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INNOVATIVE MANAGEMENT OF NATURAL RESOURCES: CASE STUDY OF MANGROVE AREA IN KUALA GULA, PERAK

Salina Nor Azam[1], & Tanot Unjah[2]

[1,2]*Institute for Environment and Development*
UNIVERSITI KEBANGSSAAN MALAYSIA

Abstract
This paper attempts to identify and explicate sustainability approach through innovative management of natural resources that is able to create balance between conservation and utilization of natural resources. Innovative management of natural resources is related to the act of bringing changes or an introduction to a novelty idea for achieving organisational goal which involves organising people, finances and resources, training, controlling, monitoring, and sanctioning. The study focuses on the mangrove ecosystem, one of the most sensitive natural resources in the country, which has been successfully managed by the government through top down approach. Data was gathered through content analysis and interviews with several key persons from the study area. This paper firstly compares the different management approaches in Matang Mangrove Forest Reserve and Kuala Gula Mangrove, before finally elaborating on the innovative management of the latter.

Keyword: Innovative Management, Sustainability, Mangroves, Community

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[1]Postgraduate at Universiti Kebangsaan Malaysia. Email: salinanorazam@gmail.com

INTRODUCTION

Sustainability dominates the current discussion worldwide for the betterment of mankind. It is a policy concept which was endorsed in the Brundtland Report of 1987. According to Kuhlman and Farrington (2010), the report addresses the conflict between human needs and the limit of what nature can offer. At present, sustainability can be described as maintaining the well-being of human for a long period of time, taking into account the three dimensions, which are social, economic and environment.

Balance in accommodating the needs of people and the ability to absorb its impacts towards the environment has been an issue of illogicality since the beginning. Therefore, there is always controversy involving development and conservation as conservation refers to the protection of resources while development is about the exploitation of the resources (Paxton, 1993).

In order to understand and address this issues better, the definition of the natural resources must be clearly defined before a new methodology to conserve it is developed. Natural resources are earth materials occurring in nature that can be extracted for economic purposes either in their raw state or after undergone various stages of processing (World Trade Organization, 2010) by using current technology and under economic and legal conditions.

Malaysia, a country that prospers through utilization of natural resources, underlines the importance of environmental protection and conservation in the Eleventh Malaysia Plan 2016-2020 (Economic Planning Unit, 2015), which indicates the effort of the federal government in the conservation of natural resources. This attempt includes two strategies to be undertaken, namely: i) ensuring natural resources security by conserving terrestrial and marine areas as well as endangered plant and wildlife species, managing natural resources and strengthening biosafety; and ii) enhancing alternative livelihood for indigenous and local communities by involving them in biodiversity conservation and empowering them for alternative economic opportunities.

One of the natural resources that needs to be conserved for the present and future generation is the forest, particularly productive forest. Among the most productive forests with various natural resources and economic benefits in the country is mangrove. People depend on the mangrove for the fuel wood, charcoal-making, timber, fishing tool, thatching material, fodder, food, tannin and other products (FAO, 1994; Kathiresan, 2012; Ong & Gong, 2013).

It is also important to highlight the significance of mangrove as environmental service provider for human wellbeing. Mangrove forest have been proven to be the best natural barrier for the tsunami (Kathiresan & Rajendran, 2005). It also plays vital function to prevent salt intrusion, reduction of pollution, production of organic materials for the marine biota, provision of spawning and nursery areas for marine fauna and as habitat for many species of wildlife. In

addition, it has a huge potential for tourism attraction and becoming eco-tourism sites to generate income in many countries (Sunil, 1997).

Globally, the world's mangroves are facing extinction as they have been overexploited for human needs. They are disappearing due to the construction of dam, diversion of waters and the development of agriculture or aquaculture in the intertidal zone such as rice fields, fish and shrimp ponds (Richards & Friess, 2016). There are long-stretches of the mangrove areas that have been converted for the industrial, land development and non-forest uses. Mangrove loss has huge biodiversity impacts; 16% of mangrove vegetation species are threatened with extinction globally, and several species are expected to become extinct by 2020 (Polidoro et al., 2010.)

Ecologically, mangrove is defined as a community of tropical trees and shrubs that inhabit the coastal intertidal areas. These plants have the special adaptations to survive in the variable flooding and salinity conditions imposed by the coastal environment. The significant and vital role of mangrove as the natural resources and environmental service provider to human kind, deserve a careful yet strong planning and management. Innovation in these areas would be able to sustain a fully functioning of mangroves forest or ecosystem.

