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Message from the President

Dear Readers,

The publications of this journal is one of the many activities undertaken by the Malaysian Institute of Planners (MIP) to propagate knowledge and information pertaining to town and country planning to its members as well as the public. This Journal also acts as a medium for MIP members and others to engage in research and writing articles that could contribute to the advancement of the theory and practice of town and country planning. Published articles in this Journal means for MIP members, is fulfilling their CPD point requirement. As to the academic contributors, journal's indexed in SCOPUS will be very meaningful as it adds extra point in terms of their involvement in research and publication.

This year, MIP's journal has moved extra mile by producing a special issue dedicated specifically on Langkawi Geopark. Ten related titles researched and written by a group of experts from LESTARI, UKM and LADA staff had contributed in this special issue. Topics which are covered and discussed in this issue would definitely promote better understanding on current issues relating to our first geopark, not only in Malaysia, but South East Asia dated back about 550 million years ago as endorsed by UNESCO in 2007. The articles discussed rigorously not only on geopark concept that made up of more than mere geological structures and landscape but also about how the local communities within it can sustain and nurture this geological heritage through effective conservation efforts and promotion of ecotourism. Experiences and suggestions put forward by the authors in this Journal could be used or adopted into practice by MIP members and authorities in carrying out their professional role in maintaining our very own world heritage. Congratulation to the authors for their excellent effort and materials published in this special issue.

On behalf of the council I would like to thank the editors. I would like to urge members of MIP and others to make full use of this Journal.

Prof. Dato' Dr. Alias Abdullah
PRESIDENT
(2011-2013)

CONSERVATION WITH DEVELOPMENT: SHOWCASING LANGKAWI GEOPARK - AN INTRODUCTION

Globalisation and trade liberalisation that have become parts of the characteristics of 21st century development have given more opportunities for the various countries to compete in the world markets and market products that they produce for the economic wealth of their people. The world economic superpowers like the United States, Japan, Russia, China and the European Union are intensely competing with each other to increase their Gross Domestic Products (GDPs), increase their people's income and enhance their quality of life. Malaysia, like all other developing countries, does not want to be left behind. Aspiring to be a developed nation by 2020, the Malaysian government has introduced the Economic Transformation Programme (ETP) to achieve a high income economy within eight years i.e. tripling the per capita income of the average Malaysians by 2020.

While applauding what economic growth and prosperity can bring for the comfort of the people, environmentalists are worried that the ever-increasing exploitation of natural and man-made resources is causing a strain on the global environment. Signs of the climate change phenomenon such as rising temperatures, extreme temperatures and rain, rise in sea level, melting of the icebergs at sea and snow at mountain tops, and water and air pollutions, are attributed to the depletion of natural environmental resources such as forests and other natural resources, non-sustainable technologies which are still being used by many developing and underdeveloped countries and unsustainable consumption patterns. This economic competitiveness for economic growth, high income development and increasing purchasing power are causing stresses on the natural and man-made environment. This phenomenon has led to the introduction of measures to counter environmental damage such as green economy, green businesses, green technology, green buildings, green construction and the like. Identification of protected areas and implementation of protected area management according to categories that were introduced by IUCN, integrated conservation and development projects (ICDPs) that were introduced by WWF and endorsed by UNDP are examples of measures taken to conserve environmental resources. However, the most important argument is that conservation and development can co-exist or even be integrated, for sustainable development.

Spatial and land use planners often face complexities or dilemmas in making trade-offs between conservation or allowing nature and natural resources to be consumed for development. Even within development areas, planners still have to make decisions between conflicting demands for the same resources. All these can be summed up as making choices between conservation and development.

This special issue of Planning Malaysia contains articles by a group of researchers and practitioners who support the argument that conservation and development can be integrated or at the very least, co-exist side by side. There are many ways of doing this, but the present collection of articles showcase Langkawi Geopark as a model or example of one approach to sustainable development in areas like Langkawi. The global geopark concept of Langkawi Geopark is to promote not only geoheritage, but also bioheritage and cultural heritage which are very crucial for maintaining healthy and sustainable environments and at the same time enhancing the economies of the local populations, present and future. The articles discuss and argue that there can be conservation with development. The writers are researchers from Universiti Kebangsaan Malaysia (UKM)'s research group on Governance for Heritage Conservation, from a special team that is preparing the Langkawi Geopark Management Plan (LGMP); and a group of practitioners from Langkawi Development Authority (LADA), which is UKM's collaborative partner in the preparation of LGMP.

The first article, *Conservation and Development: Showcasing Langkawi Geopark*, by Halimaton Saadiah Hashim, Sarah Aziz and Rahimah Abdul Aziz discusses the various definitions and concepts of conservation, development, natural and cultural heritage and conclude that there can be conservation with development, provided that they are within the context of sustainable development. The global geopark concept is described as a holistic concept which integrates conservation of natural and cultural heritage with socio- economic development of the local communities. Langkawi Geopark is showcased as an example of the symbiotic relationship between conservation and development. Land use is suggested as the integrating element between conservation and development. The Langkawi Geopark Management Plan is to complement the Langkawi District Local Plan, which is a local land use strategic development plan prepared under the Town and Country Planning Act 1976 of Malaysia.

The second article, *Geopark for Heritage Conservation: A Need for Integrated Planning and Management*, by Rahimah Abdul Aziz, Halimaton Saadiah Hashim and Ibrahim Komoo, supports the first article by highlighting the need for integrated planning and management of geoparks. A geopark contains different kinds of heritages, hence a single integrated plan may help to avoid potential conflicts in managing them as well as would enable different stakeholders to be brought onto a common platform in the best interest of the people, the area and the heritages. This is also to enable differing needs and interests to be taken into account without compromising the need for sustainable development.

Meanwhile in the fourth article, *Implementing Langkawi Geopark Through Land Use Planning*, Noor Yazan Zainol, Hapiz Abd Manap, Ibrahim Yacob, Mahani Muhammad, Mariam Tajuddin and Ikhwan Mohd Said of LADA describe the land use planning system and procedures which apply to Langkawi. They are applied through the Development Plans under the Malaysian Town and Country Planning Act 1976 that serve as the principal planning instruments in guiding and regulating protection,

conservation, use and development of land towards quality living environment. The land use planning system and procedures also act as guides to investment and use of resources as well as provide frameworks for short and long term investments by public and private agencies, and for the co-ordination of their decisions. Planning and development control at the lowest level then regulates development so that it complies with land use plans. Through land use planning, sustainable development, protection and conservation of natural and cultural heritage resources can be regulated. This article describes how the geopark concept in Langkawi is implemented through land use planning.

Identification and conservation of geological heritage resources have long been regarded as being the domain of geology and geologists. However, in the fifth article, *The Importance of Geological Heritage Resources in Land Use Planning: Experience From Langkawi Geopark*, Che Aziz Ali and Tanot Unjah suggest that to ensure the sustainability of geological natural resources it is timely to include geoheritage sites in future land use planning and land use plans. In this way, geological history and geological sites as tourist sites will be conserved by allowing only compatible activities on them and compatible land uses around them. Integrated plans will ensure the sustainability of tourism in Langkawi.

Sarah Aziz, Halimaton Saadiah Hashim, Rahimah Abdul Aziz, Chan K.L. Geraldine and Tanot Unjah, further strengthen the argument that land use planning can be an effective instrument for conservation and development in Langkawi Geopark. This discussion could be found in their article, *Land Use Planning Statutes for Langkawi Geopark Conservation and Development*. The focus lies on how existing land use related statutes could be put to use to capture the components and elements that make up a geopark. Given that there are more than 120 statutes that can be linked to the various aspects and components that make up a geopark, this article only converges on land use planning aspects, in particular about processes and procedures that are embodied in existing statutes.

The seventh article introduces potential biosites which could be identified in Langkawi Geopark. Norhayati, A., Chan, K.O., Daicus, B., Samat, A. and Grismer, L.L. in their article, *Identification of Potential Biosites of Significant Importance in Langkawi Geopark: Terrestrial Vertebrate Fauna*, suggest eight biosites of significant importance and describe their characteristics and intrinsic values for heritage conservation purposes, since Langkawi Geopark is also known for its high biodiversity of flora and fauna, many of which are endemic and rare. The identification of these biosites, as a start, will complement the 97 geosites already identified.

In the eighth article, *Planning for Heritage Tourism: The Case of Langkawi Geopark*, Ong Puay Liu and Sharina Abd Halim present tourism as the principal building block underlying Langkawi's status as a tourist destination for nature and culture enthusiasts. This article stresses that while tourism is a commercial enterprise, it has

an important role in ensuring that Langkawi's natural environment is well-protected, and the local communities' cultural traditions safeguarded. Central to this need for protection is 'heritage' - the basic ingredient in sustaining Langkawi as a premier tourism destination. Thus, tourism and heritage management have to be viewed as interdependent, as both rely on the same 'heritage resources'. Planning can act as the bridge to connect tourism, whose products are identified for their extrinsic values as tourist attractions, and heritage in which assets are identified for their intrinsic values.

Rahimah Abdul Aziz and Ong Puay Liu relate place names in Langkawi Geopark to cultural heritage. Through their article, *Cultural Heritage in Placemaking: Local Legends and Origin of Place Names*, they note that place names can reveal a great deal about the history and cultural heritage of any populated area, besides unlocking a valuable store of information that appeal to heritage tourists. As such, when engaging in placemaking of built environment or changing place names planners should build upon the existing cultural heritage rather than just ignoring it. This is because cultural heritage enriches an area or a place besides contributing to a sense of belonging and a sense of ownership of the inhabitants.

Effective participatory planning is through knowing and understanding the stakeholders, their roles in the community, their aspirations and their ability to participate in planning and implementation either in bottom-up or both bottom-up and top-down participatory processes i.e. having 'relationships' with stakeholders. This is more than 'once in a while' consultations with stakeholders to get their opinions on certain plans or programmes planned by the authorities. In the tenth article, *Introducing Networks in Planning: An Example From Langkawi*, Chan K. L. Geraldine, Halimaton Saadiah Hashim and Sarah Aziz introduce networks as a potential technique in participatory planning and implementation activities. This recommendation is backed by findings of some networks-like characteristics indicated in past and present work relationships between relevant government agencies and private stakeholders in a study of a few Langkawi Geopark activities.

The eleventh article proposes participatory management in *Participation Towards Heritage Conservation: Case of a Fishing Community in Langkawi Geopark* by Sharina Abdul Halim, Ong Puay Liu, Nurhafizah Yussof and Lim Choun Sian.. This article emphasises the importance of community participation and consultation in planning for heritage conservation and gives the example of the setting up of co-operatives community resource management (*Komuniti Pengurusan Ekosistem Perikanan* (KPEP)) as a significant attempt that acknowledges the value of local involvement in natural resource management.

The compilation of eleven articles on conservation with development, with a focus on Langkawi Geopark, in a special issue of Planning Malaysia is a mutually benefitting initiative by UKM researchers and the Malaysian Institute of Planners' Council to bring to planners significant findings from research on Langkawi for the advancement

of planning in terms of concepts, contexts and process for sustainable development. While heritage, natural and cultural, must be conserved for future generations, sustainable development too must be allowed for the benefits of all groups.
The articles have been refereed twice by the writers themselves as a group and edited by the guest editors. The added value given by external referees and editors from the Malaysian Institute of Planners is invaluable.

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CONSERVATION WITH DEVELOPMENT: SHOWCASING LANGKAWI GEOPARK

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Abstract
Debates on whether conservation and development can be integrated have been going on for decades. Economists argue that the economy is the main support of the human race; conservationists argue that without sustainable natural and human resources, economic activities cannot be sustained; humanists argue that culture and history are necessary to sustain a community's identity and continued existence. This article argues that conservation and development can be integrated through sustainable development. Land use planning is identified as the integrating process while sustainable land use development is the manifestation of integrated conservation and development. The geopark concept, developed by the Global Geopark Network (GGN), and endorsed by the United Nations Economic and Cultural Organisation (UNESCO), which promotes conservation, education and sustainable development, is accepted as a concept which conserves natural and cultural heritage while enhancing socio-economic development for the sustainable wellbeing of the local population. Langkawi Geopark is an example of such integration.

Keywords: Conservation, landuse development, conservation with development, geopark, Langkawi Geopark

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INTRODUCTION

Debates on whether or not environmental protection and conservation should be given a higher priority than development and economic growth have been on-going for decades. Economists, particularly those in support of weak sustainability, argue that it is economic wellbeing and prosperity that supports environmental protection and conservation, while conservationists, particularly those in support of strong sustainability, argue that environment and natural resources are the basis for sustainable economic growth. A third aspect that makes the debate more complex is cultural heritage – is it as important as environment and economy? Land use planners, when performing strategic land use planning or making decisions for planning and development approvals, have to face these arguments when making trade-offs where they are allowed or possible. Questions therefore arise can there be development without conservation? Are conservation programmes possible if governments do not have enough resources to allocate them among priorities? Is it possible to practise conservation with development?

> Conservation is defined as:
> "Action taken to prevent decay or dying. It embraces all acts that prolong the life of our cultural and natural heritage, the subject being to present to those who use and look at heritage properties with wonder the artistic and human messages that such properties possess…Conservation must preserve and if possible enhance the messages and values of the properties." (Rosli Hj. Nor 2008:20)

Conservation has a wide scope. However this article only discusses the conservation of heritage as defined by UNESCO and for Malaysia, as defined by the Malaysian National Heritage Act 2005 (Act 645). The Convention Concerning the Protection of the World Cultural and Natural Heritage defined two types of heritage to be protected i.e. cultural and natural heritage. Three categories of 'cultural heritage' are defined in Article 1 of the Convention (UNESCO 1972: 1):

- *Monuments:* architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;
- *Groups of buildings:* groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the points of view of history, art or science; and
- *Sites:* works of man or the combined works of nature and man, and areas

including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.

Article 2 of the same Convention also defined three categories of 'natural heritage' as follows:

- *Natural features:* consisting of physical and biological formations or groups of such formations which are of outstanding universal value from the aesthetic or scientific point of view;
- *Geological and physiographical formations:* precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; and
- *Natural sites:* precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

"… The UNESCO terminology has remained unaltered to the present day..." (Yahaya Ahmad 2006: 295). However, the importance of intangible values as part of heritage was emphasised by UNESCO when it adopted a Convention in 2003 (UNESCO, 32nd Session of the General Conference, 2003. Cited by Yahaya Ahmad 2006). The newer convention helped to protect further intangible cultural heritage, which has been defined as "… practices, representations, expressions, knowledge, skills, instruments, objects…" (Article 2). On this Yahaya Ahmad (2006:295) opined that "… while the scope of heritage has broadened to include environment and intangible values, and has received agreements from the international communities the finer terminology of 'heritage' has not been streamlined or standardised, and thus no uniformity exists between countries..."

The Malaysian National Heritage Act 2005 (Act 645) (quoted by Rosli 2008) also basically adopts UNESCO's definition of heritage, with a few variations. The Malaysian Act includes tangible and intangible cultural heritage, natural heritage, underwater cultural heritage and living human treasures as well as treasure trove. Rosli (2008) lists Malaysian tangible cultural heritage to include: cultural heritage sites, historic cities, cultural landscapes, natural sacred sites, movable cultural heritage, museums, underwater cultural heritage, handicrafts, documentary and digital heritage, and cinematographic heritage. Malaysian intangible cultural heritage includes oral traditions, languages, festive events, rites and beliefs, music and songs, performing arts, traditional medicine, literature, culinary tradition and traditional sports and games. While the natural heritage includes national parks and state parks; marine parks; wetlands/RAMSAR sites; mangrove reserves; forest reserves; geological parks; wildlife reserve birds sanctuary; Orang Asli Reserve (Indigenous Peoples Reserves); wildlife rehabilitation centres; and rivers, lakes and seas.

The above categories of protected areas used to be in isolations. However, this situation soon changed, when conservation was regarded as an active management policy where development and change are not impossible within a broad framework of protecting certain aspects of the heritage (Howard 2003). Various movements, supported by numerous groups and stakeholders, are fighting for this agenda which includes geoheritage conservation, biodiversity conservation and socio-cultural heritage conservation. Protected areas management then have undergone new paradigms. Today most protected areas have taken the holistic approach. They are no longer of single land uses but are of multiple objectives, functions and land uses, serving to protect and conserve geological, biological and cultural heritage while contributing to the socio-economy of the local communities, in a sustainable development scenario. "… Conservation, ultimately, is about promoting good land uses for the benefit of people, future generations, and the land itself…" (Freyfogle 2000: 144).

Nikita Lopoukhine, Chair, IUCN World Commission on Protected Areas, in the 'Foreword' of Lockwood M, Worboy G.L. and Kothari, Ashih (eds) 2006, sums up well the different facets of a protected area in the new paradigm when she describes the 'qualifications' for a protected area manager:

> "the manager needs a broad range of skills and personnel attributes to manage effectively. Beyond the core knowledge of an area's natural, cultural and other assets, he or she needs a far deeper understanding of the landscape, both physical and metaphorical, within which protected areas must operate in the 21st century…needs to be part ecologist, historian, economist, sociologist, diplomat, negotiator and marketer to name but a few!" (Lockwood M, Worboy G.L. and Kothari, Ashih (eds) 2006:xxiiii)

Lockwood, Worboy and Kothari (2006) also described the emerging protected area paradigm in which instead of purely protection for preservation, today's protected areas' objectives are combined with social and economic objectives, as well as conservation and recreation ones. They are often set up for scientific, economic and cultural reasons; managed to help meet the need of the local people; the wilderness areas are also regarded as culturally important places; and the objectives are about restoration and rehabilitation, as well as protection, so that lost or eroded values can be recovered.

The new paradigm is in line with the concept of sustainable development, which was popularised by the Brundtland Commission (WCED 1987). Sustainable development is widely accepted as "… development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: (1) the concept of 'needs', in particular the essential

needs of the world's poor, to which over-riding priority should be given; and (2) the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs…" (WCED 1987:43). Brundtland's definition means that resources must be sustainably utilised for economic activities to meet present and future generations, within the carrying capacities of each habitat.

CONSERVATION WITH DEVELOPMENT IN SUSTAINABLE DEVELOPMENT

Aronsun, J. 2006 of Carnegie Mellon has put together several definitions of development – some are quotes while others are his own definitions - in his power-point presentation slides on the website:

i. "Development entails a modern infrastructure (both physical and institutional), and a move away from low value added sectors such as agriculture and natural resource extraction";
ii. "Developed countries usually have economic systems based on continuous, self-sustaining economic growth and high standards of living";
iii. South-oriented definition: "a process which enables human beings to realize their potential, build self-confidence, and lead lives of dignity and fulfilment. It is a process which frees people from fear of want and exploitation. It is a movement away from political, economic, or social oppression. Through development, political independence acquires true significance. And it is a process of growth, a movement essentially springing from within the society that is developing." (The Challenge to the South: Report of the South Commission) 1990;
iv. Human Development: "The basic objective of human development is to enlarge the range of people's choices to make development more democratic and participatory. Choices include: decent wages and employment opportunities, education, healthcare, clean and safe environment, ability to participate in community decision making, and enjoyment of basic human, economic and political freedom. (UNDP Human Development Report, 1991);
v. Development as Freedom: "Development is the process of expanding the freedoms that people enjoy (Sen) Requires removing barriers to freedom: poverty, tyranny and unaccountable government, lack of opportunity, systematic social deprivation, lack of functioning infrastructure, and repression Development depends on people's ability to make good choices in their economic, political, and social lives." and
vi. Gilbert Rist's Definition: "Development consists of a set of practices, sometimes appearing in conflict with one another, which require—for the

> reproduction of society—the general transformation and destruction of the natural environment and of social relations. Its aim is to increase the production of commodities (goods and services) geared, by way of exchange, to effective demand."

The six definitions of development quoted and given by Aronsun (2006) reflect the drive towards wealth and freedom which are mostly associated with development. Very little consideration is made to the health and wellbeing of the environment and to the continuous supply of resources for future generations. A few definitions are even contradictory to the sustainable development concept and therefore are potential threats to natural and cultural resources, part of them regarded as heritage.

Sustainable development is generally regarded as a concept which balances economic development with environmental wealth and social wellbeing. However, since the 1992 Rio Summit, it has often been emphasised as an environmental issue. What is also constraining sustainable development is economic development, which reigns the world today, particularly by developed countries in attaining wealth and by the developing and underdeveloped countries in overcoming poverty and income disparities. In the process, natural resources are fast depleting and there is degradation of the environment, often threatening biodiversities and in turn threaten resources. The definition of 'development' as 'economic growth' being used by the developed countries also hampers the success of sustainable development. Furthermore the definition is also being adopted by the developing countries. Such an approach to 'development', instead of 'sustainable development', cause perils to the environment (e.g. air and water pollution) and exhausting natural resources (oil reserves). Another development which is shifting the perception of sustainable development from environmental issues to social and economic development is the negotiations of WSSD in 2002 in Johannesburg. The shift is driven by the needs of the developing countries and strongly influenced by the Millennium Development Goals (MDG) (Drexhage and Murphy 2010).

In light of the above, since the Rio Summit economic growth has been fed by unprecedented resource and material consumption and related environmental impacts. Large portions of the natural world have been converted for human use, prompting concerns about the ability of the world's natural resource base to sustain such growth. While the world has made some progress on decoupling natural resource extraction from economic growth, the absolute consumption of resources is projected to increase long into the future. This is contradictory to the concept of sustainable development. Impacts are revealed in a number of disturbing trends. Global biodiversity continues to decline, and species in all groups with known trends are, on average, being driven closer to extinction. For example, "…fishery stocks are at the point of collapse, with around 80 percent of the world marine fish stocks for which data is available are

fully exploited or overexploited (Secretariat of the CBD, 2010:48). The Millennium Ecosystem Assessment reveals that the provision of many critical ecosystem services—such as water, biodiversity, fibre, and food—is being compromised due to the impact of human development (Hassan *et al.*, 2005). Scarcity of and competition over freshwater is a growing concern for many regions in the world, with around 50 countries currently facing moderate to severe water stress (WWF, 2008). Climate change will exacerbate water stress and other problems. Current predictions, summarised in the IPCC's 2007 Assessment Report, indicate that the carrying capacity of large parts of the world will be compromised by climate change. Significant political divisions threaten international progress on climate change, yet the window for action to avert the most dangerous effects of global warming is shrinking by the day…" (Drexhage and Murhphy 2010). Therefore, sustainable development has to continue. Conservation and development have to co-exist for economic growth, environmental health and social wellbeing.

