

Visitor's perceptions of the Forest Research Institute of Malaysia (FRIM) as an urban open space for environmental learning: results of a qualitative study

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Abstract The campus of the Forest Research Institute Malaysia (FRIM) is forest plantation research site established since 1926. Urbanization and other development affecting Kuala Lumpur led to FRIM being one of the few remaining green open spaces near the capital city area. To share the benefits of the green space, FRIM opened its grounds to visitors, and it is now a popular site for educational and recreational use by the urbanized population. However, visitor's opinion may vary about the utilization of FRIM's facilities as FRIM's ground is also used for other activities. A study was done to determine what the perceptions of visitors' were regarding FRIM's suitability as a natural open space with its associated benefits such as health, quality of life and environmental sustainability and whether it offers a suitable site for environmental learning. From a qualitative study conducted at three sites within FRIM, it was found that FRIM provides in the needs of the surrounding urban population as a natural open space for escape from the city and a very suitable site for environmental learning. Some participants actually expressed a need to introduce further opportunities for environmental learning.

Keywords Malaysia · Environmental education · Ecotourism · Urban forest · Informal learning

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1 Introduction

The term “urban open space” can describe many types of open areas. One definition holds that, “As the counterpart of development, urban open space is a natural and cultural resource, synonymous with neither ‘unused land’ nor ‘park and recreation areas’”. Another is “Open space is land and/or water areas with its surface open to the sky, consciously acquired or publicly regulated to serve conservation and urban shaping function in addition to providing recreational opportunities” (Myers 1975). In almost all instances, the space referred to by the term is, in fact, green space. It should be noted that there are examples of urban open space which, though not publicly owned or regulated, are still considered urban open space.

There are numerous benefits to be obtained from urban open spaces, such as:

- *Informal learning* in an open space certainly presents a number of challenges that are not faced when teaching in a “single-cell” classroom. It was one of the criticisms of the open-plan spaces in the 1970s (Woolner 2010). However, it also presents a number of advantages (York-Barr et al. 2007). Education in community forestry projects have become a necessity for social learning (Fernandez-Gimenez et al. 2008). Therefore, environmental education in open spaces has become necessary to respond to environmental change (Walker et al. 2006).
- *Health benefits* associated with access to public open space and parks. Access to vegetated areas such as parks, open spaces and playgrounds has been associated with better perceived general health (de Vries 2003; Maas et al. 2006), reduced stress levels (Grahn and Stigsdotter 2003; Nielsen and Hansen 2007), reduced depression (Morita et al. 2007) and more walking (Li et al. 2005; Giles-Corti et al. 2005).
- *Benefits to the community* Open spaces provide an opportunity to interact with other individuals in the community. Well-designed urban and open spaces can benefit communities in a variety of ways including increasing levels of social contact and social integration, particularly in underprivileged neighbourhoods (Sullivan et al. 2004; Coley et al. 1997; Pretty et al. 2007).
- *The quality of life* The Trust of Land in the USA found that in terms of quality of life, over 95 per cent of people believe it is very or fairly important to have green spaces near to where they live (Heriot Watt University 2007). Parks and green spaces are the most frequently used service of all the public services tracked. A survey in England showed that 87 per cent of the population has used their local park or open space in the last year and 79 per cent have used it in the last 6 months. This compares with 32 per cent that had visited concert halls and 26 per cent who had visited galleries (Heritage Lottery Fund Policy and Strategic Development Department 2009).
- *Environmental sustainability/biodiversity* Urban open spaces can improve air quality, and trees can capture particles and toxic gases such as nitrogen dioxide and ozone (Maas et al. 2009). A study in Stockholm, Sweden, found that urban and suburban forests act as a refuge for threatened species of bird whose numbers had been decreasing in rural areas. Crucial to achieving this was the establishment of green corridors that included large areas of natural vegetation, a network of important habitats and a range of both mature and decaying trees (Mortberg and Wallentinus 2000).
- *Cultural importance* Many urban open spaces are important culturally and have a long history of use. Bow Butts in Ceres, England, is a space that was used after the battle of Bannockburn (1314) for arrow shooting practice. Ever since, annually on the last Satur-

day of June, a games day has been held. Events such as highland games can attract large crowds; for example, in 2004 the Burntisland Highland Games on The Links (2013) attracted 50,000 visitors.

