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ISSN 2773-5869
9 772773 586005

Makalah akademia

FOREST ECOSYSTEM SERVICES: WHAT IS IT AND WHO BENEFITS FROM IT?

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EDITOR: DR. NOR'AISHAH ABU SHAH

Introduction

It is always known that forest provides us with a range of benefits such as natural resources supply, high-quality water supply, sites for recreational activities, and a natural habitat for diverse flora and fauna. Today's growing urbanization results in the need for outdoor recreation and recreational forest offers a place to enjoy the natural beauty of the environment. Currently, the planning and management of recreational forests in Malaysia are focusing on the provision of leisure activities and preserving the forest ecosystem's biodiversity.

Due to the nature of growing needs for socio-economic growth and demands for the development of society, the usage of forest ecosystem services eventually brings negative effects. The condition of the environmental setting in a forest is impacted because of the excessive deterioration of natural resources and improper management of biodiversity conservation efforts. Subsequently, this situation affects the quality of life and well-being of humans (Emang, D., 2022). Therefore, it is very important to assess the ecosystem services offered by forests and identify the possible threats that might affect the sustainability of the place.

Definition of ecosystem services

The Millennium Ecosystem Assessment (2005) defined ecosystem services as the benefits that could be obtained from the ecosystem. Regarding the forest ecosystem services, there are four general categories of forest ecosystem services: provisioning services, cultural services, regulating services and supporting services for the benefit of human well beings. Figure 1 illustrates the categories of forest ecosystem services with examples.

Provisioning services refer to the services that consisted of materials and energy outputs that could be utilized for the sustainability of human beings. For example, aboriginal people are those who harvest natural materials directly from the forest either for their livelihood or sell it at a higher price for those in need such as medicinal plants. Fishes, timber, fruits and vegetables are examples of natural resource products that could be found in the forest ecosystem. On the other hand, the cultural services of forests provide non-material benefits to humans such as educational and recreational value.

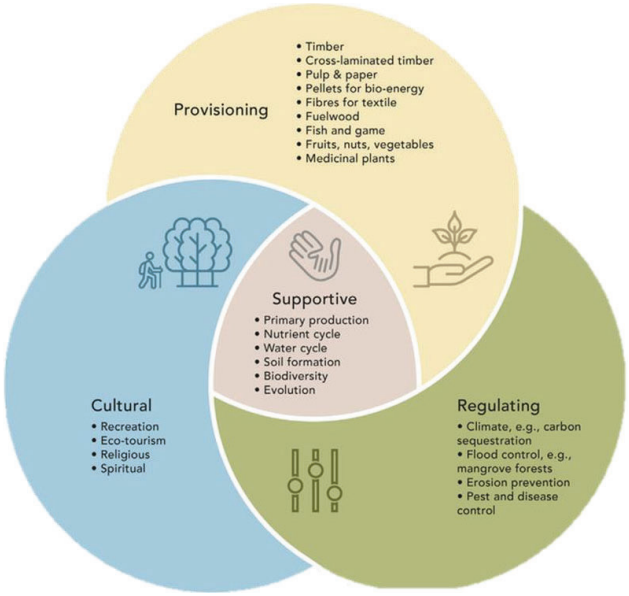

Figure 1: General categories for forest ecosystem services.
Adapted from: Kramer et. al. (2022)

