

Introducing Stakeholder Analysis in Malaysian Forestry – The Case of Ayer Hitam Forest Reserve

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Keywords: Cognitive mapping, oval mapping, SODA, stakeholder analysis

ABSTRACT

Environmental management problems involving many stakeholders are complex in nature. Often, some of the stakeholders are not consulted in the decision-making process leading to problems and conflicts. Furthermore, conventional methods such as local citizen meetings on problem solving do not adequately address stakeholder interests. These conflicts can be resolved by agreement on collaborative management of natural resources. Stakeholder analysis can provide negotiated options leading to conflict resolution. A study was conducted to examine various concerns and issues relating to the management of Ayer Hitam Forest Reserve (AHFR) using the cognitive approach. The stakeholders were interviewed and cognitive maps of issues were drawn. Then the stakeholders discussed the issues and reached consensus on a prioritized list of issues. The stakeholders were then presented with the economic valuation of timber and non-timber resources of AHFR and were asked to reprioritize the issues and rank them again. The stakeholders ranked the ecological role of forest as the most important while the use of forest as a social-cultural heritage was ranked the least important. The information on the value of conservation and non-timber products of the forest presented during the second workshop has influenced the stakeholders thus allowing them to reconsider the issues. This new list would be used as a basis for the management of the Ayer Hitam Forest Reserve.

INTRODUCTION

The increased awareness of the environment of different groups within the Malaysian society has led to changing perspectives on environmental issues and natural resource management. The number of protest letters written to newspapers on environmental issues also indicates that this awareness has translated into attitudinal change and action. This has resulted from the dissatisfaction of the masses leading to problems for the decision-makers in trying to implement developmental projects.

Environmental management problems involve many stakeholders and natural resources and therefore are complex in nature. Often some of the stakeholders are not consulted in the decision-making process resulting in difficulties and conflicts. Furthermore

conventional methods such as town-hall meetings do not adequately address stakeholder interests. These conflicts can be resolved by dialogue and agreement on collaborative management of natural resources.

Resource managers and people involved in making policy need to keep abreast of changing values. They need to know which segment of the society supports or opposes given policies or management prescriptions. They also need to know how different groups are affected by policy change. Hence better understanding of the political, social and economic aspects of a specific management option is of increasing importance. And more dialogues and communications between the resource managers, policy-makers and society are needed to develop better understanding among these players.

Stakeholder analysis can provide negotiated options leading to conflict resolution. Many studies have been conducted to see how stakeholder analysis can be used to resolve natural resource problem (De Lopez, 2001, Ravnborg and Westermann, 2002). Stakeholder analysis can be defined as an approach to understanding a system by identifying the key actors or stakeholders in the system, assessing their respective interests in that system and examination of inherent conflicts, compatibilities and trade-offs (Grimble and Wellard, 1997). These identified conflicts will be mediated through dispute resolution, consensus building or other mechanisms for stakeholder involvement.

Stakeholder analysis was first used in business to understand stakeholder interests with society and to search for better prospects of financial success (Chevalier, 2001). It is also a response by the business sector to deal with increasingly complex social systems in which modern corporations have to operate (Grimble and Chan, 1995). This approach is further enhanced by Freeman and Gilbert, Jr. (1987) who acknowledge the importance and the need to manage the stakeholder, thus the term stakeholder management. Grimble and Chan (1995) suggest guidelines on stakeholder analysis for natural resource management to be effective.

In Malaysia, stakeholder analysis of forest resource management is new and not much work has been done. The aim of this paper is to report a case study where stakeholder analysis was applied in the multiple-use management of Ayer Hitam Forest Reserve (AHFR), Selangor.

DESCRIPTION OF THE STUDY AREA

AHFR in Puchong is a lowland dipterocarp forest under the management of the Central Selangor District Forest Office. The forest is about 25 km from Universiti Putra Malaysia (UPM) and approximately 45 km from Kuala Lumpur. The size of AHFR is approximately 1,248 ha, consisting of compartments 1, 2, 12, 13, 14 and 15. The State Government of Selangor leased the forest to UPM for the purposes of teaching, research and extension.