Innovation needs new or creative ideas and the ability to transform that idea into actions to make a difference. “The outcome of the innovation is often specific and tangible as changes in the products, services or business processes provided by an organisation. We defined “innovation as the successful implementation of creative ideas within an organisation. In this view, creativity by individuals and teams is a starting point for innovation” (Amabile, Conti, Coon, Lazenby & Herron as cited in Downey, 2007, p. 3). Meanwhile, Dwan’s study (as cited in Abbah, 2014, p. 6) refers to management as planning goals of an agency with the specific purpose which involves the organizing of people, finances, resources and activities such as staffing, training, and socializing employees, leading the organization and the staff; controlling, monitoring, and sanctioning when needed.

Hence, management innovation involves the introduction of novelty in an established organization. Innovation in management is relevant to any organisation and can be applied in a number of different ways. Among the most common are in i) Product or service innovation, ii) Process innovation, iii) Business model innovation, iv) Organisational innovation, v) Marketing innovation, vi) Supply chain innovation, vii) Financial innovation (Downey, 2007). This study reviews application of organisational innovation (iv) and financial innovation (vii) as they can be observed in the study area.

METHODOLOGY

This study adopts qualitative research analysis using a case study. In order to study the innovative management for sustainability in natural resources of

mangrove forest, the Kuala Gula mangrove area and Matang Mangrove Forest Reserves (MMFR) were selected. The focus of the study is to emphasise the role of the community in contributing towards sustainability of the environment and their livelihood. Thus, interview sessions were conducted with the targeted group of restaurant entrepreneur, the former and current president of the Friends of Mangrove (*Sahabat Hutan Bakau)*, which is a non-governmental organisation (NGO) set up to protect the area, and residents in the village. Apart from interviews, primary data was also obtained through on-site observation. Secondary data was retrieved from scientific report, yearly reports, newspapers and internet sources.

MANGROVE FOREST CONSERVATION PROGRAMMES

Two types of mangrove forest conservation programme, top-down approach and bottom-up approach, were observed in the study area. Top-down approach is conservation is often lead by government agency, while bottom-up approach is often community-based. The former is applicable to MMFR, as is to most other forest reserves in the country. The latter, on the other hand, is implemented in the conservation of Kuala Gula mangroves, and is led by the local communities through Friends of Mangrove.

MMFR Conservation Management

Matang Mangrove Forest Reserve has a long history of mangrove management. Systematic management of the forest began in 1904 when the first plan was drawn up by A.E. Wells for the reserves (Roslan & Nik, 2013). MMFR covers an area of 40,466 hectares and stretches 51.5 km along the coastline from Kuala Gula in the north to Bagan Panchor in the south. The forest has been managed for more than a century primarily for the extraction of wood for the production of poles and charcoal. The forest has often been referred to as a fine example of sustainable forest management. It is based on a ten-year management plan prepared and implemented by the Perak Forestry Department (FRIM, 2013).

MMFR also plays an important role in providing other ecosystem services and socio-economic benefits. In addition to the harvesting of timber for MMFR also supports the fishing industry, aquaculture and created employment opportunity to the local residents (Roslan & Nik, 2013). It is also a habitat for migratory and resident birds (Ong & Gong, 2013), and provides recreational activities like fishing, prawning or crabbing and for those who appreciate the nature like bird watching and wildlife observation (Ahmad, 2009; FRIM, 2013). There are 34 permanent settlements located inside and adjacent to the boundaries of the forest. Of these settlements, 28 are fishing villages.

According to Ahmad (2009), ecotourism does not seem to be a major source of revenue for the MMFR. The ecotourism sites within the forest boundaries include; i) charcoal processing sites, ii) Kuala Gula Bird Sanctuary,

iii) the pre-historic site in Pulau Kelumpang, iv) fishing villages, v) floating fish cages along Sungai Sangga, vi) fishing sites along all the major rivers, vii) the boardwalk (nature trail), and viii) camping sites and chalets. Currently there are only two companies that operate in the area. The management of the MMFR involves; i) division of forest, ii) forest zoning, iii) rotation, iv) yield, v) charcoal production, vi) thinnings, vii) silviculture and viii) conservation (Wong, 2004).