To understand the relative importance of conservation and development, OECD suggests that there should be a 'decoupling' of environmental pressures from economic growth, and defines that as the key challenge of sustainable development. It argues that while economic growth was regarded as most important, maintaining functioning ecosystems that can support economic and social development is regarded as very important (in Lafferty 2004:192):

> "The interaction between economic growth and the natural environment that supports it lies at the core of sustainable development. Economic growth contributes to higher levels of human wellbeing, and provides the resources to address a range of environmental objectives. Economic growth can however also lead to excessive degradation of environmental and natural resources – when incentives to their use are inappropriate and external effects are not internalised. Historically, economic growth has meant transforming much of societies' stocks of natural resources into other forms of capital. Today, maintaining functioning ecosystems that can support economic and social development is recognised as crucial for development to last, especially when no substitutes are available." (OECD in Lafferty 2004:192).

While it is generally accepted that sustainable development means an interdependency and balance between environmental, economic and social factors, this does not mean that all three aspects must be equally treated. Many assessment of cross-sectoral policy integration of sustainable development indicate that an insistence on 'all or nothing' usually ends up with the latter. In fact Lafferty argues that the general 'environmental' or 'ecological' element of sustainable development is the most fundamental aspect – the one without which the concept loses its distinctiveness (the 'limitation' element); that the notion of 'decoupling' implies a necessary interdependency between environment

and economics (the 'need' element). To rationalise the above, Lafferty suggests that we "… stipulate a 'three-component' understanding of sustainable development goals, with 'decoupling' understood here as primarily a question of 'integrating' the first two components…" (Lafferty 2004) – see Table 1.

TABLE 1: Basic Goal Components of Sustainable Development

The environmental/ecological component:
Consisting of three major aspects (phases) of normative environmental politics:
Nature conservation
Environmental protection
Ecological balance
The economic component:
Consisting of the key elements of the Brundtland/UNCED goal of a 'qualitatively different mode of ('sustainable') economic development:
Sustainable production through improved 'eco-efficiency'
Sustainable consumption and lifestyles
The social (equity/poverty) component
Consisting of four equitable distributions of individual life changes to satisfy objectively defined 'basic needs':
National social equity
National generational equity
Global social equity
Global generational equity

Source: Adapted from Lafferty W. M. 2004:193

The general acceptance that conservation can be with development has led to the concept of Integrated Conservation and Development Projects (ICDP) which was introduced by World Wide Fund for Nature in the mid 1980s. The concept is widely practised because it helps to "… reconcile the biodiversity conservation and socio-economic development interest of multiple stakeholders at local, regional, national and international levels… aimed to reconcile the biodiversity conservation and

socioeconomic development interests of multiple stakeholders at local, regional, national and international levels…" (Frans and Blomley 2004. Quoted by Garnett et al 2007:1). ICDPs have many different names like 'People-Centered Conservation and Development', 'Eco-development', 'grassroots conservation', 'community-based natural resource management' (CBNRM) and 'community wildlife management' (CWM). ICDPs are normally linked to a protected area.

LANGKAWI GEOPARK FOR CONSERVATION WITH DEVELOPMENT

This section will showcase Langkawi Geopark as a model for conservation with development. First, it will describe conservation and development in the geopark concept. Secondly it will describe Langkawi Geopark's characteristics which highlight a mixture of conservation and development components and that have symbiotic relations with each other.

GEOPARKS: CONSERVATION WITH DEVELOPMENT

The Geopark philosophy was first introduced at the Digne Convention in 1991 to promote geological heritage and sustainable local development. In 1997 the Division of Earth Sciences of UNESCO, in response to the 'Declaration of the Rights of the Memory of the Earth', support initiatives in Earth heritage conservation through the creation of a UNESCO Geoparks Programme. This led to the creation of the European Geoparks Network (EGN) and the Chinese National Geoparks Network (CNGN) in 2000 and a year later, in 2001 the EGN was placed under the auspices of UNESCO. In 2004 the Global Geoparks Network (GGN) was formed under the auspices of UNESCO. The network soon spread to Australia, Brazil, Iran, Malaysia, and Vietnam. There was a call for the Geoparks programme to be integrated into the International Geological Correlation Programme (IGCP) and UNESCO's Man and the Biosphere Programme, but was rejected by the Executive Board (Jones C. 2008).

The geopark has its origin from the 1992 United Nations Conference on Environment and Development (UNCED) Summit in Rio de Janeiro. Agenda 21, the strategic action plan for sustainable development, proposed the protection and sustainable development of geological heritage and geodiversity through environment and development. The protection and sustainable development of geological heritage and geodiversity through Geoparks initiatives contribute to the objectives of Agenda 21, namely the Agenda of Science for Environment and Development into the twenty-first century adopted by UNCED. This was reconfirmed by the World Summit on Sustainable Development 2002 in Johannesburg. The Geoparks initiative adds a new dimension to the 1972 Convention concerning the Protection of the World Cultural and Natural Heritage by highlighting the potential for interaction between socio-economic and cultural development and conservation of the natural environment. This

development then led to the current global definition, which is holistic and integrates geo-bio-cultural heritage with socio-economic development of the local communities through the sustainable concept. GGN defines a geopark as:

> "A geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development. The geopark should take into account the whole geographical setting of the region, and shall not solely include sites of geological significance. The synergy between geodiversity, biodiversity and culture, in addition to both tangible and non-tangible heritage are such that non-geological themes must be highlighted as an integral part of each geopark, especially when their importance in relation to landscape and geology can be demonstrated to the visitors. For this reason, it is necessary to also include and highlight sites of ecological, archaelogical, historical and cultural value within each geopark. In many societies, natural, cultural and social history are inextricably linked and cannot be separated (GGN 2010).

GGN's geopark definition highlights the synergy between geodiversity, biodiversity and socio-culture which are of high heritage values. Connected to this is social history which identifies the local communities which interact and depend on the environment for a living.

A geopark seeking a Global Geoparks Network (GGN)'s status as a global geopark must abide by the *Guidelines and Criteria for National Geoparks Seeking UNESCO's Assistance to Join the Global Geoparks Network* (GGN 2010). There are six criteria to comply with: (1) Size and setting, (2) Management and Local Involvement, (3) Economic Development, (4) Education, (5) Protection and Conservation, and (6) The Global Network. The descriptive outline below is a summary from GGN 2010 and can also be taken as a description of an ideal geopark.

Criteria 1: Size and Setting

A Geopark is an area with clearly defined boundaries and an area which is large enough for it to serve local economic and cultural development (particularly through tourism). The geological heritage sites are part of a holistic concept of protection, education and sustainable development. The Geopark should take into account the whole geographical setting of the region, and include sites of biological and socio-cultural significance. The Geopark could be identical to, or partly or wholly overlaps with an area already inscribed, (for example, on the World Heritage List or registered as a Biosphere Reserve of the Man and the Biosphere Programme of UNESCO). Geoparks may be located on the territory of more than one country.

Criteria 2: Management and Local Involvement

An effective Geopark has an effective management system and programme of implementation. The management body or partnership should have an effective management infrastructure, adequate qualified personnel, and sustainable financial support. A Geopark should have a strong community support and local involvement, supported by local political and community leaders, including necessary financial resources.

Criteria 3: Economic Development

One of the main strategic objectives of a Geopark is to stimulate economic activity within the framework of sustainable development. Respectful of the environment, the Geopark shall stimulate, the creation of innovative local enterprises, small businesses, cottage industries, initiate high quality training courses and new jobs by generating new sources of revenue (e.g. geo-tourism, geo-products) while protecting the geo-resources of the Geopark (e.g. encouraging casting instead of the sale of fossils). This provides supplementary income for the local population and shall attract private capital. 'Geo-tourism' is an economic, success-oriented and fast-moving discipline, a new tourist business sector involving strong multidisciplinary cooperation.

Criteria 4: Education

A Geopark must provide and organise support, tools, and activities to communicate geoscientific knowledge and environmental and cultural concepts to the public. The success of Geopark educational activities depends on the content of tourism programmes, competent staff and logistic support for visitors, and also on the personal contact with the local population, media representatives, and decision-makers. The involvement of local people is of primary importance for the successful establishment and maintenance of a Geopark.

Criteria 5: Protection and Conservation

The branding of an area as 'geopark' does not necessarily affect the legal status of the land. For legal protection of certain geosites within the geopark, the authorities responsible for the geopark must ensure its protection in accordance with local traditions and legislative obligations. It is the government of the country where the geopark is situated which decides on the level and measures of protection of certain sites or geological outcrops.

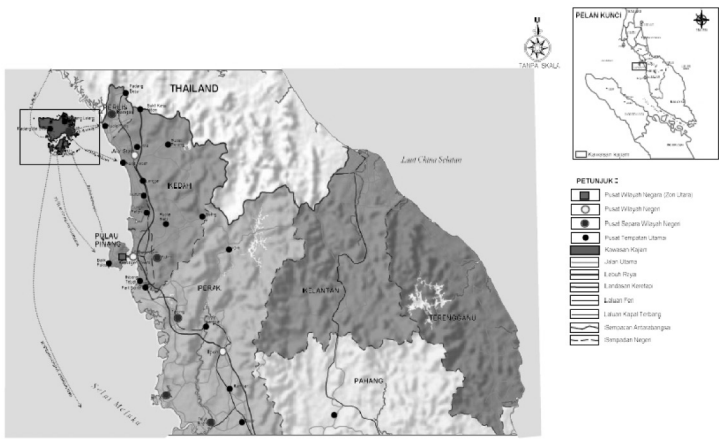
Criteria 6: The Global Network

The GGN provides a platform of cooperation and exchange between experts and practitioners in geological heritage matters. It allows any participating Geopark to benefit from the experience and knowledge of other members of the Network.

SHOWCASING CONSERVATION AND DEVELOPMENT IN LANGKAWI GEOPARK

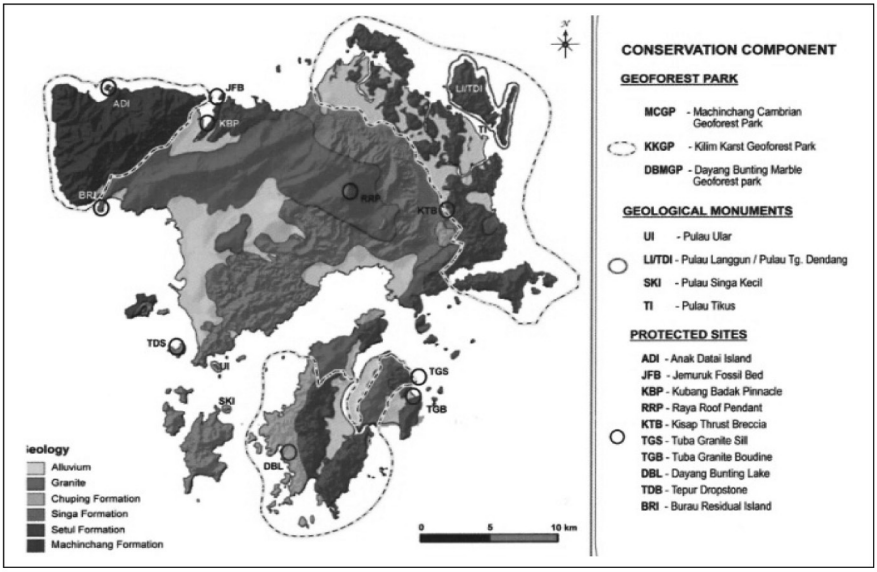
Langkawi is an archipelago located in the northern state of Kedah in the west coast of Malaysia (Map 1). Geographically, Langkawi has one big island (Langkawi Island and 98 other smaller islands), thus giving it the well-known tag of 'Langkawi the 99 Magical Islands' (Map 2). The Langkawi Islands are rich in geological and biological heritage (geo and bio heritage) and socio-cultural heritage from the four main ethnic groups – the Malays, Chinese, Indians and Siamese. The islands are also well known for their history, legends and myths that are very attractive and appealing because they are linked to nature; white sandy beaches as well as black sand beach which are clean and beautiful; outstanding rock formations that are millions of years old (the oldest being more than five hundred million years old); hills and mountains which stand proud and covered with tropical virgin forests; modern and world class tourist resorts and commercial enterprises, farming villages amidst the rice fields; rubber cultivation and fruit orchards; and fishing villages which are located along the coasts of Langkawi, Tuba and Dayang Bunting Islands. The majority of the islands are uninhabited and remain as natural tourist attractions.

MAP 1: The Location of Langkawi Geopark in North-East Peninsular Malaysia



Source: Langkawi District Local Plan 2020

MAP 2: Langkawi the 99 Magical Islands



Source: Shafeea Leman et. al. 2007

For a long time Langkawi remained undeveloped and until twenty years ago, had been underdeveloped. However, during the last fifty years she has been known and become popular among nature-loving local and international tourists. The biggest change came when Langkawi experienced a sudden development leap after it was accorded the status as a Tax-Free Island in 1987. Since then there has been rapid development in Langkawi as the new status had enabled the island to enter the international scene. The tourist industry and business activities produced impacts on the physical and socio-economic development. The local population had undergone changes from a traditional life with low income to a semi-modern life with more lucrative income. Infrastructure and modern utilities spread over Langkawi, which had become better known after the Langkawi Declaration on the Environment in 1989 that was signed by Commonwealth Heads of Governments (CHOGM) which met on the island in 1989; the annual Langkawi International Dialogue which was attended by leaders from the South; and *LeTour de Langkawi* with participation from cyclists the world over.

Langkawi which was 'cursed' to be a *padang jarak padang terkukur* (in Malay language, meaning a barren field) by Mahsuri the legendary princess, has now been transformed from merely an island of myths and legends, to a tourist island which in the year 2000 was declared *Langkawi the Tourism City* by the Malaysian government. Today Langkawi has four and five-star hotels, modern roads and infrastructure, which

bring activities that are able to raise her economy to the level which is relatively similar if not higher than that of mainland Kedah. However, Langkawi is not spared from the negative impacts of rapid development – results of *ad hoc* development; damaged or polluted environments; non-effective waste management; unsatisfactory infrastructure; modern utilities which have not reached some backward areas; and there are still poor and marginalised populations. Nevertheless, domestic and international tourists are attracted to this idyllic nature and mystical cultural destination which is still pristine in most areas.

In May 2006 Langkawi had another big development shift when it was declared a Geopark by the Global Geopark Network and endorsed by UNESCO in June 2007. The recognition raised Langkawi's status to be the first geopark in Malaysia and South East Asia, and the 52nd in the GGN. Langkawi Geopark has geological resources which are over 500 million years old, that is from the Cambrian Age (Shafeea et al 2007) and thus is recognised as an archipelago which has the oldest natural and cultural heritage in South East Asia. Langkawi Geopark was then designed to fulfil the criteria for a global geopark i.e. conserve natural and cultural heritage, education and sustainable development but also with specific objectives of fulfilling LADA's and Malaysia's aspiration (Shafeea et al 2007. The specific objectives are to (1) achieve sustainable development where nature and cultural conservation is given the top priority; (2) multiply tourism products based on the value-added k-tourism; (3) increase the capacities of local communities which are essential in driving its sustainable socio-economic development; and (4) make Langkawi the nation's leading nature education and research destination among local and international universities' academic and NGO researchers.

Langkawi Geopark's conservation and development activities not only benefit the local population but also provide direct and indirect benefits to Kedah state in which it is located (Kedah is one of the relatively poor states in Malaysia): (1) promoting Kedah to be the pioneer state in the country to have an internationally recognised geoheritage conservation entity; (2) increasing the number of local and foreign tourists to visit Kedah and neighbouring states, particularly Perlis and Penang; (3) increasing abilities to further improve the economy of the neighbouring states; and (4) promoting Kedah state as the leading state in supporting the agenda on sustainable development. Langkawi Geopark is a model example of how protection and conservation of its rich geological, biological and socio-cultural heritage co-exist with socio-economic development of the local population, thus showcasing the sustainable development process. Conservation areas and features, geological monuments and features (geosites and geo-areas), biodiversity, socio-cultural heritage (history, legend and myths) are identified and conserved in line with development needs – socio-economic needs of the local population as well as for national and local revenue through nature-heritage

tourism and duty-free island status, high-income economy etc. Symbiotic relationships between conservation and development co-exist and complement each other.

Many aspects of sustainable development are practised in Langkawi Geopark. While the protection and conservation of geo-, bio- and cultural heritage sites are emphasised, socio-economic development which benefit the local communities and the national population are also promoted as complementary land uses and activities. The local population, plus enterprising Malaysians from other parts of Malaysia, participate and contribute to the duty-free island activities and the tourism industry. Sustainable nature and ecotourism is promoted. The main attractions are its scenic beauty and recreational opportunities that are associated with natural heritage, history, legends and myths. To promote Langkawi's cultural heritage, the 'kampung' (village) ambience is offered to tourists. Trips to traditional fishing ports and villages are organised, such as to Kampung Kuala Teriang, Padang Mat Sirat, Kampung Kilim, Ayer Hangat and Kampung Kubang Badak Hangat. Traditional villages on the tourist trails include Kampung Mawat, Ulu Melaka, Kampung Raja, Padang Mat Sirat and Kampung Teluk Berembang, Pulau Tuba.

To cater for local and national visitors and tourists, facilities for mass tourism is offered in Pantai Chenang (Chenang Beach) – Pantai Tengah (Middle Beach) corridor while luxury resorts, mainly located in the Datai and Tanjung Rhu areas are more for the up-market tourists. For marine life lovers, the Payar Island Marine Park offers controlled visits in order to protect its rich marine resources. Annual events attract tourists to the Aerospace Exhibition (LIMA), *Le Tour de Langkawi,* Langkawi International Ironman Triathlon and Royal Langkawi International Regatta. Facilities for Meetings, Incentives, Conferences and Exhibitions (MICE) are also provided. Recreational forests are popular among local and foreign visitors and tourists. Examples are Temurun Waterfall, Durian Perangin, Gua Cherita, Lubuk Semilang, Pasir Tengkorak and the Dayang Bunting Lake.

Local and regional socio-economic developments are also addressed. Local communities are given priorities in certain job opportunities as well as business ventures such as in the service tourism industry (hotels, resorts and homestay programme); food and beverage (restaurant, hawker stalls, eateries); land and sea transportation (car/van/ rental, taxis, buses, boats, cruises); tour packages and tour guides (island hopping, jungle trekking, geopark trails); cottage industry (handicraft, souvenirs, batik textiles, geoproducts); food industry (downstream marine and agro-based businesses); and entrepreneurship (retail and wholesale businesses).

Education and knowledge-based tourism is also promoted, in line with the geopark concept. Among the initiatives to support this industry include the Geopark Information

Centre at the foot of Gunung Machincang (Machincang Mountain), Langkawi Research Centre, museums and galleries, Langkawi National Conservatory, geotrails and geoproducts, information brochures and posters for public awareness and training for Stakeholders. Visits to historical places enhance knowledge about historical and cultural heritage. Elements of history and legend can be found at the Mahsuri Mausoleum, the Field of Burnt Rice, legend of Dayang Bunting (Pregnant Maiden), legends of Mat Chincang versus Mat Raya, legends of Gua Cherita (Cave of Stories) and the legends of Telaga Tujuh (Seven Wells).

CONSERVATION AND DEVELOPMENT IN LANGKAWI GEOPARK THROUGH LAND USE PLANNING

The Langkawi Development Authority (LADA) in collaboration with the Institute of Environment and Development (LESTARI) of Universiti Kebangsaan Malaysia is in the process of preparing the Langkawi Geopark Management Plan (LGMP). Recognising that geoparks are about protection and conservation of land and sustainable development of land and land resources, the approach taken for Langkawi Geopark is implementation through land use planning under the Town and Country Planning Act 1976 (Act 172). This approach was approved and endorsed by the Kedah State Planning Committee (termed the Committee), formed under Sub-Section 4 of Act 172, at the Committee's meeting on 26th August 2010. This means that when completed and approved by the Committee, the LGMP will form part of the Langkawi District Local Plan i.e. it will be read together with the local plan which is already gazetted. This approach was adopted because of several relevant provisions in Act 172:

1. Planning and implementation for sustainable development of Langkawi Geopark would receive the support and approval of the National Physical Planning Council (NPPC) whose functions include (S.2A(2)) "…to promote in the country, within the framework of the national policy, town and country planning as an effective and efficient instrument for the improvement of the physical environment and towards the achievement of sustainable development in the country…" Chaired by the Prime Minister, the NPPC will receive the attention of the highest authority in land use planning and development;

2. At the state level, the State Planning Committee (the Committee) is also responsible for planning for sustainable development. One of the functions of the Committee, under Sub-Section 4(4)(a) is "… to promote in the State, within the framework of the national policy, the conservation, use, and development of all lands in the State…" The on-going preparation of the Langkawi Geopark management plan is a testimony of this function being implemented;

3. The local plan, under Sub-section 12(3)(a), requires proposals for the use of land; protection and improvement of the physical environment; preservation of the natural topography; improvement of the landscape; preservation and planting of trees. This content of the local plan is in line with the sustainable development goal of Langkawi Geopark;

4. Act 172 provides the instrument with which to gazette the policies, strategies, locations and recommendations related to heritage sites and other proposals for the sustainable development of Langkawi Geopark; and

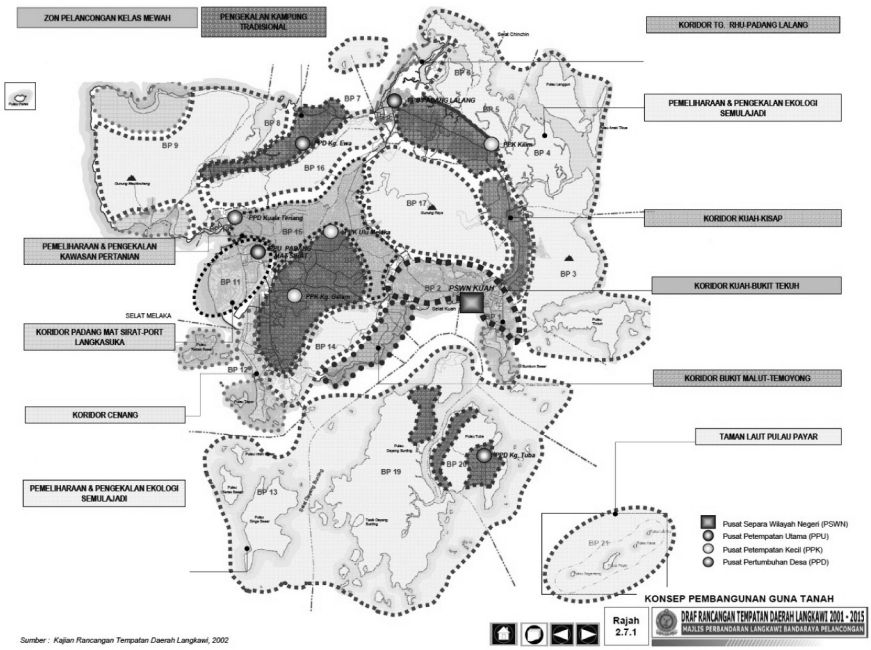
5. The mandatory requirement for public representations and objections in the structure plan preparation process as well as for public consultations and objections process in the preparation of the local plan will ensure that the geopark management and implementation will be opened for public review at least once in five years when the plans go for statutory review or whenever it is instructed by the Committee.