Physical Environment

AHFR is a lowland dipterocarp forest with altitude between 15 and 233 m above mean sea level. The highest peak in the forest is located in

Permatang Kumbang. The slopes of the forest area range between 10 and 20%. In general, the topography of the forest is undulating. In terms of its river system, AHFR is dissected by two major rivers, Rasau River on the southern half and Bohol River on the northern side.

The temperature in AHFR ranges between 22.9 and 27.7 °C; the mean daily temperature is about 25.3 °C. The relative humidity of the area ranges from 59 to 96%, and the mean daily relative humidity is about 83% (Ainuddin and Salleh, 1999).

Geologically, the forest area is covered with igneous rock; the primary component is granite. The inner soil layer has metamorphic primary matter and ferro-magnesium as secondary matter. The soil series of the area are classified as Serdang-Kedah and Serdang-Bungor-Munchong which consist of a combination of local alluvium formed by metamorphic rock.

Flora

AHFR is a logged-over forest that has not fully recovered. It is a fragmented forest that is rich in plant species. According to Faridah (1999), there are 430 species of seed plants from 203 genera and 72 families. Of all the species 20 are endemic to Peninsular Malaysia, whereas 5 have been recorded in Selangor. In addition, there are 33 species of ferns, and 98 species of medicinal plants. The indigenous people from the Temuan group use almost all of these medicinal plants for more than 140 purposes.

Fauna

AHFR is also rich in fauna diversity. Studies indicate that there exist more than 160 species of birds from 38 families. Three families representing almost 24% of the population are Timaliidae, Cuculidae and Pycnonotidae. In terms of trophic structures/groups, the forest is dominated by the insectivore/frugivore groups, especially from the Pycnonotidae family (Zakaria and Abdul Rahim, 1999). With regard to mammals, the forest has been reported to have 5 species of large primates from the lotong, ungka, beruk and kera genera. Research conducted in the area showed that there are 14 species of small mammals, not including the bat, and 10 genera of 5 families and 3 orders. The species include 6 rats, 4 squirrels, 3 insectivores, and 1 primate. A total of 13 species of bats have been found. Besides that, there also exist 10

species of reptilia, 18 species of amphibia, and 10 species of fish. In terms of insects, the largest number of species in the forest belongs to the order Hymenoptera. Other orders which have higher individuals are Collembola, Isoptera and Coleoptera (Sajap *et al.*, 1999).

Location

AHFR is surrounded by various developments (Fig. 1). To the north, the forest is bounded by Kinrara township. On the west side of the forest is Puchong, a housing and township development, while the southern boundary of the forest faces Putra Jaya, the new government administrative centre. On the eastern side of AHFR lies recently built townships such as Equine Park and Putra Permai.

The AHFR vicinity near Putrajaya has generated a lot of interest from the corporate sector and politically connected individuals. Their aim is to convert AHFR into another sprawling new township. Indeed, the agency that is responsible for AHFR has received numerous proposals to convert the forest into other types of land use. On the other hand, the Orang Asli and the communities around AHFR would like to maintain the reserve as it is because they have benefited from the forest. These conflicting uses may be detrimental to AHFR, unless a mechanism is set up to resolve the problem.

AHFR is leased to the Universiti Putra Malaysia for 88 years as a research and educational forest. Harvesting activities are not allowed in this forest. AHFR is being used as an outdoor laboratory by the Faculty of Forestry students and also as two weeks mandatory forestry camps for both Forestry Diploma and Bachelor programmes. Research activities are also conducted here by UPM and other agencies such as the Forest Research Institute of Malaysia (FRIM). All these activities are coordinated by the forest conservator of the Faculty of Forestry, UPM, and must follow the guidelines in the AHFR management plan.

AHFR is also being used by the residents of these townships for recreational and physical activities such as jogging. However, these usages have been stopped because the area has been fenced along the AHFR perimeter to prevent encroachment. This has created resentment among the residents.

