004
Tourist attractions	2 to 3	> 40
Variety of sports	1 <sup>1</sup>	16
Touristic ranches	2	23
Eco-tourism Agencies	None	17
Guides	None	> 300
Hotels/pensions/B&B's	3	27
Restaurants	3	21
Tourism businesses	Few	> 80
Tourists per year	Small	150.000/year
Tourism jobs	Hardly any	+/- 1.000
Media exposure	Regional	National
Financial transactions per year	-----	US\$34 millions

<sup>1</sup> floating down the river on an inflated tire

## Research methods

### Visitors' questionnaire

With the results of the questionnaire, we gained knowledge about the type of tourists visiting Brotas, their behaviour and the satisfaction about their visit. The knowledge provided by the questionnaire makes it easier to implement education strategies, infrastructure improvements and spatial planning.

The survey had four types of questions: 1) facts about the visitor; 2) a question for monitoring purposes; 3) questions about the time/space behaviour of the visitors; and 4) statements about the natural resources, activities, attractions and facilities.

The survey was held in 2002 during three different periods: 1) three days during the Carnival (404 surveys); 2) two days during the Easter (416 surveys); 3) two days during a regular weekend (209 surveys). Carnival and Easter represents the crowding period in the municipality. In 2002 the estimate number of visitors during Carnival was 13,000 and 6,000 during Easter. The third survey represents normal weekends and the municipality receives around 2,000 visitors.

In total 1029 surveys were done in 16 different rural properties with tourist attractions.

### Trail evaluation

In order to evaluate the environmental conditions, the planning method VIM – Visitor Impact Management (Graefe et al. 1990, Kuss et al. 1990) was used. Indicators were used for the trails and waterfalls that could evaluate if the desired conditions for the vegetation, soil and quality of the tourism experience were met. The selection of indicators and respective

standards for acceptable change were based on the objectives for implementing sustainable tourism, established by COMTUR, the Brotas Municipality Council for Tourism. The final selection was based on Passold (2002), taking into consideration that the municipality itself could train people for future survey activities.

In work meetings with representatives of tourism agencies and local guides, the parameters of the environmental valuation were confirmed by the participants indicating their perception of the potential impacts to vegetation and soil caused by tourism activity.

Thirty-four trails on sixteen properties were evaluated. Each trail was divided into a certain amount of survey spots where mapping and monitoring activities were done. The number of spots is determined by the total trail length with a minimum of 10 spots. The longest trail was 6,200 meters and the shortest 88 meters.

The indicators that were used refer mainly to 1) presence of trash/debris/waste; 2) vegetation with damage; 3) trees with anchor cable; 4) trees with inscriptions; 5) trail tread way width > 1 m; 6) organic litter; 7) exposed tree roots; and 8) social trails.

The establishment of the standards of measurement to eliminate or decrease the identified problems was also based on available literature on this subject (Cole et al. 1997, Hammitt & Cole 1998).

## Selected Results and Discussion

### Visitor's judgement

The survey contained some questions for monitoring purposes. These questions deal with the effect of other tourists on their own visit, and the condition of the places they visited.

The respondents were asked to mark on a scale of 1 to 10 how the presence of other tourists affected their own visit, where: 1 = negative effect; 5 = indifferent and 10 = positive effect.

Figure 1 shows that 42% is indifferent and 40% is positively affected by the presence of other tourists. In these cases the positive influence was related to: friendship (3%); more lively (2.5%); know new people (2%); information exchange (1.5%); interaction (1%); other reasons (15.5%); not filled in (73.7%).

The cases in which the visit was negatively affected, 83 % of the respondents didn't fill in a reason.

The others choose from four options: bawling/noise (1%); crowding (7%); trash (5%); other reasons (4%).

During the survey, we notice that when we did not give possible options, visitors had to think about their own answers and they didn't like it. The easiest way was not to fill in. Then they could quickly go back to their activities. This can be the main reason for a high percentage of not filled in answers in some questions.

