

Tourism and conservation in Bromo Tengger Semeru national park

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Introduction

This report is based on the findings of research in Bromo Tengger Semeru National Park, East Java, Indonesia. The study was carried out over a five-month period, from November 1996 to March 1997. The principal aims were:

- to provide detailed information on tourism in a protected area in a developing country in order to assess the effectiveness of tourism as a means of supporting the conservation of protected areas
- to evaluate the contribution made to community development of tourism to a protected area
- to provide information based on factual data on whether community-based ecotourism is a constructive strategy for non-governmental organisations to use in establishing income-generating projects.

Bromo Tengger Semeru National Park was selected for the case study because it receives the highest number of tourists of any Indonesian national park, and because several villages border the park, offering the opportunity to study the interactions between the villagers and the tourists; between the villagers and the national park; and between the tourists and the national park. The report will begin by outlining some of the debates currently surrounding ecotourism, sustainable tourism, community-based tourism and tourism in protected areas, and describe the current state of ecotourism in Indonesia (Section 1). The methodology will then be presented in Section 2, followed by an overview of the geography and management of Bromo Tengger Semeru National Park in Section 3. Section 4 will outline the culture and lifestyle of the Tenggerese people and non-touristic utilisation of the national park, while Section 5 will describe touristic uses of the park and the impacts of tourism. Finally, Section 6 will discuss the findings and give recommendations for future management of the park.

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Section 1 - Tourism and Conservation: The Debate

There has been much discussion in recent years over whether tourism can help conserve the environment. On the one hand, it is argued that tourism pollutes waterways, seas and the air and destroys wildlife habitats. In protected areas, tourism can be particularly destructive because it can change animal behaviour and alter the balance of fragile ecosystems. On the other hand, supporters of tourism argue that the industry helps reduce pressure on natural resources by providing jobs for people living around protected areas, and that at a regional or national level, the income produced by tourism helps generate the political will to support protection of the area. It is argued that any environmental damage caused by tourism can be minimised through careful management of the visitors, facilities, and the environment. It is also claimed that where several alternative uses for an area are proposed, tourism is less damaging than other potential uses. In the mid-1980s it became fashionable to call tourism to natural areas "ecotourism", and over the last ten years many conference hours and journal articles have been devoted to discussing exactly what ecotourism is. At the same time, tourism commentators have been participating in the broader debate concerning sustainability by trying to determine how tourism might be developed on a sustainable basis. In the last five years a similar debate has been on-going over the meaning of "community-based tourism". Many of the people who discuss these issues are academics or theoreticians, rather than practitioners of tourism, and some approach the subject from a non-tourism background and have a limited understanding of the processes of tourism. There are common misconceptions held by the two sides. Many practitioners are too busy to be aware of the wider policies and debates concerning their field, even though knowledge of these might be helpful in determining future market shifts and product developments, while many academics are unaware of the complexity and practical limitations of running a "real-life" tourism operation. A third group involved in the debate over tourism is composed of development workers, many of whom are searching for new tools to improve the economic welfare of poorer peoples in developing countries. This group may consider tourism to be an "easy" option, whereas in fact it requires as much knowledge and experience as any other discipline - if not more, given that it is a multi-disciplinary field. The remainder of this section will discuss the issues under four headings:

- the processes of tourism
- ecotourism, sustainable tourism, and community-based tourism
- ecotourism in Indonesia
- tourism and protected areas

1.1 The Processes of Tourism

Tourism involves the movement of people from one area to another. This requires an extensive network of transportation and accommodation, including roads and motor transport support facilities, airlines, railways, river and sea transport, hotels and guest-houses, and immigration and customs facilities. All these facilities are linked through informational systems such as timetables and travel agents. Even small-scale tourism enterprises such as village lodging-houses or hire-boats are linked into this international network. The most important facilitators of tourism - airlines, resorts, hotels, tour operators, marketing channels and tourism advisors or consultants - are very often linked in vast international webs with more power than some of the smaller national governments in that they can encourage a country to implement a tourism development strategy which may not be in its best long-term interests in order to supply an ever-expanding market with new destinations. In this respect, tourism is no different from the other multinational industries which drive the global economy.

Tourism is a very important source of foreign exchange in many countries, and it has been calculated that by the year 2000 it will be the largest industry in the world. While governments are generally interested in the development of international and domestic tourism, in order to provide both employment and leisure opportunities for their populations, treasuries are particularly interested in international tourism, whereby money produced in one country is spent by tourists in a different country. To an extent, regional governments are interested in the same process, with money generated in one region or province spent in another. Very few countries or destinations are in the fortunate position of having an attraction which is so unique that people will come to it because there is nowhere else that they can obtain the same experience, for example seeing the Eiffel Tower in Paris, the pageantry attached to the Royal Family in Britain, or the Grand Canyon in the United States. Most destinations are forced to sell themselves on the basis of a product which can be replicated elsewhere, such as beach-based activities or shopping opportunities, and in general, there is great competition between countries offering a similar product. There is also competition between regions or destinations in the same country. To succeed in this competitive market, a country or destination has to provide facilities which meet the expectations of their clientele. This means building hotels and providing food and service to a high standard than that experienced by the tourists at home. Even foreign tourists who like to style themselves "alternative" tourists, or back-packers, nearly always demand a standardised product in terms of accommodation and food, as do local tourists, even though in these cases the standard is lower than that of the more upmarket international clientele and uses a higher proportion of locally-generated inputs.

Tour companies also operate in a highly competitive environment, and the enterprises showing the best short-term profits will be the most successful. The demands of tourists for high quality and low prices ensure that the companies offering the "best" value for money (irrespective of long-term impacts) will be the most successful. Because of this, even though some tour operators may be aware of the environmental or socio-cultural impacts of their activities, they are unable to invest much money in safeguards. A hotel or tour company may, for instance, be willing to employ as many local people as possible, but if these people lack the skills necessary for interacting with tourists the expense and time needed for training to the required standard may ensure that a majority of non-locals are employed, in the early stages of an operation at least. Therefore, in a business environment which lacks regulations aimed at minimising damage - and, equally important, enforcement of these regulations - the impacts of tourism are likely to be negative rather than positive.

The aim of all tour operators and countries is for individual tourists to decide to take a holiday with them. There has been much research into people's motivation in choosing a particular holiday, with the important factors being age group, income, family status and less easily quantifiable influences such as lifestyle aspirations, the search for intellectual or emotional satisfaction, and fashionability. Persuading people to visit a particular place or take a particular holiday, and then fulfilling their complex needs and aspirations once on the holiday, is a sophisticated business. There has been considerable debate over whether tourists' choices are influenced by the pressures of marketing from an industry desperate to sell existing products and facilities, or whether the market is shaped by the changing desires of the tourists (i.e. whether tourism is demand-led or product-led). In practice, it is probably a bit of both: the tourism industry responds to a perceived and gradual shift in tourists' aspirations by advertising new or enhanced products, while tourists respond by purchasing these new products in ever-greater numbers. It should be noted, however, that a product should not be too new: to be successful, it must not deviate far from existing concepts of what constitutes a holiday, as the majority of people wish to relax during their vacation rather than being faced with new intellectual or moral challenges. The extent to which people's choices are determined in part by environmental considerations is still open to question. While deterioration of the physical or civil environment which directly affects the holiday-maker is known to cause falling visitor numbers, such as in the case of some over-developed resorts of the southern coast of Spain or with terrorist attacks on tourists in Egypt, environmental or social problems which are "hidden" from the tourist's awareness have not yet been shown to have an impact on visitation levels. There has been much publicity about the widespread negative environmental impact of winter sports in the Alps, yet the market for this kind of tourism is still growing. In extreme cases negative publicity may have an effect on certain market segments, such as with the use of slave-labour to create tourism facilities in Burma which has caused some UK tour operators to withdraw Burma holidays from their

brochures, but in these cases governments or less scrupulous tour companies will simply seek to replace the disappearing market with one which is less concerned with such matters. In any case, it appears that attempts to create holidays which challenge broadly-held morals or stereotypes have little success - whereas those that present an intellectual or physical challenge are perennially popular.

1.2 Ecotourism, Sustainable Tourism, and Community-based Tourism

The huge, international and complex nature of tourism has been stressed above because it is sometimes neglected in the debate on ecotourism, sustainable tourism, and community-based tourism. This means that the concept of sustainable tourism as understood by some theorists suffers from the same inherent contradiction as sustainable development generally. Sustainability is generally understood to mean that the needs of current and future generations should be met through the wise use of resources. But in both developed and developing countries there is a tendency to consume more and more resources as economic standards improve, and where tourism is being used as a strategy to improve living standards this inevitably leads to a substantial increase in the use of resources, which often results in the deterioration of the physical and social environment.

This damage can largely be avoided if tourism developments are on a small scale, and for many, the "small is beautiful" idea remains one of the principal criteria for sustainable tourism, ecotourism, and community-based tourism. In this case, however, the effectiveness of tourism as a development tool becomes severely limited, with positive impacts becoming insignificant as well as negative ones. At this level, tourism cannot achieve the aims of governments in terms of increasing employment and foreign exchange. The Bromo case study will demonstrate that to meet the policy aims of the national and regional governments and the aspirations of villagers; tourism has to occur on a scale large enough to have significant economic impacts. "Small is insignificant" is a less attractive catch-phrase than "small is beautiful", but in tourism it is likely to be more apt. It is in any case extremely difficult to ensure that a popular project remains small, so that even if a scheme is set up with the intention of keeping it small-scale and environmentally sensitive, it may turn out to be the first stage in a process of mainstream tourism development, ending up with large-scale visitor use. This ties in with the concept of the 'tourist area life-cycle', according to which destinations inevitably progress from having a small amount of tourism with little local impact, to having huge numbers of tourists every year, often with a correspondingly wide range of developments.

Another ideal of sustainable and community-based tourism is that the goods and services provided should be locally-sourced. But, as explained above, tourists have aspirations which often cannot be met locally, for instance in terms of efficient service, high standards of hygiene, and familiar food, and as

a result staff and goods may have to be brought in from outside the region or from abroad. This is particularly the case with ecotourism, which is often rather upmarket and expensive. Exhortations to tourists to compromise on their expectations are only having a limited impact so far: for instance it is possible in some hotels now to choose not to have a change of sheets and towels every day - but the facilities required by both leisure and business travelers are becoming ever more sophisticated rather than less.

The proponents of small, community-based tourism projects may not always take into account the practical implications resulting from the international processes and pressures of tourism, so that, for instance, a project may fail because it proves impossible to attract visitors to take a holiday which sounds worthy but not much fun, and which fails to provide an experience which lives up to expectations - even though these expectations may be based on unrealistic stereotypes. Another aspect of the international nature of tourism is that an individual scheme which falls outside the vast promotional network tapped into by most tourists may fail because there is no means of promoting it. From the community's point of view, it is rare to find even a small village where all the inhabitants are keen to work together and share out the economic benefits for the common good. Most communities (in any part of the world) are characterised by traditional hierarchies and contain weak and powerful individuals, some of whom are better-placed than others to take advantage of the opportunities offered by tourism. Thus it is difficult to implement genuinely the ideals of community participation and community benefits, and existing rivalries and inequalities may indeed be exacerbated by tourism rather than alleviated by it. Finally, the term "ecotourism" has been hijacked by the travel industry to indicate any kind of tourism to a natural area, rather than the purist concept of "responsible travel to natural areas which conserves the environment and improves the welfare of local people" (Western 1993) as understood by some tourism commentators. This, inevitably, has devalued the concept. In any case, several studies have shown that the general public does not share even any common understanding of the meaning of the concept: in some cases the "eco" prefix has been interpreted as "economical" tourism rather than "ecological" (Atsuko 1996, Griefenberg 1997).

These and other factors combine to make the debate about the practice and process of ecotourism, community-based tourism and sustainable tourism, as opposed to conventional tourism, somewhat irrelevant to tourists and to tourism practitioners. In practice, whatever the qualifying label applied to it, almost every form of tourism has the potential for negative and positive impacts, and any "ecotourism" or "community-based" development should be assessed according to the same principles as a conventional tourism development. Because of these reservations about the precise distinction between ecotourism and other tourism, the term "nature tourism", broadly encompassing travel to and within natural areas, will be used in the following discussion.

1.3 Nature tourism in Indonesia

Nature tourism is being developed as part of Indonesia's overall tourism strategy, which is to maximise the economic benefits of tourism and to provide recreational opportunities for an increasingly urban domestic population. Visitor arrivals to Indonesia increased by more than 400% in the decade 1985-1994, and reached over 5 million by the end of 1996. The industry is the country's third largest foreign exchange earner, generating \$5,172 million in 1995. Nature tourism is not a major component of the tourism industry, and is unlikely to become so because of the strength of the cultural attractions and conventional beach-resort tourism, and because easily-accessible sites with spectacular scenery, large mammals and a good infrastructure are few. Nevertheless, the earning potential of national parks and other protected areas has been recognised by the Directorate General of Tourism, and national parks managers have expressed the hope that community-based nature tourism will increase appreciation of the national parks amongst people living around them (Sumardja 1995, Ediwijoto 1996).

The most striking examples of Indonesian nature tourism have arisen spontaneously rather than through careful planning, for instance those centered on the orang-utan rehabilitation centre of Bohorok, in North Sumatra, the Komodo "dragons" in Komodo National Park, and Mount Bromo. In all these places, tourism began in the 1970s with a trickle of travelers in search of adventure, and evolved to the current large numbers of visitors per year. Other examples of nature tourism have been deliberately set up by conservation or development organisations to support conservation measures in a particular area. Examples include white-water rafting in Lore Lindu National Park, Central Sulawesi; trekking and cultural tours in Siberut; horse-riding, walking and river tours in Wasur National Park, Irian Jaya; and adventure tours in the Apo Kayan region of East Kalimantan. In contrast to the spontaneous type, however, the numbers of tourists using these facilities and involved in these projects tend to be very small.