Besides complying with GGN's six criteria and guidelines for conservation and development of Langkawi Geopark and the Langkawi District Local Plan, the development of the Langkawi archipelago is also guided by the National Physical Plan 2 (NPP2), Kedah State Structure Plan (KSSP) and the North Eastern Corridor Development Plan (NECDP). These are strategic development plans which have adopted sustainable development as their goals, principles and approaches. NPP2 is approved by the National Physical Planning Council; Kedah Structure Plan and Langkawi District Local Plans are approved by the Kedah State Planning Committee and gazetted under the Town and Country Planning Act 1976 (Act 172). Through their policies, strategies, zonings and development guidelines, NPP2, KSSP, LDLP and NECDP guide the development of Langkawi under four broad categories: urbanisation and settlement; tourism infrastructure; nature conservation and agricultural development. Development is regarded as complementary to nature conservation and is based on the concept of sustainability, which is anchored on the principles of social equity, economic efficiency and ecological sustainability.

Similar to Langkawi Geopark's aspirations, the LDLP's vision reflects the sustainable development goals: making Langkawi a tourist destination of international standard, environment-friendly, with local identity and enhancing the quality of life of the people. To achieve this vision, the plan's physical development strategies include: (1) maintaining the natural ecology and agricultural areas; (2) enhancing the quality of local settlements; (3) creating development areas which are well-organised, client-friendly and exhibiting attractive images; and (4) enhancing and re-arranging the local service centres; creating tourist service centres; and encouraging institutional

development. Strategies for the non-tangibles include: (1) enhancing human resource development; (2) raising the quality of life; (3) promoting local community participation; (4) promoting research and development; (5) promoting Bumiputera participation in all industries and businesses; and (6) diversifying economic activities and resources. In consonance with the above strategies, the development concepts give emphasis to four aspects: (1) encouraging tourism development of high quality; (2) implementing development which is in balance with the local ecology; (3) emphasising on beautifying and strengthening of the local image; and (4) preserving and conserving the natural resources and environmentally sensitive areas (Map 3).

MAP 3: Langkawi's Land Use Planning and Development Concept



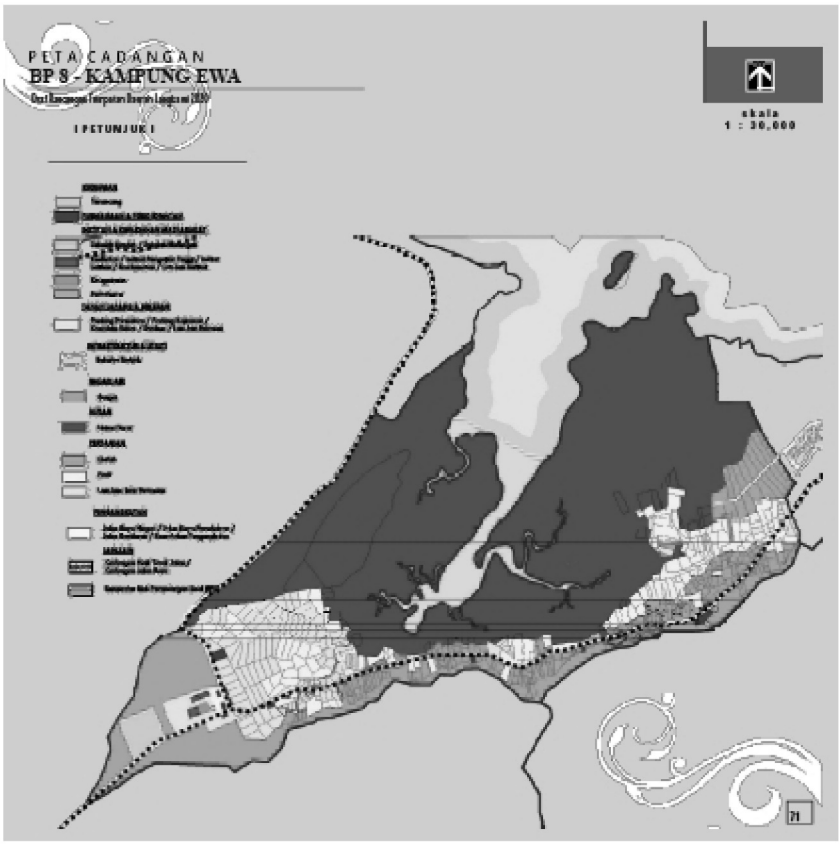
Source: Langkawi District Local Plan 2020.

Under the local plan, the development concept is translated into zoning plans for the planning blocks which are also recognised as the management units of the geopark. Groups of these planning blocks/management units are under *mukims* (sub-districts) which are recognised as management zones. Map 4 shows the zoning plan of one planning block or management unit. The zoning plan translates spatially the complementary concept of conservation and development.

The planning and development guidelines of conservation areas in local plans, which could be in the form of geological/biological/cultural areas, sites or monuments, need to be further detailed in special area plans (SAP) to be prepared under section 16B of the Malaysian TCPA 1976. These Conservation Area SAPs, either for one or groups of conservation areas/sites/monuments, should describe in detail the specific land use categories, specific activities that are allowed, density and intensity of development according to the carrying capacity of the area or site, and the design and structure of buildings (if allowed) or physical structures, which must represent and/or highlight the characteristics of the geological/biological/cultural heritage of the area or site. These SAPs will be the basis and reference for the preparation of the development proposal reports which must be submitted together with applications for planning permission under Part IV of the Malaysian TCPA. Sub-section 21A(1)(d) of the Malaysian TCPA requires that development proposal reports include "(i) a description of the land including its physical environment, topography, landscape, geology, contours, drainage, water bodies and catchments and natural features thereon; (ii) a survey of the trees and all forms of vegetation; and (iii) particulars of a building, which may be affected by the development."

In the case of Langkawi, since Langkawi Geopark is relatively new, the above practice has not been duly implemented. Identification of heritage areas or sites, in the form of geological, biological and cultural areas/sites are still on-going and yet to be indicated in site specifics in the current Langkawi District Local Plan. It is expected that once these heritage areas/sites have been identified and acknowledged by the appropriate authorities, the local plan will be amended to include them; special area plans will be prepared; development proposal reports will address these relevant issues; and planning permissions that are issued by the local planning authority will ensure that heritage elements are conserved in or next to development projects, in adherence to the appropriate development guidelines. In this context the role of the local planning authority under the TCPA 1976 (in the case of Langkawi Geopark it is Majlis Bandaraya Pelancongan Langkawi) in implementing Langkawi Geopark, is of utmost importance.

MAP 4: Langkawi's Land Use Planning and Development Concept



Source: Langkawi District Local Plan 2020.

Realising the complexity of enhancing Langkawi's tourism-related economy and its duty-free island status while at the same time conserving its natural and cultural heritage resources, Langkawi Development Authority (LADA), in partnership with Universiti Kebangsaan Malaysia, has embarked on a project to prepare a comprehensive and holistic management plan for Langkawi Geopark. The proposal for the preparation of Langkawi Geopark Management Plan (LGMP) was approved by the Kedah State Planning Committee on 26th August 2010 and the project started on January 1st 2011. A very important condition attached to the approval by the Kedah State Planning Committee is that the LGMP must complement the Langkawi District Local Pelan 2020. If there is a need to amend the local plan to rationalise the Langkawi Geopark within it, this will be done accordingly. This decision emphasises that while nature and cultural

conservation is promoted through the geopark, socio-economic development that is promoted in the local plan is not being sidelined, since socio-economic development is also part of the geopark's aspirations. The LGMP is still under preparation and is expected to be completed in the not too distant future.

CONCLUSION

UNESCO's and Malaysia's Heritage Act's definitions, as well as several other definitions of conservation, heritage, development and sustainable development discussed in this article supports the conclusion that there can be conservation with development. The new paradigm that has been adopted by IUCN in its newer protected areas also endorses the conclusion. The description of the global geopark concept by GGN-UNESCO emphasises the symbiotic relationship between conservation and development that exists in global geoparks, provided its planning, implementation and development are within the concept of sustainable development.

Langkawi Geopark has been presented as a Malaysian showcase of implementing sustainable development through a global geopark. The Langkawi Geopark Management Plan is being prepared to be complementary to the Langkawi District Local Plan which is an already gazetted land use strategic development plan at the local level. The adoption of the *mukims* (administrative sub-districts) of Langkawi District, which is under the Kedah State Government administration, to be management zones, and the adoption of the planning blocks of the local plan to be management units of the geopark is another example of the complementary nature of the two entities. Therefore, although there is no specific law to enforce the Langkawi Geopark, its enforcement can be instituted under the Town and Country Planning Act 1976 (Act 172), besides other laws which are in operation in Langkawi.

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GEOPARK FOR HERITAGE CONSERVATION: A NEED FOR INTEGRATED PLANNING AND MANAGEMENT

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Abstract
The adoption of 'sustainable development' concept by many countries of the world has drawn attention to the needs to conserve and protect what has been identified as heritage. Due to their symbiotic relationship, the natural and cultural heritage needs to be conserved in an integrated manner, thus requiring integrated planning and management. The geopark concept introduced in 1999 provides this opportunity. The concept highlights the potential socio-economic development while conserving the natural and cultural environment. Because a geopark would contain different kinds of heritage a single integrated plan may help to avoid potential conflicts in managing them. Langkawi Geopark was established in 2007. Its multifaceted features and resources require that it be managed in an integrated manner to enable different stakeholders to be brought onto a common platform. This is to enable differing needs and interests to be taken into account without compromising the need for sustainable development.

Keywords: Geopark, heritage conservation, integrated planning and management, Langkawi Geopark

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INTRODUCTION

Malaysia has generally achieved socio-economic successes that its people can be proud of. However, often times in the development process there exists conflicts between development and heritage protection, between new needs and respect for heritage. In many instances respect for heritage collides with needs for modern infrastructures, which result in heritage taking the back seat in the name of progress and development. Heritage has been known to be given low or obscure priority because it is often taken as possessing very little or no value. It is also perceived as having a tendency to impede or slow down progress.

Expanding human needs and economic activities have resulted in increasing pressure on land creating competition, contestations and conflicts that lead to conservation of heritage being sidelined. This conflict or dilemma is not peculiar to Malaysia. Generally throughout the development process of many developing countries the rule is 'to destroy to build' in order to achieve development objectives. Hence, much land is cleared and jungles destroyed to make way for new infrastructures, industries, offices, housing areas etc. In the process too many old buildings and monuments are destroyed to make way for new and modern ones. This has led to the loss of many invaluable heritages, be it natural or cultural.

However, the adoption of the Convention Concerning the Protection of World Natural and Cultural Heritage in 1972 and the adoption by the United Nations of 'sustainable development' in 1992 promised a better situation. In general sustainable development is popularly accepted to be … 'development that meets the needs of the present without compromising the ability of the future generations to meet their own need' (United Nations 2009). Attention has been drawn to the needs to conserve and protect what has been identified as heritage for sustainability. The term 'sustainable development' was first used by the Brundtland Commission (WCED 1987) and then adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Since the adoption of the 'sustainable development' concept, conservation has begun to assume a place globally and in contemporary Malaysian society. There is an increasing awareness that society can no longer afford to waste resources of any type. With such consciousness heritage too has assumed a new value. Heritage is also now regarded as having the potential to attract tourists to a country other than the conventional attractions such as shopping, sports and recreational activities. In order to ensure that conservation and sustainability objectives are achieved land and land resources need to be planned and managed in an integrated manner. An integrated approach would allow for efficient trade-offs while minimising conflicts between the needs for development and conservation.

This article discusses the integrated approach to the planning and management of heritage conservation within the context of sustainable development and with a special reference to Langkawi geopark.

HERITAGE CONSERVATION AND SUSTAINABLILITY

Initially, when the concept of sustainable development was mooted, it was associated more with protecting and conserving the natural environment than with preserving cultural heritage. However, cultural heritage has since been included in the sustainable development approach because it was recognised that there is a symbiotic relationship between natural and cultural heritage (Halimaton Saadiah Hashim 2011) and that the principles of sustainable development are just as relevant, if not more crucial, to people's daily environment. It was acknowledged that there is not always a clear dividing line between 'nature' and 'culture'. As with natural heritage, cultural heritage calls for continuity between past, present and future. Cultural heritage is not renewable: although valuable new works can be added to it, it cannot be reconstructed once it has been destroyed for it would no longer be the same heritage.

The principles and prerequisites of sustainable development imply that there is a need to conserve important and valuable resources that are then handed down to the next generation. Resources that are inherited and then preserved and conserved to be passed on to future generations are categorised as heritage, which can be both tangible (natural and physical) and intangible (history and culture). In short sustainable development encompasses heritage conservation as it aims at safeguarding heritage while ensuring its accessibility to present and future generations. To put it simply heritage can be regarded as anything that someone wishes to conserve or to collect and to pass on to future generations (Howard 2003:7). However, although anything can become heritage, not everything is heritage unless recognised as such (Howard 2003:7-8). Conservation, on the other hand can be defined as protection from any agent – environmental or human – that threaten to destroy heritage. Thus, conservation ultimately is also about promoting good land uses, for the benefit of people, future generations and the land itself (Freyfogle 2006:144). It helps a community to protect its economically valuable physical assets and to preserve its history and environment besides protecting the community's sense of identity and continuity.

The reasons heritage needs to be conserved are because heritage helps shape community identities. It contributes to a sense of community, sense of belonging to a place as well as enhances quality of the environment.

GEOPARK FOR HERITAGE CONSERVATION

As mentioned earlier sustainable development is about sustainable utilisation of resources, protection and subsequently conserving the natural environment as well as the socio-cultural environment. When Agenda 21 (strategic actions for sustainable development) was adopted in 1992 at the Rio de Janeiro United Nations Conference on Environment

and Development (UNCED) Summit (UNESCO 2000), it included the protection of geological heritage and geodiversity. In line with the development of the sustainable development initiatives, the geopark concept was introduced in 1999. As defined in the *Guidelines and Criteria for National Geoparks Seeking UNESCO's Assistance to Join the Global Geoparks Network* (GGN April 2010) a geopark is

> ... a geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development. The geopark should take into account the whole geographical setting of the region, and shall not solely include sites of geological significance. The synergy between geodiversity, biodiversity and culture, in addition to both tangible and non-tangible heritage are such that non-geological themes must be highlighted as an integral part of each geopark, especially when their importance in relation to landscape and geology can be demonstrated to the visitors. For this reason, it is necessary to also include and highlight sites of ecological, archaelogical, historical and cultural value within each geopark. In many societies, natural, cultural and social history are inextricably linked and cannot be separated.

Geopark is also described as

> … geological heritages scenic spot of special geoscientific significance, rare natural attribute and aesthetically ornamental value and with given scale and distribution scope, which integrates other natural scenes and sights and that of cultural interest into a unique natural area. It is not only a site for travel and sightseeing, vacationing and health recuperation as well as cultural recreation at a relatively high scientific level, but also a key protected area of geological heritages and base for geoscientific research and popularisation (http://www.globalgeopark.org/publish/portal1/tab59/ [19 Dec 2010]

This holistic definition by GGN clarifies that geopark is an area where there are geological, biological and cultural conservation through the integrated concepts of protection, education and sustainable development. Initially developed by geologists, the concept and its criteria were taken seriously enough by UNESCO to develop and disseminate the Global Network on Geoparks. By end of September 2011 there is a total of 87 global geoparks in 27 countries that are currently members of the Global Geopark Network (GGN). Of this total 49 are to be found in 18 countries in Europe, 26 geoparks in China and 12 in countries outside of Europe and China (www.earthwork.fsnet.co.uk/geopark/htm).

Based on the definition and description there are six criteria that need to be observed and adhered to for any area to be recognised as a geopark, namely (i) size and setting, (ii) management and local involvement, (iii) economic development, (iv) education,

(v) protection and conservation, and (vi) global network (*Guidelines and Criteria for National Geoparks Seeking UNESCO's Assistance to Join the Global Geoparks Network* (GGN April 2010) (Figure 1)

FIGURE 1: Criteria for Geopark

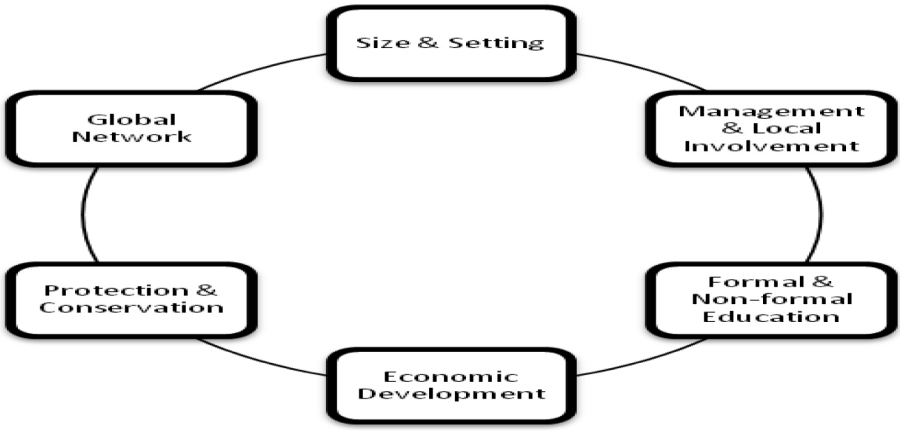


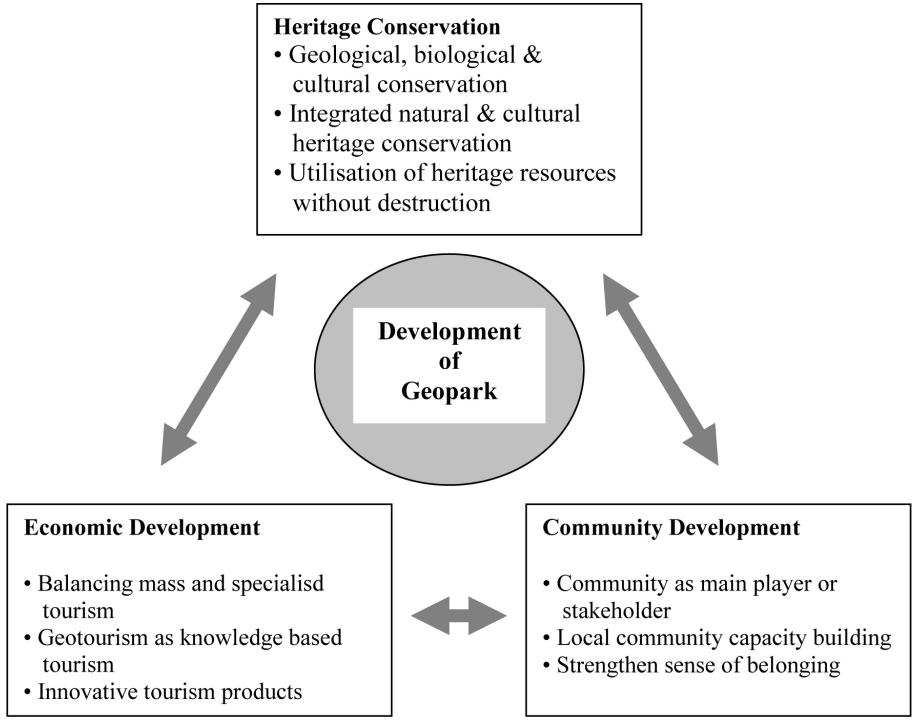
Figure 1 shows that the geopark concept highlights the potential interaction between socio-economic and cultural development and conservation of the natural environment (Mohd Shafeea Leman et al. 2007:95), thus providing opportunities to achieve a more balanced development between geoheritage conservation and local socio-economic development. In other words, as a sustainable development tool the geopark concept ensures balance between three main elements, namely conservation of heritage resources; development of tourism industry and infrastructure; and enhancement of local participation (Ibrahim Komoo & Patzak 2008). This form of sustainable economic development in areas with rich geological and biological resources has the potential to directly impact on those rural areas that have suffered from economic stagnation or demographic decline (McKeever 2009:7) and could lead to job creation in local rural communities for their own benefit. However, in order to achieve the balance there need to be integrated natural and cultural heritage conservation. As shown in Figure 2, prerequisites to the development of geoparks are three components namely: heritage conservation, economic development and community development. Geopark seeks to conserve significant geological and landscape features, biological as well as cultural and community resources in order to maintain their symbiotic relationships.. Its purpose and goal are three-pronged: conservation, education and geotourism.