An interview schedule was designed to determine whether FRIM provides opportunities for all of these benefits and whether the results of the interviews reflect that FRIM campus as a forest reserve is still viewed as an informal education site where visitors can learn about the environment.

2 Background about FRIM

The campus of Forest Research Institute Malaysia (FRIM) covers an area of 544.3 ha where a natural topography and a variety of flora and fauna are sources of attraction for recreational activities. The site was chosen as the location of the Forest Research Institute and was declared by the Government of Malaya on 1 October 1926 as a “reserve for public purpose” (Ng 2010). Since then, scientists and foresters have continuously made efforts to rehabilitate the partially tin-mined area. Thus, from a condition with only pockets of remnant forests, FRIM has now turned into a lush forest that serves as the green lung of the Klang Valley where the capital of Malaysia, Kuala Lumpur, is located.

The established forest nursery and experimental plantations had started with the planting of nurse trees which were first planted to provide shades and to enrich the soil for the commercial timber trees. FRIM's report (Anon 1973) named some of the commercial timber trees that were first planted, such as Meranti tembaga (*Shorea leprosula*), Meranti pa'ang (*Shorea bracteolata*), Meranti melantai (*Shorea macroptera*) and Mahogany (*Swietenia macrophylla*). By 1964, almost all the plantation plots were planted with trees, 43 plots with 162 indigenous species and 10 plots with 86 exotic species such as Agathis, Araucaria and Pinus (Selvaraj and Muhammad 1980).

With dense tree canopy and food resources from the planted trees at FRIM's grounds and natural forest from the nearby Bukit Lagong Forest Reserve, habitats for wildlife were also created and preserved. Anon (2013) reported that the fauna in FRIM comprises 96 families and 370 species. One hundred and eighty-five (185) species from 46 families of birds has been recorded in FRIM, and out of this total, 26 species are migrants and wintering birds. Norsham (2005) recorded 34 species of frogs and toads within FRIM's grounds. FRIM is a host to a number of mammals with 58 species from 15 families recorded (Anon 2013).

A total of 75 species of reptiles have been recorded on FRIM's grounds (2013). As for insects, for termites and trogonids alone, at least 213 species have been recorded and the butterfly fauna of the present grounds was found to comprise 147 species, approximately 14.5 per cent of the total known species for Peninsular Malaysia (Tho and Mahyudin 1982).

With a forest setting and being located 16 km northwest of Kuala Lumpur, FRIM's main campus provides an accessible variety of facilities and services to support recreational, environmental education and ecotourism activities for the local community as well as tourists. The activities include walks on nature trails, canopy walkway experience, picnic and bathing at the waterfall area as well as camping in the forest. The activity of mountain biking was introduced in 2009 and is now one of FRIM's main attractions.

The number of visitors to FRIM from 2000 to 2016 is indicated in Fig. 1.

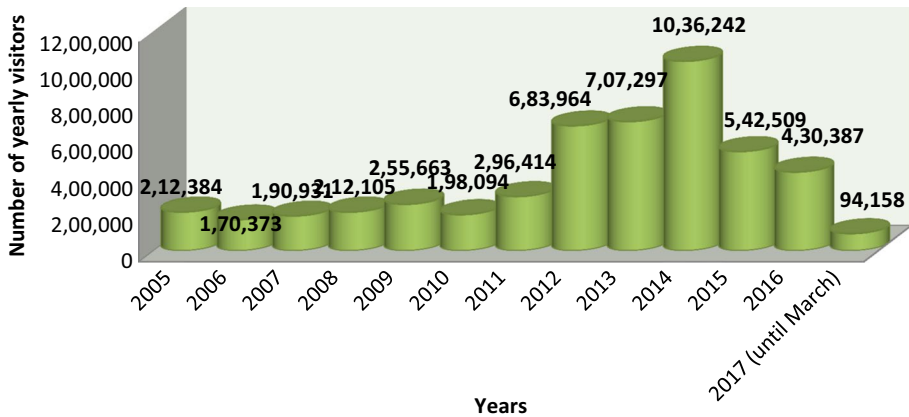


Fig. 1 The number of yearly visitors to FRIM from 2000 to 2016

FRIM receives a big number of visitors, and the number is increasing every year (Fig. 1). The type of recreational activities conducted at the FRIM campus has diversified into family day events, celebrations as well as physical activities that mostly, but not necessarily, involve FRIM's natural resources. Given FRIM's rich biodiversity as well as historical and cultural assets, there is a concern that nature-based activities could be negatively affected by other uses.