Mangrove of Kuala Gula

A renowned bird watching paradise in Perak, Kuala Gula is situated at the northern part of Perak. It is a coastal mangrove area which consists of mangrove islands, mangrove coastal forests and the buffer areas of a river and its tributaries. The mudflats and the swampy areas provide all the needs for the stopover of various species of migratory and resident birds.

Fishing villages line up the outskirt of the mangroves area. There are about 7,200 people living in Kuala Gula and approximately about 35% (2,450) of the population are involved in the fishing industries that support their livelihood such as catching fish and prawn, and cockles rearing. In addition, they are also involved in downstream activities such as the processing and manufacturing of salted fish and shrimp, and shrimp paste (*belacan*).

Local community in Kuala Gula depends on mangroves area for their livelihood. Therefore, Friends of Mangrove, a non-governmental organisation (NGO), was established in 2007 as a pilot project to engage the local community and relevant stakeholders in the mangrove forest conservation program. Members of this organisation consist of local community. They are compensated for assisting the work of mangrove forest conservation of Kuala Gula. This encourages and motivates the people to conserve and care about the environment.

The program began with the mangrove planting programme by the local community and supported by the stakeholders such as Perak State Forestry Department and academicians. The boats that have been used in the program for transporting seedlings and participants to the field belong to the local fishermen. This helps to diversify their sources of income by undertaking part-time employment. The local people are also involved as service providers of accommodations and meals for the visitors. These have been contributing to the local community's economic development.

Table 1 below summarises the common forest management practices in MMFR as compared to the management innovation in Kuala Gula Mangrove.

Table 1 Ecosystem Services and Stakeholders of MMFR and Kuala Gula Mangrove

Characteristic of Management	Common practice of mangrove management; MMFR	Innovative practice in mangrove management; Kuala Gula
Sponsor/ Financial resources	Government agency	Community/ outside sponsor (CIMB Foundation and Global Environmental Centre, GEC).
Objective/ Goal	Ecosystem management strategy is structured to maximize the production of one ecosystem service, which involves the extraction of timber and charcoal.	A pilot project to execute the programme of replanting mangrove species along national coastline through participatory of local community and students (rehabilitation of mangrove).
Coordinator	Perak State Forestry Department (PSFD), Perak Fishery Department (PFD), Department of Wildlife and National Park (DWNP).	Establishment of NGO as a pilot project – Friends of Mangrove (*Sahabat Hutan Bakau*)
Monitoring/ Controlling/ Programme of mangrove		
- Zoning	• By PSFD (an effective management tool in 1950)	• None
- Planting/ Replanting/ - Weeding	• By PSFD	• By local community trough engagement with school students and university students.
- Rehabilitation/ Rotation	• By PSFD	• By local community trough engagement with school students and university students.
- Conservation	• By PSFD	• By local community trough engagement with school students and university students.
- Harvest system - (Felling and thinning)	• By PSFD	• For local community uses.
- Economic generation	• The silviculture practices at the MMFR have been strictly focused on the continual regeneration of the more economically	• The members of SHB who dedicate their time to assist the work of mangrove forest conservation of Kuala Gula will be compensated.

	valuable species of the Rhizophora. • Collection of royalties, premiums, licensing fees and fines was approximately US$ 597,323 per annum.	• Eco-tourism by local community.
Resources and activities		
- Fishing	• Fishing (Net cage fish culture) – by PSFD and PFD	• Fishing, catching mullosc – by local community
- Aquaculture	• Aquaculture (Shrimp ponds, cockle culture) – privately owned, PSFD and PFD	• Aquaculture (Shrimp ponds, cockle culture, soft crab)
- Tourism or eco-tourism	• Tourism/ eco-tourism (Nature Education Centre, Firefly watching, Bird watching, Charcoal processing site, River cruise) – by PSFD and DWNP	• Tourism/ eco-tourism (Bird watching, River cruise, Fishing, Education Centre) – by local community and DWNP
- Regulating services	• Erosion prevention, tsunami and storm protection, filter human and animal waste) – by PSFD	• None
- Raw materials	• Timber for charcoal and poles, wood vinegar, briguettes, nypa products, nibong poles, vegetable support structure, firewood) – by PSFD	• Non-timber forest product, food and beverage byproduct of mangrove plant, jeruju (Acanthus ilicifolius) and piai (acrostichum aureum), souvenir from cockles shell) – local community
Labour/ Human resource	• Staffs of government agencies	• Working together with partnership (local community, NGOs, government agency and private sector)

DISCUSSION

It was observed that innovative management approach that contributes to sustainable development in the Kuala Gula Mangrove were the organising of the people, the proper channel for finances and resources, the continuous capacity

building and training, and the publication of guideline in controlling, monitoring and sanctioning the mangrove area.