In order to achieve the objectives the management of geopark need to educate and communicate geoscientific knowledge and environmental conservation needs and concepts to the public and to enhance public awareness. Geopark also emphasises on

public participation and involvement in economic activities such as geotourism. Cultural and natural heritage are the selling points of a geopark and forms part of the key factors to stimulate local socio-economic development. By attracting increasing numbers of visitors, a geopark stimulates local socio-economic development through the promotion of a quality label linked with the local natural heritage. It encourages the creation of local enterprises and cottage industries involved in geotourism and geoproducts, thus contributing to the capacity building of the local community.

In a nutshell, geopark is more than just to protect and conserve the natural heritage especially the geological, it also acts as a development tool. Geopark emphasises local community participation for socio-economic development, especially geotourism. These concepts are in line with the concept and principles of sustainable development, which aims for a balance between social wellbeing, economic development and environmental conservation. Sustainable development concept creates the opportunity for all stakeholders in the geopark to aim at ensuring long-term prosperity and quality of life for future generations.

FIGURE 2: Geopark Development Framework: Balance between Need for Conservation, Economic Development and Community Development/Wellbeing



Source: Adapted from Ibrahim Komoo 2010:13

INTEGRATED PLANNING AND MANAGEMENT FOR GEOPARK

The multifaceted features and resources of a geopark have to co-exist in a compatible manner if it is to be sustainably managed and for the geopark to achieve its objectives. This means that all stakeholders and affected or relevant public departments and agencies need to be brought to a common platform to enable planning to be done in an integrated way from the national to the local level. The objective is to examine all economic, social and environmental costs and benefits in order to determine the most appropriate option for action. Integrated planning and management is the effective management of resources through collaboration of efforts and cooperation of the various entities in order to meet conservation purposes and at the same time to provide the public with tangible community benefits.

It is increasingly recognised that planning, management and regulation are important at the local level. Environmental and socio-economic conditions vary greatly from locality to locality even within the same region. There are many different stakeholders – public sector, private sector, non-governmental organisations (NGOs), local communities – and they give heritage different values, functions, roles, ranking and as such can suggest different conservation strategies and actions (Halimaton Saadiah Hashim 2011). The different stakeholders are becoming increasingly important in heritage management and planning, especially the community as owner and custodian of heritage (Nuryanti 1996; Peters 1999). It is crucial that the community be involved to increase the quality of planning and reduce the likelihood of conflict. Through education and other awareness creating campaigns community sense of ownership of its heritage could be increased and its trust in heritage management enhanced (Hall & McArthur 1998). Also, national and regional policies are important, but local communities are the most aware and best able to respond with the optimal use of local resources (United Nations 2001:24).

Most heritage places include more than one kind of heritage and each of the different types needs to be understood. Also each kind of heritage - such as archaeology, geology, biodiversity, buildings – that might be important in its own right – for example a geological monument, a site of special scientific interest, or a listed building - may need different plans and methods for conservation and management. As such having one single plan avoids the need for different plans for different kinds of heritage. It would require careful planning, systematic implementation of the plans as well as continuous and effective management.

The above planning system, which encompasses different plans at the different levels of government need an integrated approach that considers environmental, socio-economic and cultural, institutional and financial aspects, when formulating strategies, programmes and projects. The integrated approach requires the involvement,

participation and comprehensive cooperation between the various institutions and stakeholders and the creation of partnerships between the public and the private interests at the national, regional and local levels. Planning is an activity of both government and business while integrated planning is one of several management approaches used to address the increasing complexity resulting from complex interaction of many variables (United Nations 2001:19). This integrated approach to planning and development calls for a multidimensional approach to address the complexity of the various perspectives involved and to achieve a relatively balanced evaluation of resources, constraints, needs etc. This is to enable successful planning and management as well as guarantee social acceptance. A single integrated plan may also help to avoid potential conflicts in managing different kinds of heritage by helping the different stakeholders understand what is important about each of them, in relation to each other.

The most important challenge for sustainable development concerns the perspective and expectations that all stakeholders, particularly government policymakers, have about heritage conservation's contribution at the local, regional and national levels. There can be both positive and negative effects from heritage conservation that planners, managers and policymakers need to better understand.

LANGKAWI GEOPARK: GOVERNANCE, PLANNING & MANAGEMENT

Langkawi, encompassing historical sites (examples: Mahsuri Mausoleum, Field of Burnt Rice), geological wonders (examples: limestone pinnacles, Pulau Ular geological monument, Lake of Pregnant Maiden, Gua Kelawar), beautiful natural landscapes (examples: stretches of sandy beaches, Machincang mountains, karst landscape, Pulau Anak Burau, Lubuk Semilang waterfall) and a wealth of local culture and traditions (examples: Malay traditional houses, Mek Mulung theatre), is one of the well-known Malaysian tourism island destinations. The island possesses rich geodiversity in terms of rocks, minerals, fossils, geological structures, geomorphological and landscape features, with heritage value of national and regional significance (Mohd. Shafeea Leman et al.. 2007). There are more than 90 geoheritage sites that have been identified throughout Langkawi Geopark (Mohd. Shafeea Leman et al. 2007), some of which have been proposed to be included in the National Geological Heritage List. These special features need to be protected, conserved, and managed in a sustainable manner so that they could still be appreciated, valued and enjoyed as well as benefit present and future generations. In June 2007 the whole of Langkawi's 99 islands, covering a total area of 478 square kilometres, was recognised as a Malaysian geological heritage, accorded a global geopark status by Global Geopark Network GGN and endorsed by UNESCO (Mohd. Shafeea Leman et al. 2007). It is the first geopark in Malaysia and Southeast Asia to be recognised as such. It is also the only geopark in the world with a duty-free status.

The establishment of the Langkawi Geopark marks an important milestone both in the pursuit of geoheritage conservation and the enhancement of nature's aesthetic tourism potential (Mohd. Shafeea Leman et al.. 2007:3). It also provides the opportunity to combine the geological sites with tourism which can lead to the sustainability of both. In fact as a geopark Langkawi could enhance its ability to fulfill the following targets: (1) achieving sustainable development where nature conservation is given top priority; (2) multiplying tourism products based on value-added knowledge that in turn is based on k-tourism; (3) increasing the capacity of the local community which is essential in driving its sustainable socio-economic development; (4) making Langkawi the nation's leading nature education and research destination (Mohd Shafeea Leman 2007: 96).

As a geopark, and because of its multifaceted features and resources Langkawi Geopark island needs its own system of governance, its own management body. 'Governance' is taken to mean "… the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It comprises the mechanisms, processes and institutions, citizens and groups through which they articulate their interests, their exercise legal rights, obligations and mediate meet their differences…" (UNDP 1997 in http://mirror.undp.org.magnet/policy). Langkawi Geopark require a governance system that would focus on the need to balance the various demands, bringing together the various stakeholders and interests and shows the direction that guides the development process (Rahimah Abdul Aziz 2011). Research on the governance of Langkawi geopark conducted between 2008-2010 shows that there are many stakeholders directly or indirectly involve with the development of Langkawi Geopark in particular. The stakeholders include the various ministeries at the federal level, namely the Ministry of Finance, Ministry of Tourism and the Ministry of Rural Development and Langkawi Development Authority (LADA); the Kedah state agencies such as the State Forestry Department, State Town and Country Planning Department, and State Fisheries Department and the local agencies (Langkawi District Office, and Langkawi Tourism City Council). These entities are with their various legal mandates and responsibilities. Besides these stakeholders, are the private sector, the various environmental and conservation concerned non-governmental organisations (NGOs), and the local communities and individuals.

Although in general the stakeholders share a common desire to see Langkawi develop and prosper in a sustainable manner, at the same time each stakeholder has its own interests, purposes and objectives. Each stakeholder has its authority, and different zone of influence. However, under the global geopark criteria all stakeholders - public, private, NGOs and community - are expected to cooperate in the efforts to design, plan, manage and implement measures to conserve and develop heritage resources for the sustainable development of Langkawi Geopark. In short, the governance of Langkawi Geopark is related to the implementation of authority held by the various stakeholders in the efforts to conserve heritage resources and implement sustainable economic development on the island.

Malaysia operates on a federated system of government or a 3-tiered government system. Within the context of governance of Langkawi Geopark, the stakeholders are not only at the local and state levels, but also at the Federal level. While the Federal Government provides budget allocations for the development of Langkawi, the State Government has jurisdiction over the administraion of land and the Langkawi District Office overseers the development that is taking place on the islands. With the involvement and responsibility of the Federal Government, State Government, local authorities, and various other stakeholders, the issue of governance for heritage conservation has become complex because of the involvement of many parties and interests.

Various stakeholders in turn require an effective system of governance if Langkawi Geopark is to maintain or ensure its sustainability. This is because governance has the ability to: (a) bring together the various stakeholders and interests, which is essential for the success of Langkawi Geopark other than to achieve sustainable development; (b) address the need to balance the many different demands; (c) design an ideal pattern of relationships to help realise the connectivity of the various stakeholders; and finally (d) show the direction towards sustainable development. Thus, it is necessary to convert the form of management that encompasses many different authorities to a form of management that has only one party in order to avoid fragmented, overlapping and decentralised directives.

The importance of integrated planning, in particular land use planning, for sustainable development have been acknowledged by the Brundtland Commission (WCED 1987). This is further endorsed in Agenda 21 (WCED 1992). Since then, sustainable development through land use planning, or planning for sustainable development, has been widely debated. Land use planning procedures and processes have expanded leaps and bounds to be more comprehensive in terms of planning considerations and planning inclusiveness. However the biggest asset of land use planning for sustainable development is its comprehensive aspects that are included as planning considerations and planning criteria.

Within the Malaysian land use planning system, integrated planning is institutionalised via the National Physical Pelan (NPP) at the federal level, structure plans at the state level and local plan and special area plan at the local level. The Town and Country Planning Act 1976 (TCPA 1976), replaces the comprehensive development plan system enforced before 1976. The development plan system thus becomes the planning instrument, which determine land use and land development that take into consideration environmental (geological and biological components), social, economic and cultural elements. Land use plans therefore complement the geoparks management plans.

A typical structure plan and local plan for instance covers an average of sixteen or even eighteen aspects or sectoral studies. The outcome of these studies, in the form of policies,

strategies, land use zones, development projects and development guidelines, have to be assessed to ensure compatibility, consistency and sustainability. In Malaysia this is done through strategic impact assessment, sustainability assessment and social impact assessment. At the development control stage, this is done through the development proposal report, traffic impact assessment and many more according to the areas and nature of development proposal. Local plans and special area plans are site specific. Therefore, their preparations have to take into consideration the detailed attributes of the area, making sure that resources are sustainably utilised while protecting and conserving natural, historical and cultural heritage monuments, sites and areas. More detailed site planning and development are monitored and enforced via development control under the planning permission system by local planning authorities under the TCPA 1976.

Participatory planning has long been accepted as a prerequisite for planning for sustainable development. Malaysia too has accepted this concept and has incorporated statutory requirements for public participation and objections in its planning process (TCPA 1976) for state structure plans and local plans and representative consultation for the national physical plan. Stakeholders' engagement in land use planning enhances integrated planning, beside the planning instruments mentioned earlier. Although non-statutory, other planning agencies, including the Prime Minister's Department, have acquired public consultation exercises in their planning processes. Since participatory planning is a requirement for planning for sustainable development, the initiatives by these agencies are moves in the right direction for Malaysia.

Planning and management of Langkawi Geopark too has been integrated into the planning process. Langkawi's dossier to the GGN and UNESCO made strong references to the Langkawi District Local Plan as a tool for its implementation, since the local plan is for sustainable development and has integrated both development and natural as well as cultural heritage conservation components (Mohd. Shafeea Leman et al. 2007). The Kedah State Planning Committee, in its approval of the project for the preparation of the Langkawi Geopark Management Plan, in its meeting on 26th August 2010, has made a requirement for the management plan to complement the local plan.

The Langkawi Geopark Management Plan that is under preparation now adopts the integrated planning approach. The study encompasses fourteen sectoral studies and four cross-sectoral studies. Stakeholders' participation from government agencies, private sector, non-governmental agencies, teachers, school children and community reprensatives from the six Mukims (administrative sub-districts) of Langkawi are parts of participatory planning for sustainable development. The topics of discussion at these meetings are mainly about the inter-relatedness and the need for complementary roles of development and conservation. The Langkawi District Local Plan is being used as the principal information baseline for analysis and proposals, beside the information from sectoral and cross-sectoral studies.

CONCLUSION

Sustainable development is premised on the responsibility of the government and all other stakeholders to ensure that long-term prosperity and the quality of life of both the present and future generations is not placed at risk. The geopark concept is about integrated heritage conservation based on geoheritage resources of national or international significance and with the local communities as the custodians and beneficiaries of the integrated heritage resources. In order to sustain development it is necessary to address various issues that arise in an integrated, comprehensive, and systematic manner. Issues of policymaking, planning, management and the participation of the private sector and all other stakeholders must be addressed in terms of opportunities for actions and possible constraints that may arise and that need to be overcome by concerted efforts.

The establishment of Langkawi Geopark in 2007 marks an important milestone both in the pursuit of heritage conservation, especially geoheritage, and the enhancement of nature's aesthetic and cultural tourism potential. It provides the opportunity to combine the geological and biological sites with cultural tourism in the form of heritage tourism, which can lead to the sustainability of both and subsequently to further enhance socio-economic development of the local communities.

The success of the geopark depends on integrated planning and management of its natural and cultural assets as well as on integrated actions of the various stakeholders – public and private sectors, NGOs, and the local communities. This is because there are multiple mandates applicable to the various aspects that can put heritage conservation into effect. This means that there are multiple government entities, multiple laws and a host of processes and procedures. Therefore, an integrated planning and management approach that could take into account the various stakeholders and various interests without compromising the need for sustainable development is needed. With such complexities as discussed above, the question then is how to 'integrate' and bring the different stakeholders on to the common platform? Which should be the leading agency with enough authority to carry out the responsibility? These are areas for further research that would add value to Langkawi Geopark specifically and heritage conservation generally in Malaysia and globally.

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IMPLEMENTING LANGKAWI GEOPARK THROUGH LAND USE PLANNING

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Abstract
Development Plans under the Malaysian Town and Country Planning Act 1976 serve as the principal planning instruments in guiding and regulating protection, conservation, use and development of land towards quality living environment. They also act as guides to investment and use of resources and provide frameworks for short and long term investments by public and private agencies, and for the co-ordination of their decisions. Planning and development control at the lowest level then regulates development so that it complies with land use plans. Through land use planning, sustainable development, protection and conservation of natural and cultural heritage resources can be regulated. For Langkawi Geopark, tourism is the most important sector in its economic development. To further enhance and capitalise from this sector, eco-tourism with iconic geo-bio-cultural sites can be promoted through implementing the Geopark concept. This article describes how the geopark concept in Langkawi is implemented through land use planning.

Keywords: Development plan, protected areas, geopark, Geoforest Park, sustainable development, ecotourism

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INTRODUCTION

In Malaysia, land use planning or commonly called town and country planning matters are the concurrent responsibilities of Federal and State Governments under the Federal Constitution. In Peninsular Malaysia land use planning is formally undertaken within the provision of the Town and Country Planning Act, 1976 (Act 172), which has been amended several times to accommodate the evolutionary needs of the rapidly changing environment for more comprehensive and integrated development planning (Khir 2008).

Yeo (2008) acknowledged that it is important to improve the quality of life based on the principle of sustainable development (SD) so that development meets the needs of the present without compromising the ability of future generations to satisfy their own requirements (WCED 1987). In this respect, irreparable damage caused to the natural environment or the depletion of available natural resources must be prevented or remedied, failing which the access of future generations to these resources would be limited and, thereby, their ability to meet their own needs would be compromised. Thus, sustainable development is a social responsibility that demands an interplay between the economy and the environment with the aim of managing both to ensure intra and inter-generational equity. Land use planning has been acknowledged as an effective instrument for implementing sustainable development (WCED 1987, Agenda 21 1992). Among international agreements on the environment which were ratified by Malaysia in relation to land use (Halimaton Saadiah Hashim 2008) include: the Vienna Convention for the Protection of the Ozone Layer 1985, the Convention on Biological Diversity 1992, the Kyoto Protocol to the UNFCC Convention on Biological Diversity 1992, the United Nations Framework Convention on Climate Change (UNFCC) 1997, and the Convention Concerning the Protection of the World Cultural and National Heritage 1989.

Local Agenda 21 (LA 21) is a local level translation of Agenda 21, which is an action plan for the implementation of sustainable development as agreed by 178 member countries of the United Nations at the Rio Earth Summit in 1992. This requires every local authority to draw up its own Local Agenda 21, a strategy and programme for implementing sustainable development towards ensuring a better quality of life for the people in its area. This follows from the argument that the achievement of sustainable development must start from the local level. Like Agenda 21, LA21 should focus on an economic, social and environmental agenda, and develop solutions to problems through encouraging better, more efficient practices.

Malaysian land use planning is implemented through several tools such as the following:

Development Plans

The purpose of applying planning principles and standards in land use and physical planning is to create a suitable environment for human habitation. This is done through the application of wide-ranging theories and techniques, and the use of planning principles and standards. Development Plans under the Town and Country Planning Act 1976 (Act 172) comprises the state structure plans and local plans. The plans are to provide adequate infrastructures and utilities, basic public facilities, and other services to satisfy the needs in every aspect of human life within the framework of the overall physical, economic and social development of urban and rural areas, with the main goal of implementing sustainable development. They are tools for comprehensive integrated planning, and in order to create a sustainable living, working and recreational environments, consideration for the environment and environmental resources should be one of the important issues and sectors included in development plans.

The TCPA has been amended several times since 1976. As noted by Muhammad (1994), the revisions to the mandates, scope, procedure and process of preparing Development Plans (structure and local plans) were necessary in the Town and Country Planning system in order to incorporate stronger means of control over the development and management of Protected Areas. He further stressed that this is because land use planning, by definition, is a dynamic activity that requires its legislation to be able to adopt new approaches and adapt to changing needs and situations over time. Specifically, he argued for an additional emphasis on the role of target-setting in plans, and on ensuring their full implementation.

The sustainability agenda has been considered in the Development Plans prepared under the TCPA. The National Physical Plan (NPP) serves as the framework to achieve integrated and sustainable land use planning in the country (FDTCP 1995, 2010). This clearly deals with sustainability through its policies that are directed towards conserving natural resources and the environment, and the need to identify and manage Environmentally-Sensitive Areas (ESAs) which, it is stated, shall be protected and used in a sustainable manner. According to Bruton (2007), the NPP fills the gap between higher order socio-economic plans and policies and the more detailed plans (tructure and local plans) that are closer to the implementation mechanisms. Bruton also mentioned that the NPP serves as a strategic land use/spatial plan for spatial development on a national scale and lies within the framework of Malaysia Plans, Vision 2020 and Agenda 21.

At the local level, the local plan, serves as an important instrument in shaping the development of an area and as the basis for planning control. The local plan translates all policies outlined in the NPP and the state structure plan to the local level. This is considered a crucial stage where actual interpretation of policies and the agenda for

sustainability in the form of spatial planning takes place. To ensure that local plans adhere to the principles of sustainability, sustainability assessment (SA) is conducted in the preparation process of every local plan prepared under the Ninth Malaysia Plan. The aim of the SA is to check and guide the preparation of the local plan to ensure compliance with the principles of sustainability. The administrative structure and hierarchy of Development Plans, and the planning control system set a clear framework for all planning activities and decisions in Malaysia.

According to Kleemann (2000) a large number of international initiatives that combine regulatory and incentive instruments are aimed at protecting special areas, and the three categories of combined approach most commonly used in current practice are: integrated coastal zone management (ICZM), special municipal programmes, and efforts that promote sustainable local development such as eco-tourism. Regulatory and incentive approaches should always be combined in such a way that they resolve the key threats to protected areas.

Since distinctive and characteristic landscapes make major contributions to national, regional and local identity, it is common for such areas to receive some form of official protection either through planning safeguards or conservation management. The benefits of participatory management in land care, such as sharing responsibilities and negotiating benefits highlighted by Selman (2004), are gained by the incorporation of wide-ranging professional knowledge that: enhances the capacity for implementation, increases trust between stakeholders, reduces the deadweight of enforcement, improves understanding and awareness, facilitates policy integration, and increases public commitment.

In order to implement effective planning and management strategies for protected areas, an integrated and comprehensive environmental management policy within the Development Plans is vital (Noor 1999). Such a system will definitely help in the decision-making process during processing planning applications for change of land-use, preparing Development Plans, and in development control and planning decisions made by State, and Local Planning Authorities (LPAs).

Development Control

The objective of development control is to ensure that development would take place as envisioned by the development plans, including land use zoning, intensity of use, allocating adequate open space, and providing infrastructure and community facilities. Local plans form the detailed basis for this activity. Every instance of land development requires planning permission from the local authority,which is the local planning authority (TCPA 1976), and this involves the assessment of the specific development proposal to establish whether or not it conforms to the local plan for the area. Protected

areas that are located within a local planning authority area and covered by gazetted development plans incorporate clear and strong development control guidelines.

Sustainability is the ultimate vision in land use planning. Therefore, sustainability assessment (SA) is applied to ensure that sustainable development is treated in a comprehensive manner in a local plan. This is especially so in examining the relationship between the social, environment and economic needs, which must be sustainably balanced and integrated. The SA in a local plan is an assessment process which identifies the compatibility of proposals and their impacts on the sustainability objectives of that plan. In the SA process, sustainability indicators are designed for the study area and are used to benchmark current sustainability status, and to identify gaps or deviations from comparators and sustainability targets, thus facilitating problem-solving for the study area. Sustainability indicators include all environmental, social, economic and physical aspects of the local plan. Eventually, these indicators can be used as a monitoring tool to examine the performance of the local plan in relation to its sustainability targets.