Since its establishment in 1992, FRIM's canopy walkway has been one of the most popular visitor attractions. It was first constructed as a research platform for the study of flora and fauna, but to fulfil its social obligation FRIM as a research institute has officially opened the walkway to the public in 1993 with the intention to enhance recreation opportunities, nature appreciation and public awareness. Built 30 m above ground on Bukit Lagoon, the canopy walkway gives a bird's eye view of the tree tops and forested valleys at the foot of the hill. At the canopy walkway, information of trees as well as the forest is provided to visitors through information plates displayed along the walkway's platform.

The number of visitors in 2015 decreased because of a management decision in 2014 to limit the number of visitors. The action was taken to reduce congestion, discomfort as well as protect the environment and to ensure the sustainability of its forest ecosystem (FRIM 2014). In addition of that, the closure of the canopy walkway starting on October 2015 due to the damage of the walkway caused by thunderstorms also affects the numbers of visitor to FRIM (FRIM 2015).

FRIM desires to be utilized as an educational forest, practicing the true concept of ecotourism (Noor Azlin 1999), where it is defined as "nature tourism that contributes towards conservation through generating funds for protected areas, creating employment facilities for local communities and offering environmental education" (Boo 1990) in a sustainable manner. With the efforts taken by FRIM, it is hoped that the understanding of and attitudes towards the environment and nature specifically will be enhanced and may lead to people's commitment to protect natural resources and promote their conservation. FRIM has introduced environmental education activities, especially for school children, but has resolved to improve its focus on informal nature education, if a need for it can be established.

This study was therefore conducted to assess whether FRIM visitors still perceive the campus as a place where they can experience nature and how suitable FRIM is as a

resource for environmental learning. The research question resolves around these aspects and can be stated as: "Is FRIM perceived as an urban open space where nature-based activities can be experienced and where environmental learning can take place?"

3 Research design and methods

As answers to the research question are obviously dependent on the perceptions of people regarding FRIM (the reality they find themselves in) and the fact that such knowledge can only be uncovered by investigating their interpretations of how they experience this reality, qualitative research from a positivist paradigm needed to be undertaken in the form of a case study with interviews as preferred method.

3.1 Research design

Reliability is just as important for qualitative research as for quantitative research (Becker 1970; Deutscher 1970; Zelditch 1970). However, the issue of reliability is more often discussed in research studies based on quantitative research than qualitative research. A more explicit approach is therefore required by qualitative researchers to provide results over different coders, raters or observers (Popping 2010; Tashakkori and Teddlie 1998). Therefore, the semi-structured interview questions were developed at a workshop between researchers and interviewers in Malaysia to ensure the trustworthiness of the study. The researchers endeavoured to give a true representation of the phenomenon being studied to ensure credibility, supplied a detailed description of the context where the study was undertaken to ensure transferability to similar contexts, made repetition of the research possible by ensuring dependability of data and findings and ensured conformability by strictly basing findings on the data. Four interviewers were included in the discussion on how to conduct the interviews (including deeper probing where appropriate) as well as to assist with the actual initial coding in association with the researchers. The reasons for this were that interviewers could supply additional information and interpretations because they did the actual interviews and that most interviews were held in Bahasa Melayu which is their and the participants' mother tongue. This assisted in ensuring correctness of the data and assisted in establishing trustworthiness thereof.

To obtain information on the personal lived experiences and perceptions of visitors, the following interview questions were developed:

- How did you know about the FRIM campus?
- How often do you visit FRIM?
- Which facilities do you utilize in FRIM?
- How did you experience your visit(s) at FRIM?
- What attracts you to FRIM?
- Why do you think other people visit FRIM?
- Why do you think some people do not visit FRIM?
- Can you suggest any improvement to make you visit FRIM more regularly?
- What will prevent you from visiting FRIM again?
- Do you visit a similar place or would you like to visit a similar place to FRIM?

In the actual interviews, participants were asked to elaborate on answers that related to the purpose of the research, namely the natural elements of FRIM and possible educational benefits thereof. No direct initial questions were asked regarding this so as not to influence participants towards a particular view through asking leading questions only when they themselves referred to these aspects where they prompted for additional information.

Validity is also an important requirement for authentic research results. It has to show that it encompasses the entire experimental concept and establishes whether the results obtained meet all of the requirements of the scientific research method. During this specific research, the rules of qualitative research were followed (e.g. rather than doing sampling as in quantitative studies, participants were chosen that seemed to be in the best position to provide information rich data based on their personal experiences and perceptions). Healy and Perry (2000) assert that the quality of a study in each paradigm should be judged by its own paradigm's terms.