The multiple uses of AHFR by different stakeholders may lead to disputes in the future and it is important to understand the needs of different stakeholders for the forest. One of the approaches is to use stakeholder analysis to identify interested parties and to understand their needs in using the AHFR. Only by understanding the stakeholders' interests and needs can the manager develop a comprehensive management plan that addresses them.



Fig. 1: An aerial view of Ayer Hitam Forest Reserve (AHFR)

METHODS

In the stakeholder analysis two workshops were conducted. In the first workshop the stakeholders were invited and interviewed by the researchers and their ideas were mapped into network of concepts and issues that were linked to form chains of argumentation. The concepts and issues were aggregated, linked and prioritized. This approach which is called cognitive mapping has been used by many authors to analyse policy (Eden and Ackermann, 2004), public participation (Hjortso 2004) and stakeholder analysis (Ainuddin *et al.*, 2005).

The critical success factor in ensuring meaningful outcomes of the cognitive group mapping approach is the participation of all relevant groups of stakeholders. This is to make sure that issues, trade-offs, conflicting interests and their justifications, constraints, opportunities and other influential factors are all taken into consideration and thoroughly deliberated in the discussions before consensus building is achieved. In the first workshop held on 16 to 17 March 2004, efforts were taken to bring in relevant stakeholders of various backgrounds. Although, a number of important stakeholders could not make it to the workshop, the deliberations have been very open and productive.

The stakeholders were interviewed about their views on the usage of AHFR and what roles they could play to ensure they continue to benefit from AHFR. Their responses were mapped using the cognitive mapping technique. The maps were later discussed by the facilitators and the issues raised by the stakeholders were aggregated

into issues. This was to avoid overlapping and redundancy among the issues. The next day, the aggregated issues were presented to the stakeholders and discussed. After getting feedback from the stakeholders, some of the issues were reworded to bring more clarity to the statements. The issues were then prioritized and ranked by the stakeholders (Fig. 2).

In the second workshop held on 23 February 2005, the same participants were invited and were enlightened on the valuation of timber and non-timber resources of AHFR including recreation, carbon sequestration and medicinal plants. At the end of the second workshop they were again asked to rank the issues that were given in the first workshop.

RESULTS AND DISCUSSION

Stakeholders of Ayer Hitam Forest Reserve

As mentioned earlier, there are various government agencies, groups and individuals who are interested in and want to influence the usage and decisions regarding AHFR. These are called stakeholders that may have conflicting uses of AHFR. Table 1 lists the stakeholders of AHFR.

Stakeholders' Roles

The stakeholders' range from the Selangor Forestry Department, which is the state agency responsible for safeguarding the forest, to the individual Orang Asli who depends for his livelihood on the forest. They can be classified into government agencies, educational

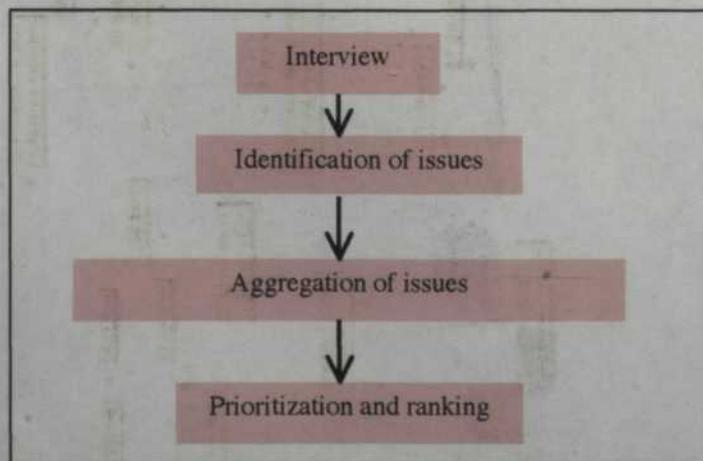


Fig. 2: Flowchart in the stakeholder analysis using cognitive mapping

TABLE 1
Stakeholders of Air Hitam Forest Reserve interviewed in this study

Stakeholder	Type
Selangor Forestry Department	Government agency
Selangor Wildlife Department	Government agency
Department of Urban and Rural Planning	Government agency
Orang Asli community	Local community
Taman Lestari Puchong community	Local community
Bandar Kinrara community	Local community
Majlis Perbandaran Subang Jaya	Government agency
Bandar Kinrara	Corporate institution
Malaysian Nature Society	Non-government organization

institutions, corporate institutions, non-government organizations and local communities.