Community Involvement

Community involvement in the management of this mangrove is either as a member of the Friends of Mangrove or as a volunteer. Their contribution ranges from the work of conserving, protecting, monitoring to sanctioning of mangrove. This numerous task is similar to Halim, Salleh and Omar (2011) description on the effectiveness of the involvement of local community in the management of natural resources, which is strenuous but a requisite to successful natural resources management. With the community assuming the management functions of the mangrove conservation, the government resources can be freed to focus on enforcement of laws relating to the mangrove area. Such arrangement not only minimise the costs to the government, but also builds trust between the community and the government.

Finances and resources

Another indicator of innovative management is the ability to channel the finances and resources accordingly among the local community and for the management of the area. This has benefitted the local community financially and has consequently improved their livelihood. It also becomes an incentive for the community to better manage their natural resources.

Community involvement in the management of the area were incentivised through several methods. For example, an arrangement was put in place in which local community gets the right to use natural resources on state owned land but is responsible to manage and protect the resources sustainably. Ecosystem services are also being paid - the local community is given incentive for conserving and managing the mangrove and its resources which is part of an integrated approach to coastal area management. Additionally, the community also gets involve in tourism activities in the area, such as by becoming guides and also by providing boat rental. This has increased their income and standard of living.

Continuous capacity building and training

During its early years of establishment, Friends of Mangrove operated under the umbrella of Global Environment Centre (GEC), which is also an NGO. Being under the umbrella of a larger and more established NGO, Friends of Mangrove has benefitted in terms of acquiring knowledge on management and conservation of the mangrove area. At the same time, PSFD had also provided management guidance to Friends of Mangrove. Additionally, PSFD had also provided monetary support to Friends of Mangrove to fund their activities related to the mangroves. At the same time, the NGO is also allowed to collect donations,

charge membership fees, and collect profits from investment and rentals in order to finance their its operation.

Most of the local youth who are under 18 years old, were automatically absorbed by the NGO as volunteers. The purposes of this initiative were i) to carry out activities related to training and environmental education to the local people in order to create a positive feeling and to foster respect for the environment, especially the mangroves, ii) to promote conservation and preservation activities for mangrove forest mainly in Kuala Gula (mangrove reforestation activities with the public), iii) to help improve the standard of living for the local people through entrepreneurial activities such as eco-tourism and the production of handicrafts, and iv) to promote the attractions of Kuala Gula to tourists.

Guidelines preparation

Guidelines were also prepared to reduce conflicts in the management of the area. Additionally, proposals to improve the area were also included in statutory development plan, the Kerian District Local Plan 2020. Among the proposals are:

i. Upgrade research facilities in Kuala Gula, especially at the Kuala Gula Conservation Centre (*Pusat Konservasi* Kuala Gula);
ii. Provide shuttle buses for tourists from the city centre (Parit Buntar and Bagan Serai) and Bukit Merah Laketown Resort to Kuala Gula; and
iii. Upgrade the existing accommodation facilities to encourage tourists to spend the night in the Kuala Gula.

Proposals in the local plan were designed to promote influx of tourists into the area. This would further benefit the local community, in terms of revenue from ecotourism. Consequently, it will further incentivise local community to manage and conserve the natural resources in the area sustainably.

CONCLUSION

The management of natural resources in Kuala Gula by involving the local community and by establishing a Non-Governmental Organisation (NGO) led by the local people is an innovative way of maintaining and enhancing the protection of the mangrove forest while sustaining the livelihood for local community. The incentives given to the members of Friends of Mangrove which are also the villagers is one of the new initiatives that contribute to the sustainability of the mangrove management.

The setting up of a cooperation between all the stakeholders has indirectly helped the local community to become self-reliant and initiated the involvement of rural women in generating their own income. Local community has also increased their income from the natural resources and ecotourism

activities. This pilot project of Friends of Mangrove in Kuala Gula has resulted in sustainable use of natural resources and better collaboration between local people and the local authorities.