To ensure that suitable participants could be found a Saturday was chosen to do the interviews as it is the busiest day for visitors to FRIM. The interviews were conducted in the most visited/busiest places in FRIM which is the FRIM One Stop Centre, the Picnic area of Sg. Kroh and the Canopy Walkway. Interviews in all three areas were held at the same time.

Interviewers used the list of questions to ask respondents about their experiences and perceptions thereof, but also used the probing technique (Bernard 2006) to get additional information regarding the possible attraction of natural elements of FRIM and the possible educational benefits thereof. The same initial questions were asked to all respondents. Most respondents chose to be interviewed in Bahasa Melayu and others with mixed Bahasa Melayu and English, while one interviewee responded only in English.

Twenty-eight (28) interviews were conducted before answers became so repetitive that it was obvious that little or no new insights could be gained and a point of saturation was reached. This is well aligned with qualitative research practices such as that of Green and Thorogood (2009) that state that "the experience of most qualitative researchers is that in interview studies little that is 'new' comes out of transcripts after you have interviewed 20 or so people". In addition, Francis et al. (2010), through their study on adequate sample size for data saturation, found that data saturation occurs more or less after thirteen to fifteen interviews which they consider to be consistent with Guest et al. (2006)'s findings that twelve interviews resulted in saturation.

These interviews were recorded (Wolcott 1995) and later transcribed, translated into English and typed. Before coding, the researchers went through an initial process to establish a uniform system of coding (Layder 1998). In essence, a process of "from code to category" was followed (Saldana 2013). Data were linked, grouped and categorized to reach conclusions for the research (Richards and Morse 2007).

Because several researchers from different countries were involved in the coding of data, interrater reliability of the coding had to be a priority. After reading and rereading the data, each researcher coded the data separately. According to what was recorded in the coding book at this stage, intercoder reliability was measured at .62. The rather low intercoder reliability could be because the coders were of varying levels of expertise and experience in the coding of semi-structured interviews and perhaps also because we worked inductively.

After this followed a discussion of the codes to see how they compared especially where there were differences between coders. Each researcher could explain their thinking which led them to such codes and that brought them closer together and nearer to agreement on some codes. After doing this, intercoder agreement was reached at .90. Where there was still disagreement, the data were consulted and discussed again, and where needed a very

experienced emeritus professor was consulted until a common agreement could be reached which eventually resulted in the categories and themes discussed in this article.

4 Results

The results of the interviews after coding are indicated here with a few examples of direct quotes for reference. Two main themes emerged from the research each consisting of two categories. Theme one related to features of FRIM that attracted people to this urban open space, and it was considered important as a theme because it is a prerequisite for environmental learning to take place. The two categories under this theme were natural elements of FRIM that attracted visitors and what would prevent visitors from coming to FRIM. The second theme related to environmental learning, and the two categories were environmental learning already taking place and the need expressed for more opportunities for environmental learning.

4.1 Theme one: features of FRIM that attracted visitors

Features mentioned by participants included natural elements and some human-made elements. The vast majority of responses referred to natural elements.

4.1.1 Category one: natural elements of FRIM that attracted visitors

The following participants indicated that they visited FRIM because of its abundance of natural features:

I like the natural surroundings such as the river, the waterfall and the forest.
All the things about the natural environment make me come here almost every week.
It brings me close to nature as I don't have a village to go to... live in Kuala Lumpur.

Some respondents indicated what benefits they believed the natural elements of FRIM had for them:

It release tension for people from Kuala Lumpur.
There is fresh air and it is cool because of the many trees.
... quiet and tranquility is important for city people...

Participants indicated that they made use of the natural features during their visits in the following ways:

We come often for the mountain biking... good trails... not so challenging so we can enjoy this as a family.
My family do jungle trekking and love to see the view from the trees (canopy walk) as we want to experience a local forest... not only Kuala Lumpur.
The children like to swim at the pool near the waterfall... I sometimes come to jog on my own in the forest. My wife took part in a nature photography competition here... there are so many natural things to photograph.

4.1.2 *Category two: reasons why people will not visit FRIM in future*

Several participants made it very clear that they would not visit FRIM if its character as a natural place would change and said the following in this regard:

When there is no forest... like if they cut down the trees... there is no need to come again.