Stakeholders that fall under government agencies play the role of managers of the forest and are involved in protection and conservation of the flora and fauna of the forest. The Selangor Forest Department is the agency responsible for the forest. One of its major activities is monitoring encroachment of the area. To date the department has erected fences along the border of AHFR. The department also monitors forest management activities conducted in AHFR. The Wildlife Department, on the other hand, is responsible for the conservation and the protection of wildlife present in AHFR. There were a few times when teams from the Wildlife Department had gone into AHFR to survey the existence of big mammals.

AHFR is under the jurisdiction of Subang Jaya Urban Council (MPSJ) which has designated AHFR as a green area in its structural plan. Its role is also to make sure that AHFR is maintained as a green area. The Department of Urban and Rural Planning (JPBD) is a government agency which develops the National Physical Plan (NPP) and also the structural plan with MPSJ.

Communities in the townships and villagers around AHFR perceive the forest as a valuable resource to ameliorate the harsh urban climate. It is a place where they can go for recreation at the waterfalls and streams in the forest. During weekends AHFR has many visitors even though admittance into the forest is being restricted. The Orang Asli living near AHFR have been using this forest as the source of their medicinal supplies for many generations. Here they still

find many herbal species which can be used as health remedies.

Corporate institutions owe their existence to the bottom line, i.e. all projects undertaken should result in profit. With this in view, these companies see AHFR as a big land bank that could be converted into housing estates and urban development. There have been many such proposals forwarded to the agency concerned, raising doubts as to the survival of AHFR in the future. Unless the corporate institutions understand the socio-environmental and educational roles of AHFR, their perceptions of AHFR would be negative.

Non-governmental organizations such as the Malaysian Nature Society play an important role in raising public awareness of environmental issues. They view AHFR as an important green lung and wildlife corridor joining the north and south of Klang Valley which therefore needs to be conserved. With their grassroots support and organizational ability, their role would greatly help the conservation of AHFR.

Stakeholders Interviews and Cognitive Maps

In the first workshop the stakeholders responses were mapped using the cognitive mapping technique. The maps were developed using a software called Decision Explorer®. The casual points were written in blue with arrows pointing to green rectangles designated as concerns. These concerns led to red rectangles designated as issues. The issues led to the uses of AHFR. The cognitive maps were later collected and discussed by the facilitators and the issues were aggregated into 13 groups. Fig. 3 shows the combined cognitive map of all the stakeholders.

