

Water and Environmental Sustainability Education Linked with Ecotourism in Langkawi Geopark, Malaysia: Initiative towards Sustainable Development

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Abstract: Project on Water and Environmental Sustainability Education linked with Ecotourism in Langkawi Geopark, Malaysia is an initiative carried out by LESTARI, UKM under the UNESCO framework of "Science Harnessed for ASEAN Regional Policy (SHARP)" with Malaysian Fund In Trust (MFIT) financial assistance. Sustainability science as a new emerging field can be a tool to solve a complex environmental anthropogenic issue by promoting an integrated approach of various disciplines, multi scale and across stakeholder. It is a problem driven and solution oriented approach in creating a sustainable society requires the problem solving skills. Thus the establishment of sustainability science demo site in Langkawi Geopark involved integration of the sustainability science concepts into natural resource management frameworks and processes for supporting opportunities for more sustainable and resilient future. This initiative is linked with Education, Ecotourism, Geopark and Local Stakeholders and focused on applying sustainability science principles to strengthen policy, legal and institutional frameworks through collaborative linkages, learning alliances and targeted interventions for capacity building in Langkawi Geopark. The objective of this initiative is to develop the whole Langkawi Geopark as a demonstration site on water and environmental sustainability education linked with ecotourism in Langkawi Geopark, where the functions of stakeholders, ecotourism and ecohydrology is integrated. It is an appropriate initiative because the components of water resources and environment are distributed throughout the Langkawi Geopark and the resources in this island have access and impact on local community. Thus, this approach is suitable in promoting sustainability science as a platform to responds to the future needs in dealing with water and environmental sustainability related issues in Langkawi. Local stakeholders workshop and interview sessions has been conducted with some local government agencies, local authorities, private entities, NGOs and local community. Field data collection and survey on water and environmental quality state condition in Langkawi were also conducted through water sampling and questionnaires distribution to local stakeholders and community in Langkawi. A five (5) ways feasibility framework has been developed and applied in order to demonstrate the sustainability science approach in Langkawi Geopark through multi stakeholders participatory process conducted during the study. The establishment of sustainability science demonstration site in Langkawi managed to illustrate the sustainability science based solutions to solve related issues on water and environmental sustainability in Langkawi Geopark and identified how environmental sustainability best practices can support sustainable development policies at local, national and regional levels

Keywords: Sustainability Science, Demonstration Site, water, environmental, education, ecotourism, Langkawi Geopark, sustainable development.

Introduction

The Langkawi Geopark is continuously facing environmental and water resources vulnerability in spite of ecotourism activities adopted. The ecological strategies which have been implemented through planning and development program imply the drawbacks in existing governance. Sustainable development is the best alternative practice in the development of ecotourism. Education plays important role for resolving issues related to water and environmental sustainability as a tool for conservation. Establishment of Langkawi Geopark as a demonstration site will contribute to the reduction of present environmental, social and economic issues and problems with the projection of availability of resources for the future generations in a renewable mood.

Background

The Initiative for establishing the sustainability science demonstration site on “Water and Environmental Sustainability Education linked with Ecotourism in Langkawi Geopark, Malaysia” was carried out by the Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia (UKM) under the UNESCO framework of “Science Harnessed for ASEAN Regional Policy” (SHARP) with Malaysian Funds-in-Trust (MFIT) financial assistance. It was part of the establishment of UNESCO sustainability science demonstration sites in Asia Pacific out of 5 selected demosites i.e. Langat River Basin, Malaysia; Langkawi Geopark, Malaysia; Davao River Basin, Philippines; Ifugao Rice Terraces, Philippines; and Angkor Watt and Tonle Sap, Siem Reap, Cambodia.

The latest initiative in applying the sustainability science approach was implemented through “demonstration sites/projects” which were initiated by UNESCO (UNESCO & LESTARI 2015; Elfithri et al 2015; 2016). Through a demonstration pilot project, UNESCO is actively working towards integration of the “Sustainability Science” concepts into natural resource management frameworks and processes for supporting opportunities for more sustainable and resilient futures (UNESCO & LESTARI 2013).