1.4 Tourism and Protected Areas

As with many national parks in Indonesia and other developing countries, Bromo Tengger Semeru National Park was, in part, superimposed upon an area where people have carried out farming and other activities for centuries. This situation has meant that the internationally-agreed criteria that national parks should be areas which are materially free of human exploitation and involvement (IUCN in Stankey 1988) has resulted in a clash between the management aims of the park authorities and the need for local people to pursue their traditional way of life, which included reliance on the national park territory for hunting, gathering of food and fodder plants, and collection of firewood. Thinking on utilisation of national parks has shifted away from the rather restrictive criteria developed in the 1960s and 70s towards a more

human-orientated approach, and a search for a non-destructive ways of exploiting the resources of protected areas has been continuing. One proposed non-destructive use is tourism, which is now generally accepted as an integral part of national parks management, as it is thought to produce benefits in terms of earning foreign exchange, providing local employment, and increasing conservation awareness. The negative impacts of tourism however may outweigh any perceived benefits, and these benefits may in any case be presumed rather than proven. The negative impacts can include air, water and aesthetic pollution through cars, littering, and poor waste management; destruction of habitat through construction or trampling; and disturbance to animal behaviour. The failure of benefits to materialise, at least at a local level, may be because not enough effort is made to involve local people, as it is easier for government agencies to involve private concessionaires - who are usually from outside the area. When this happens, there is then little incentive for the local inhabitants to stop exploiting the natural resources of the protected area. Another problem is that management plans for protected areas are frequently not implemented or fail to address tourism development because of lack of funds and human resources or because the management plan was inappropriately designed in the first place. These points will be considered in assessing the findings of the Bromo case study which forms the subject of this report.

Section 2 - Methodology

The study of Bromo Tengger Semeru National Park was undertaken between November 1996 and March 1997. The work was carried out by the author of this report, with the invaluable help of a field assistant, Agus Wiyono, whose patience, hard work, insights, and knowledge of the national park and of the Javanese language and culture contributed immeasurably to the findings of this study. Four principal approaches were taken.

2.1 Desk research and government offices

To gain background information on the study site, relevant government departments in Jakarta, Surabaya, and Malang were visited. These included the Directorate General of Tourism in Jakarta, the provincial tourism office in Surabaya, the regional tourism office in Malang, the Directorate General of Forest Protection and Nature Conservation in Jakarta, the Bromo Tengger Semeru National Park head office in Malang, and the Environmental Research Centre at Brawijaya University, Malang. Officials in these offices kindly provided a great deal of help in the form of advice, maps, information on policy and regulations, and documentary support in the form of reports.

2.2 Ground survey

A field survey of Bromo Tengger Semeru National Park was carried out in two phases: a week-long survey to gain an overview of the park and to select villages for further study, and a much longer phase during which five villages were visited for a period of between one week to three weeks each in order to gain detailed information. During the first phase areas of the park in the west, south, east and north were visited, resulting in the selection of five villages, all of which border the national park and lie at or above an altitude of 1900 metres above sea level. In three of the villages it was decided to study one dusun (a large section of a village) rather than the whole community, because the dusuns in question were large enough and far enough from the other part or parts of the village to constitute an entity in their own right. The villages were located in the four kabupaten (a kabupaten is a division of a province) which cover the national park, and were as follows (see also Map 1):

1. Ranu Pani, a dusun of the village of Argosari, with 247 households and located in an enclave on the eastern side of the park and in the kabupaten of Lumajang. The main village, Argosari, is a day's walk from Ranu Pani. Ranu Pani provides access to the national park's secondary tourist attraction of Mount Semeru.
2. Ngadas, in an enclave in the western side of the park, and in the kabupaten of Malang. Ngadas consists of two dusuns two hours' walk apart, Ngadas and Jarak Ijo, of which only the former was studied. It has 325 households, and no tourism.
3. Kandang Sari, a dusun of the village of Mororejo, on the north-western border of the park and in the kabupaten of Pasuruan. Kandang Sari is an hour's walk from Mororejo. The village has 130 households and no tourism.
4. Wonokitri, on the northern border of the park, also in the kabupaten of Pasuruan. Wonokitri consists of two adjacent dusuns, both of which were studied. The village was the largest of those studied, with 574 households. It receives a few tourists, although most stay at a hotel in the nearby village of Tosari.
5. Ngadisari, on the north-eastern edge of the park and in the kabupaten of Probolinggo. Ngadisari consists of two nearby dusuns, Ngadisari and Cemoro Lawang, which were both studied. There are 344 households, and the village hosts nearly all of the tourism to the national park.

The five villages were selected because their underlying characteristics are similar in terms of ethnicity, culture and livelihood strategies, because of the similar geographical and agricultural conditions they experience, and because one of the villages had a lot of tourism, two had a small amount, and two had none. These factors together offered the opportunity to make a comparative study between areas with tourism and areas with little or none.

2.3 Resident and Tourist survey

Interviews were carried out with three principal sets of informants in the villages: the residents, the formal and non-formal leaders, and the tourists.

2.3.1 Residents

Ten per cent of the residents were interviewed in house-to-house surveys. Only in one of the villages (Ngadas) was there a convincingly complete and sequential numbering system which allowed a relatively simple method of visiting every tenth house. In the other villages the researchers also attempted to visit every tenth house, and where this was not possible for various reasons, a spread of villagers from different streets or parts of the village was obtained. In Ngadisari/Cemoro Lawang it was found that many villagers owned houses in both dusuns, rendering it impossible simply to visit every tenth house because many were unoccupied when the owners were in the other part of the village, and the high level of dual home ownership meant that there were far more houses than families. In order to ensure that the sample interviewed was thoroughly representative, villagers were also approached in their places of work or relaxation, ie. In the fields, with their livestock, collecting wood, in shops, or at neighbours' houses. Because the educational and literacy levels of the villagers were rather low, an informal approach of semi-structured interviews was taken rather than attempting more formal questionnaires. One object of the interviews was to gain a picture of the ethnic and religious background and family structure of the household, as well as their livelihood strategy in terms of principal and subsidiary occupations. As the vast majority of respondents were farmers, they were asked about specific agricultural methods they used and problems they encountered. Utilisation of the national park's resources was an important point for the study, so questions were asked about the type and source of cooking fuel used and about obtaining fodder for livestock, as well as attitudes to the national park itself and to the authorities responsible for it. An attempt was also made to gauge involvement in and attitudes to tourism in order to try and compare the impacts of tourism on the economy and culture in the different villages. Although the actual format of the interviews varied greatly due to the semi-structured approach taken, an attempt was always made to cover the following points:

- place of origin (ethnicity) of the respondent
- family structure
- religion and participation in cultural manifestations
- type of cooking and heating fuel used
- principal and subsidiary occupation
- ownership of land and other agricultural assets
- type of agriculture engaged in
- success or failure of agricultural enterprises
- opinion of and involvement in tourism
- awareness and usage of the national park

The interviews generally lasted between half an hour and an hour. In most cases the respondents were open, friendly and hospitable, and appeared interested in the survey and willing to share their life histories with the interview team. Only in Ngadisari/Cemoro Lawang were the villagers rather reserved and uncommunicative, which the researchers initially attributed to the presence of many foreign tourists in the village over a number of years. Later on, however, it transpired that other researchers in earlier years had also encountered the same attitude.

In all cases, it was explained that the survey was to assess tourism in the area. A few problems were encountered in carrying out the interviews. The most significant of these were that in some cases respondents seemed wary of openly giving information on the national park, probably because they were aware that its resources should not be used, and that many of the house-holders did not speak Indonesian, as Javanese is their native language. In cases where the interviews could not be conducted in Indonesian, they were carried out by the author's field assistant. Another slight hindrance was that almost all of the house-holders were farmers who tended to depart for their fields around 8 o'clock, returning at around 4 in the afternoon. This was countered by conducting interviews in the fields. In one or two of the villages, an antipathy towards official-seeming visitors was encountered, with house-holders locking the doors and running away to hide in the back of the house on the approach of the survey team. Fortunately, this occurred in only a very few cases and it was not thought to be significant in obtaining a representative sample of the population. A contrasting problem was that in some cases friends, neighbours and relations would congregate in the house where the interview was being conducted, occasionally making interjections or even taking over the session entirely, rendering it difficult for the interview team to determine which answers applied to the householder in question. As with the previous problem, these cases occurred infrequently, and it was considered that the disadvantage of losing some quantitative significance was outweighed by the advantage of the wider discussions which sometimes occurred in these cases between the villagers.

It was found far more effective to conduct the interviews in the form of a casual conversation rather than to take out notebooks during the meeting and make notes. While this had the disadvantage that some details were perhaps forgotten, the advantage of greater openness far outweighed this.

2.3.2 Tourists

Tourists selected at random were interviewed in the principal tourist destination of Cemoro Lawang (Ngadisari), which provides access to Bromo volcano; at the secondary tourist access point of Wonokitri/Tosari; and in the village of Ranu Pani, which provides access to Mt. Semeru. Tourists were approached in the hotels and homestays, camping grounds, restaurants, in the

streets, on public transport, in the car parks, in the horse park, and at the main site where people congregate near souvenir shops and the viewpoint. Two slightly different questionnaires were used for domestic tourists and for foreign tourists (see Appendix A). Questions were asked on nationality or town of residence, age, occupation, group size, length of stay and activities in the area, expenditure, and attitudes to the national park, with the aim of building up a profile of the type of tourists visiting Bromo, assessing their attitude to the park, and evaluating their impact on the local economy and socio-cultural situation. In most cases the tourists were invited to fill in the questionnaire themselves, while in others the team carried out the survey in the form of a spoken interview.

In the majority of cases people were happy to complete the questionnaires. Difficulty was encountered in collecting the views of tourists from other parts of Asia, because of language difficulties and because their length of stay in the area is very short.

2.3.3 Formal and non-formal leaders and key informants

Prominent local members of the communities and tourism industry were interviewed, such as the village head and other officials, religious and cultural leaders, teachers, and owners and managers of the tourism infrastructure such as hotels, homestays, restaurants and transport.

2.4 Observation and Mapping

The survey team spent a lot of time making observations in the villages, in the fields, in the national park, and in areas popular with tourists. A photographic record was made. A map was made of each of the villages surveyed, showing the location of streets, houses, points of interest such as the schools and places of worship. The maps also marked the location of each household interview, in order to ensure that a good spread of households was achieved. Knowledge of the national park was supplemented by walking around and between the villages wherever possible. Map 2 shows the main walking routes taken by the team.

Section 3 - Bromo Tengger Semeru National Park

3.1 History of the National Park

Bromo Tengger Semeru National Park is located in the centre of the province of East Java. It was one of the first Indonesian national parks to be officially gazetted, in 1982, but its status was only ratified in 1994. Most of its territory is comprised of land which had protected status as nature reserve or other protected area before the national park was declared. One of the principal reasons Bromo Tengger Semeru was established was as a recreational and

tourism resource because of the spectacular scenery of Mount Bromo and Mount Semeru and their surroundings. Other important reasons were for watershed protection and as a buffer zone for volcanic eruptions. The extent to which tourism has succeeded in reducing exploitation of other park resources will be considered in Section 6.

3.2 Physical Description

Bromo Tengger Semeru National Park consists of the Bromo-Semeru massif, a block of volcanic highland averaging 40 km north-south and 20-30 km. east-west, covering an area of 50,276.3 hectares and an altitudinal range of 1000 to 3676 metres. The principal features are Mount Semeru, in the southern part of the park, which at 3676 metres is Java's highest mountain and one of its most active volcanoes, and the vast Tengger caldera to the north, in the centre of which is Mount Bromo. The middle slopes of Semeru are covered with tropical montane forest in good condition, with sub-alpine forest above 2000 metres. Casuarina forest is common around the populated areas and results from vegetation burning in the past. Grasslands cover the floor of the Tengger caldera and hill slopes to the south of the Bromo crater, while a desert-like sand-sea of lava and ash extends north from Bromo to the caldera wall. The park contains nine species of plant found nowhere else on Java, including one endemic (FAO 1977, FAO 1980 and Dep. Kehutanan 1992/93a), and also much of the typical Javan fauna, including muntjac deer, wild pig, leopard, Javan porcupine, jungle fowl, and wild dog *Cuon alpinus*, of which a small pack is still said to live in the Tengger caldera. However wildlife is surprisingly rare, which was attributed by the biologists who researched the park for gazettment to high levels of hunting in the past (FAO 1977, FAO 1980).

Day-time temperatures average 18 degrees, with night-time temperatures falling as low as 3-4 degrees. Very occasional frosts are reported by the villagers, and in the highest village, Ranu Pani (2300 metres) snow has been recorded. The rainy season, when temperatures are slightly higher, falls between October and March, with colder, clearer weather from April to September. The five villages surveyed all present an attractive appearance, being neatly set out and surrounded by carefully-tended agricultural land. All offer spectacular views over steep, farmed slopes to the forests and high mountains of the national park. In many places there are signs of considerable soil erosion, including deep gullies and silted-up ditches and stream-beds. At Ranu Pani there are two lakes, Ranu Pani and Ranu Regulo, from the first of which the village takes its name - Ranu meaning "lake".

3.3 Management and Financing

Administration of all Indonesian national parks is the responsibility of the Directorate General of Forest Protection and Nature Conservation (PHPA), which is part of the Ministry of Forestry. The budget for financing the parks is

established and administered centrally. In 1992 regulations standardising entry fees for national parks were drawn up, but none of the money accrues directly to the park where it was earned. Instead, 30 per cent of revenues are passed to the provincial government, 40 per cent to the kabupaten in which the park lies (divided between several kabupaten if there is more than one according to the entry tickets sold in each one), and 15 per cent each to the National Treasury and to the Ministry of Forestry. The income returned to the kabupaten governments is ear-marked for local conservation initiatives. The division of income reflects the importance attached to the national parks as national and provincial assets rather than local ones. There is some feeling on the part of managers of successful national parks that the central collection and re-allocation of funds makes it difficult for them to develop their parks, but at the same time they are aware that income from the more popular parks is used to support the more remote or less-visited ones. Bromo Tengger Semeru is one of the most successful parks, both in terms of income and visitor numbers: it has the highest visitation levels of any Indonesian national park.