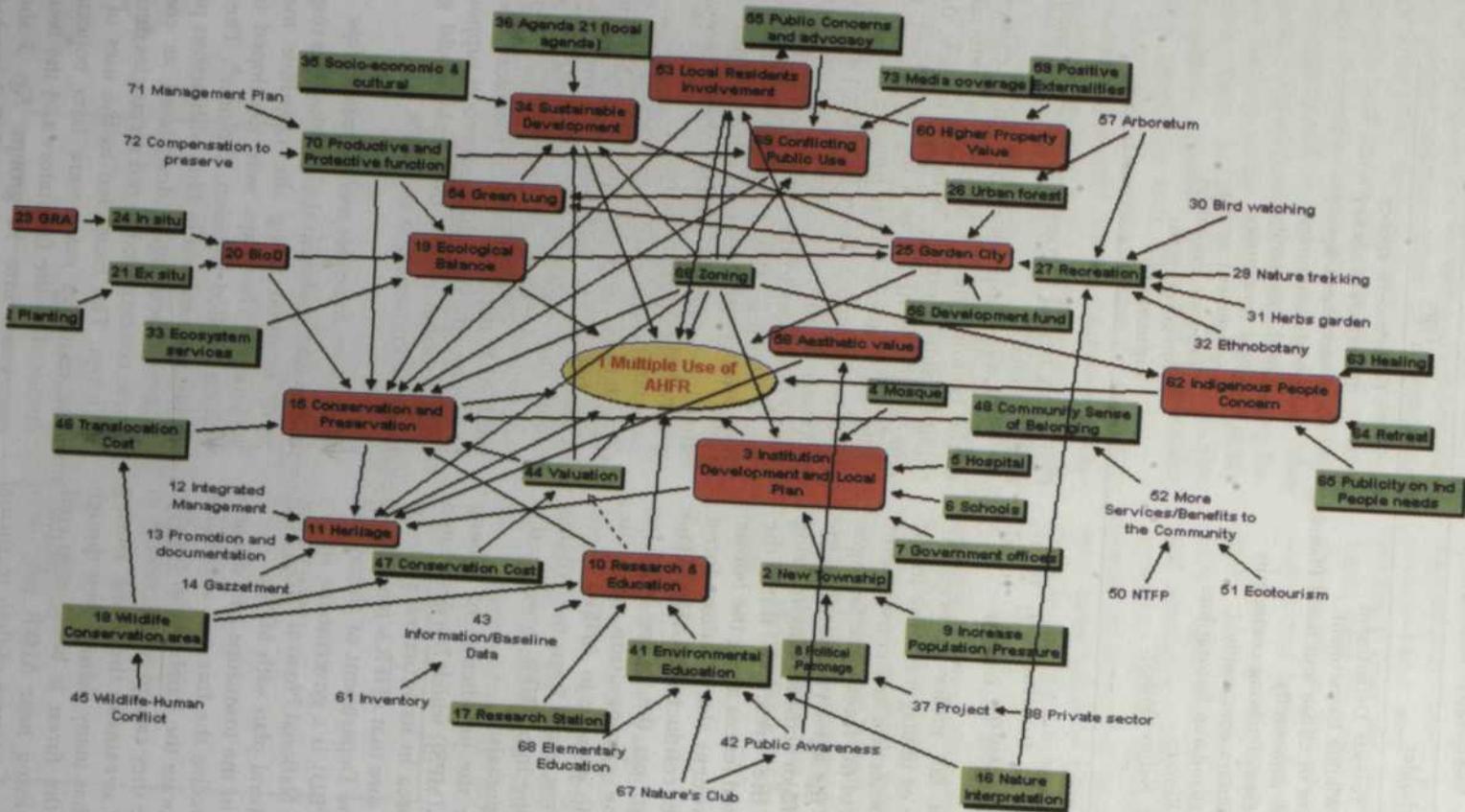


Fig. 3: Cognitive map of all the stakeholders combined

Next, the aggregated issues were presented to the stakeholders and discussed. After getting feedback from the stakeholders, some of the issues were reworded to bring more clarity to the statements. The issues were then prioritized by the stakeholders (Table 2). The top three top ranking issues were education of the public on nature, ecological balance/use and research while the last three were indigenous peoples' concerns, wilderness and exploitation of nature theme for development.

The ranked issues of the second workshop are presented in Table 3. The three top ranking issues were ecological balance, sustainable balance and green lung. There were slight changes compared with the last workshop; the issue on sustainable development rose to the second ranking and research fell into the fifth ranking. The last three ranking issues were wildlife refuge, aesthetic value and socio-cultural heritage. These different rankings were due to the additional information given during the second workshop where the non-timber values of AHFR were presented. Furthermore there were also more time for the stakeholders to discuss the issues pertaining to the uses of AHFR.

The thirteen issues identified during the workshops show that different stakeholders have different issues regarding how they want to use AHFR. Previously, the uses of AHFR were only from the perspective of the State Forestry Department. Based on the second workshop, the number one ranking (i.e. most important) issue was the role of the forest as an ecological

balance/use serving as a buffer against the concrete jungle and in the amelioration of the urban environment. The role of forest in urban areas is becoming more significant because of the increasing environmental awareness of the public with more calls being made by the urban community to preserve green areas and to discourage tree cutting in the urban areas (Akbari *et al.*, 2001). In fact the third ranking issue of green area further strengthens this argument.