The current planning process in Malaysia has not been developed to a stage where it can properly accommodate the concerns of environmentalists, and at this point it is appropriate to outline its operation, since the identification of gaps in powers, integration and co-ordination with other professionals, will demonstrate where some of the difficulties lie.

The planning of physical land use is important since it has the potential to sustain or destroy protected and conservation areas, in light of the fact that protected areas and planning for such areas are closely linked to areas around them. Obviously, the creation of protected areas and the identification of conservation areas is a pointless exercise if the nature reserves in question are going to be gradually eroded away by external forces. In this respect, physical land use planning does not only present a means for containing such threats, but it may also contribute to site planning and management of protected areas.

Development Plan and Protected Areas

In attaining environmental goals, total integration is an ideal. Consequently, management and decision-making must move towards greater integration through interaction between all involved sectors, and that must include participation by the public and co-ordination among stakeholders (Margerum and Born 2000). Many of the elements of an integrated approach are already in place, but they need to be more widely applied, further developed and strengthened (UNEP 2000). According to Cullingworth (1999), planning authorities have a duty to determine which parts of their areas are of special architectural or historic interest, such that their character must be preserved or enhanced, and also to designate such areas as protected. When a protected area has been designated, special attention

must be addressed in all planning decisions to the preservation and enhancement of its character and appearance.

Two approaches to determine development in protected areas are outlined by LESTARI (1999). The first approach emphasises controlling development through the application of development standards to ensure minimal negative impact. This strategy assumes that development proposals are made from outside the system, and the planning task is to ensure that the development to be implemented will not damage the environment, to the detriment of residents and consumers of the area. The second approach involves indicating proactive development trends within the protected area. Both these approaches involve radical actions as part of which there is a role for the Planning Authority and administrators in identifying trends and specific projects for the area.

Development Plans can make a significant contribution towards creating a sustainable local environment. In fact, environmental problems would not have reached such an alarming stage in developed areas, if such plans had been properly prepared and seriously implemented (Halimaton Saadiah Hashim 1994). Environmental planning and management of local resources must be carefully formulated and based on a good environmental understanding, environmental appraisal, and social and physical land use characteristics of the local planning area. Any changes projected are likely to have effects on the development of the planning area.

Local Planning Authorities (LPAs) that are entrusted with planning, development control, and cleansing functions of their areas, must be the first line of defence against destruction of the environment in their area of jurisdiction. In fact, they are in the best situation to ensure that efforts are made to reduce environmental degradation and that the aspirations of the community in creating a sustainable built environment are met. They are also empowered to perform duties which are specifically authorised by law under the Local Government Act 1976 (Act 171) and the Street, Building and Drainage Act 1974 (Act 133). As such, the local planning authority has the power to prepare local plans, which are the lower level plan in the strategic hierarchical system of development plans (the state structure plans are the upper level plan), that are environmentally sustainable and to reject development projects that are deemed to be environmentally hazardous or damaging. The process of physical land use planning is a continuous activity of evaluating and compromising the conflicting needs of various land uses and activities which are the basic planning tool in the development plan, and which displays how land is to be allocated between various needs and distributed in spatial terms. This is done through the traditional and time-tested planning technique of land use zoning (Cullingworth and Nadin 2002). Land use zoning is supported by planning policies, which articulate related

proposals, strategies or even general guidelines for the use and development of land. The important purpose of planning policies is to guide the development approving authority when undertaking controls over development activities.

To move forward in the sustainable development process, there are many challenges and issues that must be dealt with. Where planning is concerned it will always be a challenge to produce a plan that is fully effective and implementable. To plan for sustainability also means focusing on planning issues and subject matters that are central to the creation of sustainability. Beyond the traditional environment-oriented concerns, e.g. protection of natural features and environmentally-sensitive areas, land use planners must consider issues at the very core of physical planning which have a major implication on sustainability. Among the great planning challenges is the need to put the principle of good governance into practice, which as noted by Ibrahim (2007), is a pre-requisite for sustainable development. In terms of public participation alone, there are many issues that need to be addressed. Firstly, it is essential to be able to assess the effectiveness of each public participation exercise so that there can be a more systematic way of improving such involvement. Secondly, there is the need to educate the public. Thirdly, there is a need to understand the complexity of the underlying interactive processes in a community and to bring together the diverse views of different groups of people. And finally, the greatest challenge is to make planning a collaborative effort by all involved in development.

THE CONSERVATION CONCEPT

The term 'conservation' from publications by Badan Warisan (Malaysia Heritage Trust) and the International Council on Monument and Sites (ICOMOS) as mentioned by Ibrahim (2007), is in accord with the Burra Charter. Ibrahim further stressed that the fundamental conservation processes derived from the international charters can be summarised to involve four major physical activities, these being: preservation, restoration, reconstruction and adaptation as follows: *Preservation* stresses the maintenance of heritage in its existing state and in retarding deterioration; *Restoration* indicates a process of returning the existing heritage to an earlier known state by removing accretions or by reassembling existing components without the introduction of new material; *Reconstruction* relates to the process of re-creating a non-surviving heritage or conservation area as nearly as possible to a known earlier state; and *Adaptation* signifies modification to a place to suit a proposed compatible use.

The future role of conservation is seen through the opportunities for land-use planning to integrate heritage policies in relation to the wider demands of sustainability (Barker 2006). According to Green (1996), there are three main types of conservation. Firstly, conservation is essentially the preservation and protection of environmental features,

beautiful sceneries or landscapes, wildlife, clean air and water. However, if the pollution of air and water reaches levels where our very existence is threatened, the maintenance of environmental quality is much more a necessity than an amenity. Secondly, there is the control of pollution and the maintenance of an environment fit for living, as well as the need for it to be pleasant to live in; and thirdly, conservation means the planned use of resources to ensure their continuing supply until sustainable substitutes can be found. Thus, conservation involves a compromise between conflicting interests and its definitions, where the formulation of scientific management of natural environments and resources for the purpose of maximising their aesthetic, educational, recreational and economic value, is done to bring benefits to society.

One of the essential tasks for government, local authorities and all public agencies concerned with the use of land and natural resources, is to make adequate provision for development and economic growth, whilst at the same time ensuring effective conservation of wildlife and natural features as an important element of a clean and healthy natural environment. The conservation of nature is important for attractive environments, and hence, attention to nature conservation is essential to social and economic well-being. With careful planning and control, conservation and development can be compatible.

LAND USE PLANNING AND MANAGEMENT OF PROTECTED AREAS

The designation of a protected area is often only the first step in a continuing, and sometimes unsuccessful, process of protection, and this gives rise to the phenomenon of 'paper parks', in which protected areas are designated but where there has never been any real attempt to manage their conservation (Dudley et al. 1999). In such situations, threats from illegal incursions, poaching and fire are being matched by more subtle impacts from trans-boundary air pollution and climate change (Phillips et al. 2001). Clearly, serious threats to protected areas cannot, by their very nature, be stopped by fences or guards, and processes of economic integration and the growing economic influence of corporations are creating new challenges to protect the lifestyles and habitats of high value to the public. Therefore, protected areas should be seen as more relevant to the development plans and to the needs of local people. Otherwise, many protected areas will, sooner or later, be overwhelmed.

Most large protected areas have people living inside their boundaries and many more have local populations just outside the protected area limits. Consequently, a key challenge for protected areas according is to find ways in which human needs can be better integrated with the needs of wildlife, biodiversity and the wider environment (Oviedo and Brown 1999). This includes both the needs of local or indigenous people and the needs of people living far away from protected areas in towns and cities, but who nonetheless,

have a stake in their future, such as for nature or ecotourism, or for sustainable use of environmental resources e.g. medicinal plants in the forests.

The need for a large network of well protected areas connected by buffers, corridors and linkages with adjacent lands, and for an approach that takes into account the whole landscape or bioregion, should be addressed within a larger portfolio of sustainable resource use (Figgis 2004). Protected areas are graded from strictly protected core reserves, through a range of relatively soft or low impact development uses, to areas where human needs predominate and where there is relatively little emphasis on protecting wildlife. Although the concept of buffer zones and support zones around protected areas has been recognised for some time, a range of other soft options is now becoming available, such as sustainable forest management, leisure fishing, organic agriculture, low-level collection of non-timber forest products, and nature or eco-tourism (Sayer 1999).

It is important to link heritage conservation plans with other national and state plans, and national strategies for sustainable development; defining priority species, sites, habitats and preparing action plans with clearly specified objectives and targets. In sustainable development context, heritage areas cannot be protected and conserved in isolation, and a big challenge is to reconcile or break down the borders that lead to the isolation of such places from living environments. New partnerships with local people, non-governmental organisations (NGOs), private initiatives, tourism operators, resource users, development agencies, human rights groups, religious organisations, local governments and the general public are all increasingly important in this mission, especially so because protected areas exist in a world where institutions and political structures are rapidly changing.

STRATEGY FOR PROTECTED AREA PLANNING

Natural areas may be managed either to maintain their geodiversity and biodiversity, to provide physical environmental and resource protection, or because they constitute scenic features that have high amenity value. In many cultures, amenity values are not particularly associated with natural, undisturbed habitat but are treasured landscapes that have been drastically modified by human activities. These have to be rationalised with natural areas.

On a bio-regional scale, people and protected areas can co-exist, both through the judicious use of categories that can consistently combine biodiversity conservation with human habitation and managed sustainable resource extraction, and by developing region-wide co-operative programmes along protected areas and neighbouring activities (Miller 1999). Successful use of bio-regional planning represents an exciting approach with considerable potential to strengthen efforts to integrate parks and protected areas into the larger landscape. This approach seeks to maintain biological diversity across

entire landscape regions while meeting people's needs. Cases in all continents already demonstrate that such options are viable and tend to foster social, economic and sustainable environmental management.

A comprehensive and planned approach to conservation for bio-regional planning involves three critical requirements: (1) *Prioritisation*: there is a need to prioritise within global conservation, in order to focus most attention on areas that have the greatest biodiversity richness, intactness or which are under most threat; (2) *Broad-scale conservation*: there is a need to develop larger scale approaches to conservation, which consciously plan conservation interventions over a large area, such as an eco-region or bio-region, based around an agreed biodiversity vision and involving a mosaic of protected areas and other forms of sustainable land use; and (3) *Integration*: there is a need for conservation and development objectives in land-use planning and regional development strategies, based on an ecosystem approach aiming to build a mixture of protected areas of various categories, linked and buffered by various other types of sustainable land uses.

Protected areas can be incorporated as a viable land use along with other types of development. Maps that illustrate areas with physical, biological, or social constraints to development can be over-layed on top of land use maps to show exactly what pieces of land require protection, conservation, or management and mitigation (RCEP 1999). Reasons for development constraints and the need for additional protection may include habitats of rare or endangered flora or fauna, unique geological features, scenic areas, high erodable areas, vital groundwater recharge areas, wetlands, historical or cultural landmarks, existing recreation areas and watershed protection areas. Therefore, it is important that the planning and management of protected areas be incorporated and integrated into a regional development scheme or expressed in special area plans or master plans, since such schemes or plans provide a framework or structure by which the role of protected areas can be defined, thereby enabling more effective integration of conservation and management to be made in a more refined, detailed and specific action plan.

Most protected areas are managed for multiple, yet compatible uses (Stolton and Dudley 1999). They can have many management objectives beyond biodiversity conservation, including outdoor recreation, tourism, watershed protection, sustainable forestry, hunting or fishing, scientific research, and environmental education. Establishing a protected area requires more than simply setting aside a track of land for protection, and a management plan is crucial to ensure that geodiversity biodiversity and cultural heritage are protected (UNEP 2004). To be effective, the plan must address the various threats to the area and the biodiversity that it supports. Threats to any given protected area might include the conversion of natural habitats to agriculture, incompatible land uses of neighbouring land, unsustainable extraction of environmental resources, illegal logging and poaching,

the introduction of invasive or alien species, pollution and effects of climate change, lack of enforcement of rules and regulations and inefficient and ineffective management.

The IUCN emphasises that protected areas should not be seen as isolated entities, but must be treated as parts of broader conservation landscapes, including both protected area systems and wider ecosystem approaches to conservation that are implemented across the landscapes or seascape.The over-riding purpose of a system of protected areas is to increase the effectiveness of *in-situ* nature conservation, and the long-term success of *in-situ* conservation requires that the global system of protected areas comprise a representative sample of each of the world's different ecosystems.

IMPLEMENTING LANGKAWI GEOPARK

A geopark is an area that contains unique rock formations dated back millions of years. Apart from that, there are biological diversities of flora and fauna, rich cultural heritage and socio-economic activities of the local communities amongst the elements that contribute towards the creation of a geopark. Due to its rich natural and cultural heritage that Langkawi is well known for, in 2007 the whole Langkawi archipelago of 99 islands was bestowed the status of a global geopark by the Global Geopark Network (GGN), endorsed by UNESCO – the first in South East Asia and 52nd in the world. This placed the Langkawi archipelago as a protected and conservation area with the global geopark functions of conservation, education and sustainable development (Shafeea et al 2007). This is different from Malaysian National and State Parks gazetted under the National Parks Act, National Forestry Act or under specific enactments. Langkawi Geopark is not about total nature protection and conservation because there are other development land uses on the islands, the main island of Langkawi in particular. It does not restrict developments, as long as they are compatible and complementary to the natural areas and support sustainable development.

The definition of geopark by GGN, and endorsed by UNESCO, describes its multi-faceted nature. It has all the elements of environmental and cultural conservation areas but at the same time explains that sustainable development components and elements are necessary for the economic well being of the local communities. The GGN definition is as below:

> "A geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development. The geopark should take into account the whole geographical setting of the region, and shall not solely include sites of geological significance. The synergy between geodiversity, biodiversity and culture, in addition to both tangible and non-tangible heritage are such that non-geological themes must be highlighted as an integral part of

each geopark, especially when their importance in relation to landscape and geology can be demonstrated to the visitors. For this reason, it is necessary to also include and highlight sites of ecological, archaelogical, historical and cultural value within each geopark. In many societies, natural, cultural and social history are inextricably linked and cannot be separated (GGN 2010).

MAJOR CONSERVATION AND DEVELOPMENT AREAS IN LANGKAWI GEOPARK

The national Land use planning policy and strategy which affects Langkawi Geopark are stipulated in the National Physical Plan. The state strategic land use policies and strategies which affect the Langkawi Geopark are framed in the gazetted Kedah State Structure Plan, while the land use zonings and development guidelines for the archipelago are outlined in the recently gazetted Langkawi District Local Plan. In planning and implementing Langkawi Geopark, sustainable development, conservation and education shall be the main criteria and thrusts. Sustainable development is to ensure that while natural and cultural heritages are protected and conserved to become sustainable tourism resources for local and foreign tourists, other development and activities will support the conservation areas and sustainable socio-economic development of the local population is ensured.

Currently, Langkawi Geopark's major protected areas are in the form of forest reserves, mainly the three geoforest parks of Kilim Karsts Geoforest, Machincang Cambrian Geoforest and Dayang Bunting Marble Geoforest that cover 16,889 hectares, comprising 13,772 hectares of diptrocarp forests and 3.117 hectares of mangrove forests. Other smaller forest reserves are scattered all over the archipelago. A total of 97 geosites have been identified but no biosites or cultural sites have been declared, although there are several areas which are known for their rich biodiversity and cultural values. Only a few sites such as Pulau Anak Tikus Pulau Ular, Pulau Tepur and Pulau Jemuru – 'pulau' is a Malay word for island - are promoted and open to visitors. Development within these areas are controlled and only trails for public paths are provided. In Kilim Karsts Geoforest, only Jetties and Information Centre are provided. For Machincang Cambrian Geoforest, Cable Car and recreation facilities are provided while at Dayang Bunting Marble Geoforest only jetties and recreation facilities are provided. This concept indicates that land use planning does not reject development within these three areas, but sustainable development is greatly emphasised within Geoforest Parks.

For other areas in Langkawi Geopark, developments are strictly in compliance with the zonings stipulated in the Langkawi District Local Plan Development zones. Even though some of geosites are located within the development zones, new development within its vicinity are avoided or will be strictly controlled. Nevertheless, there are some geosites

of lesser importance, or of lower heritage value, which may need to be sacrificed to make way for development, such as Gua Pinang due to the economic returns that the nearby activity generates, that is the LARFAGE Cement Industry.

FUTURE PLANNING OF LANGKAWI GEOPARK THROUGH DEVELOPMENT PROJECTS

Langkawi is one of the tourism islands which are competing with other island destinations in the tourism industry. After being proclaimed a geopark, its economic and tourism market has been broadened through rebranding and creating new attractions to boost local tourism activities. For the 10th Malaysia Plan, all LADA's development projects will focus on the enhancement of tourism products and the promotion of Langkawi Geopark. The main tourism assets in Langkawi are the invaluable million years old geological formations, pristine beaches, forests, water falls and rivers. These natural resources will be protected and carefully managed as they form the heart of tourism activities for Langkawi and degradation of the natural environment will have direct effect on Langkawi's tourism. In this respect, the current planning approaches focus on information dissemination and understanding of matters pertaining to Geopark. The projects to be implemented are those related to the enhancement of infrastructures and accessibility to the geosites.

A Malaysian Geopark Resource Centre will be constructed within the Kilim Jetty area as added value to present activities and tourism products within the area. The centre will function as the main reference centre to other countries as the geological formation in Langkawi are the oldest in Malaysia and South East Asia and the Palaeozoic rock sediment formation dated 550 to 220 million years are also present. The centre will not only house geological heritage, flora and fauna and cultural diversity but also as attraction to tourists, students, researchers, scientists and the general public. The present facilities at other well known tourist attraction products such as Laman Padi, Telaga Tujuh and Tasik Dayang Bunting should be enhanced in terms of quality, safety and comfort.

To ensure the sustainability of Langkawi, the planning of tourism development and protecting the environment should be supplementing and complementing each other at every level. The integration and co-operation of all stakeholders as a team from Federal Agencies, State and NGOs should be realised in Committees to formulate well informed decision making on matters pertaining to geopark development.

CONCLUSION

In the process of developing an effective implementation system, any management plan must reflect upon needs and priorities and must be owned by those who will have

to implement it. Therefore, adopting a plan should mainly be the task of the people responsible for protected area matters, although many other stakeholders will need to contribute to its initiation, development and implementation. There should be direct links between the system plan as a rational tool and the local action plan required to give effect to it, such as a clear connection between the system plan and site-based management plans.

Land use planning can apply to spatial physical arrangements of land uses of a town or city, or countryside, region, nation and even international zones, or to national, regional and local policies which determine the spatial arrangement of the use and development of land. A successful planning system will promote economic prosperity by delivering land for development in the right place and at the right time. It will encourage urban regeneration by ensuring that new development is channelled towards existing urban or service centres rather than adding to urban sprawl.

Development Plans are intended to set the main considerations on which planning applications are decided and to guide other responsibilities of local government and other agencies. They are also intended to contain the local planning authority's policies and proposals for the development and use of land, Plan-making has been generally regarded as a central component of the planning process, and a key means of devising and delivering planning policies for the improvement of the environment, the management and conservation of natural beauty and amenities of the land. The plan can be a means of setting long-term strategies to provide a more sustainable pattern of development.

A Development Plan is a potentially powerful instrument for environmentally sustainable development. The approach starts from an assessment of the current state of the physical environment, and attempts to qualify what effect the plan will have on this state. Development control operates within a plan-led system which is the most effective way to contribute to more sustainable development through development control to ensure environmental appraisal and to screen development control decisions for their conformity with the plan. It is only through the physical land use planning system that protected areas can be considered within the broader context of the surrounding region. This enables planning to integrate protected areas into their regional environments and to effectively address adjacent land use issues that influence protected area resources.

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THE IMPORTANCE OF GEOLOGICAL HERITAGE RESOURCES IN LAND USE PLANNING: EXPERIENCE FROM LANGKAWI GEOPARK

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Abstract
Being an oldest landmass with the most complete Paleozoic rock sequence Langkawi archipelago hosts the richest geological diversity and heritage resources in the country. As a popular tourist destination, the scenic beauty has attracted tourists to Langkawi without them realising that the beauty has been created by the islands' rich geological heritage diversity. To date more than 90 geoheritage sites of highly significant scientific, aesthetic, social or recreational value have been identified. Some of these geoheritage sites have become popular tourist sites. To ensure the sustainability of the tourism industry Langkawi needs to have a comprehensive and practical conservation strategy and mechanism. Without a good conservation policy the geoheritage sites are constantly under threat and under stress due to the need of space for development. To ensure the sustainability of these natural resources it is timely to include geoheritage sites in future land use planning.