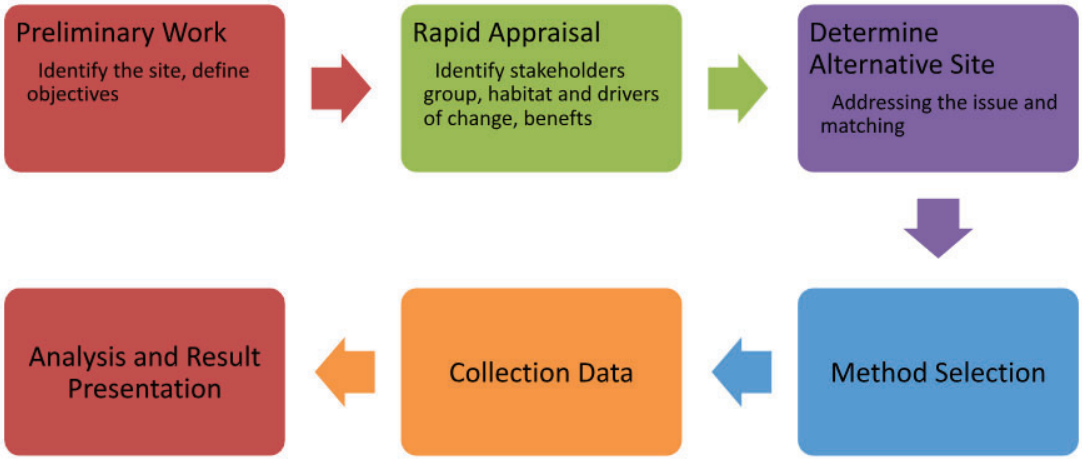

Figure 2: TESSA toolkit steps in assessing forest ecosystem services.

The recreational forest is gaining increasing attention from society as people are looking for a place where they could spend their time with families and friends and be able to escape from their hectic schedules. Due to the diverse flora and fauna found in the forest, the ecosystem of the forest also provides a 'living lab' for researchers for educational and research purposes, especially in the environmental management field.

As for regulating services, the forest ecosystem acts as a regulator which is very critical in regulating the environment such as climate regulation which trees in the forest help in maintaining humid temperatures in the city and also act as flood regulation to avoid flash floods. A mature tree approximately can absorb 22 kilograms of carbon dioxide from the atmosphere in a year and then release oxygen in return.

More than 2500 tonnes of air pollutants are removed annually by the 1.3 million trees planted in a year. Lastly, supporting services is related to the biodiversity conservation played by the forest as it is providing a natural habitat for flora and fauna. Forest ecosystems are incredibly rich in biodiversity, supporting a wide variety of plant and animal species. Forests provide habitat, food and shelter for countless organisms, contributing to the overall ecological balance and resilience of the ecosystem.

Toolkit for ecosystem services-based assessment (TESSA)

TESSA is a toolkit designed with the purpose to guide a non-specialist in identifying what types of ecosystem services to assess, which method might be applied to measure the services and what data are required to present the ecosystem services identified. The toolkit involved the identification of an assessment site by evaluating the benefits offered for human beings compared with the alternative plausible site. Generally, there are six (6) steps in TESSA toolkit as illustrated in the figure below.

TESSA started with the identification of a site where to conduct the assessment and define the objectives of the project. A rapid appraisal is required to get in-depth information and knowledge regarding the stakeholder groups involved in the ecosystem services delivered by a site, conduct a site-level workshop in order to obtain information on the types of ecosystem services received and determine the possible threats that could affect the sustainability of the site. Ecosystem services identified either global climate regulation, harvested wild goods, water-related services, nature-based recreation and cultivated goods.

With an identification of which ecosystem services to be assessed, an alternative site could be determined by comparing the data between the assessment site and the alternative site. It is very important to do a comparison to evaluate the differences in the data. Then, the selection of the data collection method is to be used according to the decision-making trees framework provided in the toolkit but could be adapted to the local context. Next, data analysis will be formulated to come out with the presentation of data and the results should be communicated to the stakeholders' groups involved especially in the decision-making process for the site.

Conclusion

Not all ecosystem services might be provided by the forest, but it is not wrong to carefully evaluate the services in order to maintain the sustainability of our forest. Our forests are increasingly receiving recognition for their biodiversity uniqueness and breathtaking natural settings. It is critical to assess the ecosystem services provided by forests and who are the ones who benefited from the services. For this purpose, TESSA is a straightforward framework helping non-expert to assess the ecosystem services discovered in their place and communicate the result to raise awareness towards the forest ecosystem services. It is hoped that our forests are being preserved for the sake of future generations.

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