If it becomes too crowded... people might damage the forest... litter all over... I will go elsewhere even if it is farther away.

They must not do too much development... build more offices... if FRIM keeps the place like this I will keep coming.

4.2 **Theme two: environmental learning at FRIM**

Participants referred to environmental learning already experienced at FRIM and some expressed a need for additional environmental learning opportunities.

4.2.1 *Category one: existing opportunities for environmental learning already being utilized by visitors*

Participants indicated that they made use of the following opportunities for environmental learning associated with the natural aspects of FRIM:

We bring our students to camp here because we need to teach our students to show appreciation for nature and the environment because it is one of the subjects in school.

The pond is okay for kids to learn about water and things in there.

... is important for education regarding the environment... there are lots of things we can learn about science and nature.

4.2.2 *Category two: need expressed for more opportunities for environmental learning*

There were many responses from participants that indicated that there was a need amongst visitors for additional opportunities for environmental learning associated with natural features of FRIM.

Make a leave sample display so we can see what types of trees there are along the trail.

Make handouts for schools as students have to learn about the trees in school... do research for school projects

Put up interpretive panels—it looks good and we can learn about the trees we do not know.

If there is more information it might help kids to choose a career about nature.

Just now the guide only tells us about the names of the trees... brief us about the functions so we have more knowledge.

5 Discussion and interpretation of the findings

5.1 FRIM as an urban open space

FRIM was established more than 80 years ago, and the forest has been regenerated to the extent that it can now serve the public in the many ways indicated by the interviewees. FRIM has the benefit that it offers a natural forest with natural areas which are rich in biodiversity. This includes streams with aquatic life, forest life including many insects, amphibians, reptiles, birds and mammals (described in the second section of this paper). The natural area is the reason for many visits to FRIM. Because it is a large area, the probability of a sustainable environment is greater as long as the area is protected.

It is clear from the results obtained from the interviews that a large number of people visit FRIM because of the natural features on offer. Many of their activities such as exercise, walking along trails, riding bicycles, breathing fresh air and relaxing in a safe, clean atmosphere are also related to these natural elements. This aligns well with findings in England where similar high visitor numbers are experienced in such places (Heritage Lottery Fund Policy and Strategic Development Department 2009). Other studies indicate that attempts are made to increasingly use school grounds as spaces for environmental learning (Malone and Tranter 2003), but other studies (Davidson and Lawson 2006) have shown that school grounds are simply not equipped for environmental learning and children need to go to other places (open urban spaces) (such as FRIM) to be able to learn in a conducive environment.

The theme of sustainability of FRIM as a natural open space and an environmental learning site for the surrounding society came forward quite prominently from the interviews. Participants indicated quite strongly that they would not visit FRIM if its natural character was disturbed either by loss of natural elements, too much development or overcrowding. They felt that the very reasons they were coming to FRIM were that it was a serene natural setting that provided an urban open space to get away from the city and all its noise, crowding and pollution. This aligns directly to findings regarding quality of life that green urban open space can offer in the literature study (Heriot Watt University 2007). A number of other studies also support this need for urban open spaces (Hansmann et al. 2007; Maas et al. 2009). In it lies a sanction for FRIM to ensure its sustainability and limit development and growth so that it keeps its unique character as a natural haven and a place for environmental learning. In the words of one participant "if FRIM keeps the place like this I will keep coming". In the literature study, it was found that other researchers made similar findings regarding the natural nature of urban open spaces and the importance of ensuring their sustainability (Mortberg and Wallentinus 2000).

FRIM is perceived by participants as an excellent area for environmental learning which aligns well with similar findings indicated in the literature study (Walker et al. 2006) and is supported by similar studies by Ward (2002) and Lee et al. (2015). Many visitors are already making use of learning opportunities associated with the many natural features of FRIM referred to in the previous section.

FRIM has already made efforts to make its campus a space conducive for environmental learning, and participants have indicated that they make full use of these. FRIM is furthermore already involved in environmental education and workshops in environmental education on its campus. On weekends, programme at the camping site is popular, but there are also "official" learning activities conducted at other times such as tree planting displays. Participants also referred to learning specifically related to the natural environment that is

already taking place (e.g. the labelling of trees, the pond and signage at the canopy walkway), while they indicated the role that some guides are playing in providing enriching information.