INTRODUCTION

Geology is the basis for the lives on earth. In general it underpins the societal need for natural resources and raw materials that support our day-to-day existence (Prosser et al. 2006). The understanding of the importance of geology as a prime natural resource is

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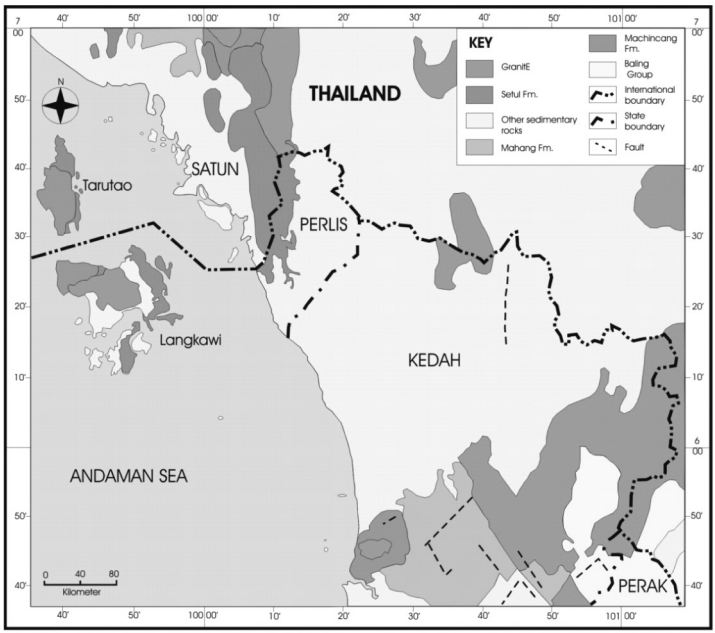
shared by many and among them are planners. Knowledge of geology plays a fundamental role in land use planning and in understanding the site suitability for development and residents. This is through the study on soil types and habitat that determine the land use of an area. Besides the study of geology the understanding of the dynamic of the natural environment such as the geological evidence on the last climate change, the changes of sea levels and the extinct as well as evolved species, would enable us to better understand and plan for current and future environmental changes and associated hazards. The dynamics of natural environment includes the present day natural system such as rivers and coastlines. This is the most common contribution of geology to the land use planning in the country. This is because it is associated with better prediction and management of flood events, coastal erosion and other potential hazards (Pereira & Komoo 1999; James Bachat et al. 2007; Nur Fazzillah Muhamed Noordin et al. 2007)

Another area of geology knowledge that is important for the land use planning has emerged in the last 20 years known as geological heritage or geoheritage (Joint Nature Conservation Committee 2002). The relationship between geoheritage and planning in Malaysia has been highlighted through the work by Halimaton Saadiah Hashim et al. (2007), who had includedgeological and landscape heritage as one of Environmentally Sensitive Area (ESA) within integrated work of identification and management of area. The integrated ESAs approach that includes the geoheritage is still confined to Selangor and has yet to be adopted by other planners in the country . Geoheritage can simply be seen as a significant geology, landform and landscape that carry the identity or signature of a place such as Author Seat, an extinct volcano system to Edinburgh, Table Mountain to Cape Town and limestone Hill to Ipoh. The heritage values are not limited cultural based but are also important for scientific, research and educational purposes particularly in understanding the Earth. This paper highlights Langkawi Geopark, the land that hosts the oldest continent in the country, and the importance of land use planning to protect the natural heritage within it.

LANGKAWI GEOPARK

Langkawi archipelago lies in the Northwestern corner of the Malaysian Peninsular (Figure 1). It is famous for its myths, idyllic natural scenery, picturesque landscapes and dramatic and beautiful coastlines as well as endemic fauna and flora. This natural and beautiful island has inevitably become one of the top tourist destinations in Malaysia. The landscapes reflect a rich geological diversity that made up the archipelago. The geological diversity of Langkawi has been widely studied by members of the Geological Heritage Group of Malaysia and results of the studies are published in Geological Heritage of Langkawi book and also in Malaysian Geological Heritage book series.

FIGURE 1 : Location Map of Langkawi Island and Its Geological Element in Relation to the Main Land.



The rich geological diversity has in turn created wide habitats and ecosystem diversities including biological and cultural diversities. These habitats are influenced by the underlying geology therefore raising the awareness regarding the importance of geological diversity in order to preserve this fragile island environment. This has made the area a perfect place not only for nature lovers, but also for scientists who want to study the geological and natural resources of the area. Every year large numbers of scientists including geoscientists, biologists, natural scientists and social scientists visit the place and use the natural and cultural resources for teaching, research and recreation. Up to now more than 90 geological sites of high heritage value have been identified in Langkawi and most of which are located in geoforest parks, that is areas designated for protection in the Langkawi geopark. For the time being those geosites are quite safe provided the parks are not converted into development areas in the near future. Some other geosites still remain vulnerable and can be wiped out at anytime to give way to development. With ever increasing population and tourism as well as development activities, the geological resources in Langkawi are always under pressure. The present population of Langkawi is about 93,000 living within an area of about 48,000 hectares. On top of that Langkawi attracts about 1.5 million visitors a year. A study by Narimah Samat (2010) showed that between 1974 and 2005 the built-up area of Langkawi has

increased 23 folds. This enormous development rate will somehow put pressure on the natural resources of Langkawi if it is not taken into account in the land use planning.

However, at the same time everybody realises that those geosites together with other natural resources are the main attractions that bring tourist money to Langkawi. Realising the importance of preserving the geoheritage resources and the great potential of eco-geotourism that the resources can offer in future, the Geological Heritage Group of Malaysia is doing intensive promotion and public awareness programmes to ensure the sustainability of the resources through the global geopark initiative.

Since it was declared a member of the Global Geopark Network (GGN) under the auspice of UNESCO in 2007 Langkawi has witnessed a steady growth of tourist arrivals at the rate of about 5 to 7 percent a year. The increasing tourism activities also pose more threats to the geosites in particular and other natural resources in general. This paper highlights all the geological resources in Langkawi and the need to protect and conserve them for the sake of sustainability of geo-ecotourism of Langkawi.

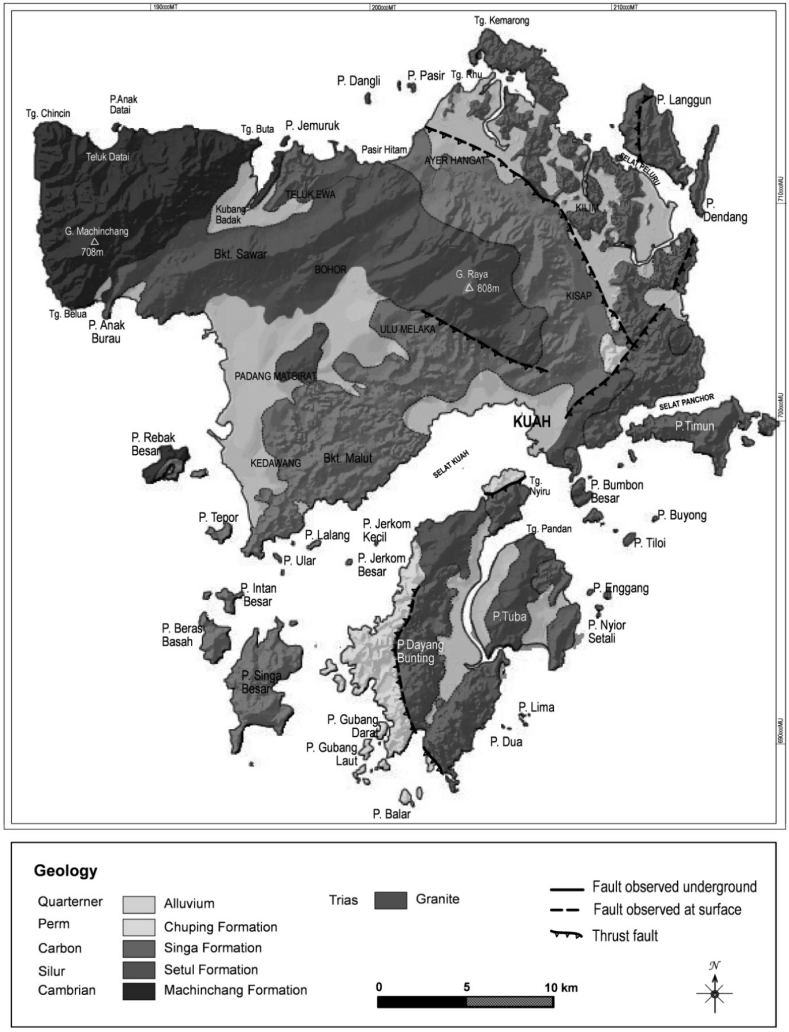
BRIEF GEOLOGY OF LANGKAWI

The geology of Langkawi is mainly made up of sedimentary and granitic rocks, which have evolved since the Cambrian time until the latest part of the Paleozoic period. Scrivenor (1911) published the first document of the geology of Langkawi in the Royal Society Journal. In the early days most works were focused on the geological mapping in tandem with the needs in those days to look for the presence of economic minerals. Jones (1973) wrote a lengthy report on the Paleozoic sedimentary sequence and the granitic rock of Langkawi, but the most extensive report about the geology of Langkawi was published in 1981 complete with a geological map on one-inch scale. Since then a wealth of geological research has been undertaken by various local and international geoscientists covering a wide aspect of geology including stratigraphy (Jones 1981; Kamal Roslan Mohamed 2003), sedimentology (Ibrahim Abdullah et al., 2003; Kamal Roslan Mohamed 2003; Che Aziz Ali 2003), geochemistry and mineralogy (Wan Fuad Wan Hassan 2003 a & b), structural geology (Tjia 1989; Ibrahim Abdullah 2003), geomorphology (Zaitun Harun & Juhari Mat Akhir 2003; Juhari Mat Akhir, 2003; Pereira 2003; Ibrahim Komoo & Syafrina Ismail 2003), sea-level changes (Tjia, 1995; Zaitun et al 2003 a & b) ,and paleontology (Mohd Shafeea Leman 2003). Since the inception of the Geological Heritage Group of Malaysia (GHGM) in 1996 research programme has been geared more towards mapping and describing all the geosites in Langkawi. The first fruit of this effort by the GHGM was published a year later in 1997 (c.f. Ibrahim Komoo et al. 1997)

The geology of Langkawi islands today is a result of a very long geological processes that took place under various conditions due to surface and subsurface processes

including deposition, tectonic and magmatic events and finally by surface processes such as weathering and erosion that carved the present landscape. Basically the geology of Langkawi is dominated by sedimentary rocks that were deposited since Cambrian to the Permian time (Figure 2) before the deposition was interrupted by the granite intrusion in the Triassic period. The sedimentary formations are the Machinchang, Setul, Singa and Chuping formations.

FIGURE 2 : Geological Map of Langkawi (Modified after Jones 1981)



Machinchang Formation

The oldest rock outcrop in Langkawi is represented by the Machinchang Formation that forms the present day Gunung Machinchang (Ibrahim Abdullah et al. 2003). Patches of the formation outcrops are found at the northeastern corner of the main island, and on Pulau Jemuruk and Pulau Rebak. The rock was formed about 540 million years ago in different environments ranging from delta to shallow sea, when the earth was still barren during the late Cambrian time. Sediments from the hinterland was brought down to the river mouth and deposited in a terrestrial–marine transition environments forming a wide delta covering an area from Tarutao islands in Thailand to Langkawi, and Gunung Jerai and it extend southwards until Selangor where it formed the present day Dinding Schist. Deposition in different type of environments (Lee, 2006) had yielded a wide variety rock types in this formation ranging from the largest grain conglomerate to sandstone and siltstone with minor amounts of shale. In Langkawi most of the sediments that formed the Machinchang Formation were initially deposited in channels with minor presence of inter-channel muddy facies. These channelised facies were later superseded by shallow marine mouth bars and sand bar deposits, which eventually became deeper before the deposition of limestone took place.

This oldest rock in Malaysia and one of the oldest rock formations in Southeast Asia had undergone various types and phases of deformation and metamorphism, which resulted in the rock being invariably metamorphosed. However, owing to the competent nature of the thickly bedded sandstone and quartzite the deformation effects are much less apparent higher up the sequence where several hundreds of meters of totally non-deformed sedimentary rock successions can still be observed.

Setul Formation

Stratigraphically the Machinchang Formation is conformably overlain by the limestone of the Setul formation. The carbonate sediments that formed this rock was deposited in shallow to deep marine settings on a carbonate ramp during the early Ordovician time, about 480 million years ago. Deposition of this limestone began with accumulation of impure calcareous sediments comprising mud, peloidal grains, lime mud and very minor amounts of bioclastic grains (Che Aziz Ali et al. 2003 and 2005). Fossils such as *Hormotoma sp., Helicotoma jonesi, Paleomphalus giganteus, Lesueurilla zonata, Malayaspira rugosa, Endoceras sp., Ormoceras langkawiense, Discoceras chrysanthemum, D. laeviventrum,* and stromatoporoids (Jones 1981) can be found in this unit. This basal unit was later transgressed by a clastic interval consisting of siliceous mudstone and siltstone during the Hattengian transgression that marked the boundary between Ordovician and Silurian (Cocks et al. 2005). The rocks are now deformed and changed to slate, phyllite and quartzite due to tectonics. Graptolites *Monograptus*

sedgwecki, M. convolutes, Dimorphograptus malayensis, Orthograptus vesiculosus, Climacograptus rectangularis, Diplograptus modestus, trilobite Mucronaspis mucronata, and gastropod *Lophospira* sp. are among the fossils that can be found in this unit (Leman et al. 2005). The deposition of this clastic sediment occurred in deeper marine conditions during high sea level which the carbonate was submerging and being smothered by the clastics.

The sea level dropped again during the Upper Silurian and witnessed the deposition of another calcareous sediments interval mainly consisting of peloidal and with less bioclastic components. The main facies in this unit comprises peloidal packstone, wackestone with minor amounts of peloidal grainstone. Only *Dentalium* sp., *Ormoceras* sp., trilobite and conodonts can be found in this unit (Jones 1981). Some tentaculites can also be seen in the thin section of rock taken from the lower part of this unit.

Early Devonian to Middle Devonian period had witnessed another episode of increasing clastic input due to the increase in sea level. This has brought the accumulation of a thick interval of clastic sediments consisting of mudstone, siltstone and sandstone which have been partly metamorphosed into phyllite and quartzite. *Monograptus langgunensis, Nowakia* sp. and *Styliolina* sp. are among common fossils in this unit. The deposition of this unit marked the end of a sedimentary formation named as the Setul Formation (Jones 1961). A brief break in deposition was postulated to have occurred after the deposition of the upper clastic unit of the Setul Formation but current data from the main land areas indicates that deposition continues with the deposition of a clastic sedimentary formation known as the Singa Formation in Langkawi and Kubang Pasu Formation in Perlis.

Singa Formation

Deposition of the Singa Formation occurred mainly in shallow marine environment during which Langkawi was located within cooler climatic area in southern hemisphere from Late Devonian to Early Permian time. The total thickness of the formation is estimated at 2100m. Jones (1961) named the formation after Pulau Singa Besar for the predominantly dark coloured shale and siltstone widely distributed in the southwestern part of Langkawi Islands. In certain areas very thin alternations between very fine sands and silt appears like varve deposits. This type of deposit could have been deposited alternately during cold and warm seasons that took place in the protected shallow marine environments bringing about sediments similar to temperate lake deposits. The formation also contains various horizons of glacial marine diamictites (Stauffer & Mantajit 1981, Stauffer & Lee 1986, Leman 2000) represented by thickly bedded to massive dark grey to black siltstone and mudstone, containing sporadic clasts of various origin, size, shape and degree of roundness including a foreign one billion years old igneous rock named tronjehmite. The formation also yields various horizons of cold-water brachiopod fauna

(Shi et al. 1987, Leman 2003a). The Singa Formation can be divided into four members i.e. the Rebak, Kentut, Ular and Selang members, from oldest to youngest.

Chuping Formation

Towards the end of Early Permian time Langkawi has witnessed the end of clastic sediments deposition and at the same time the sea was again dominated by carbonate material. The clastic sediments that formed the Singa Formation were slowly replaced by carbonate sediments forming a thick sequence known as the Chuping Formation. Jones (1961) named the formation after Bukit Chuping in Perlis State for the thickly bedded to massive light grey crystalline dolomitic limestone exposed in Perlis and Langkawi Islands. However, in Langkawi Islands, a significant portion of the formation is composed of thinly bedded dark grey bioclastic limestone, particularly in the lower part of the formation (Leman 2003b). The age of the formation is late Early Permian to possibly late Triassic, but only Early to Middle Permian fossils are known in Langkawi Islands. The entire upper half of the formation had undergone a certain degree of metamorphism and is therefore devoid of fossils. The basal part of the formation shows transitional passage bed between siltstone of Singa Formation to limestone bed of Chuping Formation as can be seen on Pulau Singa Besar and Pulau Singa Kechil. The upper boundary of the Chuping Formation is not exposed but overthrusted by older Setul Formation in the eastern part of the Langkawi Island and also in Pulau Dayang Bunting.

Igneous rock

The Paleozoic geological history of Langkawi was terminated by an episode of major granite intrusion that occurred throughout the Malaysian Peninsula in the late Paleozoic to early Mesozoic era. In Langkawi, large and small igneous bodies can be found scattered, particularly in the central part of Langkawi Islands (Wan Fuad Wan Hassan 2003). The two largest igneous bodies are the Gunung Raya and Bukit Sawar granites, which extend out to the base of Gunung Machinchang at Telaga Tujuh. Other granite bodies include the Kuah, Tuba and Dayang Bunting stocks that are comparatively smaller than these two. All these granite bodies are interpreted to belong to the same stock. It has been named collectively as the Gunung Raya Granite and a radiometric dating by Bignell & Snelling (1977) had given a Late Triassic age to this intrusion episode.

GEOLOGICAL HERITAGE RESOURCES AND THE IMPORTANCE OF MANAGING AND CONSERVING GEOSITES IN LANGKAWI

Various geological processes that have taken place since 540 million years ago until now have produced a wide geological diversity in the Langkawi archipelago. The diversities, some of which can be considered as having high geoheritage values are

present in many forms ranging from various rock types, geological structures, fossils, minerals, geomorphs, and landscapes. These geoheritage resources are scattered all over the Langkawi archipelago and the place where each of these geoheritage resource occurs is identified as a geosite. More than 90 geosites have been identified in Langkawi (Figure 3; Table 1), some of which have been developed as tourism sites (Tanot Unjah 2009). Each geosite possesses at least one or more special geological heritage feature that defines the geosite. For instance, Pulau Anak Tikus is a special geosite because it hosts the richest Paleozoic marine fossils in Langkawi, while Gua Kelawar is special because of its beautiful cave and also the presence of ancient shells attached to its roof that shows the sea level at about 6000 years ago. This shows that each geosite that had been identified carries important value and is very significant either at national level, regional level or even global level. Some of these geosites have been visited and studied by numerous researchers from all over the world.

FIGURE 3 : Stratigraphic Column of Langkawi (Modified after Kamal Roslan Mohamed 2003).

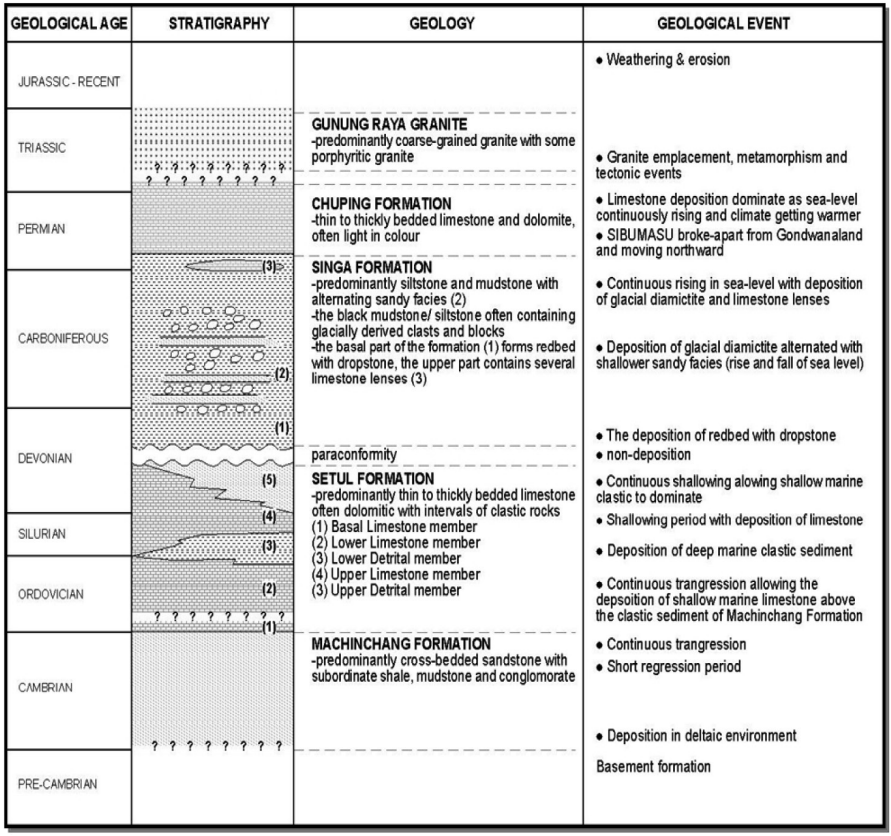


TABLE 1. : List of Geosites Based on Geodiversity and Significance (Modified after Tanot Unjah 2011).