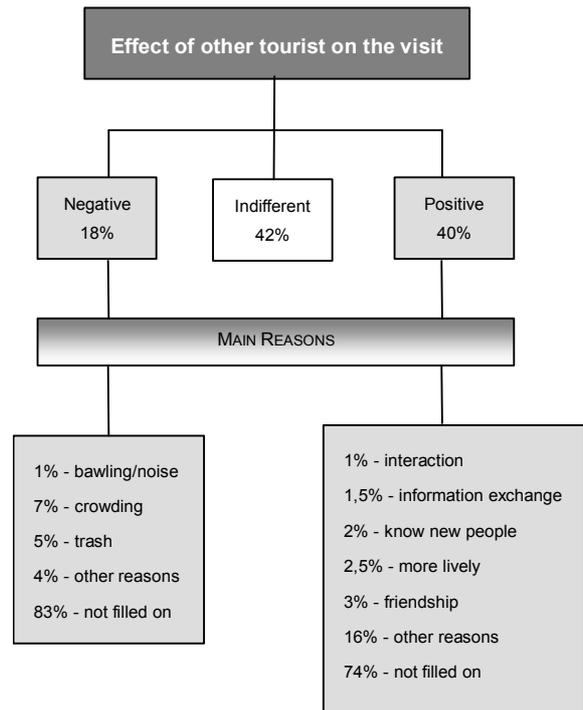


Figure 1. The effect of other tourists on the visit (n = 1029).

Then the respondents were asked to describe the trails conditions and places visited, using the following options: empty (24%); normal (43%); a bit crowded (27%); extremely crowded (3%). A three percent of the respondents didn't answer this question.

The scores for repeat visits to Brotas are quite high. Forty-five percent of the respondents had visited Brotas before, nearly 30% even in the last year. The number of participants (96%) that plan to visit the area again shows a high satisfaction rate.

Nature is a very important item for visiting Brotas. In 91% of the cases this is the main reason for the visit. However, 60% of the participants state that they could visit any other place for nature purposes. So how do they value the quality of Brotas' nature? Eighty-three percent of the respondents disagreed with the statement that Brotas does not have specific natural resources. However for 61% of the participants the nature of Brotas is not the most primitive they have seen up to now (Figure 2). Twenty-seven percent of the participants can compare the quality of the natural resources of Brotas to other natural areas in different countries.

There is a desire for more tourism information. This is supported by the results of the survey. Eighty-five percent agrees with the statement that they would like more information about the activities and attractions of Brotas. One could assume that if this information were offered, the repeat-visit-rate to Brotas could be even higher.

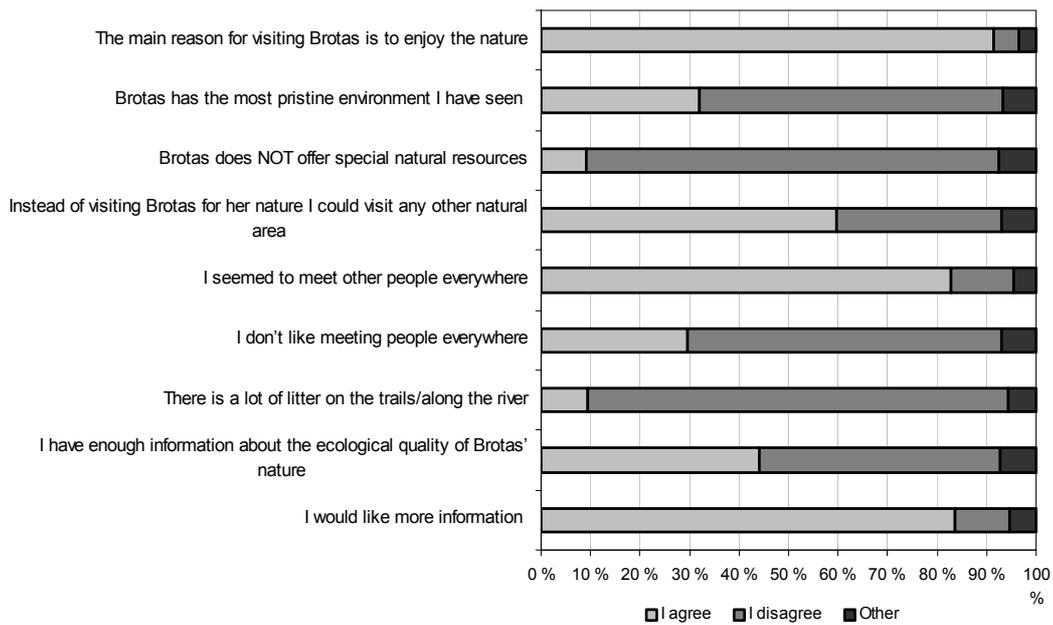


Figure 2. Visitor's judgement about the visit and the environment in Brotas (n = 1029).