Previous research has shown that involving the local fishing community in the management of natural resources can lead to success, as in the case in Langkawi (Halim *et al*., 2011). This resembles to what is happening in Kuala Gula as they get the local community to participate in the managing of natural resources. This is a new paradigm which is in line with the sustainable development goals (SDGs) that promote sustainably managed forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss, and at the same time end poverty, protect the planet, and ensure prosperity of the people and the Earth (UN 2015).

The innovative approach in the management of Kuala Gula Mangrove can be applied to other places. However, proper monitoring must be undertaken by the stakeholders to ensure success of the programme. As Wever et al. (2012) point out, "Mismanagement may occur if subnational governments do not have equal expertise and capacity to perform effective management, and misappropriate and local profiteering can occur due a lack of federal oversight". Further research need to focus on how to strengthen this collaboration and bring more profit to the local community.

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REFERENCES

Abbah, M. T. (2014). Employee motivation: The key to effective organizational management in Nigeria. *IOSR Journal of Business and Management Ver. I*, 16(4), 2319–7668.

Ahmad, S. (2009). Recreational values of mangrove forest in Larut Matang, Perak. *Journal of Tropical Forest Science*, 21(2), 81–87.

Economic Planning Unit (2015). Eleventh Malaysia Plan, 2016-2020. https://doi.org/10.1017/CBO9781107415324.004

FAO (1994). Mangrove forest management guidelines. *FAO Forestry Paper No. 117*. Rome, 117(117), 319.

Forest Research Institute Malaysia (FRIM) (2013). *Wetland forest mapping; a tool for socio-economic development and poverty reduction* (Technical Report).

Halim, S. A., Salleh, H., & Omar, M. (2011). Engaging the local community in participatory resource management through learning: The experience from Langkawi Island, Malaysia. *Kajian Malaysia*, 29(SUPPL 1), 125–139.

Downey, J. (2007). *Innovation management*. Retrieved from http://www.cimaglobal.com/Documents/ImportedDocuments/cid_tg_innovation_management_jul07.pdf.pdf

Kathiresan, K. (2012). Importance of mangrove ecosystem. *International Journal of Marine Science*, 2(10). doi: 10.5376/ijms.2012.02.0010.

Kathiresan, K., & Rajendran, N. (2005). Coastal mangrove forests mitigated tsunami. *Estuarine, Coastal and Shelf Science*, 65(3), 601–606.

Kuhlman, T., & Farrington, J. (2010). What is sustainability? *Sustainability*, 2(11), 3436-3448.

Ong, J. E. & Gong, W. K. (Eds.). (2013). *Structure, function and management of mangrove Ecosystems*. Okinawa, Japan: International Society for Mangrove Ecosystems.

Paxton L. (1993). *Enviro Facts 3: Sustainable development*. Howick, South Africa: Environmental Education Association of Southern Africa.

Polidoro, B. A., Carpenter, K. E., Collins, L., Duke, N. C., Ellison, A. M., Ellison, J. C., … & Yong, J. W. H. (2010). The loss of species: Mangrove extinction risk and geographic areas of global concern. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0010095

Richards, D. R., & Friess, D. A. (2015). Rates and drivers of mangrove deforestation in Southeast Asia, 2000–2012. *Proceedings of the National Academy of Sciences*. https://doi.org/10.1073 /pnas.1510272113

Roslan, A., & Nik, M.S., (2013). *A working plan for the Matang Mangrove Forest Reserve, Perak: The first 10-year period (2010-2019) of the third rotation*. Malaysia: State Forestry Department of Perak Darul Ridzuan.

Sunil, L. (1997). Pilot project: Participatory management of seguwanthive mangrove habitat in Puttlam District, Sri Lanka. In G. F. Claridge & B. O'Callaghan (Eds.), *Community involvement in wetland management: lesson from the field*. Kuala Lumpur: Wetlands International.

Wever, L., Glaser, M., Gorris, P., & Ferrol-Schulte, D. (2012). Decentralization and participation in integrated coastal management: Policy lessons from Brazil and Indonesia. *Ocean and Coastal Management*, 66, 63–72.

Wong, S. L. (Ed.). (2004). *Matang mangroves: A century of sustainable management*. Kuala Lumpur: Sasyaz Holdings Sdn Bhd.

World Trade Organization. (2010). *World trade report 2010: trade in natural resources*. Retrieved from https://www.wto.org/english/res_e/booksp_e/anrep_e /world_trade_report10_e.pdf

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