No	Geosites	Geodiversity	Significance
1	Tg. Chinchin – Tg. Buta Sandstone	Rock	Exposed the complete sequence of Machinchang Formation
95	Teluk Mempelam Mudstone	Rock	The only record of basal part of Setul Formation
2	Scarn of Pulau Bumbon	Mineral	Scarn mineral consist of variety of garnets and amphiboles
3	Ilminite Mineral of Black Sand Beach	Mineral	Accumulation of ilminite mineral that forms dark beach
93	Tg Apau mineral	Mineral	Patches of Ag and Silver in Langkawi
96	Tourmaline of Gunung Raya	Mineral	Patches of 120cm2 of tourmaline mineral
15	Glacier Dropstone of Pulau Tepor	Primary structure	Glacier palaeoenvironment during Permian.
16	Cross bedding of Pasir Tengkorak	Primary structure	Shallow marine deposition in Machinchang Formation
17	Kuah Tor	Primary structure	Porphyritic granite underneath the alluvium of Kuah
18	Primary Sediment Structure of Tok Manap	Primary structure	Deltic to shallow marine environment of Machinchang Formation
19	Cross bedding of Pondok Nibong	Primary structure	Shallow marine deposition in Machinchang Formation
94	Scree Breccia of Dayang Bunting	Primary Structure	Angular limestone cemented by sponge tuffa. The evident of underground river during the formation of limestone
20	Boudine of Tuba Granite	Tectonic structure	The only example of granite boudine in Malaysia
21	Recumbent Fold of Tuba	Tectonic structure	An evident of fold that formed the sill and dyke
22	Sill and Dyke of Tuba Granite	Tectonic structure	Plastically deformed granite sills to form tight disharmonic folds
23	Breccia fault limestone of Kisap	Tectonic structure	Crushed Chuping limestone as an evident of Kisap Thrust Fault
24	Recumbent Fold of Tg. Timun	Tectonic structure	An evident of parallel fold to Kisap Thrust

No	Geosites	Geodiversity	Significance
25	Overturn Fault of Teluk Air taun	Tectonic structure	Evident of fault that separate Setul Formation and Chuping Formation
4	Fossil Bed of Teluk Mempelam	Fossil	Age determination for Basal part of Setul Formation and palaeoenviron ment fossil
5	Fossil of Pulau Anak Tikus	Fossil	Rich fossils island representing the early Ordovician ancient life.
6	Graphtolite Fossil of Batu Puyoh	Fossil	Age determination of Silurian fossil
7	Kisap Fossil	Fossil	Abundant fossil significant age as it corelated to Chuping Formation
8	Kilim Fossil	Fossil	Abundant cold climate fossil significant in palaeoenvironment during Early Permian.
9	Jemuruk Island Fossil	Fossil	Age and stratigraphical correlation for upper part of Machinchang Formation
10	Fossil of Bukit Tekuh	Fossil	Abundant cold climate fossil significant in palaeoenvironment during Early Permian.
11	Fossil of Bukit Asah	Fossil	Record of palaeoenvironment and palaeobatrymetri as well as palaeo biogeography and palaeoclimate fossil.
12	Kuah Fossil	Fossil	Abundant cold climate fossil significant in palaeoenvironment during Early Permian.
13	Fossil of Pulau Langgun	Fossil	Reference specimen of fossil that recorded the palaeoenvironment and plaeobatrymetri of Setul Formation
14	Fossil of Pulau Jong	Fossil	Age determination for stratigraphical correlation of Chuping Formation during Permian.
26	Machinchang Range	Landscape	Rugged range with sharp peak formed by Cambrian rock
27	Gunung raya	Landscape	Highest peak of Langkawi at 807m high, part of hornfel roof-pendant features.

No	Geosites	Geodiversity	Significance
28	Seven Well Waterfall	Landforms	Waterfall with 7 huges pot holes of which the name came from
29	Durian Perangin Waterfall	Landforms	Waterfall that exposed the Singa Formation
30	Lubuk Semilang Waterfall	Landforms	Waterfall mix with cascade at granite rock
31	Temurun Waterfall	Landforms	The highest waterfall in the island at 150m exposed the Machincang beds
32	Telaga Ayer Hangat	Landforms	Hot spring along the fault lines
33	Teluk Datai Beach	Landforms	Long curve beach with golden fine grain sand. The best quality in Langkawi
34	Teluk Burau Beach	Landforms	Pocket sandy beach mixed with rocky beach made of granite
35	Teluk Baru Beach	Landforms	Small pocket beach of fine sand near to fishing village
36	Teluk Yu Beach	Landforms	Local small linear sandy pocket beach sometimes intruded by large granite boulder
37	Batu Hampar Beach	Landforms	Pocket sandy beach
38	Kok Beach	Landforms	White sandy beach with granite boulder
39	Chenang Beach	Landforms	Longest linear sandy beach at Langkawi at 1.5 km
40	Tengah Beach	Landforms	Adjacent to Chenang Beach is a mixed of sandy and rocky beach at 1km long.
41	Dato' Syed Omar	Landforms	BeachPocket sandy beach Kuah
42	Tg. Rhu Beach	Landforms	Sandy beach and a cove surrounded by limestone hill
43	Pasir Hitam Beach	Landforms	Dark ilminite beach close to fishing village
44	Pasir Tengkorak Beach	Landforms	Golden pocket sandy beach and rocky beach
45	Beringin Beach	Landforms	Pocket beach surrounded by wall of limestone and granite side by side
46	Karren-like features granite	Features	Direct waves action on granite crafts a karren-like features that is common in limestone

No	Geosites	Geodiversity	Significance
47	Granite Residual Island	Landforms	An almost oval shape like residual granite. Also the only one in Langkawi
48	Ular Abrasitional platform	Landforms	A huge abrasional platform crafted by waves on sedimentary rock
49	Tg. Dendang Ancient Sea Notches	Features	A 23m high sea notch, highest record of ancient sea level, circa 7000 years old.
50	Mahsuri Ring	Landforms	Two large rounded features cause by meteorite impact, only visible from the Gunung Raya
51	Singa Kecil Mogote	Landforms	A top rounded limestone or mogote of Chuping Formation lies on the top of Singa Formation
52	Kubang Badak Pinacle	Landforms	A wall of limestone cliff with sharp pinnacle
53	Karst Kilim (Limestone Hill at t he East of Kilim)	Landforms	Series of tropical limestone hills surrounded by mangrove
54	Sungai Siam Caves	Landforms	Limestone caves with features located at 25m above current sea level.
55	Sg. Banjar Limestones cave	Landforms	Caves in the limestone
56	Layang Limestones cave	Landforms	Limestone caves with caves features and sea shells.
57	Pasir Dagang Limestones cave	Landforms	Caves in the limestone, displayed numerous features.
58	Langsiar Limestones cave	Landforms	Limestone caves with entrance approximately 80m from current sea level
59	Gubang laut Limestones cave	Landforms	Hollow features leave by the erosion in limestone
60	Gubang Darat Limestones cave	Landforms	An ancient and current sea caves
61	Kelawar Limestones cave (Sg. Kilim)	Landforms	Limestones cave known to host a numbers of bats.
62	Kelawar Limestones cave (Pulau Tuba)	Landforms	Limestone caves with caves features

No	Geosites	Geodiversity	Significance
63	Tg. Dendang Limestones cave	Landforms	Limestone cave connected to sea caves 20 metres below.
64	Balai Limestones cave	Landforms	Limestone caves with chambers
65	Langsir Limestones cave	Landforms	A small underground tunnel that connects the large lake to the sea
66	Nau Limestones cave	Landforms	Limestone caves
67	China Limestones cave	Landforms	Limestone caves
68	Asam Limestones cave	Landforms	Limestones cave
69	Tembus Limestones cave	Landforms	Tunnel in the limestone area
70	Cherita Limestones cave	Landforms	Two chambers cave at two seperate levels, closely related to the local myth Garuda (bird) and the Chinese Princess
71	Teluk Udang Limestones cave	Landforms	Limestone caves located at more than 80m from today sea level
72	Teluk Dedap Limestones cave	Landforms	A tunnel connecting a bay with calm turquoise water to a doline intermittently filled with marine or brackish water
73	Tok Jangkit Limestones cave	Landforms	Limestone caves with basic chambers hidden in the limestone hills.
74	Tok Sabung Limestones cave	Landforms	Limestone caves with two chambers
75	Dangli Limestones cave	Landforms	Limestone caves with fabulous caves features
76	Siam Limestones cave	Landforms	Limestone caves at the main land with archeological remains.
77	Pinang Limestones cave	Landforms	Limestone caves with sea shell located 25m above current sea level
78	Pulau Lima	Landscape	Clusters of limestones island with sea archs, depth sea notch and sea caves. Own the highest sea arch at 15m above current sea level.

No	Geosites	Geodiversity	Significance
79	Bukit Kecil Limestones cave	Landforms	Limestone caves with c omparativelyshallow chamber and low ceiling
80	Bukit Putih Limestones cave	Landforms	Limestone caves with faboluos white stalactites and stalacmites. Current stream running through the caves
81	Landak Limestones cave	Landforms	Limestone caves with caves features. The mouth located 20 metre bellows the land.
82	Dukung Adik Limestones cave	Landforms	Limestone caves with basic caves features. The mouth close to the sea
83	Buaya Limestones cave	Landforms	Limestone caves at 2 meter for the limestone tunnel. Preseved layer of ancient sea shell.
84	Batak Limestones cave	Landforms	Limestones caves
85	Asam Limestones cave (K. S. Kisap)	Landforms	Limestone caves
86	Lake of Dayang Bunting	Landforms	The biggest fresh water lake in Langkawi, formed by a collaped doline
87	Langgun Lake	Landforms	Second largest fresh water lake in Langkawi.
88	Pulau Langgun Landscape	Landscape	A structured control limestone island
89	Pulau Singa Besar Landscape	Landscape	An island landscape dominated by mudstone and shale
90	Pulau Anak Datai Landscape	Landscape	The oldest strata of Machinchang formation, remnant island and numerous features such as sea caves, sea arch, sea stacks and spit
91	Pulau Rebak Tombolo	Landforms	A 1km long tombolo connected the Pulau Rebak Kecil and Pantai Chenang
92	Wang Buluh Caves	Landforms	Limestone caves with numerous caves features
97	Pulau Dua	Landforms	Clusters of limestone island with dinasour like sea arch.

Geosites in Langkawi archipelago can be divided into at least four (4) categories depending on the underlying geology where the geosites occur. Geosites on granites are normally related to the weathering and erosional features that was produced after the rock was exposed to the surface. Rare and unique features like tafoni, solutioning grooves due to wave erosion along weak zones or minerals, strangely shaped granite torrs and remnants of erosion processes have aesthetic and recreational values and at the same time have become subjects of scientific studies especially for those who want to study the tropical weathering on granite terrain (Ibrahim Komoo and Tanot Unjah 2003; Tanot Unjah 2011). Such interesting and significant features can be found at Burau Bay, Pulau Anak Burau and also along the northern coast of Pulau Dayang Bunting and around Kuah town.

Geosites on clastic sedimentary rocks are normally related to the clastic rock diversity, fossil content, sedimentary and secondary structures, metamorphic minerals at places where the rock has been metamorphosed and also weathering and erosion features that embody the whole landscape of this rock type. Those geosites can be found scattered all over the area underlain by the Machinchang and Singa Formation on the main island and also on the islands in the southern part of the archipelago. In the Machinchang area, geoheritage features such as sedimentary structures that were created when the sediments were deposited in the shallow sea occured in very excellent condition and according to some experts they are the best textbook examples found in the country. These features can be found at several geosites along the coast from Teluk Belua to Tanjung Buta in the northwestern part of the main Langkawi island. Many more geosites occur in areas underlain by the Singa Formation on smaller islands in the southern part of the Langkawi archipelago such Pulau Tepur, Pulau Singa, and Pulau Beras Basah. These geosites on the Singa Formation possess high value geoheritage resources which tell the earth history during the formation of the rock itself. Geoheritage resources such as fossils of shallow marine life, sedimentary structures and the variation in the sediment patterns give us clues as to what happened during the Middle Paleozoic time. Some geosites around Kuah area (e.g. Batu Asah) and Sungai Itau are associated with fossils of cold water marine fauna that thrived in the area during that time. Fossil and lithofacies evidences show that Langkawi at that time was influenced by cold climatic condition in the southern hemisphere (Mohd Shafeea Leman 2003). Some geosites of the Singa Formation on the smaller islands also show the same evidence such as at Pulau Tepur, which show the presence of the oldest piece of rock that was brought to the area by floating ice and dropped to the bottom of the sea when the ice melted. The so called dropstone was dated using radiometric dating by the previous researcher (Jones, 1981) and accorded an age of about 1 billion years old. This very rare and internationally significant geological resource should always be protected and be made an icon of the geological heritage of Langkawi. Some geosites on the Singa Formation are associated with geomorphic and landscape features that resulted from weathering and erosion on

the surface. Features such as remnant islands and erosion platforms are commonly seen on the smaller islands as well as along the southern coast of Langkawi island. The most outstanding landscape feature on the Singa Formation is Pulau Ular where weathering and marine erosion (especially wave and tide) have carved the island into a swimming snake when viewed from far (Ibrahim Komoo & Syafrina Ismail 2001). Pulau Ular can become a good example of a very outstanding geosite where in one small place a combination of several geoheritage resources can be found including beautiful scenic landscape, rare shallow marine cold water coral, u-shaped arenicolites and other trace fossils, sedimentary structures including channelised sandstone and varve, quaternary faults, and synsedimentary deformation features. This geosite is now considered as the most beautiful and outstanding geological monument that carries the highest scientific, aesthetic as well as recreational values. However, this highly regarded geosite is under threat and have been partly disturbed by structural development.

Limestones in Langkawi bear the most interesting geological heritage features of all. As shown in Figure 2, limestones of Langkawi are concentrated in Kilim-Kisap and Dayang Bunting areas. Most of them belong to the Setul Formation. Chuping Formation is only dominant in the western part of Pulau Dayang Bunting and in the north of Kuah Town. Due to its meta-stable condition the rock can be easily modified and shaped into various unique landscape and morphologies by weathering processes. This has resulted in a wide range of geoheritage resources in those areas.

Kilim-Kisap and Dayang Bunting areas are characterised by rugged but beautiful karst landscapes and seascapes. Unique limestone morphologies in the shape of dome, pinnacle, table, cone, pillar and messa and fresh water lake are common features in these areas (Figure 4). Some morphology are so strange that they resemble certain objects that we commonly encounter in life such as human face, animals, ship, etc. Large and small limestone caves laden with unique and beautiful cave features are also commonly found in Dayang Bunting and Kilim areas.

FIGURE 4

Along the shoreline and in the sea where limestone is in contact with the sea water marine erosion and weathering processes produced beautiful and unique seascape features such as sea-stack, sea-arch, sea-cave, sea-notch, promontory, remnant island, abrasion platform and magnificent rare mangrove forest growing on limestone bedrock. This phenomenon forms beautiful and unique scenery between limestone hills.

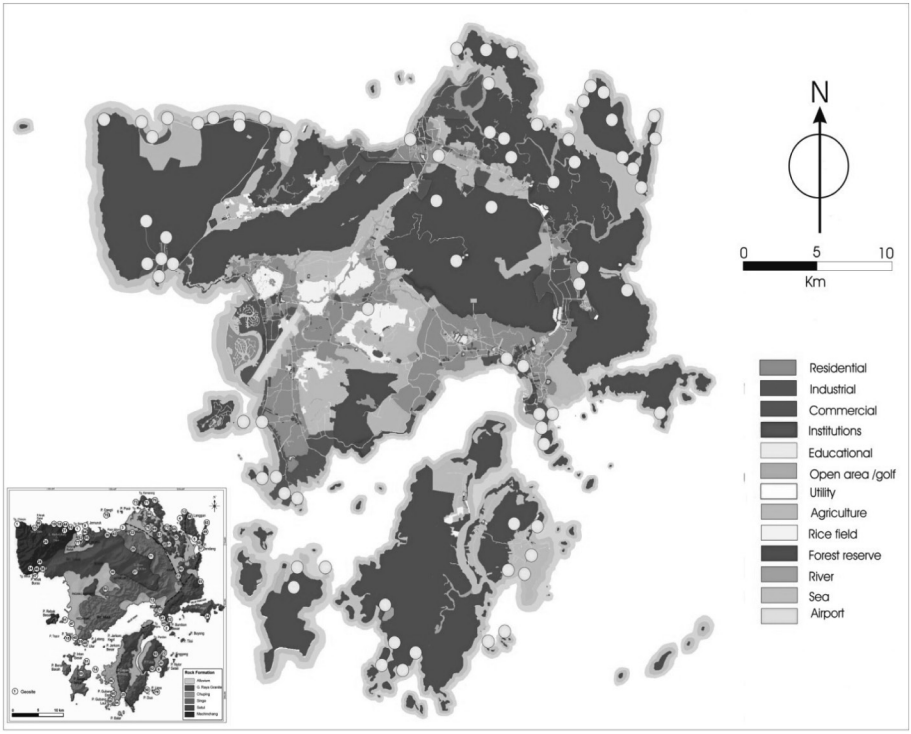
Apart from landscape features, limestone is also rich in fossils and other geological elements of high scientific value. Several fossil and mineralisation sites have been identified in Kilim-Kisap and Dayang Bunting areas.

IMPORTANCE OF GEOHERITAGE IN LANDUSE PLANNING AND THE NEED FOR CONSERVATION

As discussed above the geological heritage features at each geosite have taken hundred million years to be produced through very slow geological processes. A feature like the oldest piece of tronjehmite rock is found only on Pulau Tepur and should be well protected. Many other features of similar rarity and importance can be found in Langkawi and must be included in the list of national heritage. The sea-karst and island karst features are very rare and similar landscape can only be found in a few places in the whole world. The majestic Machinchang landscape is only found in the Machinchang range. These evidences tell us that they are priceless and should remain intact or with minimum disturbance in future.

Most of the beautiful geoheritage features and geosites as shown in Figure 5 are located in either geoforest parks or permanent forest reserve. There are more than 70 geosites within these forest reserves some of which are included in the three geoforest parks in 2005, namely Machinchang Cambrian, Kilim Karst and Dayang Bunting Marble Geoforest Parks. The concept of geoforest park was introduced by Ismail et al. (2004) as a new concept and approach for conservation which combine the importance of geological and biological elements found together within the forest reserves. Geosite protection is considered as an important agenda in Geoforest Park in ensuring sustainability of all natural resources and in adding more value and attraction to the park.

FIGURE 5 : Distribution of Geoheritage Sites Superimposed on the Present Land Use Map to Show the Present Vulnerability of Some Geosites



Another approach to conservation is via the introduction of geological monuments and protected sites (Ibrahim Komoo and Kaderi Md Desa 2003; Komoo 2003). Geological monument is defined as a large site with several important geoheritage resources and outstanding landscapes. Two of the four geological monuments of Langkawi are related to limestone geoheritage and the other two are associated with the clastic sedimentary rock. They are Pulau Langgun and Pulau Singa Kechil Geological Monuments. Pulau Langgun is made of Setul limestone and protected within Kilim Karst Geoforest Park, while Pulau Singa Kechil bears Chuping limestone and is protected under the Protected Forest Reserve. Conservation strategy for other geoheritage sites located outside of the Forestry Department jurisdiction is still in its early planning stage.

Most of the geosites mentioned above possess very high scientific or cultural heritage values. Most of these geosites possess very significant scientific values and until now have been the subjects for research and education for local and international people. Some of these geoheritage features and geosites are not available anywhere else on earth

and can be regarded as national treasures and heritages. These geoheritage features are also non-renewable, which means that once they are damaged or wiped out they will be gone forever. These reasons justify that most of the geoheritage resources and geosites need to be urgently protected or at least given due consideration in the land use planning to ensure their sustainability. At present most of the geoheritage features identified at more than 90 geosites in Langkawi are located either in the three geoforest parks or Permanent Forest Reserve, but the rest remain vulnerable because they are not located in any conservation area (Figure 5) and can be easily wiped out for development (Tanot Unjah 2011). Realising this possibility the Malaysian Geological Heritage Group of Malaysia has submitted about 15 of the highly critical and most important geosites to the Heritage Department of Malaysia to be listed as national heritage.

Geoheritage conservation efforts under the geoforest park concept are not only very important to science but can also ensure the sustainability of geotourism activities in Langkawi Geopark. All the three geoforest parks have now become main tourism areas due to their rich natural attractions provided by the unique geosites combined with rich biological resources. In Kilim Karst Geoforest Park, tourists are coming in large numbers to experience the boat trail and to enjoy the beautiful scenery created by the combination of limestone karst landscape, mangrove forest and geosites found along this trail. For Dayang Bunting Marble Geoforest Park, the main attractions are its freshwater lake, the Pregnant Maiden island landscape and other beautiful smaller islands within the park. In reality the beautiful karst landscapes which were formed by geological processes over a very long period of time is actually the main attraction in these areas. Whilst in the Machinchang geoforest park the mountain landscape is already very majestic and magnificent even without other features. In reality Machinchang Geoforest Park hides so many highly valuable resources including the primary and sedimentary structures as well as beautiful ones of the oldest shallow marine sequence in this region. This aspect however was not known to many people before they have the basic geological knowledge to enable them to appreciate the importance of the geological features and factors in these scenic areas. While cruising along on the way to Dayang Bunting tourists can stop at several geosites in the Singa formations scattered on the several smaller islands.

Tourism data collected by Langkawi Development Authority (LADA) shows that tourist arrival to Langkawi is growing at about five (5) to seven (7) percent a year after the declaration of Langkawi as a global geopark in June 2007. The same trend is also observed in the limestone areas such as Kilim (Table 2). This increase in tourist arrival could reflect the increase in the level of understanding and awareness about geology among the tourists. Hopefully this increasing awareness will lead to increase in the sense of belonging among the local people and visitors for them to support all activities related to conservation of geological heritage resources not only in the fragile limestone ecosystems, but also in other parts of the country.