The demonstration site in Malaysia focused on applying sustainability science principles to establish a learning alliances and community practices with sustainability focus as well as capacity building on sustainability frameworks to move to a sustainable and resilient future. Thus the establishment of sustainability science demo site in Langkawi Geopark involved integration of the sustainability science concepts into natural resource management frameworks and processes for supporting opportunities for more sustainable and resilient future.

The study was conducted at Langkawi Geopark, Malaysia. Langkawi Islands has been recognized as the Langkawi Geopark by UNESCO on 1st June 2007, the first UNESCO Geopark in Southeast Asia. Langkawi Geopark has been identified as a pilot demonstration site to apply sustainability science for resolving water and environmental issues in the area through education and ecotourism, linking with local stakeholders. It promotes best environmental management principles and practices with a clear pathway to regional science policy interface.

Research Methodology

The research methodology for this study was conducted by using two approaches i.e. qualitative and quantitative analysis in order to obtain the sustainability framework as solution option for actionable knowledge that stakeholders are willing to implement under close collaboration of academics and non-academics (government and private sectors; industry player and social society). The overall research framework for Sustainability Science Demonstration Site on Water and Environmental Sustainability Education linked with Ecotourism in Langkawi Geopark, Malaysia is shown in **Figure 1**.

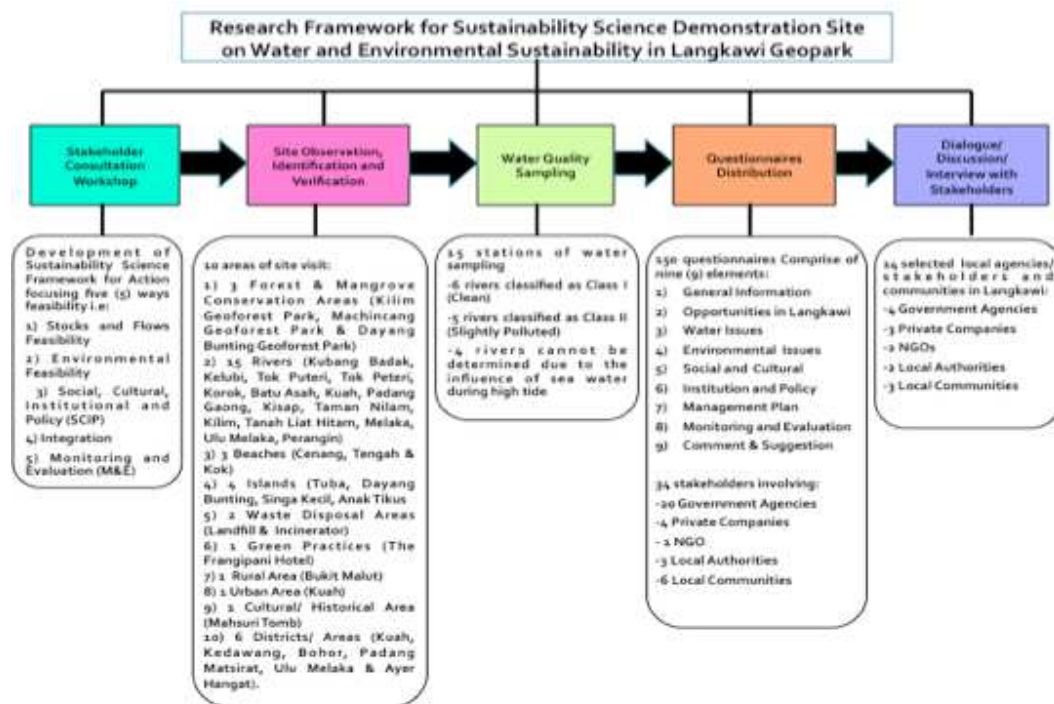


Figure 1: Research Framework for Sustainability Science Demonstration Site on Water and Environmental Sustainability Education linked with Ecotourism in Langkawi Geopark, Malaysia