Before Bromo Tengger Semeru National Park was officially ratified in 1994, some land around the protected area had been managed by the state forestry company, Perum Perhutani, which permitted certain uses by local people. When the status of the area was altered some Perhutani land changed hands to come under the management of PHPA. However, despite the three years which have elapsed since the changeover, many of the villagers were unaware of the different status, and believed the territory still to be managed by Perhutani. At the change in status a head of the national park was appointed. The Head of the National Park has a certain amount of autonomy in initiating programmes around the park, for instance community forestry schemes such as the one at Ngadas, described in Section 4.4.1. He is however based in Malang, rather than in the park itself, and is unable to oversee day-to-day management of the park. This is carried out by the rangers based at 11 "resorts", or guard-posts, around the park. The duties of the rangers include patrolling the park boundaries, extension work among the villagers, park interpretation for visitors, and issuing tickets and permits to enter the park. In the experience of the research team, however, the first three duties were poorly carried out, with only the last tackled with any enthusiasm. PHPA has long suffered from a poor reputation amongst other conservation bodies, and the Bromo field study unfortunately found no evidence to refute this. In Ngadisari/Cemoro Lawang the park rangers were more frequently engaged in money-making activities than in their conservation duties. Throughout the park, flouting of regulations by villagers and people from outside the area was common, with many incidences of wood-collecting, grass-cutting, charcoal-burning, bird-snaring, cultivation of commercial crops, and the collection of plants for sale common in all five sites visited (in varying degrees). Most infringements are simply examples of the local people continuing their traditional way of life, and the park management admit to turning a blind eye to the collection of fodder for livestock and of wood for domestic use as they fall into the category of traditional uses of the

park - only dead wood is supposed to be collected. The religious leader (dukun) of one of the villagers commented that "the people of this village understand the duties of PHPA and they understand our needs. We help each other." Incidences of bird-snaring and charcoal-burning, which are both carried out for commercial reasons, are however recognised as strictly illegal by both the PHPA and local people, but ground coverage by PHPA rangers is so poor that there is little chance of transgressors being caught. Until the change in management responsibilities for boundary areas from Perum Perhutani to PHPA, a common system of using the protected area land was tumpang sari, under which farmers contracted land, usually a quarter of a hectare, from Perhutani for a three year period. The farmers planted young trees - mainly acacia - in rows on the land and cultivated cash or food crops between them. At the end of the three-year period the young trees had grown large enough to need the whole area and to shade out crops, and the farmers would then leave this plot and move on to another one. The survey team found that the tumpang sari scheme gave the farmers a more positive attitude to the protected area, as under it they had some incentive to plant and maintain the trees. Once the scheme was phased out the opportunities for legal utilisation of the protected were reduced, and this resulted in some negative feeling towards the PHPA. The study team observed that former tumpang sari areas generally had reasonable tree cover.

A new management plan for the national park is currently being produced by the National Park office in Malang. A draft version of this states that the management aims of the park are to combine conservation and recreational needs, through restoring damaged habitats and protecting plants and wildlife, reducing human interference in the park, and diversifying tourism activities in keeping with the area's natural status (Dep. Kehutanan 1995:1-56). The objectives of management policy are to broaden employment and entrepreneurial opportunities, increase the welfare of people throughout the area of the national park, add to national earnings and foreign exchange, enhance people's pride in their natural heritage, spread the benefits of regional development, and increase national security. The management plan also establishes four different zones within the park: a core or wilderness zone mainly to the south of Mt. Semeru which acts as a protection zone from possible volcanic eruptions, a forest zone in much of the rest of the park, an intensive use zone encompassing the current tourist areas, and buffer zones around the enclaves which contain villages.

As far as visitor management is concerned, there is little formal co-ordination between the PHPA and the Directorate General of Tourism (DGT). Marketing activities are carried out by the DGT, with Mount Bromo figuring prominently in promotional material. Certain tourism or cultural facilities have been provided by the DGT, such as the steps which lead up the Bromo crater and a large new temple for local worshippers in the sand-sea between Mount Bromo and the neighbouring Mount Batok.

PHPA's involvement in visitor management includes the provision and leasing of a camp-site, shelters, shops and cafes at Cemoro Lawang, and the provision of a Visitor Information Centre, although this is often closed. They also issue tickets and collect entry fees through four official entry points, at Ngadisari, Wonokitri, Ranu Pani and Ngadas. There are several "unofficial" ways of entering the park and avoiding payment of the entry fee.

There is no control over the numbers of visitors and their activities in the sand-sea or at the Bromo crater. Previous research into visitor use management in the national park suggested that better information and trails should be provided for visitors, along with the introduction of measures to control visitor flows at peak times through pricing or rationing policies, and strengthening of law enforcement (Sutito 1994).

Section 4 - The Tenggerese and Bromo Tengger Semeru National Park

4.1 Population, Religion and Culture

There are 167,255 people living in 51 villages bordering the park (Dep. Kehutanan 1992/93b). The majority of the population is Tenggerese, a remnant population of the Hindu-Buddhist Majapahit kingdom which was gradually replaced by Islamic rule during the 15th and 16th centuries. While many of the ruling Hindu families and their retainers fled to Bali, some of the commoners found refuge in the mountains of East Java. When the Dutch arrived and instituted their system of plantation agriculture, converting extensive tracts of land in East Java to the production of coffee and sugar cane, the Tenggerese were gradually forced higher and higher up into the mountains. The Dutch plantation owners employed thousands of migrant workers from the island of Madura, whose Islamic religion formed a natural cultural barrier to fraternisation with the Hindu Tenggerese. Hefner (1985) reports the suspicion with which the lowland Javanese still regarded the Tenggerese in the late 1970s. These experiences helped define their strong sense of a separate cultural and religious identity to the lowland Javanese. The Tenggerese of Ngadisari/Cemoro Lawang was found by the survey team to be particularly self-contained and reserved.

The Tenggerese formerly called their religion "Buddha Jawa", but in the 1960s researchers determined that their beliefs were closer to Hinduism than Buddhism, and since the 1970s the Tenggerese have increasingly called themselves Hindus. In the 1960s and 1970s they felt that their religion was threatened by improving communications with the surrounding Muslim majority, and with help from Hindu Bali, they strengthened their theology and formalised religious practices, with visible influences on religious architecture and ceremonies. The only village with a majority of people who still profess adherence to "Buddha Jawa" is Ngadas, and even here there is a growing number of people who term themselves Hindus (80 in late 1996).

Tenggerese Hinduism incorporates many folk beliefs, resulting in many differences with the Hinduism of Bali. Their best-known festival is the Kasodo, which takes place every 270 days. The Kasodo consists of a huge ceremony centred on the crater of Mount Bromo, into which offerings are thrown, and on a temple at the foot of Bromo and Mount Batok, the neighbouring peak. At the time of the Kasodo it is estimated that an additional 20-25,000 people enter the park, the majority of whom are domestic tourists, with a small number of Hindus from other parts of the Tengger region. For individual villages, an important festival is Karo, which occurs approximately two months after Kasodo. This is followed seven days later by Sadranan. These festivals honour the spirits and the ancestors, with part of the Sadranan ceremony taking place in the graveyard. The religious ceremonies are accompanied by traditional cultural manifestations such as whip-fighting, dancing horses, and trance-dancing, none of which are exclusive to the Tenggerese. In Ngadisari only there is a special dance performed at Hindu festivals which is unique to the Tengger people. Juma'at Legi, a day occurring every 35 days when Friday (Juma'at) coincides with the fifth day of the Javanese calendar (Legi) is a significant day throughout Javanese culture, and in the Tengger region trance-dancing and other ceremonies often take place then. The trance-dancing and whip-fighting are well-supported, and indeed new groups have started up in recent years. Only men take part in these. Other art forms, such as ludruk (a kind of traditional theatre) have died out due to lack of leadership. There appears to be a horizontal social split between those who participate in the trance-dancing and those who do not, with the less well-educated and poorer families more likely to include members who take part, while members of the better-off families had participated in ludruk and regretted its disappearance. The survey team encountered men from different social levels who would not participate in the trance-dancing because it meant being "possessed by devils", and two respondents in Ngadas commented that it was better to grow crops than to dance.

Elementary school education is available in all the villages. Children from Ngadisari and Wonokitri have access to junior high school nearby, while in the other three villages access to anything more than elementary school is difficult. A semi-formal junior high school has recently been established in Ngadas. The propensity for education is rather low, especially in Ranu Pani, partly because of the expense of paying boarding fees and partly because education was held in low esteem. In Ngadisari and Wonokitri, however, there is a higher awareness of the value of education and hence more enthusiasm for sending children to high school.

The institutional characteristics of each village were found to be important in determining levels of development. Wonokitri has often been commended for its development programmes, mostly originated by a former village headman who held his post from 1955-1988. The villagers continue to respect and revere the memory of this man, Pak Djojoredjo, who died in 1990. His daughter is now

married to the current headman, and has been influential in running family health and welfare programmes. In contrast, the headman of one of the other villages is considered by the villagers to be lazy and corrupt, and there were complaints that no substantial developments had taken place during his tenure. Kandang Sari and Ranu Pani are both dusuns, rather than official villages, and lack the status and institutions of a village (desa). The village headmen in these cases reside some distance away, in the main part of the village, and the villagers feel they suffer developmental disadvantages as a result.

4.2 Livelihood Strategies

The Tenggerese have developed a livelihood strategy based on the cultivation of temperate-climate crops and on animal husbandry. With the exception of school-teachers and a tiny number of other civil servants from outside the region, all residents of the villages other than Ngadisari are engaged solely in agriculture. In Ngadisari between 70 and 80 per cent of families are also involved in tourism. The majority of people are landowners, with plots ranging from a fraction of a hectare to five hectares. A frequently-cited holding was one to two hectares - although many people were not sure of the exact size of their holding. Much of the land was held in different parts of the village territory because of inheritance customs, under which people divide their land between their children. A small number of families - fewer than ten per cent - do not own land. When the tumpang sari (contract land) system operated, some of these people and the smaller land-owners often rented land to farm, whereas now they generally work as day-labourers for other people, earning Rp.1750-2250 per day (women) or Rp.2000-2500 per day (men). In Ngadisari and to a lesser extent Ranu Pani there is a shortage of labour, and men are imported from other areas to work at rates of Rp.2500-3000 per day.

4.2.1 Animal husbandry

A majority of families throughout the region care for at least one farm animal. Cows, pigs, goats and horses are all tended, with the popularity of different animals varying between villages. The animals are all kept in pens and fed with grass, corn stalks and other greenery collected on a daily basis. The horses' feed is occasionally supplemented by rice chaff. People who can afford it are inclined to buy livestock when they have surplus money from the sale of crops, using them as a sort of bank account which can be cashed in when needed, such as when capital is needed to pay for ceremonies. Some people are unable to invest in their own animals, and take on the responsibility of looking after other people in return for half the proceeds of the eventual sale. Fodder is collected from fallow fields, terrace edges, road-sides, and from inside the national park. Occasionally animals are also grazed inside the park. In the areas studied this was done on a very small scale and it seems unlikely that current levels will have a significant impact on park ecology, although there is a

specific issue in the case of the collection of fodder for tourist horses which will be discussed in Section 5.6.3. 4.2.2 Horticulture

In the past, the main crop was maize, which provided the staple food of ampok, a form of steamed maize flour, as well as fodder for livestock. Ampok is still eaten, though less often than rice, which is bought in from lowland areas. Until fairly recently fields were opened up and tilled on a subsistence basis to provide this staple, with plots used in rotation (shifting cultivation). The difficulty of transporting produce to market restricted the production of cash-crops, with the main one being castor oil, produced from the jarak trees which are still seen in the fields. In the late 1970s and 1980s, however, roads or tracks usable by four-wheeled vehicles were extended into areas previously only served by foot or horse-trails. The introduction of these tracks - even though in some cases they were only passable in the dry season - provided the means of transporting goods to market, which in turn gave the incentive for intensifying crop production. The principal cash crops are now potato, cabbage, garlic, bawang pre (a type of multi-stemmed leek or large spring onion) and broad bean. Bawang pre is especially popular for a number of reasons: it requires little capital to cultivate; plants can be harvested whenever cash is needed, and the inputs required looking after it is relatively low. In Ngadisari some farmers remarked that they grew bawang pre because it needs so little attention, leaving them free to pursue their involvement in tourism. However, in Ngadisari there was also greater variety of crops, with peas and an increasing number of tomatoes grown.

The work of tilling the fields is shared equally by men and women, with older children also helping. The crops are either harvested by the farmers and transported to central points for collection by wholesalers, or bought as standing crops in the fields by wholesalers who then provide the labour to harvest the crop. The price of the crops fluctuates considerably: for instance the price of bawang pre had fallen from Rp.1000/kg. in early 1996 to Rp.200/kg. in late 1996, and the price of potatoes fluctuated between Rp.1500/kg. and Rp.400/kg. in the first two months of 1997. The farmers are aware of the market prices for their crops through listening to special announcements on the radio, but can be caught out by wholesalers who offer a good price one day to encourage a lot of people to harvest, and then reduce the price the next day on the grounds that there is an over-supply. Most of the wholesalers live outside the village, but in Wonokitri several male farmers have become dealers, leaving their wives to manage the fields on a daily basis. Some of the bigger farmers are aware that their produce is in competition with vegetables grown on an industrial scale in other parts of Indonesia, for instance in the hills around Malang or in Sumatra. There was a government-imposed increase in the price of chemical fertilisers in the middle of January 1997, which was pegged to the regulated price of rice. There is no such regulation of the price of vegetable crops, however, and after the price increase Tenggerese farmers felt that insufficient attention was being paid to their requirements.

4.3 Ecological impacts of agriculture

At the same time as access to the Tengger villages was improved in the late 1970s and early 1980s, the innovations of the Green Revolution meant that chemical fertilisers and pesticides and new crop varieties became widely available. This added to the intensification of crop production. It appears that many of the practices which have resulted in the current ecological impoverishment of the farmed areas date from that time. In this respect, three especially noticeable features of the farmlands are: the high level of soil erosion, the lack of bird and insect life, and the high level of chemical inputs. The last two points are closely connected.

4.3.1 Soil erosion and loss of soil fertility

Much of the land farmed by the Tenggerese is extremely steep, judged conservatively (in the absence of a clinometer) at 50-60 degrees. In many places, the steepness of the slopes provokes admiration as to how the farmers manage to cling on while simultaneously digging the earth. With the heavy rainfall, the top-soil is washed downwards, creating deep eroded gullies. In some places, for instance in Ranu Pani, the top-soil is extremely thick and erosion has yet to affect yields. Here, the road-side ditches are filled with top-soil, and there are concerns that the lake of Ranu Pani is becoming silted up. In other places, notably Ngadas, the top-soil is thinner or has been cultivated for longer, so that at the tops of the slopes the reddish, sandy or stony sub-soil is now exposed, with the darker top-soil showing up further downhill, or choking the stream beds in the valley bottoms. The sub-soil is clearly less productive than the top-soil, a loss of fertility which can only partially be compensated for by increased chemical inputs. The speed and severity of rainwater run-off is increased by the common practice of cross-contour cultivation, with furrows between crops running straight downhill. This is apparently done to avoid water-logging in times of heavy rainfall.