Concerning the allocation of the visitors, 83% of the respondents state that during their visit in Brotas they meet people everywhere and 30% agrees with the statement that they do not like meeting other visitors everywhere. Luckily, 64% disagrees with this statement (which can be supported by the results of the monitoring questions in the survey).

### Trail's conditions

The lack of trail-management was indicated more often, compared to the indicators that reflect an improper behaviour of the tourists (Figure 3).

The indicator for trees with exposed roots occurred for 100% of 34 the trails.

The use of tree trunks as a support for a banister or handrail for steps was valued in 41% of the observations. The placing of poles or other structures compared to using the trees alongside, is more expensive and only some landowners opted for this application. This is why we found seriously damaged trees in 91% of the observations. The damage caused to the trees is hardly seen as a problem, but this practice is affecting the strength of the trees and sometimes, the loss of a circular strip of bark around the circumference, causes their death.

Other damages to the vegetation are a result of extensive cutting of leaves and branches in order to keep the trails neat and the breaking of branches by tourists, using them as a support in areas with declivity. In 30% of the observations the lack of organic litter was caused by this extensive cleaning of the stratum (top layer) of the trail, together with erosion. Some landowners sweep the trails and remove moss from stones and rocks nearby waterfalls so that the tourists have the sensation of being in a clean and tidy place. The proposed management strategies to

address these problems should, however, take cultural aspects that are involved into consideration; the inadequate management is due to the practises applied in agricultural cultivation.

Indicators like trees with inscriptions and trash hardly occurred, respectively in 9% and 15% of the observations. The inscriptions occur on the flat sections of the trails, especially on the trails that have been open for a longer time.

The existence of social trails was in all accounts a result of drainage problems, forming puddles and mud in the original trail.

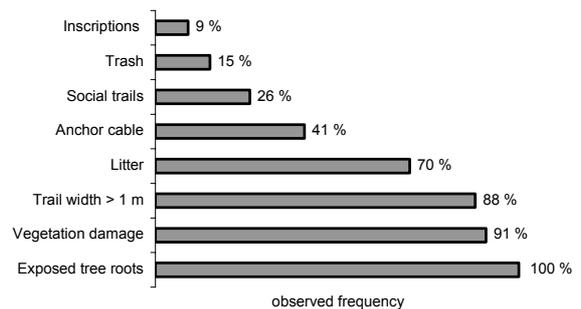


Figure 3. Indicators frequency for 34 trails.

### The effectiveness of the emerged recommendations

Management strategies can be directed to *working on the causes* of the impacts or *treating the symptoms* through the recovering of the impacted areas. According to Hammitt and Colle (1998) the option of treating the symptoms is the most expensive option and will be an everlasting effort. Ideally, both strate-

gies should be used together, giving priority to the actual cause of the problem.

The expectation for the completion of this research project was to gradually implant the indicated recommendations and strategies on the rural properties. The project brought forth tools so that the landowners could make environmental adjustments and monitor the areas used by tourists.

The monitoring activity is essential for the natural resources in the region, in order to attain the desired conditions in the future. This is why the survey and mapping activities were done according to criteria specifically defined for each property. The activities were presented in detail to the experts assigned by the municipality.

As proposed, the monitoring of the conditions of the attractions will be undertaken annually, by experts indicated by the municipality and COMTUR. The monitoring will take place under supervision of an environmental specialist.

The survey concerning the implementation of the proposed actions (for the improvement of the environmental conditions), will be carried out in 2004 on the 16 rural properties that were evaluated in 2002.

