

## A Framework for Sustainable Tourism Planning in Johor Ramsar Sites, Malaysia: A Geographic Information System (GIS) Based Analytic Network Process (ANP) Approach

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**Abstract:** This study presents an approach based on an integrated use of GIS, ANP and Water Quality Index (WQI) for sustainable tourism planning in a wetland environment (Ramsar site). ANP will be utilized to evaluate the relative priorities for the conservation, tourism and economic development of the Ramsar sites based on chosen criteria and indicators (elements). Pair wise comparison technique will be used in order to evaluate possible alternatives from different perspectives. To reflect the interdependencies in the network, pair wise comparisons will be conducted among all the elements. As different elements are usually characterized by different importance levels, the subsequent step will be the prioritization of the elements, which allows for a comparison among the elements using expert opinion as input and the results transferred into GIS environment. Elements to be evaluated and ranked will be represented by criterion maps. The criterion maps will be evaluated by reclassifying the data layers, to represent different needs for conservation and development of the Ramsar sites. To determine the water quality of the river, parameters of the sampling stations will be used to calculate the sub-indices. Consequently surface data of water quality will be generated from the points of the sampling stations and decisions taken appropriately. Map layers reflecting the opinion of different experts involved will be compared using the Boolean overlay approach of GIS. Subsequently conservation, tourism and economic development models will be generated, which will ensure that tourism maintain the viability of the study area for an indefinite period of time.

**Keywords:** Analytic network process, geographic information system, sustainable tourism, water quality

### INTRODUCTION

Tourism is the fastest growing industry in developing countries (TIES, 2009). However, it is associated with negative impact which includes deforestation, pollution, indigenous culture loss, habitat and biodiversity loss, have caused an enduring damage to pristine environments in some of the regions. Tourism is the major environmental burden in some of its destinations (Tubb, 2003). In fact, generally this pressure degrades the natural values of the protected areas resulting in lower amenity value for tourists. Therefore, tourism should be proposed as a driving force for sustainable development, not as an aim in itself. Several scholars (Cottrell and Vaske, 2006), have been advocating for a certain type of tourism as desirable as it could contribute to the conservation of biological diversity, environmental education to the tourists, protection of the local culture, economic development for the inhabitants and provide funding for maintaining their environmental values.

The 1992 World Summit held in Rio de Janeiro, asserted that there is a need for a more balanced approach in development planning and therefore

charted a framework in which economic, socio-cultural and environmental aspects are equally important for a sustainable future. Since then, governmental and non-governmental organizations, international, national and the academic community have been trying to construe the term sustainable development. One way of doing this is to examine the concept of sustainability and establish how it applies in the various sectors of the economy. Tourism is an economic activity and cannot be ignored as its progress strongly relies on the environmental and socio-cultural resources. A definition of sustainable tourism is rather clear; Sustainable tourism may be thought of as "tourism which is in a form which can maintain its viability in an area for an indefinite period of time" (Butler, 1993).

For any proposal to be sustainable it means having a model in which to compare the proposal: criteria and indicators. It is an established fact that such a model is difficult to obtain because of the need to consider a number of variables and the relationships among them, which are usually complicated to set. On the other hand, for a model to be accepted, it has to arise from a compromise among the stakeholders as much as possible. Otherwise some of the stakeholders may feel