According to sources at the University of Malang, attempts have been made to encourage the farmers to terrace their land. However, in most places the farmers reported little action by agricultural extension workers, and in general terracing was resisted on the grounds that it reduces the cultivable area, and that it is a lot more work. In some places, however, the farmers were aware that terracing would reduce soil loss and had attempted to do this, although the terraces were still sloping rather than flat. The best examples of terracing were in Wonokitri. Where terracing does take place, the plants generally used are casuarina trees or elephant grass, which is cut for animal fodder, thus providing dual use for the plants used. In other places contour farming was practised or crop rows were planted in a herring-bone pattern, methods which are less effective than full-scale terracing but which do reduce soil loss.

Farmers reported using increasing amounts of chemical fertilisers on their land, mainly urea. They also use crumbled livestock waste (pupuk ternak), which has a lot of concentrate feed in it. Older farmers said that in the past they used green fertiliser or livestock manure, but this seems rarely to occur now. In conversation, the idea that soil structures can be impoverished through the excessive use of chemical additives was greeted as a novelty and with interest, although amongst the better-educated people there was an awareness that excessive chemical use can result in soil degradation.

4.3.2 Crop failures and Destruction of Ecological Balances

As mentioned above, the larger species of wild animal in the park have mostly been hunted out. Some smaller species continue to thrive, with incursions into cropland from the forest particularly by porcupines, jungle fowl and monkeys. In some places, particularly Ngadisari, crop predation by monkeys was so severe that fields near the forest boundaries were no longer used (although there may be other reasons for this, as will be discussed in Section 5.6.3). There is a distinctive lack of bird-life in the farmed areas. This paucity is almost certainly due to two factors: farmers reported the large-scale trapping and shooting of birds a few years ago, and the high levels of pesticide means that the insects which would normally form the food species of some birds are missing. Very few insects were observed, not surprisingly, given that in most cases farmers are spraying their crops with insecticide and fungicide at least every week, and as often as every two or three days in some places. It was found that use of insecticides and fungicides had gradually increased in frequency over the years, and that crop-spraying was carried out on with no regard to climatic conditions: for instance spraying during rain was seen. This was put down to the fact that the farmers are provided with little scientific information on crop management. It was found that "cocktails" of different additives, sometimes including local remedies such as ash, plant extracts or holy water, were being applied to the crops. The only response to decreasing yields and crop failure seemed to be to increase the level of chemical inputs applied.

These practices have resulted in increasingly resistant crop pests and in the spread of these. The potato crop, in particular, has been afflicted with two problems since around 1992: in some cases it turns yellow and then black on emerging from the ground, and in others the maturing plants die off, with reduced or non-existent tuber production. The crop failure is attributed by the farmers to a variety of causes, including excessive rain, sulphurous emissions from the volcanoes, and failure to carry out religious ceremonies correctly. Research by the author suggests however that the most likely cause of the first problem is a fungus which afflicts the potato at an early stage, while the second is due to the leaf-miner fly *Chromatomyia horticola*, which lays its eggs in the stems of the plants. When the caterpillars hatch out they feed on the interior of the stem, drastically reducing yield and eventually killing the plant.

The leaf-miner flies normally only occurs below 1800 metres, but has extended its range to live at the higher altitudes of the upper Tengger region. Information on the fly was obtained from the village headman of Ngadisari, who had been provided with it by an agricultural research laboratory in the neighbouring kabupaten. Even though the information had been available for some months, village headmen in other areas did not yet know about it.

A further contributory factor to lower yields is that new seed potatoes are rarely bought in. It is seen to be more economical to reserve a part of the harvest to plant for next year's crop, a tactic that apparently worked well in the past. However, the variety of potato used, Granola, appears to have lost both its ability to resist attack by insect and fungal pests, and its resistance to the ever-changing viruses present in the soil. In Western agriculture, this loss of vigour is compensated for by annual checking of seed stock for viral resistance and use of new first generation hybrids (F1s), but in the Tengger region few instances of purchase of new hybrid stock were recorded. Even in these cases, the farmers remarked that the high yield in the first year had given way to reducing yields in subsequent years, which, again, indicates the poor quality of the scientific information available to them.

The combined result of the pests and the loss of hybrid vigour was that potato yields had decreased by a significant amount. Before the attacks, farmers reported yields of 9-20 tonnes per hectare, with a ten-fold increase over the seed potatoes planted, but now they report harvesting only three to six times the seeds, with in some cases only the same amount harvested as was planted, or even none at all.

In the year preceding data collection for this study, the cabbage crop had also began to suffer from a disease which the local people described as ngrupuk, ie. that the leaves of the cabbages curled up and gone crisp, like the krupuk, or prawn crackers, eaten with Javanese food. There seemed to be no explanation for this, but it is probably due to a fungal infection. In some areas, even the mainstay of crop production, the bawang pre, which is a relatively trouble-free and low-maintenance crop, was beginning to suffer an increased amount of insect predation (by leaf-hoppers).

4.4 Utilisation of the park's resources

4.4.1 Fuelwood

The principal form of exploitation of the park's resources is the collection of fuelwood. Except in Ngadisari/Cemoro Lawang, 95-100 per cent of families interviewed in each village used wood both for cooking and for heating. The most popular wood is casuarina, followed by acacia, which is faster-growing but also burns more quickly. Other types of wood and scrub were also used. In Ranu Pani and Ngadas a further important use for wood is for drying out garlic

bulbs, which hang in bunches in the rafters over the stove. For this purpose fires were often kept burning overnight - a factor which increases wood consumption considerably and which has apparently been ignored by previous researchers. In Ngadisari there was a higher rate of use of LPG, kerosene, and charcoal for cooking and for warmth, and as garlic is not grown, heating is not required to dry out the bulbs. There was a greater density of casuarina trees on people's land in Ngadisari/Cemoro Lawang, which made claims that most fuelwood came from this source more convincing. There are some cultural inhibitions about using alternative sources of fuel to wood, as people feel that wood is friendlier and creates a focal point to the home. However, in the better-off households, particularly in Wonokitri and Ngadisari, the soot and smoke produced by the chimney-less stoves was often disliked, with gas, paraffin or charcoal preferred. The hope was expressed in some official quarters that the introduction to electricity to the enclave villages of Ranu Pani and Ngadas would result in electricity being used for cooking and heating, but since electric cookers are virtually unknown in Indonesia, this was felt by the researchers to be unrealistic.

A 1992 study by PHPA calculated that 4.5 per cent of the fuel needs of the population surrounding the park is supplied from the protected forest (Dep. Kehutanan 1992/93b), although by 1995 park managers were aware that "people from all the villages in the buffer zones still use the forest as a source of fuelwood and collect it on a daily basis" (Dep. Kehutanan 1995:1-48). The findings of the 1997 study certainly suggested that this latter picture is far more realistic than the estimate of 4.5 per cent. All the households needed one bundle of firewood per day (i.e. about as much as a person can carry), and over 70 per cent of respondents in Ranu Pani, Ngadas and Kandang Sari openly reported collecting wood in the protected area. In Wonokitri and Ngadisari/Cemoro Lawang the figures were lower, largely due to the better tree availability on farmlands and to greater use of alternative fuel sources.

Those respondents who collected wood in the protected area stated that they only took dead wood, as they could be caught and "fined" a hundred trees for each one cut if they cut live trees. However, no-one interviewed actually knew anyone who had been caught. The collection of fuelwood is largely ignored by PHPA, who argue that there are no alternatives for most people. The families also often claimed to take wood from their fields, and although they certainly do supply a portion of their fuelwood needs from their own casuarina trees, the study team felt that this answer was given because it was the "right" one. The small plots owned by many people, the lack of signs of wood-cutting in the fields, and the weakness of sanctions made it unlikely that the majority of wood-needs were supplied from this source. It was a daily occurrence to see parties of people departing for the forest in the early morning, returning later on with bundles of wood. Wood collection generally occupied one member of the family for between one and two hours per day. The wood was almost never bought in.

In each of the villages the study team visited the forest near the farmlands, often following wood-cutting trails, and in several places found clear signs of living trees having been felled. Ways of disguising the collection of green wood had been devised: for instance in Wonokitri, people with fields near the forest boundary cut green wood from the forest and stored it in their fields for a few weeks until it was thoroughly dead, and only then carried it past the PHPA post. Having said that, the forest around the villages was by no means devastated, except around Kandang Sari. In the other four villages, despite the fact that PHPA rangers rarely went on patrol, their presence in the village appeared to deter open wood-cutting from the protected area. In Ngadas and Ranu Pani people were observed planting casuarina and acacia seedlings in the protected forest bordering their own fields. There has been some reforestation of bare hill-slopes around Ranu Pani, mainly thanks to the efforts of one particular family. Most people said they participated in reforestation schemes when asked to by PHPA, but it appeared that this happened only once a year in Ranu Pani, and only twice in the preceding fifteen years in Ngadas, and not at all in the other villages. Wonokitri had implemented its own programme for tree-planting in the fields, with the help of an extension worker from the Dept. of Agriculture.

Some attempt is being made to manage use of wood from the park on a sustainable basis. Under a community forestry scheme initiated in Ngadas by the Head of the National Park in late 1996, 15 hectares of protected land were made over by the national park to the village for management as a community forest, with families allocated a quarter of a hectare each to plant fuelwood. The villagers appeared to be tackling management of the new area with some enthusiasm, but there was not enough land for all of the families, and it was too early to tell whether the scheme would be successful in reducing exploitation of trees from other parts of the forest. In general, the villagers find it easier to collect wood from the forest than to grow it in their own fields, and the lack of sanctions applied to collection in the forest discouraged the production of more wood in village-owned areas. Attitudes to the trees, however, varied. In some of the villages (Ngadas and Kandang Sari) it was felt that the trees reduced the area available for cash-crops, and that they shaded the crops too much. Here, the lower branches of the trees were lopped off in order to reduce the shade. In other villages (Wonokitri, Ngadisari/Cemoro Lawang) the shade provided by the trees was felt to be useful in reducing evaporation of moisture from the soil in the dry season, and it was considered important to pass on good stands of trees to the next generation. The study team felt that with better implementation of community forest schemes and firmer control of wood collection from the forest, the villages could fairly easily be supplied in a sustainable way.

4.4.2 Other uses of the park

The poor health of many crops indicate the damaged state of farmland ecology, which may not immediately be seen as having a direct effect on the ecology of the national park. But the failure of the potato and cabbage crops is forcing the Tenggerese in some areas to rely increasingly on the resources of the park, rather than allowing resource exploitation to be reduced. In the particular case of Ngadisari the principal alternative resource use is tourism, as will be elaborated in Section 5, but in other areas the local people are having to turn to more damaging forms of exploitation. A notable example was in the village of Kandang Sari, where charcoal production is now a common way of earning a living. It was reported by older residents that the area of protected land adjoining the village was thickly forested in the past, whereas it now consists of low scrub with scarcely any trees. Kandang Sari has no PHPA post, in theory being covered by rangers from one of the nearby "resorts", but in practice PHPA rangers are not seen. Other forms of exploitation are also damaging the ecology of the park. For instance, it was reported that even ten years ago wild animals such as wild pig, rusa deer, muntjak and leopard were frequently seen, whereas now they are uncommon. This is almost certainly due to hunting. Collection of fungi and other plants used in the preparation of traditional medicines also occurs, but it is not known whether this takes place at levels which are unsustainable in terms of the plants' ability to regenerate. Bird-trapping was encountered in two villages, in one case carried out by a resident, and in the other by two men from the lowlands who had entered the forest equipped to catch birds. It is highly probable that, given the strong market in Java for caged birds and in the absence of effective patrols by PHPA, a considerable amount of bird-trapping takes place.

4.5 Attitude to Tourism and the National Park

The villagers' opinion of the national park and to tourism was assessed through the interviews and in conversation.

4.5.1 Attitude to Tourism

The direct involvement of local people in tourism will be discussed in detail in Section 5, but in general, the Tenggerese were found to have a very positive attitude to tourism, mainly because of the economic opportunities it offered, even if they themselves did not gain any direct benefit from this sector. Most villagers were aware of the concentration of tourists around Ngadisari, but, interestingly, there was more jealousy of Wonokitri, which was felt to have unfairly captured part of the tourism market by building a road down to the sand-sea as a secondary entry point for tourists. (In fact, as will be discussed below, Wonokitri has few economic gains from tourism.)

Three of the villages with little or no tourism felt that they had attractions which could draw people: two waterfalls in the case of Ngadas, the two lakes at Ranu Pani, and an easy alternative entry to the park via Kandang Sari.

However, the hopes that these features might be used as the basis for a tourism industry were felt by the survey team to be unrealistic, except in the case of Ranu Pani. The lakes here are certainly attractive, and set off by a cool climate which offers a pleasant alternative to the heat and humidity of the plains. There is already substantial visitation by climbers to Mt. Semeru, and it was felt by the researchers that once a road to Ranu Pani from the west (via Ngadas) is completed in 1997/98, there could well be an influx of lowlanders seeking land for building weekend villas. If this occurs, it is likely to provide few economic opportunities for local people as they have few skills likely to be of use to vacationers.

As far as the other two villages are concerned, the entrance to the park via Kandang Sari is only the easiest in that it is the flattest: the route enters the sand-sea a long way from the focal point of Bromo and has little of interest to recommend it. Reaching the waterfalls at Ngadas involves a long and difficult walk which is unlikely to attract many people. Here, however, there is an opportunity to capture some economic benefits from tourism as a number of people with their own transport enter the park from this direction, either because it offers a quicker route from Malang or because they know they are unlikely to be charged an entry fee, as the guard post is rarely manned and the barrier across the road into the park is never closed. If food, accommodation or souvenirs were available in Ngadas a proportion of tourists would certainly stop there. In Wonokitri there was awareness that despite their hard work in building the road down to the sand-sea, they had largely missed out on economic gains from tourism, mainly because of the shortage of tourism facilities in the village.