Improvements were already observed when a preliminary (non-systematic) survey was completed in 2003. The improvements related to the environmental conditions of the trails and the partial implementation of the recommended strategies. To substitute living trees by proper structures in order to fasten handrails, was apparently the most effective recommendation. On the other hand, the excessive cleaning of the trails, removing the organic litter as a top layer, with soil erosion as a consequence, remained to be one of the regular practices in all of the properties. The cleaning is done in order to avoid accidents with snakes.

The recovery of the Permanent Protection Areas became one of the most urgent actions on the local-government level.

Some rural landowners have already initiated the re-vegetation of the riparian forest. For the results to be effective it is necessary to carry out the actions in the entire region, involving the sugarcane plantations and the cattle breeding farms. These farmers however are not involved in tourism related economic activities and therefore not motivated to improve their form of land use and change their agricultural practices.

### Local government laws

The greatest challenges of this research project were the implementation of the management strategies and the monitoring of the visits to the touristic ranches. The natural areas that should be managed, lay within the rural properties, with distinct characteristics from the public protected areas. This is an important item as once the area is private the landowners could refuse to implement the management proposals that emerged. The same accounts for the local tour-operators. Involving the landowners and tour-

operators in the data collection and discussions about the objectives for the implementation of sustainable tourism in the municipality gave more perspective for this challenge.

To standardize the tourism activities the local government created a set of laws and implemented the monitoring of the public use of the rural properties. Before the execution of this research project the intention of COMTUR was to use the Recreational Carrying Capacity Method (Cifuentes 1992) in order to establish a limited visitor's number for each trail of the rural properties. Even though it is the easiest method and directly regulates tourism use, it will not be the most effective method. This regulating action, along with the guidance of the landowners are aspects that contribute to the improvement of the environmental quality of intensively used areas. As such the implementation of the Local Government Policy for the Development of Sustainable Tourism - PMTS (Brotas, 2002), has amongst its objectives:

- Establish an ideal amount of users for the attractions and activities, monitoring the impact, controlling the tourism growth, avoiding environmental degradation and guaranteeing the quality of products and services.
- Promote, stimulate and encourage the forth bringing and improvement of the infrastructure for tourism activities, respecting the ideal amount of visitors for each ecosystem.

The project developed for the rural properties and touristic ranches as presented in this article, granted the credibility (public trust) that was necessary for the implementation of a monitoring system and motivated one of the priority actions of the PMTS:

- Monitoring the visitors, implanting a system in which the trails and paths are used in rotation, allocating the visitors, and controlling the improper use of the resources or services.

### Conclusions

The results of the questionnaire show that there is no negative effect on the visit of the respondents caused by the presence of other tourists. The effect was either neutral or positive. Even though the interviews were held during two occasions with visitor's congestion, the majority of the respondents considered the situation as normal. We can't affirm if these results reflect the true perception of the tourists in relationship to the situation met. A manifestation of dissatisfaction may require the implementation of controlling systems with utilization restrictions.

The tourists showed a high level of satisfaction, which can be observed by the intention to make a return visit after a short time.

Yet they also show a great concern for nature conservation in Brotas. Some studies demonstrate that

experiments done in natural environments, involve visitors that are generally more concerned with nature conservation and visit natural areas with a higher frequency. Therefore they are able to compare natural areas with each other. Here's a snag; visiting more primitive environments than those of Brotas, could imply a lesser satisfaction of the natural resources of Brotas. If this tendency confirms then the investments done by the municipality will be in vain.

The paths leading to the attractions are mostly situated within the Permanent Preservation Areas, because of the declivity of the terrain or the nearness of rivers and springs. Due to the fragility of these ecosystems they are seen as environmental protected areas (protected by the Forest Code of Law) but are managed as part of a touristic ranch by the rural landowners. The monitoring of the environmental conditions on the touristic ranches, established by the Local Government Policy for the Development of Sustainable Tourism, could guarantee the quality of these ecosystems.

As in all other regions where the development of tourism has been encouraged, the increase in visits to the natural attractions in the region of Brotas caused an augmentation in the impacts. These impacts previously occurred within acceptable levels and were often absorbed by the carrying capacity of nature. The actions brought forth for the improvement of the environmental conditions will control these impacts. In this matter, these actions should be succeeded by maintaining the economic sustainability of the tourism activity in the region.

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