

Direct Uses of Ayer Hitam Forest Reserve, Puchong, Selangor

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EXTENDED ABSTRACT

Forest land can be categorised into various uses depending on the nature of goods and services provided by the forest. This can be categorised into several uses such as maintenance of environment, provision of opportunity for recreation activities, habitat for wildlife, watershed protection, general conservation including minimization of soil erosion, and the production of wood for various uses. For each category of use, it might be subdivided, or combined to be used in the same area of forest land.

The use of Malaysian tropical rainforest is numerous and is not restricted to only timber production as most people commonly believe. The management of forest resources in Peninsular Malaysia is based on sustainable forest management principles. It means that the forest is managed for timber and non-timber outputs. A particular use of permanent forest reserve is subject to legal provision in accordance to Section 10(1) of the National Forest Act (NFA), 1984, which categorised functional uses of the forest reserve as follows:

- Timber production forest under sustained yield
- Soil protection forest
- Soil reclamation forest
- Flood control forest
- Water catchment forest
- Forest sanctuary for wildlife
- Virgin jungle reserve forest
- Amenity forest
- Education forest
- Research forest
- Forest for federal purposes

The Ayer Hitam Forest Reserve (AHFR) can be classified under either research or education forest as defined in the NFA, 1984. Even though the forest is categorised under one of these functions, many of the uses are used simultaneously in the same forest reserve. Thus, it can be said that the AHFR is a kind of multiple-use forest, whereby many outputs from the forest are used from each forest over time. In this context, the AHFR is either used directly (e.g. forest goods and services derived from the forest by people), or indirectly (e.g. for indirect support and protection provided by the forest's natural functions and regulatory environmental services).

The nature of direct uses of AHFR was examined through the collection of primary and secondary data. Primary data were obtained through surveys conducted on the direct users of AHFR. These include the indigenous people residing the forest, recreation users, and staff of Faculty of Forestry, UPM. The secondary data collection was gathered through examining records of direct users of AHFR available from the Faculty of Forestry, UPM. These data were then summarised to obtain qualitative indicators on the direct users of AHFR. In some cases, the quantitative estimates of direct users were tabulated to calculate percentages.

The current direct uses of AHFR can be broadly divided into three categories: research, education, and other uses.

Research

The AHFR is used directly by staff and students of UPM for scientific research. The majority of research conducted at AHFR is carried out primarily by final year degree students for their

theses. The research projects are not confined to forestry students only, but from other disciplines as well. The focus of the research is mainly on biology, ecology, environment, and wildlife. Research projects are also conducted by academic staff, mainly from the Faculty of Forestry, UPM. Other research projects are also conducted by staff from the Faculty of Science and Environmental Studies. The main outputs of the research projects are B.Sc. theses, research reports, and papers in journals and seminars. Among the research projects conducted at AHFR include the following:

- Distribution of small mammals
- Studies on the root biomass and root growth
- Tree species diversity and composition
- Inventory of medicinal plants
- Biomass studies of forest trees
- Valuation of stumpage
- Valuation of recreation benefits
- Pattern of insect herbivory
- Ethnobotanical survey
- Valuation on the use of AHFR by local indigenous community
- Small mammal species composition
- Bird species composition in intermediate and high land areas
- Genetic diversity of selected tree species
- Characterisation of soil temperature in forest gaps
- Bat species composition
- Remotely sensed indicator of bird habitat heterogeneity
- Microclimatic conditions
- Environmental aspects

Education

The AHFR also plays a very important role in education. The direct use of AHFR for education include forestry camp by forestry students of the Faculty of Forestry (diploma and degree), field laboratories, students' practical training, environmental education programmes (essay and national science camp), other nature-based activities such as team building, nature camping, and organised visits.

In the diploma and degree forestry curricula, the students are required to attend a forestry camp during the first-year semester break for two weeks. At present, the most important contribution of AHFR is that it provides a suitable place for students to carry out their forestry camp because of its close proximity to UPM

campus. The students have to stay in the forest and conduct daily activities with the supervision from faculty members. The forest is also used for field laboratory in related courses such as dendrology, ecology, mensuration, silviculture, botany, environmental science and biology.