4.5.2 Attitude to the National Park

In general, the villagers had a positive attitude to the national park, but their awareness of it was not very high. Some had no comprehension of the term "taman nasional" (national park), and most still referred it as Perhutani land (i.e. belonging to the state forestry company). This is despite the fact that the change of jurisdiction from Perhutani to PHPA occurred three years before the survey. The majority of respondents had at least a rough idea of why the area was protected, with comments including: erosion control, re-greening, protection of plants and animals, protection of water supplies, so that plants will get bigger, prevention of wood-cutting, as an object of regional pride, and to attract tourists. People in Wonokitri most often mentioned their pride in having the substantial attraction of Bromo close to them, while the connection between tourists and the national park was made most clearly in Ngadisari/Cemoro Lawang. The same connection was also made in Ranu Pani. There was however no link made between the facts that excessive collection of wood or other forest products could damage the national park's viability for tourism. This was particularly noticeable in Kandang Sari, where production of fuelwood and charcoal from the protected area is a well-established industry,

with consequent degradation of forest cover, as described above. Given the lack of encouragement for fuelwood production in most of the villages, it is hardly surprising that the villagers see the national park as a useful and convenient free resource.

These comments of residents in general indicated a basic level of extension work by forestry or national parks staff, but with insufficient emphasis on the change of status of the protected area and on the long-term problems which might occur if resources are over-exploited.

Section 5 - Tourism in Bromo Tengger Semeru National Park

The Bromo area is highly valuable to the province of East Java because of its tourism potential. Bromo is a convenient stopover point for tourists on overland tours of Java and Bali, being accessible in less than two hours from the main highway. With its dramatic landscape of volcanic craters and the sand-sea, combined with the cool mountain air and upland agriculture, the area makes an interesting contrast to the hot climate and rice-paddy landscape of the lowlands. It also attracts large numbers of domestic visitors from Surabaya and other large cities, particularly on Sundays and public holidays.

5.1 Tourism Activity

Most visitors drive to Ngadisari/Cemoro Lawang, the closest village, and ride a horse or walk to the foot of the Bromo crater. From there, it is a steep climb up steps to the rim, traditionally visited at sunrise. There is another viewpoint at the top of Mount Penanjakan, the highest peak on the caldera rim, visited both from Cemoro Lawang and from Wonokitri, which is the secondary gateway to the Bromo complex. The possibility of driving up Penanjakan largely exists because of the foresight of a previous village headman who organised his villagers into building roads down into the sand sea, and up to the top of Mount Penanjakan (see Map 3). The great majority of visitors pass through Ngadisari or Wonokitri, with a smaller number staying at Ranu Pani en route to climb Mount Semeru, which takes a minimum of two days. An increasing number of Indonesian visitors arrive by motorbike via Ngadas or Pakis Bincil (see Map 1), either because it is a quicker route from Malang and other places west of the park, or to avoid having to pay an entry fee. (The ticket booth at Ngadas is rarely staffed.) Many people stay one night in Ngadisari or Tosari, while others drive through the night to arrive in time for dawn, leaving again straight afterwards. The most popular times are at weekends and on public holidays, with the crater rim and Penanjakan viewpoint crowded with hundreds of people at dawn.

The average length of stay of domestic tourists was 0.88 days, with 1.89 for foreign visitors except for the Hong Kong and Taiwanese groups, who stay only 2 hours. An increasing number of tourists, particularly East Asian ones, arrive in

Cemoro Lawang in late afternoon to visit the volcano, with some even arriving in the evening and visiting the crater in complete darkness. These groups depart straight afterwards.

From Cemoro Lawang, it is a relatively short journey to the foot of the crater steps, and most Western and Indonesian visitors accomplish the journey on foot. The second most popular method is by horse, although Indonesian and budget Western travellers tend to reject this because of the expense, while many Westerners do so because they feel sorry for the small horses. Richer visitors and those in groups tend to hire vehicles to go to the crater. All visitors from Wonokitri approach by jeep or minibus because of the distance.

5.2 Accessibility, Facilities, and Ownership

5.2.1 Communications and Services

Access to Ngadisari and Wonokitri is by good quality roads, in the first case built by the provincial government to facilitate tourism, and in the second built by the villagers to improve their access to the outside world. Roads to Ngadas and Ranu Pani are already deteriorating, despite having only been surfaced in 1990 (Ngadas) and 1993 (Ranu Pani), and there is a dirt road to Kandang Sari. There is around 10 km. of road between Ngadas and Ranu Pani, 2-3 km. of which are extremely rough and difficult to pass by vehicle. This road is scheduled for upgrading in 1997, which will make access to Ranu Pani from the west much easier, facilitating the export of vegetables and the entry of visitors. Of the five villages, only Ngadisari/Cemoro Lawang is served by frequent public transport. Wonokitri, Ranu Pani and Kandang Sari have none, which in the case of Wonokitri is rather surprising given its relatively large population and prosperity. It is however well served by "ojeks" (motorcycle taxis). Transport from the other two villages is rather difficult. Ngadas is served by a regular truck and pick-up service, both leaving once a day. It is possible to charter private vehicles in most of the villages.

All the villages have piped water, mostly from public stand-points in the village rather than in individual homes. In all cases the water supply had been installed relatively recently, within the last 15 years, prior to which water had been carried in from rather distant water sources. In Ngadisari the water supply was poor, with only enough for the households; the main hotels paid to have water brought in by truck from sources towards Probolinggo.

Wonokitri, Ngadisari, and Kandang Sari have mains electricity, and Ngadas and Ranu Pani are soon to be supplied with it. In these two villages, most households bought sufficient electricity to power a couple of neon lights and a black-and-white television from diesel generators owned by richer members of the community. Ngadisari had telephones, and Wonokitri was soon to be joined

to the network. It is unlikely that the other villages will experience telecommunications in the near future.

5.2.2 Information, Interpretation, and Access to Park

A leaflet produced by PHPA is helpful in giving basic ecological information about the park and travelling times (on foot and by vehicle) between key points. However, this is not widely available. The extensive trail system within the park, developed primarily as trading and communication routes between the Tengger villages which lie around the caldera rim, is almost unknown to tourists; yet the routes are relatively easy and offer spectacular views of the mountainous, forested scenery. Basic accommodation is available in villages such as Ngadas and Ranu Pani, and staying in such places offers a chance to observe the lives of the Tenggerese farmers, which would certainly be of interest to many people. As the survey of tourists revealed, a large number of visitors would appreciate more information on the area (see Section 5.4.3). There is a new Visitors' Centre in Cemoro Lawang, which is officially open from 8 am to 4 pm, and shows films and slide-shows on the park. However, during the 17 days of the survey period in the village it was only open on two occasions, once at the request of the author, and once when a group of visiting dignitaries was expected. Opening the centre at 8 o'clock is anyway rather late, as most tourists return from visiting Bromo crater before 7 o'clock and many depart for their next destination at 8. A British parks interpretation expert began work at the Visitors' Centre in mid-1997 and it is possible that he will be able to improve the flow of information and thereby increase usage of a more extensive area of the park.

5.2.3 Food and Accommodation

In 1977 fifty-six households in Ngadisari were reported to provide board and lodging for tourists (FAO 1977), at which time the majority of tourists stayed with villagers as there was only one hotel. By 1990/91 two more hotels had opened in Cemoro Lawang, and by 1997 there were four hotels and around six homestays in the village, with several more hotels on the main road from Probolinggo. With the increasing availability of official lodgings tourists began to stay in villagers' homes less and less, and they now generally stay with the villagers only when the hotels are full, such as for the Kasodo or on busy public holidays. Room charges range from Rp.10, 000 to Rp.50, 000, with reports of Rp.100, 000 being charged at the time of the Kasodo. This does not include food. The householders and homestay owners prefer Indonesian visitors because they do not complain as much as Westerners and require fewer blankets, sleeping with several people to a bed in order to keep warm and save money. Westerners have a very clear idea of the standard of charges and room quality available in budget tourism destinations elsewhere in Indonesia, and are reluctant to pay the high prices demanded by the Tenggerese, particularly as

much of the accommodation offered is of poor quality in terms of cleanliness, facilities, and privacy.

The first hotel in Ngadisari, the Bromo Permai, was built in 1974/5 on land leased from the Ministry of Forestry, and is owned by a businessman from outside the area. The owner of the most popular budget hotel, the Lava Hostel, came to the area as a PHPA ranger and married locally. He is now head of the Cemoro Lawang PHPA guard-post. He recently opened another hotel, the Lava View on the rim of the caldera, although as this is within national park land where construction is generally prohibited, it is not clear how he obtained permission to do this. The other budget hotel, the Cemara Indah, which is not popular with either tourists or staff, is owned by a Tenggerese man. There are 20-25 cafes, restaurants and mobile food-stalls in Cemoro Lawang, around half of which are operated by non-Tenggerese. One of the most popular hotels with Western visitors, Yoschi's, is on the main road from Probolinggo about 5-6 kilometres from Cemoro Lawang. This is owned by a German-Madurese couple, and employs mainly local people. The nearby Bromo Hotel, which also caters to the budget market, was the subject of numerous serious complaints by tourists including cheating and physical aggression. Around twenty-five kilometres on the main road before Cemoro Lawang is the Hotel Raya Bromo, a three-star hotel with 192 rooms.

A number of Indonesian students camp at Cemoro Lawang in order to save money. There is an official campground not far from the village, which opened in 1996.

In Ranu Pani all the Indonesian mountain-climbers stay in one of the two climbing huts provided or camp, as do a few of the foreign tourists. A few people stay at the PHPA post, although this is dirty and lacks water. Most of the foreigners and a few Indonesians stay at a homestay in Ranu Pani run by a lowland Javanese couple who came to the village as school-teachers and are now retired. They received almost 300 visitors in 1996. There is little cooked food available commercially in Ranu Pani other than at the homestay, although a small warung (cafe) near the PHPA post provides good quality food at weekends. Both the homestay and the warung are owned by lowland Javanese who have come to the area for various reasons; a part-owner of the warung arrived in 1996 specifically because of the economic opportunity offered by tourism. Most of the climbers bring their own food - principally instant noodles.

A large number of foreign tourists also visit the national park via Wonokitri, but they stay in the village of Tosari, about 5 km. lower down. Most of them stay at the three-star Bromo Tosari hotel, which caters mainly to large and small groups accompanied by a guide. The Bromo Tosari is owned by people from outside the region, and employs both local staff and people from elsewhere. There is another, smaller hotel in Tosari, owned by local people and catering mainly to an Indonesian market. About ten households in Wonokitri offer

lodging but no food, and the only eating facilities are small warungs, offering good Javanese food but unattractive to foreigners and rich Indonesian tourists.

There are no tourism facilities in Kandang Sari, and no tourists. Currently a number of tourists pass through Ngadas en route to Ranu Pani or to Bromo itself, and when the road to Ranu Pani is improved this number will certainly increase. However, the village has no food or accommodation facilities and is unable to benefit from tourism.

5.2.4 Transportation

There are 450-500 horses in Ngadisari/Cemoro Lawang, around one-third of which are owned by people in neighbouring villages. Some of the horses are operated by their owners, while others are worked by other men on payment of a percentage of the takings. The horse-men congregate at Cemoro Lawang before dawn, waiting for rides, and often stay in the area all day. In the busy season they can get two to three rides per day. A Horse-owners Association groups most of the owners and provides a contact point for tour operators, as well as standardising prices and practices. If a large group is due the tour operators telephone key members of the Horse-owners Association so that enough horses will be waiting for the group on arrival. The names of horse-men are taken and horses allocated to tourists on a first come, first served basis. The horse-men pay various local taxes, including Rp.1000 to a village fund and Rp.500 to the Association. There are also around 70 jeeps, which are used for driving tourists into the sand-sea or to the viewpoint on Mt. Penanjakan. Until a new road between Ngadisari and Cemoro Lawang opened in 1992/93, the jeep owners transported nearly all tourists up and down a steep cobbled road to the crater rim from the transport terminal. However, with the opening of the new road it became possible for public and private transport to reach a car park just below the caldera rim in Cemoro Lawang, which put an effective end to the lucrative operation of the jeeps. Some of the operators have replaced this lost business by offering rides across the sand-sea to Bromo crater or up Penanjakan, but according to jeep owners their business never recovered from the road opening. There is a jeep association run along similar lines to the Horse-owners Association, with owners allocated passengers on a rota basis.

At weekends Indonesian tourists often stay in Wonokitri. These tend to be wealthier than the people visiting Cemoro Lawang and generally have their own transportation, due to the lack of public transportation.

5.2.5 Ownership of tourism facilities

In Cemoro Lawang/Ngadisari and in Wonokitri most tourist accommodation and the jeeps are owned by the richer people, i.e. the larger farmers and more prominent members of the community. There is some accommodation provision by poorer people in Cemoro Lawang/Ngadisari, especially in households beside

the road leading up to the caldera rim. Horse-ownership in Cemoro Lawang/Ngadisari has a much greater vertical spread throughout the community, with families at most social levels evidently capable of owning at least one.

5.3 Visitor Profile

5.3.1 Volume and Provenance of Visitors

According to national park statistics taken from sales of entry tickets, the park received 129,148 visitors in 1995/96, of which almost 30 per cent were foreigners (Table 1). These figures should be treated with some caution, as there is a discrepancy between figures from different sources: for instance data from the provincial tourism office indicates that Bromo received 45,830 foreign tourists in 1995 (Diparda 1996) rather than 37,689. There is also an interesting and unlikely decrease in numbers between 1992/93, when formal entry tickets were first issued and better records kept, and the following year, leading one to suspect that by this time methods of avoiding the payment of entry fees and of "hiding" visitors - or rather their entry fees - had been perfected. The figures however do give some indication of numbers, and also of the percentage of foreign to domestic tourists.

Table 1 - Visitors to Bromo-Tengger-Semeru National Park

Year Domestic % Foreign % Total

1976/77	13,113	77.5%	3,799	22.5%	16,912
1990/91	66,539	72.4%	25,352	27.6%	91,891
1991/92	84,898	74.7%	28,792	25.3%	113,690
1992/93	98,728	74.3%	34,113	25.7%	132,841
1993/94	87,118	73.3%	31,713	26.7%	118,831
1994/95	88,484	68.5%	40,653	31.5%	129,137
1995/96	91,459	70.8%	37,689	29.2%	129,148

Sources: FAO 1977, Dep. Kehutanan 1996a, Dep. Kehutanan 1996b

The busiest months are July and August, when 27 per cent of visitor arrivals were recorded for 1995/96.