It is further clear that the environmental learning available is being utilized by young and old (there are references to learning by different age groups). This is quite interesting as there are some institutions and environmental educators that only focus on environmental learning for young people. Here it is quite apparent that adults are also using the opportunity to undertake informal environmental learning and find FRIM the ideal place to do so. According to participants, the type of learning they have a need for is directly related to the natural environment that FRIM provides.

Notwithstanding the fact that there are opportunities for environmental learning and that these are utilized, there were also participants that indicated that what there is might not be enough or correctly packaged. Some interviewees felt that signage (which is an aspect of free-choice learning and is currently provided at certain places) was inadequate. It was also found that the museum was not visited by any of the interviewees although the museum provides an opportunity for informal environmental learning. This might be because visitors choose to do their environmental learning in the environment rather than in a museum when they are in a wonderful natural setting like FRIM. An outdoor museum might be of more interest to them.

There were participants that also felt so strongly that there could or even should be more opportunities for environmental learning associated with the natural features of FRIM that they made suggestions in this regard (leaf exhibit, interpretive panels, etc.). Two prominent features of these suggestions were that the learning should be associated with natural elements and that the learning should cater for opportunities for young and old.

In terms of the young, it is quite evident that FRIM is perceived as an outstanding place for research by school students (learning about several sciences associated with nature) and that such learning is actually required by schools (learning about trees). This creates a wonderful opportunity for FRIM to prepare a tailor-made brochure that would lead such students to sites where such learning can take place (as was requested by one of the participants). An interesting suggestion is that FRIM can also interest students in careers associated with the natural environment if they wished to do so. Environmental learning for the general public is also a need according to the participants and they mentioned that guides should be more knowledgeable so that they could answer more questions from visitors. This is an aspect that can easily be attended to in the training of guides and that can enrich the experience of visiting FRIM.

Quite a number of participants seem to be interested in free-choice learning as there were many request for interpretive panels and exhibits from which they can learn themselves. FRIM has such an abundance of fauna and flora that the themes for such panels and exhibits are endless. Once more it could conceivably enrich the environmental learning experience for visitors and create an awareness of the importance of such places and why they should be sustained.

6 Conclusion

In conclusion, the findings of this research clearly indicate that FRIM is perceived as an urban open space with benefits to education and other related issues such as health, community, quality of life, environmental sustainability as well as cultural importance. The

most valuable asset of FRIM is its natural resources. FRIM needs to keep its greenery intact as a polluted and damaged environment is deemed unattractive to visitors.

FRIM has to be careful about receiving too many people since crowding was indicated as a reason why people would not visit FRIM in the future. Therefore, the suggestion to do more promotion to increase the numbers of visitors in general made by some participants needs to be evaluated carefully to avoid overcrowding. On the other hand, promotion could be done to increase visitors for the purpose of educational experience that relates to the natural environment of FRIM. Effective educational experiences might inculcate in visitors the responsibility to protect and share the management burden of maintaining facilities and conserving resources at FRIM.

From interviews, it is clear that most visitors to FRIM are nature lovers and prefer to come here because of its natural assets; therefore, FRIM has to maintain the natural environment. Unnecessary development in FRIM will discourage some visitors to FRIM. Visitor perceptions indicate that FRIM may need to improve and increase its interpretational signs and take more advantage of its natural environment when providing educational opportunities for visitors. Existing facilities like the museum could be promoted or reinvented for use by recreational visitors and for educational purposes. At the moment, it is mainly utilized by organized groups. The museum at present provides an educational experience through exhibits and displays indoors. An open air museum might be more suitable for a natural open space like FRIM where people come to be outdoors.

Valuing FRIM as a venue for environmental learning activities that promote understanding of nature will ensure that FRIM's valuable assets are optimally utilized and might encourage visitors to become stewards who help to protect FRIM thereby ensuring its sustainability.

The findings regarding FRIM as an educational recreation site will be very relevant for readers as in many developing countries natural areas are scarce especially within 20 km of a major city centre. Good environmental programmes will not only invite "desired" visitors but will lead to the inculcation of awareness regarding the conservation of natural resources.

Similar studies may yield very useful information for sites similar to FRIM to base management decisions on rich data gathered through qualitative research that not only tell managers what people like or do not like but why this is the case. Such decisions can then be based on more reliable and detailed perceptions of participants which has the potential to be more informative to decision-makers. Although this is a case study, the methodology used such and the interview questions and analysis may be applicable to research at other sites with a similar context where management decisions needs to be taken.

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