The direct uses of AHFR for environmental education programme include essaython and national science camp. The essaython programme was introduced in 1994, and it is based on writing with activity concept. The target group of this programme is secondary school children in Malaysia. The participants are selected by the State Education Department to represent each state. The total number of participants is 56, comprising students from different schools. The programme is jointly sponsored by the Ministry of Education and ESSO Productions. It is normally held in November during school holidays. The conduct of essay writing competition is to provide students with 'real situation' by participating in activities designed during the 10-day programme. The participants are required to stay in the forest for the whole duration of the programme. The general objective of essaython programme is to inculcate awareness and appreciation on the importance of environmental conservation. Specifically, the essaython programme aims to:

- Provide a greater sense of love and care for the environment
- Increase the ability of observation and writing skills
- Increase interest in science and technology

Another environmental education programme conducted by the Faculty of Forestry is the National Science Camp introduced in 1994. The aim of the programme is in-line with the Science Encouragement Programmes implemented by the Ministry of Education. Its ultimate aim is to instill enthusiasm among students in science subjects and encourage students to take-up science related disciplines when they pursue higher degrees. The programme is conducted with the cooperation from the Ministry of Education. The specific objectives of the programme are to show the students:

- that science is not a difficult subject if the learning of it is done the right way,
- that science is not a dull but an interesting subject,

- that it is crucial to learn and understand science since our daily activities involve science, and therefore, it contributes towards the quality of life to humankind.

The National Science Camp is usually held twice a year during the school holidays. Each camp lasted for about one week. There are two target groups: students from primary and secondary schools, and teachers from primary schools. The participants (students and teachers) represented all states in Malaysia. Each state is required to send five students including a teacher.

Another important direct use of AHFR is unstructured nature-based activities which include visits, camping activities, and gatherings. There have been 77 reported activities of this nature, which last between one and four days. The number of participants also varies, ranging from 4 to 150 participants. The participants are mostly UPM students. Other participants include UPM staff, school children, members from NGO and youth associations.

Other Uses

Among other direct uses of AHFR include recreation and use by indigenous people. The AHFR is also used by the local population for recreational activities. Mohd. Shahwahid *et al.* (1998) conducted a study to determine the economic value of recreation benefits of AHFR. Based on interviews of 80 respondents, they found that the majority of the recreation users were mainly from the District of Petaling (46.3%), followed by the District of Gombak (20%), District of Hulu Langat and Kuala Langat (11.2%), District of Sepang (7.5%), and the remainder 3.8% were from the District of Klang. They also found that the average expenditures of RM12.36 per visitor made by the respondents in making the trip to experience the recreational

services are for transportation, expenditure for foods and recreational services/materials.

The use of AHFR by the indigenous people or Orang Asli was reported by Rusli *et al.* (1997). There are two indigenous villages located within and adjacent to the AHFR: Sungai Rasau Luar and Sungai Rasau Dalam, Puchong, Selangor. The quantity of timber and non-timber forest products collected by the indigenous people as well as the revenue that could have been generated by collecting these products were gathered through personal interviews with heads of household. The results showed that the indigenous people are more dependent on the forest reserve for food and fruits than for other purposes like housing construction, handicraft-making and medicine. The results also indicated that 24 animal species were hunted for their meat and 48% (10 species) of the plant species are for fruits. Birds and small mammals comprise 75% of the animal species collected. In terms of revenue, the results showed that the indigenous people collected about RM110,000.00 for the year 1996. The revenue generated by plant species was about seven times more than that of animal species. The greatest source of revenue came from housing construction followed by handicraft-making and fruits. Table 1 shows some of the forest products collected by the indigenous people.

In conclusion, the direct uses of AHFR are numerous, where the main uses are for research and education. While other uses such as environmental protection are not directly used by local people, it plays a significant role in maintaining the green lung for the urban environment in the Klang Valley. The potential role of AHFR for eco-tourism and other nature-based activities in the future is very great. The AHFR should be conserved not only for research and education but also for long term benefits to the community at large.

TABLE 1
Forest products collected by indigenous people

Product category	Products
Handicraft materials	Bamboo, mengkuang, bertam, rattan, bertam leaves
Medicinal plants	Akar bertam, Tengkok biawak, Kacip fatimah, Serapat, Tongkat ali, Ubi jaga
Food	Jering, kerdas, petai, bamboo shoot, bayas shoot, bertam shoot, nibung shoot, rattan shoot

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