Numbers of visitors staying at Ranu Pani/Mount Semeru were calculated at 3722 in total (1993 data), of whom about 8 per cent were foreigners (Sutito 1994).

The country providing the largest number of foreign visitors was Hong Kong, followed by Taiwan and the Netherlands (Table 2). The presence of so many

Hong Kong and Taiwanese visitors is a relatively recent development, only occurring since the opening of the Hotel Raya Bromo in 1990, by which considerable marketing effort has been made. The large contingent of Dutch visitors is explained by their historical association with Indonesia.

Table 2 - Nationality of visitors to Bromo 1995/96

Nationality Numbers %

Hong Kong	13,208	32.4%
Taiwan	6,953	17.1%
The Netherlands	5,003	12.3%
Other European	6464	15.9%
North America	2131	5.2%
Australia/New Zealand	1976	4.9%
ASEAN	1383	3.4%
Japan/Korea	1334	3.3%
Other	2192	5.4%
Total	40,644	

Source: Dep. Kehutanan 1996a

During the survey period 101 Indonesian visitors and 72 foreign visitors were surveyed. Of the foreigners, 60 per cent were European, 16 per cent were from North America, and 16 per cent from Australia and New Zealand. Other tourists came from Japan, Hong Kong, Taiwan, Russia, Israel, and South Africa. A small number of people (8 per cent) were foreigners working temporarily in Indonesia or in other parts of Asia. Although the largest numbers of tourists to the park are from Taiwan and Hong Kong, these groups are considerably under-represented in the survey due to a number of factors, including the inability of the researchers to speak any Chinese language, and to the brevity of stay of these groups in the area. Information on their activities, attitudes and expenditure was gained from observation and from tour leaders accompanying the groups.

Most of the domestic tourists came from cities not far from the national park, such as Probolinggo, Surabaya, and Malang. Only 12 per cent of those who stated their town of residence came from outside East Java.

5.3.2 Age, Occupation, and Group Composition

Over one-third of foreign visitors (38 per cent) to Cemoro Lawang who were surveyed and two-thirds (66 per cent) of Indonesians were aged 25 or under, and over three-quarters (76 per cent) of the foreigners and 90 per cent of Indonesians were aged 35 or under. However, while 32 per cent of the foreign

visitors were students, with most of the remainder in professional occupations (58 per cent), over half of Indonesian visitors (52.5 per cent) were school or university students. Of the remainder, 32.5 per cent worked for private companies, and 12.5 per cent were civil servants. The proportion of working and retired foreign visitors and of professional Indonesians arriving via Wonokitri and Tosari is much higher, and most of the East Asian visitors are working or retired rather than students.

Of the visitors surveyed at Cemoro Lawang, only 8 per cent of the foreigners came on organised tours. All of the Taiwanese and Hong Kong visitors were on organised tours. All the visitors arriving via Wonokitri and staying at the Bromo Tosari, whether Asian or European, were on organised tours. All the Indonesian visitors encountered were on trips organised by themselves or by their school, university, or work-place, rather than by official tour operators. The Indonesian visitors arrived in larger groups than the non-Taiwanese or Hong Kong foreigners, with an average of 15.5 people per group, whereas the Western visitors arriving through Cemoro Lawang had an average of 2.2 people per group. The Taiwanese and Hong Kong groups generally consist of 15-25 people. The village has the capacity to cope with extremely large groups, as long as they do not require overnight accommodation: one group of over 350 Indonesian students was encountered, and during the initial week-long survey a group of 108 Westerners from a cruise ship was observed, all of whom were provided with horses for the trip to the Bromo crater. The larger groups of foreign tourists generally stay at the Hotel Raya Bromo or in big hotels in Surabaya or Probolinggo. Surabaya has an over-supply of accommodation and prices have been brought down to entice a part of the Bromo market away from the local hotels. However, the local hotels feel confident enough about the future to expand: the Bromo Permai (in Cemoro Lawang) will be constructing a further 100 rooms and the Hotel Raya Bromo (between Ngadisari and Probolinggo) a further 300 rooms over the next 3-5 years.

5.3.3 Expenditure

The majority of Western visitors to Cemoro Lawang were budget travellers, expecting to spend Rp.15, 000-Rp.40, 000 per person per day on food and accommodation. In many cases this budget was exceeded, and there were several complaints that the food and accommodation was more expensive than in other popular tourist sites in Java and Bali. The hotel and restaurant owners justified these higher prices by the fact that water has to be bought and trucked in from Sukapura, about 20 kilometres away, and most food brought in from Probolinggo, about 60 kilometres away. Western visitors spend little on souvenirs other than postcards. The better-off Indonesian visitors buy the hats and scarves on offer, expecting to spend between Rp.7, 500-30,000 each. The Taiwanese and Hong Kong visitors are welcomed by the local tradespeople with enthusiasm because of the large amounts of money they spend on hats, scarves, gloves, and on renting jackets. The prices charged to these visitors are

generally higher than to other tourists. This is also the case with hire of the horses to the crater. The standard fee is Rp.12, 500, posted in two places on notice-boards, but written rather discreetly and in Indonesian only. Western tourists are generally aware of the standard fare and often manage to bargain the horse-men down to Rp.10, 000, especially if business is slack. Many Indonesian visitors walk for reasons of economy, and there were complaints that the horse-hire prices were not standardised. Until recently, when the guides accompanying the Taiwanese and Hong Kong visitors reached a more business-like arrangement with the Horse-owners Association, the horse-men would frequently manage to get up to Rp.25,000 from the Asian visitors, but this practice of very high charges has now largely stopped except at very busy periods. There are standard fares for the jeeps, which also operate on a rota basis.

5.4 Attitudes

The tourists surveyed were asked for their opinion of the facilities available, of Mt. Bromo as an attraction, and of the national park in general.

5.4.1 Use and Opinion of facilities

In general, foreign tourists were realistic about the standard of food and accommodation available in Cemoro Lawang. The budget market is well catered for by the Lava Hostel and by Yoschi's, which were generally praised by their clients for the warm atmosphere, good food and clean, cheap surroundings. The Cemara Indah fared less well in that it was sometimes criticised for lacking in atmosphere and providing poor service. The Bromo Hotel was universally slated for the rip-offs, hassles and aggression encountered there. The mid-market Bromo Permai was thought to provide a satisfactory service, although there were some complaints about the maintenance of facilities. Comments on the Bromo Tosari ranged from "basic" to "good", which probably reflected the high expectations of some of the clientele rather than any great variation in the standard of rooms and food provided. Tour leaders accompanying the East Asian groups which make up much of the clientele at the Bromo Tosari commented that their clients generally expected four-star food and accommodation. In Wonokitri there was disappointment by visitors that none of the accommodation offered food.

Over one-third of Indonesian visitors to Ngadisari/Cemoro Lawang did not stay the night (35 per cent), and a further third either camped or slept outside or in the mosque (23 per cent), or slept in their vehicle (10.5 per cent). The remainder stayed in hotels or rented rooms from local people. There were particular criticisms directed at the camping facilities available in Cemoro Lawang. Although opened as recently as 1996 and with a supply of running water, the toilets are already damaged, the site is littered, and the water supply apparently failed the day after the opening ceremony. The lack of water

and the lack of public toilets at Cemoro Lawang generally attracted a high number of complaints from Indonesian tourists, with 23 comments on this out of 104 comments made on various "dislikes" about Cemoro Lawang/Bromo.

5.4.2 Opinion of Mount Bromo

Reasons cited by Indonesian tourists for visiting Bromo and their activities while there fell into three main categories: recreation, nature, and study. The number of recreational and nature-based motivations were almost equal, with 56 comments on recreational aspects of the place (eg. sight-seeing, taking photographs, relaxation) and 52 comments on nature-oriented aspects (eg. seeing the sunrise, the view, and admiring the beauty of nature). A further 11 comments concerned observation or study of various aspects of the park or Tengger culture. (Several people commented on more than one aspect.) The most common motivation for foreign tourists was to see an active volcano, followed by enjoyment of the cool air. As negative aspects, the highest cause of complaint amongst Indonesian tourists (18 comments out of 104) was the smell of horse manure, while foreign tourists' most frequent complaints were about the litter, over-charging, and - for those who came on a Sunday - over-crowding. The comments of foreign tourists often appeared to be more enthusiastic, using adjectives such as "fantastic", "awe-inspiring", and "spectacular", while Indonesians were more low-key in their praise, using words such as bagus, indah, and menarik (good/lovely, beautiful, and interesting). This difference is probably a reflection of the fact that Indonesians are generally less demonstrative than Westerners. Some Indonesian comments also revealed an admiration for the wonder of God's creation.

5.4.3 Opinion of the national park

The foreign tourists were asked what their image of a national park was, and then to comment on whether their impression of Bromo Tengger Semeru matched up to this image. Of the 87.5 per cent who responded, 40 per cent of comments said that a national park should be an area of nature protection or preservation, with 28 per cent of comments focusing on the beauty, tranquility and nature of the area. 13 per cent of comments said that tourism to a national park should be regulated, while only 2 per cent thought that tourism was one of the primary purposes. In response to whether Bromo matched up to their idea of a national park, almost equal numbers said that it did (41 per cent) and that it did not (37.5 per cent). A further 20 per cent had mixed views. The "no" comments concerned the excessive amount of litter (36 per cent), the presence of vehicles in the sand sea (19 per cent), and the lack of information, over-crowding, and a lack of apparent management (12 per cent each). Amongst those who had mixed views, the most frequent comment was that the park was currently very attractive. 76 per cent of respondents said that they would be interested in more walks and wildlife-viewing opportunities in the area, with 17 per cent saying "possibly". Almost half the respondents commented that they

would have appreciated more information on the natural and cultural features of the area, including the agricultural systems, and some suggested that there should be a visitors' centre - apparently unaware that there already is one. 12.5 per cent of the visitors did not know that Bromo was a national park. One-third had visited other Indonesian national parks, although 12.5 per cent of respondents to this question named a place which is not a national park.

Indonesian visitors were asked what the functions of a national park were. Nine respondents did not answer this question, while four said that they did not know. From the remainder there were 114 comments. The largest single number of comments (44 per cent) concerned environmental or nature conservation, while a further 25 per cent concerned the recreational facility offered by parks. 11.4 per cent of the comments concerned educational aspects. Indonesian respondents were also asked if they had visited other national parks, and if so, which ones. Of the 93 respondents to this question, 35.5 per cent had never visited another park, and 64.5 per cent said they had. However, the examples of places considered to be national parks were often incorrect, with 34 per cent of the total respondents citing places such as Baluran and Meru Betiri, which are indeed national parks, and 28 per cent naming places such as botanical gardens, Bedugul in Bali, or Taman Mini, near Jakarta, none of which are national parks.

Taken together, these statistics are significant in that they indicate a fairly high propensity amongst visitors to Bromo to go to other national parks or areas of natural interest, particularly for recreational purposes, but that awareness of the places which actually constitute a national park is fairly low. These findings cannot of course be extrapolated to apply to Indonesians in general, as the visitors to Bromo were self-selecting in that they already had sufficient interest and motivation in natural areas to make the visit to one.

5.5 Economic significance

The park's economic importance lies in three main areas:

- the generation of revenue for the national parks authority
- the generation of revenue for people in the area immediately surrounding the national park
- the generation of revenue for the province of East Java as a whole.

5.5.1 Revenue for the Parks Authority

In 1995/96 the 129,148 acknowledged visitors produced Rp.246, 299,000 in entry fees (approx. \$107,086), collected by the PHPA. The standard entry fee is Rp.2000, with Rp.1000 payable by students. Both groups pay an additional Rp.100 insurance premium. Vehicles pay Rp.12, 500 to pass the barrier into the sand-sea from Cemoro Lawang, although fees for vehicles entering the sand-sea

from other points are not payable. The revenue was divided up according to guidelines set out in 1992 legislation covering entry fees to national parks, according to which, as described in Section 3.3, none of the proceeds return directly to the park (Table 3).

Table 3 - Allocation of park revenue (1995/96)

Destination of funds Amount (Rp.) %

National Treasury	36,944,850	15.00%
Ministry of Forestry	36,944,850	15.00%
East Java government	73,889,700	30.00%
Kabupaten Probolinggo	69,623,600	28.00%
Kabupaten Pasuruan	27,102,000	11.00%
Kabupaten Malang	1,417,200	0.57%
Kabupaten Lumajang	376,800	0.15%
Total:	246,299,000	

Source: PHPA 1992, Dep. Kehutanan 1996a.

The cost of running the park is Rp.1, 279,808,000 (\$556,438), about five times as much as the revenue. This funding comes from the central government in one form or another. Revenue from the park will increase when plans to raise the standard entry fee are implemented in the near future to Rp.5000 (\$2.20). A lower fee will still be payable by students (Sudarmadji 1996 pers. comm.).

The 1997 survey included a question on how much people paid to enter the park, and some of the respondents were asked whether they actually received a ticket. This indicated that 79 per cent of Indonesian tourists were aware of paying an entry fee, while 19 per cent did not pay at all. Of the ones who paid, 16.4 per cent said that they did not get a ticket. The remainder was not sure. These figures are probably rather conservative, given that respondents may have been reluctant to admit that they had not paid, or that they had paid less than the correct amount. Together, the Indonesian visitors who paid and did not get a ticket and those who did not pay at all add up to 35.4 per cent of the total surveyed. Non-issue of tickets to foreigners appeared to be somewhat less, with 12.5 per cent saying they had not paid. The discrepancy between under-reporting of foreign and domestic visitors means that the proportion of foreign to domestic is likely to be quite different than that reported.

The true number of visitors to the park is "hidden" in several ways. The main ticket office to the national park is beside the road at the entrance to Ngadisari, and is manned 24 hours. Public buses pause at the booth and tell the staff how many visitors to the park are on board. This is a somewhat haphazard system in that it is not always obvious if Indonesian passengers are local people

or visitors, and money is occasionally taken from the visitors without tickets being given in return. A common "scam" is for visitors to be charged Rp.3600 for the bus ride from Probolinggo to Cemoro Lawang, which passengers are told includes the entrance fee to the park. The actual fare is Rp.2500, with the remaining Rp.1100 as the entrance fee. The actual entrance fee is Rp.2100, and the passengers are clearly happy to pay a discounted rate. The difference of Rp.1100 is then split between the bus driver/conductor and the ticket-booth staff - again, no ticket is issued. At Wonokitri the PHPA ticket-booth is not manned full time, and visitors occasionally wait at the bottom of the road below the office until the ranger goes inside, at which point they drive quickly past the booth and into the park. As at Ngadas, the barrier is rarely if ever closed in order not to irritate local people, who use the road to get to their fields. A major failing of the system is that there is no double-checking of tickets in Cemoro Lawang. The lack of date-stamping and a period of validity on the tickets means that the same ticket can be used for an indefinite period and for an indefinite number of entries to the park: the author purchased one on first visiting the park in December 1996, which was accepted (without ever being checked) on numerous subsequent occasions.