The second most important issue ranked by the stakeholders was sustainable development of AHFR. The stakeholders recognized that other than ameliorating the environment there are other activities that can be conducted in the forest with minimal disturbances. Activities such as those concerning conservation of biodiversity, medicinal plants and recreation are examples causing minimal disturbances to the forest. This is in line with the local agenda 21 which the local government authorities must adhere to.

The stakeholders also recognized the importance of the forest to the indigenous community by ranking it seventh. The forest serves as a place where the indigenous people spend days or weeks for their spiritual retreat trying to recuperate from the stress of urban life. They also depend on AHFR as their pharmacy where they can get their medicine when afflicted with ailments.

The last three ranking issues from the stakeholder analysis relate to the socio-cultural aspects of the forest. Putting near the bottom the issue of AHFR as a refuge for wild animals,

TABLE 2
Ranking of issues after the first workshop

No.	Issue	Rank
1.	Education of public on nature	1
2.	Ecological balance/use	2
3.	Research	3
4.	Green lung area/environmental use	3
5.	Wildlife survival - as a refuge	4
6.	Aesthetic value	4
7.	Local community use	5
8.	Recreation/public use	5
9.	Sustainable development	5
10.	Socio-cultural heritage	5
11.	Indigenous peoples' concerns	6
12.	Wilderness	7
13.	Exploitation of nature theme for building township near forest	8

TABLE 3
Ranked issues after the second workshop

No.	Issue	Rank
1.	Ecological balance/use	1
2.	Sustainable development	2
3.	Green lung area/environmental use	3
4.	Education of public on nature	4
5.	Research	5
6.	Exploitation of nature theme for building township near forest	6
7.	Local community use	6
8.	Wilderness	7
9.	Indigenous peoples' concern	7
10.	Recreation/public use	7
11.	Wildlife survival - as a refuge	8
12.	Aesthetic value	9
13.	Socio-cultural heritage	10

the stakeholders recognized that AHFR with its small size and fragmentation from the main forest would not function effectively as a wildlife sanctuary.

This AHFR stakeholder analysis using cognitive mapping managed to gather the stakeholders together to discuss their concerns and issues related to the multiple uses of the forest. This is the first time that the stakeholders were brought together ranking their concerns on the uses of AHFR. The discussions and dialogues have also generated an understanding of the diverse needs of the stakeholders and have managed to narrow the differences among the different parties.

CONCLUSION

The stakeholders, from the dialogues and interviews, have been able to discern several issues of importance using the cognitive mapping technique. In the first workshop the stakeholders listed and ranked the issues related to the uses of AHFR. In the second workshop, where the stakeholders were presented with the non-timber values of AHFR, the rankings changed making the role of forest as an ecological balance the most important while the use of forest as a social-cultural heritage was the least important. This shows that when the stakeholders were presented with additional information and given more opportunities to discuss, the priority of the issues may change. These issues should be useful as a guide to develop activities in the AHFR and also to the management of the forest.

Similar studies conducted at different places are needed to fine-tune the stakeholder analysis approach in line with the cultural characteristics of the stakeholders involved. Naturally for Malaysia, interviewing with cognitive mapping appears to be more compatible with the cultural characteristics of the society.

ACKNOWLEDGEMENTS

We would like to thank Mohamad Parid Mamat, Ahmad Fadli and Azmi Mohamad Idris for their assistance in the study. This study was funded by the Malaysian - Denmark Twinning Programme - Multipurpose Forestry in a Changing Society.

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INTERACTION

The Malaysian tropical forest is well known for providing rich natural resources. It is also generally rich and considered in terms of diverse and healthy habitats and non-timber forest products. Forests also provide a source of food and genetic resources. Environmental degradation and deforestation have caused a loss of biodiversity and natural resources. The loss of natural resources has led to a decline in the quality of life of the people living in the forest. The loss of natural resources has also led to a decline in the quality of life of the people living in the forest. The loss of natural resources has also led to a decline in the quality of life of the people living in the forest.

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