Source: Elfithri et. al. 2016

Stakeholder Consultation Workshop

The stakeholder consultation workshop was organized on 23-25 November 2015 to discuss a sustainability science framework and demonstration sites establishment related to water and environmental sustainability; to engage community and stakeholders who can be involved in the establishment site in Langkawi Geopark; to identify sustainable management plans and policies to harmonize conservation and tourism development in Langkawi Geopark; to propose learning alliances for promoting sustainability aspects of water and environment in Langkawi Geopark and to design a sustainability science demonstration site on water and environmental sustainability linked with ecotourism in Langkawi Geopark. Many stakeholders were identified to provide adequate baseline information on water and environmental sustainability in Langkawi Geopark. Stakeholder's views were gathered through a stakeholder consultation workshop comprising 6 different categories of stakeholders viz. international organization, government, private sector, Kilim, NGO and media.

Site Observation, Identification & Verification

A random observation was done during November 2015 until April 2016 at Kilim Geoforest Park, Kisap River, Landfill area, Incinerator, Taman Nilam, Bukit Malut, Kuah Town, Mahsuri's Tomb and Cultural Center in Langkawi Geopark, Malaysia. Site visits have done to 10 category areas in Langkawi Geopark to identify the current water quality status in Langkawi Geopark including Forest & Mangrove Conservation Area, River, Beach, Island, Waste Disposal Area, Green Practices, Rural Area, Urban Area, Cultural/Historical Area and Districts/Regions.

Water Quality Sampling

Water Quality Study and Sampling have been conducted to 15 selected rivers and tributaries to identify the current water quality status in Langkawi Geopark, Malaysia.

Questionnaires Distribution

The questionnaire on “Stakeholder and Community Perspective on Water and Environmental Sustainability Issues in Langkawi Geopark” has been distributed in order to get information on water and environmental issues in Langkawi Geopark as well as level of awareness for better management of Langkawi Geopark. The questionnaires distribution were done during February-April 2016 to the communities at six territorial division of Langkawi Geopark: Kuah, Kedawang, Ulu Melaka, Bohor, Padang Matsirat and Ayer Hangat Involving total 34 government agencies and community. A total of 591 questionnaires passed to respondents, however returned questionnaires from the stakeholders were only received from 326 respondents. And only 150 questionnaires were analysed due to incomplete answer provided.

Dialogue/Discussion/Interview with Stakeholders

Detailed discussion/interviews were conducted through Discussions/Interview Sessions with 14 selected local agencies/stakeholders and communities in Langkawi Geopark to obtain more detailed information about specific roles of agencies in management and conservation of Langkawi Geopark as well as current development and implementation by agencies in Langkawi Geopark, Malaysia.

Results

Framework Development

The sustainability science framework for action has developed during stakeholder consultation workshop focusing on five (5) ways feasibility and has applied for Langkawi Geopark. The developed framework is shown in Figure 2 below:

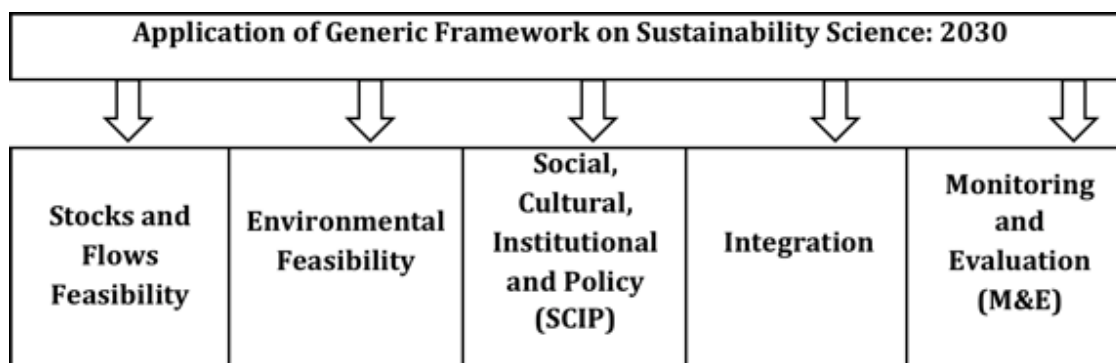


Figure 2: The Sustainability Science Framework for Action in Langkawi Geopark, Malaysia
Source: Elfithri et. al. 2016

Issues Identification

Based on data collection, stakeholder consultation workshops and site observation conducted under this study, it was identified 6 key issues in Langkawi Geopark i.e: Sewage Discharge; Solid Waste Management/Rubbish; Lack of Awareness; Land Clearing/Forest Area Reduction/Mangrove Exploitation; Water Quality Deterioration; and Tourism and Recreation Activities.

Water Quality Sampling Analysis

As a result of the water sample analysis, below showed table of water quality index and classification based on DOE-WQI guideline. All stations were categorized under class I or II, with varied WQI value from 84 to 97. Classification based on National Water Quality Standard indicates that present freshwater resource is remaining clean, can be utilized with required minimal treatment. It is important to maintain the present status of water quality and any development in Langkawi Islands must implement with good sustainability concept. The result for Kuah River, Kisap River (Intake 1& 2) as well Kilim River is corrupted due to mix of brackish water.

Community Learning Alliance for Sustainability Science (CLASS)

Pathway towards Sustainability to Promote Sustainability Science Practices in Langkawi Geopark has been established through Langkawi Research Centre (LRC) of LESTARI, UKM as Community Learning Alliance for Sustainability Science (CLASS). The promotion of Sustainability Science Practices in Langkawi have been done through 4 Sustainability Showcases i.e Local Community Participation @Kilim Geoforest Park; Water and Environmental Sustainability Practices @The Frangipani Langkawi Resort and Spa; Socio-Cultural Heritage Preservation @Mahsuri's Tomb & Cultural Centre Langkawi; and Interaction between Local Authority and Local Community @LADA & Land and District Office as shown in Figure 3.



Figure 3: Pathway towards Sustainability to Promote Sustainability Science Practices in Langkawi Geopark, Malaysia

Source: Elfithri et. al. 2016

Discussion and Recommendation

There are some sustainability practices and work plan that have already implemented in Langkawi, however more effort and improvement need to be done in the future in order to sustain Langkawi as one of the UNESCO Global Geopark and UNESCO Demonstration Site for Sustainability Science. There is a need for strategic management and development in Langkawi Geopark focusing Water and Environmental Sustainability linked with ecotourism management in the context of holistic approach with all stakeholders in Langkawi. The ecotourism activities and planning need to be in line with the sustainability framework for Langkawi Geopark.

Conclusions

The study has successfully identified water and environmental sustainability issues in Langkawi. There are some sustainability practices and work plan that have already implemented in Langkawi, however more effort and improvement need to be done in the future in order to sustain Langkawi as one of the UNESCO Global Geopark and UNESCO Demonstration Site for Sustainability Science. Overall, this study has managed to consult various stakeholders in Langkawi Geopark representing Government Agencies, Private Sectors, NGOs, Universities and Local Communities in various stages and activities. It was found that there is widespread stakeholders and community participation and involvement in Langkawi Geopark. It is noble to discover that there have been extensive sustainability practices and learning programmes already in place in Langkawi that contribute towards sustainable development of Langkawi Geopark. There is a need for strategic management and development in Langkawi Geopark focusing Water and Environmental Sustainability linked with ecotourism management in the context of holistic approach with all stakeholders in Langkawi. The ecotourism activities and planning need to be in line with the sustainability framework for Langkawi Geopark.

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