Further scams concern the jeeps entering the sand-sea, which are supposed to pay Rp.12,500 on entry. Tickets for this are rarely issued, and much of the money generated is almost certainly split between various staff members of the PHPA. On one occasion a group of passengers was observed to be waiting on the track down to the sand-sea below the ticket-barrier, while the jeep-driver passed the barrier with an empty vehicle, for which no money is payable. He then stopped to pick up his passengers out of sight of the ranger issuing the tickets. It was clear to the researchers that the 12.5 per cent of foreign visitors and 35.4 per cent of Indonesians who fail to be issued with tickets according to the survey findings was an under-estimate of the true situation, and that due to the weakness of the current system a considerable sum of money is failing to reach the intended government departments.

5.5.2 Revenue generated from local involvement

In interviews with government officials and from reports on Bromo Tengger Semeru National Park, the researchers were given to understand that the Tenggerese had little interest in tourism, preferring to concentrate on their agriculture. The 1995 draft management plan produced by the national park office does state that a majority of the people in Ngadisari and Wonokitri work in tourism transportation, but that this is only additional work to their main occupation as farmers (Dep. Kehutanan 1995). The research showed, however, that this is inaccurate. It is certainly the case that in most areas the Tenggerese have little involvement in tourism, but this was found to be because of lack of opportunity rather than lack of interest. In fact, only a minority of people in Wonokitri are involved in tourism, while in Ngadisari tourism has become a major source of income, rather than just a side-line.

a) Ranu Pani

In Ranu Pani, where climbers begin the trek up Mount Semeru, around 30 per cent of households had at least one male member who had worked as a porter to help people with their climb. They could earn up to Rp.20, 000 per day for this (reported amounts varied), clearly a significant sum of money where the standard agricultural wage is Rp.2, 500 per day. Porter work appeared to be infrequent, occurring only 3 or 4 times per year at the most, but several of those interviewed expressed the hope that it would become more frequent as time went on. In Ranu Pani there was also occasional involvement in performances of kuda lumping (horse-trance dancing) for the tourists, and this was also felt to be desirable as money could be earned - generally around Rp.10, 000 per man per performance. Several people expressed the hope that when the roads were improved and more tourists came, the local economy would benefit, but this was felt by the researchers to be unlikely unless the villagers were trained in the provision of clean accommodation and palatable food, both of which are lacking in Ranu Pani except at the existing homestay, which provides clean, cheap accommodation, excellent food, and a warm atmosphere.

b) Ngadas, Kandang Sari, Wonokitri

Neither Ngadas nor Kandang Sari earned any money from tourism, and in Wonokitri involvement in the industry was limited to the provision of jeep trips and occasional accommodation. There are around 60 jeep owners grouped in an association. Two officials of the association visit the Bromo Tosari hotel nightly to ask how many jeeps will be needed the next morning, and then allocate the work to jeep owners on a rota basis. The jeep owners were disappointed that this work had fallen off since the hotel had bought two of its own minibuses - although if this hotel had not been built with outside investment the possibilities for earning money from driving tourists would be far more limited. The hotel takes a commission on the jeep rides: the cost to the tourist is Rp.70, 000, while the jeep owners receive Rp.50, 000. The jeep owners have no insurance, and there is no check on whether the drivers have a driving licence. In February 1997 a jeep driven by the 15 year old son of the owner went off the road on the steep hair-pin bends leading to the sand sea, resulting in severe injury to the occupants.

c) Ngadisari/Cemoro Lawang

It may have been true up to the early 1990s that the Tenggerese around Ngadisari and Cemoro Lawang preferred to concentrate on their agriculture than to become involved in tourism. However, by 1997 it was clear that the situation had changed considerably. As already noted, there are over 450 horses servicing the tourist demand for rides to the crater, and the horse-men claimed to have no difficulty in getting a ride at least once a day. Most of them

said they took their horses out on 5 to 7 days per week, and at weekends and other busy periods they can get three or four rides a day. The standard fare is Rp.12,500, of which Rp.1,500 is paid out in various village taxes and subscriptions. Even at a low calculation of one ride per day on five days, the men can thus earn Rp.55,000 per week - an important sum. At the end of Ramadhan (the Muslim fasting month), which in 1997 occurred in early February, one man said he had taken Rp.600,000 in rides over a ten-day period. The cost of owning a horse is relatively small: initial purchase is around Rp.1,000,000, and the horses apparently work for 12-18 years. Some are given dedak, or rice chaff, and sugar-cane residue as a food supplement, at a cost of around Rp.1000 per day, and otherwise eat grass collected by the horse-man or another member of the family. At busy times the horse-owners buy grass from men who collect it in the sand-sea. The grass-collectors mainly come from Argosari, a village on the crater rim about 1.5 hours' walk from Cemoro Lawang, or occasionally from Ngadas (2.5 hours' walk) or other villages. They sell the grass for Rp.4, 000-5,000 per load of two baskets, and generally cut and sell two loads per day. The work is extremely strenuous: the baskets weigh around 80 kg and have to be carried up the steep caldera wall, but the hard work and long journey from the other villages is clearly considered worth-while for the sums earned.

Although horse-ownership and management is the main form of involvement in tourism, jeep ownership and provision of accommodation provide additional sources of income for many families. It was also found that members of several households worked in hotels, either in Cemoro Lawang or down the road to Probolinggo, while others were in other forms of tourism-related work, such as driving the trucks which collect water for the hotels or as parking attendants. Several of the younger people expressed an interest in pursuing a high school education so that they could work in tourism.

Some of the farmers expressed the opinion that the increasing revenue from tourism was extremely fortunate in that it compensated for the loss in revenue from agriculture. As described in Section 4.3 above, the main cash crops of potato and cabbage have suffered from disease and decreasing yields since 1994 and in other areas of the Tengger region families are experiencing considerable hardship as a result. In Ngadisari/Cemoro Lawang villagers said that tourism revenue equaled or exceeded farming revenue, and that they used their daily tourism earnings to cover their regular outgoings, with the larger lump sums earned from crop sales to pay for capital expenditure such as house improvements. It was calculated by the survey team that around three-quarters of the households in Ngadisari have some involvement in tourism, and it should thus not be assumed that the Tenggerese are uninterested in the sector.

In addition to the sums earned by individuals in the village, all vehicles entering Ngadisari/Cemoro Lawang pay a fee of Rp.1000, which is used for road or other village development activities.

5.5.3 Revenue for the province and country

Far more significant than either entry fee revenues or local expenditure are the amounts spent by tourists in the province as a whole as a result of visiting Bromo. According to the East Java government, Bromo is the "primadona" (sic) of its tourism attractions, being the largest single attraction for foreign visitors. Elsewhere in the province, only Surabaya Zoo (17,656 visits) saw foreign arrivals in excess of ten thousand - compared with the 40,000 or so for Bromo (Diparda 1996). In 1995 tourism to East Java generated foreign exchange of \$173.98 million. It is clear, therefore, that the park is an extremely important part of the tourism product at provincial level. The national tourism authority also recognises its value as a national asset because of its uniqueness and the fact that it is the most accessible large natural attraction in the whole of Java. In many cases, it is the only natural object that tourists visit during their stay in Indonesia, as with the Hong Kong and Taiwanese groups, whose week-long tour starts in Bali or Jakarta and stops only at Bromo and Yogyakarta in between.

5.6 Impacts of tourism

The amount of tourism activity taking place at Bromo, with 150,000 visitors per year, could be expected to have impacts on the ecology of the park and on the local society and culture. Few of the reports or student dissertations available tackled these impacts in any useful detail, and the following remarks are therefore based on field observations.

5.6.1 Economic Impacts of Tourism

The residents of all the villages were universally in favour of tourism for the economic opportunities it offered, and as discussed above, tourism has a far more important role in the economic life of Ngadisari/Cemoro Lawang than most outsiders are aware of. The direct economic impacts are clear, in that the furnishings and material goods of houses in Ngadisari/Cemoro Lawang are on average more expensive than in any of the other villages except Wonokitri, and visitors are given shop-bought drinks and snacks rather than homemade ones. The propensity for educating the children is also rather high in Ngadisari, with none of the residents interviewed complaining of the high cost of education and board and lodging in towns outside the area, as was the case in the other villages.

An important finding of the study was that tourism to Bromo is having an economic impact in local villages in a broader area than just Ngadisari. As described above, many of the male residents of the village are too busy with the horse-rides for tourists to collect the grass for their horses and other livestock. The women work in the fields rather than collecting grass - although they occasionally do this too, carrying one basket-load at a time rather than

two. To cater to the shortfall in fodder, grass is bought from collectors from other villages. It was estimated that 30-40 men are engaged in this activity on a daily basis.

An indirect economic impact is that the residents of Ngadisari no longer have time to work their fields themselves, and cannot find labour locally to do so, as earnings are much higher from working directly with the tourists as horse-men. There is therefore a considerable amount of imported labour, mainly from villages along the road towards Probolinggo. Although the need for migrant labour is probably due partly to the large size of land-holdings, as outside workers are also used in Ranu Pani, their use is certainly increased by the tourism-induced labour shortage in Ngadisari.

5.6.2 Socio-Cultural Impacts of Tourism

The socio-cultural impacts of tourism have been well-documented, and include the breakdown of traditional social structures due to an influx of tourists and migrant workers, adoption by younger members of the host community of behavioural traits and morals of the tourists ("the demonstration effect"), and marginalisation of the host community. In the case of tourism to Bromo Tengger Semeru, the research team found however that these negative impacts have so far largely failed to materialise. Social and religious structures appear to be intact, and none of the young people showed the signs of cultural breakdown that occur in parts of Bali, such as hanging around the tourist spots and chatting up young foreign women. There is in fact very little social interaction between the visitors and the residents. In the 1997 survey, both Indonesian and foreign tourists were asked what interaction they had had with the residents. In the case of the foreigners, most were unaware of the distinction between local people and domestic tourists, and comments that they had chatted and exchanged addresses clearly referred to visiting Indonesians rather than to the Tenggerese. Several people commented favourably on the lack of "hassles" and commercialism in Ngadisari compared to Bali.

There is very little out-migration of the Tenggerese, and little in-migration by outsiders. According to the village headman of Ngadisari, outsiders are not allowed to settle in the village unless they marry a local person, and as few outsiders share the religion of the Tenggerese, marriages outside the community are uncommon. The ability of the Tenggerese in Ngadisari/Cemoro Lawang to resist outside influences is strengthened by their separate religious and cultural identity and their history of partial alienation from the surrounding lowland community. The structure of land-holdings is complex, with people owning land in several different parts of the village territory due to inheritance patterns. This, with the strong attachment most Tenggerese seem to have to their land, has made it extremely difficult for outsiders to purchase land in the area to build hotels or other tourism facilities. None of the

hotels or homestays in Cemoro Lawang is owned by a non-Tenggerese except where an outsider has married locally, and in Wonokitri villagers have turned down large sums of money offered to buy land for building hotels. (The Bromo Permai is on forestry land.)

Marginalisation of the host community often occurs when tourism becomes lucrative enough to attract outside entrepreneurs. A key factor in the ability of the Tenggerese to resist this trend is that they have succeeded in retaining control of an important part of the provision of tourism services - the horse-rides. While many Western tourists do not ride the horses to the crater, almost all East Asian and many of the better-off Indonesian tourists do so. Horse-ownership is restricted to residents of Ngadisari and neighbouring villages, and as the horse-ride is an integral part of the holiday experience as far as many tourists are concerned, the vital role of the Tenggerese in the mechanism of tourism in Bromo is guaranteed.

As far as cultural artistic manifestations are concerned, it was found in Ranu Pani that the occasional opportunities for performing kuda lumping (horse-trance dance) to foreigners stimulated enthusiasm for participation in this. There are some moves by local hotel-owners to increase cultural performances to tourists in order to increase the possibilities for local earnings from tourism and to increase visitors' length of stay in the area, but this had not come been happened by the time of the 1997 survey.

5.6.3 Ecological Impacts

It was not possible to find any ecological surveys of Bromo Tengger Semeru National Park other than the original management plans carried out by the WWF/FAO programme in the late 1970s. More recently, a number of studies have been carried out by forestry and other undergraduates into the impacts of tourism in the park. These focus only on the specific area around Mt. Bromo and Cemoro Lawang, and comment on the trampling of vegetation by visitors, the litter, and the graffiti scrawled on rocks and trees. In the absence of detailed scientific surveys, the research team used observation, and compared photographs taken in 1980, 1983 and 1997 to draw conclusions about the ecological impact of tourism on the national park.

a) Direct effects of tourism

There is certainly trampling of vegetation in the sand sea along the path to Bromo crater, but this is limited in extent as most visitors on foot and on horse-back tend to keep to the path, and the vegetation is anyway rather scarce. More damage is caused by jeeps and motor-bikes in the sand-sea, and vehicle tracks running between Cemoro Lawang, the Bromo crater, and the road to Wonokitri/Penanjakan are now obvious, whereas in photographs of the area from the early 1980s there were few signs of tracks. However, the impact is

probably more aesthetic than ecological as, again, the vehicles tend to stay on the same tracks - although a small minority of jeeps and motorbikes zoom around in the sand-sea at random. This will certainly become more of a problem if unlimited numbers of motorbikes and four-wheel-drive vehicles continue to be allowed into the sand-sea.

A more significant problem for the native vegetation is the collection and sale of edelweiss flowers, a protected species. The dried, whitish flowers are considered to be attractive. Edelweiss is collected from the slopes of Mt. Batok (the peak next to Mt. Bromo) and from other mountains within the national park, and is apparently becoming harder to find. It is sold quite openly on the road up to Ngadisari and at Cemoro Lawang, with PHPA rangers ignoring the trade and even directing tourists to places where they can buy the flowers.

b) Indirect effects of tourism

The indirect effects of tourism are probably more significant than the direct ones, in that much of the fodder eaten by the horses used for tourism is collected in the sand-sea and on the walls of the caldera. There is also periodic burning of the grass in the sand-sea to encourage new growth, although this is illegal and apparently occurs less frequently than formerly in the area visible from Cemoro Lawang - although clear signs of recent burning were observed on grasslands in the western areas of the park, around Kandang Sari. The combined effect of the burning and grass collection is to prevent natural vegetative succession, whereby bushes and eventually trees might be expected to take over from the predominant grassy forms. On the other hand, grass-cutting is helping to maintain the sweeping, open landscape so attractive to tourists, and volcanic eruptions and deforestation for fuelwood purposes have a more significant impact on natural vegetation cover than tourism.

Another indirect impact is that there is increased litter in Ngadisari as a result of the higher disposable income there. Waste packaging from household goods was observed in litter dumps down the caldera wall at Cemoro Lawang, and there is considerable litter around some of the hotels (especially the Cemara Indah). This is despite the fact that Ngadisari is the only village out of the ones visited to have an organised rubbish collection.

c) Induced effects of tourism

Ownership of motorcycles and jeeps in Ngadisari and Wonokitri has been encouraged by tourism, and these vehicles are used not only to service tourists but also to facilitate working and ceremonial practices. There are many family ties between the different Tengger villages located around the caldera rim, and there is some vehicular traffic between these villages using the sand-sea tracks as a shorter alternative to the longer paved routes around the outside. There is also visitation to the various sacred sites of the Bromo complex,

including the large Hindu temple (poten) at the foot of Mount Batok, and a holy cave on Mount Widodaren. Journeys to these sites were formerly on foot or on horse-back, and are now often accomplished by motor vehicle. One of the aims of this study was to find out whether tourism had any beneficial impacts on the environment. The research in villages showed that the most important direct function of the protected area for the villagers is as a source of fuelwood. As described in Section 4.4, in the four villages with little or no tourism, substantial amounts of firewood are collected from inside the national park. However, in Ngadisari/Cemoro Lawang it appeared that much less fuelwood was collected. The forest bordering the fields was in good condition, and in many cases the trees actually encroached upon the farmers' land. The casuarina trees on people's land were more numerous, larger and healthier than in the other villages. There was far greater use of other fuels for cooking and heating, such as paraffin, LPG, and even electricity. There was also greater use of charcoal, although this merely displaces exploitation of the forest rather than replacing it, as most of the charcoal is bought from villagers from another, very poor village which borders the national park (Keduwon).

Given that an estimated 70-80 per cent of the families in Ngadisari are involved in tourism in some way, it is clear that this sector is providing sufficient income to reduce reliance on the fuelwood resources of the national park.

Section 6 - Discussion and Recommendations

6.1 Discussion

This study was designed to provide detailed information on tourism in a protected area in order to find out whether tourism focusing on a protected area can contribute to community development and to conservation, and to identify the factors which help it do so. A secondary consideration was to contribute to the debate on whether participatory, community-based ecotourism is a realistic strategy for NGOs to follow in trying to establish income-generating projects. As far as the first point is concerned, the evidence of the Bromo-Tengger-Semeru study is that, under certain conditions, nature tourism can be directly and indirectly beneficial to people's economic, social and cultural welfare. It was quite clear from people's houses, material possessions and foods that the residents of Ngadisari are wealthier than in Ngadas, Ranu Pani, or Kandang Sari. Awareness of the need for education is higher, and the number of people reporting infant deaths in the family was lower. These factors are almost certainly not due to greater agricultural productivity, since the land was less intensively farmed while the average farmland per family was no greater. Furthermore, tourism has clearly prompted the local government to make infrastructural improvements such as better road, electricity, telephone and public transport networks, all of which improve the quality of life for residents as well as facilitating tourism.

It is hardly new to say that tourism is responsible for generating economic wealth. What is interesting about the Bromo Tengger Semeru case is that the community with the most tourism, Ngadisari, has remained the principal beneficiary of the direct economic impacts by retaining firm control over ownership of tourism services, and this appears to be the key element in ensuring their prosperity. Another key factor arising from the study is that tourism has to occur on a medium to large scale relative to the size of the host community in order for it to make a useful contribution to development, such as in Cemoro Lawang/Ngadisari, whereas the small scale of tourism in Wonokitri and Ranu Pani provides negligible benefits.

Although in Wonokitri tourism is a minor factor in the village economy, where social and economic indicators such as material possessions, propensity for education, and awareness of health and hygiene are as high or higher than in Cemoro Lawang/Ngadisari. The research team tried to determine what other important factor could be present, and the only substantial difference found was that Wonokitri had benefited from a long period of enlightened leadership from the long-serving village headman and his successors.

As far as any conservation benefits of tourism are concerned, the picture is complicated. On the one hand, it appears that tourism-generated wealth enables people in Ngadisari to buy alternatives to fuelwood, and in Ranu Pani some people made a link between tourism and conservation - even the need to sustain fuelwood supplies was probably a more significant factor in generating a few conservation-related practices. On the negative side, tourist vehicles are creating unsightly tracks in the sand-sea, and the collection of grass is interfering with the natural ecology of the park. In theory, the outstanding contribution of Bromo Tengger Semeru to East Java's economy should result in increased political will to ensure the park's long-term ecological health, but no effort is expended on park protection by the local government. The few investments in infrastructure are designed to facilitate tourism or as part of a general development programme, rather than to improve park conservation. This is partly because the area is seen as the responsibility of the PHPA, but all the villages lie outside the park boundary and there is nothing to prevent extension work in them by other agencies. However, as tourism takes place in only a small area of the park, deterioration of areas outside the touristic zone will have no impact on visitation numbers, and tourism is therefore an ineffectual justification for supporting conservation measures in other parts - other reasons for stronger protection measures have to be found, such as the park's usefulness for protecting water supplies or providing a buffer zone from volcanic eruptions.

It is a pity that the interests of PHPA field staff focus more on making money than on their official duty of protecting the park, and that at a more senior level these abuses are not regulated. Such obvious and public negligence is bad for Indonesia's conservation record. It also contributes to the conclusion that

the link between tourism and conservation is tenuous, and that nature tourism is unlikely on its own to improve conservation of the target area. Official policy support in the form of government regulations and incentives are essential. Also essential, since these regulations often already exist, is effective enforcement and better extension work to ensure that villagers are fully aware of the purposes and relevance of the national park.

The tacit acceptance of the right of local people to continue to use the resources of a protected area to facilitate subsistence aspects of their daily lives is in keeping with the international philosophy of protected areas management, which since the mid-1980s has recognised that the former hard-line approach of trying to exclude indigenous people from their traditional communal lands was both inhumane and unlikely to succeed in improving conservation of the area in question. Unfortunately, growing populations and the inclusion of almost all groups in society in the cash economy has resulted in an increased need for people nearly everywhere to earn cash income in order to maintain a livelihood at or just above subsistence level. This has resulted in exploitation of park resources for cash. This occurs in parks all over Indonesia. In this particular case study, abuses of regulations seen were the excessive making of charcoal around Kandang Sari, bird-trapping around Kandang Sari and Ngadas, and collection of protected plants for sale to tourists at Ngadisari.

Where there is little prospect for developing tourism, such as in Ngadas and Kandang Sari, other strategies have to be found for protecting the forest. In these cases, rather than proposing unrealistic tourism schemes, it would be more effective to increase the availability of long-term sources of fuelwood and improve agricultural methods, particularly through soil erosion measures, terracing, crop diversification, and reduction of dependency of chemical inputs. In other words, development strategies have to be flexible and tailored specifically to each specific location.

As far as community-based tourism is concerned, the response is again mixed - or at least the conclusions do not entirely concur with current development fashion. Tourism to Mount Bromo is rooted in the community to the extent that the Tenggerese are benefitting from the industry through their individual involvement in tourism-related enterprises, and they are able to resist the incursion of outsiders and the over-development which has resulted in negative impacts in other places. However, their level of participation in decision-making and management is limited, as they are not involved in promotion and are not in control of whether tourism happens or not. As negative environmental and cultural impacts currently appear to be low, it therefore appears that a high level of participation in the industry through ownership of facilities and the ability to profit from private enterprise, coupled with a strong local identity, are more important for success and sustainability than involvement in policy and management. Of course, every case study is an isolated example to the extent that local circumstances influence the condition

of tourism, and in the case of Bromo the Tenggerese are fortunate in having a unique, world-class attraction and a strong community identity, while the national park has a relatively robust ecology.

It may be argued that as tourism to Bromo is not "ecotourism" in its purest sense, its impacts are not relevant to the continuing debate on whether tourism is beneficial to conservation. However, this kind of tourism has to be taken seriously in the context of a developing country, and indeed of national parks tourism, in that it is only this level of medium to large scale tourism which can generate sufficient economic benefits to have any impact at all; small-scale tourism may be beautiful, but it is also irrelevant to the planners and policy-makers who are trying to make conservation and development compatible, and to the communities who have to live within the schemes of development planning.

6.2 Recommendations

National Park Management

1. Better extension and information programmes should be carried out with the villagers to increase their awareness of the status and functions of the protected area.
2. More frequent and wide-ranging patrols along the park boundaries should be carried out to deter excessive fuelwood collection and animal poaching.
3. More cooperation should take place with the agricultural services to ensure better fuelwood production on villagers' own land.
4. Senior national parks staff should undertake random and unannounced visits to PHPA posts to check on ranger activities in order to reduce neglect and abuses of responsibility.
5. PHPA staff involved in tourism-related income-generating activities should be encouraged to restrict their involvement to non-working hours, and to redirect some of their energies into their official responsibilities.

Tourism

6. A system of controlling tourist numbers at the Bromo crater rim must be considered, particularly on Sundays and public holidays. The present situation of over-crowding on the narrow rim is dangerous and potentially counter-productive, in that tourists and tour organisers may cease to visit the area if it gains a bad reputation for poor visitor management.

7. Checks should be carried out on foreign and domestic tourists at Cemoro Lawang to ensure that tickets have been paid for and issued. Tickets should also be date-stamped and indicate a period of validity.

8. The Visitors' Centre must be more effectively used through better exhibitions, more promotion, and more suitable and rigorous opening hours. Allied to the Visitors' Centre, better information on walking trails should be made available to tourists in order to diversify and spread tourism within the park.

9. Young people from Ranu Pani in particular should be encouraged to learn tourism-related skills in order to ensure that they can benefit from future tourism opportunities.

Agriculture

10. A team of horticulturalists with experience of temperate-climate crops, working at provincial level in order to cover all four kabupaten, should begin to address the problems affecting the potato and cabbage crops. They should also encourage crop diversification.

11. More extension work should be carried out among the villagers to discuss the long-term effects of poor farming practices such as cross-contour cultivation, lack of terracing, and over-use of chemical inputs.

References

Atsuko, H. (1996) Environmental Interpretation in the Tourism Industry in Mainland China, Taiwan, and Japan, paper presented at International Conference on Tourism and Heritage Management, Yogyakarta, October 28-30

Departemen Kehutanan, Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam, Taman Nasional Bromo-Tengger-Semeru (1992/93a) Laporan Pengkajian Zonasi Taman Nasional Bromo-Tengger-Semeru, Buku I, Malang (Zonation report)

Departemen Kehutanan, Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam, Taman Nasional Bromo-Tengger-Semeru (1992/93b) Laporan Identifikasi Daerah Penyangga Taman Nasional Bromo-Tengger-Semeru, Malang (Buffer zone identification report)

Departement Kehutanan, Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam, Taman Nasional Bromo Tengger Semeru (1995) Rencana Pengelolaan Taman Nasional Bromo Tengger Semeru (1996/97-2021/2022), Buku III, Rencana Tapak, Malang (Management Plan)

Departemen Kehutanan, Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam, Taman Nasional Bromo-Tengger-Semeru (1996a), Laporan Tahunan 1995/1996 Taman Nasional Bromo-Tengger-Semeru, Malang (Annual national park report)

Departemen Kehutanan, Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam, Taman Nasional Bromo-Tengger-Semeru, (1996b) Potensi dan Permasalahan Pemanfaatan Serta Pengembangan Obyek Wisata Alam, presented at: Rapat Koordinasi Pemanfaatan Obyek Wisata Alam, 5-6 November 1996

Diparda: Dinas Pariwisata Daerah (1996) Pariwisata Dalam Angka 1995 (Tourism statistics 1995), Surabaya

Ediwijoto, B. (1996) Kebijakan dan Strategi Pengembangan Obyek Wisata Alam (Policy and strategy for nature tourism), during Co-ordinating meeting for management of nature tourism, 5-6 November 1996, Banyuwangi, organised by Regional Office of the Ministry of Forestry, East Java

FAO (1977) Proposed Bromo-Tengger-Gunung Semeru Mountain National Park, East Java, Field Report of UNDP/FAO Nature Conservation and Wildlife Management Project INS/73/013, Bogor

FAO (1980) Bromo-Tengger-Gunung Semeru Proposed National Park, Management Plan 1981-85, Field Report of the UNDP/FAO National Park development project, INS/78/061, Bogor

Griefenberg, R. (1997) comments at Seminar on Ecotourism for Forest Conservation and Community Development, Chiang Mai, January 28-31

Hefner, R.W. (1985) Hindu Javanese: Tengger Tradition and Islam, Princeton New Jersey: Princeton University Press

PHPA: Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam (1992) Kumpulan Peraturan tentang Pungutan dan Iuran Bidang Pariwisata Alam serta Pungutan Masuk Kawasan Pariwisata Alam (Regulations on fees for entry to national parks), Jakarta, Ministry of Forestry

Stankey, G.H. (1988) Tourism and National Parks: Perils and Potential, in National Parks and Tourism proceedings of a New South Wales National Parks and Wildlife Service seminar, Sydney

Sudarmadji, Ir. (1996) Head of Bromo-Tengger-Semeru National Park, pers. comm.

Sumardja, E.A. (1995) National Parks and Foreign Aid, Conservation Indonesia Vol.10, No.4, Jakarta: Worldwide Fund for Nature

Sutito, A.S.B. (1994) Visitor Use Management at Bromo Tengger Semeru National Park, East Java, Indonesia, MSc thesis submitted to North Dakota State University, Fargo, North Dakota

Western, D. (1993) Foreword to Ecotourism: A Guide for Planners and Managers, Vermont: The Ecotourism Society