TABLE 2 : Number of Tourist Arrival in Kilim Area, 2006-2009

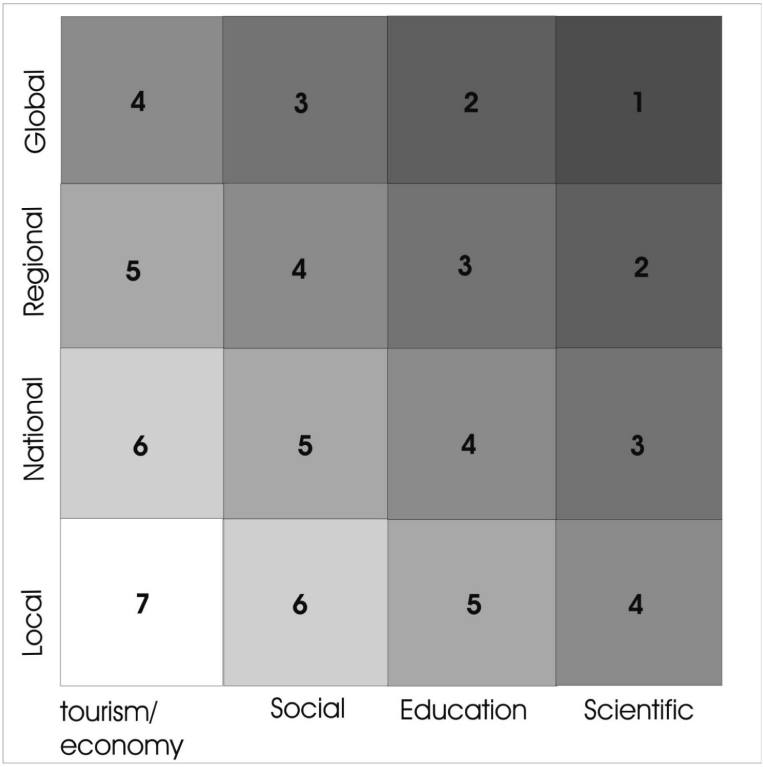
YEAR	TOURIST ARRIVAL AT KILIM
2006 (Langkawi Geopark was declared as national geopark in May 2006)	42,375
2007 (Langkawi Geopark was declared as a member of Global Geoparks Network in June 2007)	78,145
2008	167,142
2009	115,660 (up to September)

Source: Langkawi Development Authority 2009

RANKING THE GEOSITE FOR CONSERVATION

As had been shown all the geological heritage features and sites in Langkawi are very important. Those features and sites, which are very significant at the global or regional level need urgent protection. How they can be protected is another subject for discussion. At the same time there are quite a number of other features that look very similar and fall in the same category. Hence, a method to rank each feature or geosite is very important not only for it significance, but also for the purpose of management and protection. First and foremost all geosites in Langkawi need to be categorised accordingly such as based on rock type, mineralogy, fossil, geological structure, landscape, geological process, etc. Then the ranking processes can be done within the category, for instance, if there are five geosites that fall in the same category, each of them should be ranked to indicate exactly which geosite or feature is the most important and should be urgently protected by whatever means and the rest may be sacrificed for the sake of development. In order to do this a chart (Figure 6) is proposed and can be used as a guide to rank the geosites or stand alone geological features. This chart is a subjective assessment of the geosites based on the significance and the usage of the geosites. If a geosites is very important to science at the global level it carries the highest rank and so on as shown in the figure. Based on this which geosite is the most important and should be protected without compromise can be shown.

FIGURE 6 : Chart Showing the Significance Versus the Usage of a Geoheritage Site or Feature That Can Be Used as a Guide in Ranking It.



CONCLUSION

Langkawi has long been a treasure trove for geologists because it can be considered as a geodiversity hot spot of the country. Geoscientists come from all over the world to Langkawi to study its oldest sedimentary sequence as well as the most complete sequence of Paleozoic sedimentary rock. Its long and complex geological history makes Langkawi a very interesting place where geological diversity is so wide and rich with highly valuable geological features. All the geosites identified thus far have very special features some of which are so priceless as they are not found anywhere else in the world. Realising the importance of all these features and geosites, since 1996 the Geological Heritage Group of Malaysia has taken the initiative to increase awareness among the people and at the same time to promote the resources for long-term benefit through the concept of geotourism. Recently with the advent of the geopark initiative by UNESCO Langkawi was approved to join the Global Geopark Network and became

the first global geopark in Southeast Asia. This would not have been possible if not because of continuous research programmes that had unveiled the geological secrets of Langkawi and tireless public awareness programmes and promotion of the unique and internationally significant geological features found there. Even at this stage there is no guarantee that all the geological features found at more than 90 geosites will be sustained for over a long period of time. Rapid physical development and the needs for space might one day wipe out some of the most important geosites. These geosites are the main attractions in geo-eco-tourism for now and also in future. Protecting these geosites mean that protecting the future of Langkawi's tourism industry. To ensure the sustainability of geo-ecotourism industry these geosites need to be given due consideration in future land use planning. This consideration for land use planning would also mean a better-integrated city plan. For this purpose each geosite needs to be accurately zoned and protected or at least put under a management body that will look after its promotion and future development.

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LAND USE PLANNING STATUTES FOR LANGKAWI GEOPARK CONSERVATION AND DEVELOPMENT

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Abstract
This paper takes off from the point that geoparks and land are intertwined, and that land use planning can serve as a means to enable effective conservation and development of geoparks. The focus lies on how existing land use related statutes could be put to use to capture the components and elements that make up a geopark, particularly in the case of Langkawi Geopark. Given that there are more than 120 statutes that can be linked to the various aspects and components that make up a geopark, this article has taken the liberty to only focus on a few statutes rather than all that has been identified. This is intentional so as to enable detailed discussion regarding where components that make up a geopark can converge in land use planning aspects, also about processes and procedures that are embodied in existing statutes.

Keywords: Langkawi Geopark, law, statutes, land, land use planning

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INTRODUCTION

This article will begin by setting out the use of terms for the following key words, i.e., law, conservation, development and geopark, so as to facilitate a focused discussion that would lead towards determining options that can make law work for geopark conservation and development focusing on land use planning. This is essential as what is meant by the different terms and how they are used are diverse, and differ from one discipline to another. Here the terms used are contextualised, using the broadest sense of the word, so as to fit the many disciplines and interpretations available. A brief note is also about how statutes are chosen and matched with prerequisites in ensuring that conservation and development can be both made complementary, through existing regulatory mechanisms.

Without going into a protracted debate as to what is meant by law, or what is the concept of law, the 'law' as discussed here is taken in its simplest form, as being a set of rules set in statutes (written law as opposed to oral, customary law or judicial precedents) which are instruments of governmental power (Morrison 1997). It focuses purely on the systems and sets of rules that manifest or can be manifested through statutes of law, which controls human behaviours and actions. Laws are useful means to help establish mandates, jurisdiction, standards, procedures, processes and rules, as well as determine the scope of responsibility and accountability (Sarah Aziz et al. 2002). The emphasis is on the rules and regulations needed to effect conservation and development in a geopark setting, pinned to the fact that what constitutes on geopark and the focus areas of a geopark are predominantly related to land and how land is used.

The terms conservation and development gives rise to a challenge, as present statutes applicable in Langkawi do not clearly define what is meant by it. This article will borrow from Pinchot (1910), who suggests that among others, the principles of conservation stands for development, not just husbanding resources for future generations as it demands the welfare of the present generation first, then the following generation; secondly it stands for the prevention of waste and the destruction of natural resources; thirdly it stands for the development and preservation of natural resources. He further notes that conservation means the greatest good over the greatest number for the longest time. Conservation can also refer to two basic notions; using only the resources we need (frugality principle); and using resources efficiently (efficiency principle) (Chiras et al. 2006). It can also be taken as a philosophy of managing the environment in a way that does not despoil, exhaust or extinguish, whereby conservation is not an applied science, but a means that incorporates aspects of applied science (Jordan 1995). Noted also, is the perspective offered by Burek et al. (2008) that conservation can be taken to mean the active management of something to ensure its quality is retained.

Development, for the purpose of discussion will be taken to mean that which advances growth and fosters improvement of as well as for human wellbeing. Given that this article is slanted towards conservation and development in a geopark setting, it will be guided by what the WCED (1987) offers in terms of 'development':

> "… The word "development" has also been narrowed by some into a very limited focus, along the lines of "what poor nations should do to become richer," and thus again is automatically dismissed by many in the international arena as being a concern of specialists, of those involved in questions of "development assistance." But the "environment" is where we live; and "development" is what we all do in attempting to improve our lot within that abode."

What is meant by geopark, is taken from the concept mooted by the Global Geopark Network (GGN) that grounded the designation of an area with clearly defined boundaries and a large enough area for it to serve local economic and cultural development (particularly through tourism) (GGN April 2010). An area designated as a geopark would be made up of a geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development, that facilitates the synergy between geodiversity, biodiversity and culture, highlighting sites of ecological, archaeological, historical and cultural value (GGN April 2010).

The proposed context for the use of terms as put forward earlier, would serve to structure and guide the discussion regarding the role played and can be played by statutory law. The discussion will focus on the link between existing statutory provisions, the prerequisites for geopark conservation and development and land use planning. This article borrows from the arguments advanced by Moroni (2010), in that social-spatial order can exist only if it has been deliberately thought out and constructed, in this case, an order in which the system of rules and order of actions will match up. He further quotes Patrick Abercrombiei, who states, "… planning occurs when mankind…makes a definite and conscious attempt to model or mould his environment …". This is the point of departure, in that how can statutes be used to help better mould human behaviour in a geopark setting.

GEOPARK CONSERVATION AND DEVELOPMENT: BUILDING BLOCKS FOR CONSIDERATION

As mentioned earlier, there are at least four key aspects to be considered once an area has been designated as a geopark for inclusion into the Global Geopark Network (GGN). These are: the designation of a clear boundary and area; clear designation of authority either as a singular body or through a partnership; means to ensure sustainable tourism and sustainable economic development; and regulative measures that will effect conservation of the geological, biological and cultural heritage and area (GGN 2010).

Taking each aspect, fundamental questions will have to be set out to aid identification of statutes and statutory provisions available and options required to ensure that the four aspects are addressed. From the research undertaken on Langkawi Geopark Governance and Langkawi Geopark Management Plan funded by Universiti Kebangsaan Malaysia (UKM) research grant and Langkawi Development Authority (LADA) respectively, it was determined that a statutory profile is necessary to enable clearer understanding of what mandates are available in so far as managing a geopark is concerned. In addition, both studies also set out to detail the various required mandates to govern Langkawi as a geopark. This necessitated the breaking down of the component that constitutes and serves as the key focus of a geopark. In this article, the exercise is referred to as identification of geopark building block.

The main focus of the statutory profiling component and mandate identification, was finding out the true sense of any form of words (Singh 2004) therein a statute. In order to do that, the keywords intended to be sought need to be identified first, then an approach is adopted to aid profiling, focused on the purpose of the statute, or purposive approach which is the favoured approach here in Malaysia, as expounded by the Interpretation Act 1948 (revised 1967), section 17A, which states that in the interpretation of a provision of an Act, a construction that would promote the purpose or object underlying the Act (whether that purpose or object is expressly stated in the Act or not) shall be referred to as a construction that would not promote that purpose or object. From this exercise more than 120 statutes were identified based on the key aspects of what constitutes and can be linked to a geopark. For the purpose of this article, the examples shared herein, focus on the key aspects of geopark, conservation and development, which will later be used to establish the link between law and land use planning.

An essential requirement under the GGN guidelines for inclusion of an area as a geopark under the list (GGN 2010) is the determination of a clear boundary and area pegged to protection, education and sustainable development. From a statutory perspective this brings forth three fundamental questions:

- Which governmental entity has the mandate to determine the boundary and area?
- Which statutory provision provides the processes and procedures required to establish such boundary and area?
- How can the law be used to make sure that aspects of geological, biological and cultural heritage and diversity are 'captured' when a boundary is determined?

Determining which statutory provision matches or can be used to match, will be dependent on keywords such as boundary, area, establishment, determination, delineation and demarcation.

The second aspect touches on the designated authority or partnership of authority to conserve and develop a geopark. Statutory law figures heavily here, as it serves as the basis for which mandates can be set out and the identification of jurisdiction of specific components that make up a geopark. Essentially, geopark conservation and development can be divided into two parts: the components or 'things' that make up a geopark, and the activities that can be directly or indirectly linked to a geopark, including the ensuing impact (positive and negative). Taking this simplistic point of view, the identification of government authority and relevant statutory provisions can be divided into these two sectors to aid preliminary profiling of the 'who's' and 'what's'.

The components 'sustainable tourism' and 'sustainable economic development' are not as easily determined, given that there is a wealth of literature on the subject matter. The United Nations Environmental Programme and World Tourism Organisation, in their *Making Tourism More Sustainable: A Guide for Policy Makers* (2005), provides some insight as to what sustainable tourism could mean:

> "…Sustainable tourism is not a discrete or special form of tourism. Rather, all forms of tourism should strive to be more sustainable…Making tourism more sustainable is not just about controlling and managing the negative impacts of the industry. Tourism is in a very special position to benefit local communities, economically and socially, and to raise awareness and support for conservation of the environment. Within the tourism sector, economic development and environmental protection should not be seen as opposing forces - they should be pursued hand in hand as aspirations that can and should be mutually reinforcing…It must be clear that the term 'sustainable tourism' - meaning 'tourism that is based on the principles of sustainable development' - refers to a fundamental objective: to make **all** tourism more sustainable. The term should be used to refer to a condition of tourism, not a type of tourism…"

Drawing from this, it would seem that the law should focus on ensuring that conditions are in place to ensure that tourism activities are sustainable, based on principles of sustainable development. The laws should be structured to facilitate tourism activities that benefit local activities and environment, in this case local communities and geopark components in Langkawi.

The GGN guidelines (GGN 2010) states that one of the main strategic objectives of a geopark is to stimulate the local economic activity, fostering development that is culturally and environmentally sustainable, improving human living conditions and the environment, focusing on "pride of place", which in turns aids protection of geological heritage. Eder et al. (2004) suggests that geological heritage sites, if properly managed, can generate employment and new economic activities. A geopark should contribute

through the enhancement and promotion of a certain image related to the geological heritage and the development of tourism with related actions that have a direct impact on the territory influencing its inhabitants' living conditions and environment (McKeever et al. 2005). It should also take into consideration the sustainable resource utilisation, provision of infrastructure and local socio-economic development (Sharina Abdul Halim et al. 2011). The essential consideration here would be how the law could be used to structure provisions that would enable the fostering of local economic activities that in turn would serve both human and environmental well being.

The fourth building block to be considered is the conservation and development of the geological, biological and cultural heritage and area. This trigonal dimension, interlinking biodiversity, geology and culture adds further challenge, in that each aspect will have to be broken down then regrouped based on commonalities. The term biodiversity, as defined in the United Nations Convention on Biological Diversity 1992, literally blankets the biological kingdom and its ecological processes, which covers a wide variety of plants, animals and microorganisms as well as ecosystems. The Millennium Ecosystems Assessment Report (2005), also refers to it as being a multi-dimensional term that also includes the complexity and interdependency of living organisms and humans, forming the foundation of ecosystems services to which human beings are intimately linked ; a layer of living organisms through the collective metabolic activities of its innumerable plants, animals and microbes physically and chemically unites the atmosphere, geosphere and hydrosphere into one environmental system, which is the manifestation of the workings of life.

This would mean, in so far as conservation and development had been simplified in context, biodiversity offers a three-layered focus area. The first encompasses the living and complex organisms, which include humans, plants, animals and microbes. The second layer looks at habitat and ecosystems, while the third layer looks at ecological services. What would be of primary consideration is the various species that make up the biodiversity family, including the sub-species; the areas, habitats and ecosystems where these species reside (focus being on non-human species); and lastly, the components of ecological services. In Malaysia, the term biodiversity is contextualised in the National Biodiversity Policy 1998 as encompassing three levels, genetic diversity (within species, measured by variations within genes of individual plants, animals and microorganisms, both within and between populations of species), species diversity and ecosystem diversity (this covers habitats, biotic communities and ecological processes in the terrestrial, marine and other aquatic environment).

As far as the law here is concerned, in relations to biodiversity, the emphasis would be on who and what mandates are available to regulate matters pertaining to all of the above, be it the identification, determination, listing, protecting, rehabilitating, the actual conservation or development of the material, species, sites, areas or systems.

Consideration will also have to be made regarding whether the act of conservation and development is conducted *in situ* or *ex situ*, as the means to regulate would then vary. Geodiversity (Gray 2008), is the abiotic equivalent to biodiversity, and includes the natural range of geological (rocks, minerals and fossils), geomorphological (land form and processes) and soil features, which also include their assemblages, relationships, properties, interpretation and systems. Gray also breaks them down into four categories, features, processes, sites and specimens. With regard conservation, Sharples (1993) offers a perspective worth considering in that, geoconservation aims at conserving the diversity of the Earth features and systems and allowing the ongoing processes to continue to function and evolve in a natural fashion. Gray (2008) also cites the principle upheld in the Australian Natural Heritage Charter 1996 (updated in 2002), which states that conservation is based on respect for biodiversity and geodiversity, and should involve the least possible physical intervention to ecological processes, evolutionary processes and Earth processes. Almost similar to biodiversity, the focus would also be on 'who' and 'what' can be used to regulate matters pertaining to the conservation and development of features, processes, sites and specimens.

Without going through the debates on what constitutes culture, this article will look at what culture means based on the definition given by Edward Burnett Tylor in his book *Primitive Culture* (1871) (in Jokilehto 2005).:

> "Culture ... is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society."

The link that binds all three components, i.e. biodiversity, geodiversity and culture would be heritage. Based on the World Heritage Convention (1972), they would fall within two distinct groups, cultural heritage and natural heritage (geodiversity and biodiversity). The United Nations Educational, Scientific and Cultural Organisation (UNESCO), at its webpage http://whc.unesco.org/en/about/ states that "… heritage is our legacy from the past, what we live with today, and what we pass on to future generations …". The geopark concept focuses on the heritage aspect, which cuts across the trigonal components that make up a geopark. For cultural heritage, the main aspects are monuments and, groups of buildings (both are judged for their outstanding universal values from the point of view of history, art or science) and sites (to be judged for their outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view). Natural heritage also has three key aspects i.e. natural features consisting of physical and biological formations or groups of formation (to be judged from the point of outstanding universal value from the aesthetic or scientific point of view); geological and physiographical formations that constitute habitats of threatened species of animals and plants (to be judged on the outstanding universal value from the point of view of science or conservation); and natural sites or precisely delineated areas (judged on its

outstanding universal value from the point of view of science, conservation or natural beauty).

In Malaysia, the National Heritage Act 2005 (NHA 2005) interprets natural heritage to include any features of any area in Malaysia, which may consist of earthly physical or biological formations or groups of such formations, geological or physiographical features, mountains, streams, rock formation, sea shore or any natural site of outstanding value from the point of view of nature, science, history conservation or natural beauty including flora and fauna. The NHA 2005 further interprets cultural heritage to include tangible and intangible forms of cultural property, structure or artefacts and may include heritage matter, object, item, artefact, formation structure, performance, dance, song, music that is pertinent to the historical or contemporary Malaysians' way of life, on or in land or underwater cultural heritage or tangible form but excluding natural heritage.

What is prevalent here, is that there is a need to identify, from the present statutory regime, who and what can be used to determine a heritage, what would be the criteria used, and what should be done should a 'heritage' is identified or determined. This is critical to ensure that such interpretation, definition or contextualisation is adopted for usage by all parties concerned, and reflected either through a legal instrument such as a statute, rule or regulation or through accepted practices, either through administrative orders or circulars. It is also important to take into account that the NHA 2005 on heritage refers to national heritage, not local heritage.

The cursory deconstruction of what constitute the building blocks that make up a geopark is crucial. This is to enable the profiling of the 'statutory needs' to facilitate the conservation and development of a geopark. The main intent of establishing a geopark, is for the protection of and to highlight the geological heritage, within the synergistic relationship of biodiversity, geodiversity and cultural heritage. It should also provide for education on the environment, training and development of scientific research in the various disciplines, enhancement of the natural environment and sustainable development policies (Eder et al. 2004). If biological, geological and cultural heritage are put together, perhaps the aims raised for geological heritage (Sharples 1995) could be used as a guide, as it would be pinned to aspects, which are of significant value to the people so long as their intrinsic values are not decreased, be it for purposes of education; scientific research; aesthetics and inspiration; recreation; cultural identification and development as well as a sense of contribution to a sense of place as experienced by people.

Taking cue from the land use aspect, and the brief discussion of what entails from each building block discussed above, from a legal perspective, there is a need for clear identification, description, characterisation and classification of materials and sites, both in situ and ex situ. In addition there is a need to also identify and structure what is needed to conserve the various specimens, materials and sites identified, particularly the

processes and procedures. Guided by the discussion above, Table 1 links biodiversity, geodiversity and cultural heritage components with the key aspects for consideration in geopark conservation and development, particularly when reviewing current statutory regime. The items listed in the conservation and development aspects columns have been drawn from the literature listed in the Reference section of this article.

TABLE 1 : Factors for Consideration when Reviewing and Determining Statutory Needs for Geopark Conservation and Development

<table>
<tr><th>Geodiversity</th><th>Components
Biodiversity</th><th>Cultural</th><th>Legal
Prerequisites</th><th>Conservation
Aspects</th><th>Development
Aspects</th></tr>
<tr><td>Natural
features
(rocks,
minerals &
fossils)
Geomorphological
features
Soil features</td><td>Species
Habitats
Ecosystems</td><td>Property
Structure
Artefact
Object
Item
Sites</td><td>Mandate
(Responsibility/
Accountability)

Jurisdiction
(Subject matter/
Scope)</td><td colspan="2">Information
Approach
Methods
Techniques
Tools
Programmes
Activities</td></tr>
<tr><td>Specimen
Sites
Features
Formation</td><td rowspan="2">Ecological
Services and
Processes
(Terrestrial,
marine
and other
aquatic
environment)</td><td>Formation
Structure
Monuments
Buildings</td><td rowspan="2"></td><td rowspan="2">Characterisation
Classification
Categorisation
Designation
Delineation
Listing
Demonstration
Planning
Protection
Conservation
Rehabilitation
Evaluation
Assessment
Monitoring
Reporting
Review
Revision
Education
Communication</td><td rowspan="2">Identification
Determination
Investment
Planning
Evaluation
Assessment
Monitoring
Reporting
Review
Revision
Communication</td></tr>
<tr><td>Assemblages
Processes
Systems</td><td>Performance
Dance
Song
Music</td></tr>
</table>

From a legal point of view, using the land use approach can help address the points for consideration raised for each building block identified. The emphasis then would be on the need to balance the use of land, and the control of land use. More importantly the

planning of how it should be used becomes the primary point of departure. Considerations will have to be made regarding what is on the land (the materials and sites of interest and significance); what is the condition, state and status of the land; what are the existing and planned activities on the land; what are the development directions (as evident in policies); and what are the existing regulatory measures in place. What is important is how land use planning measures are to be used to control, restrict and permit activities within a designated geopark. For that the following must be made clear:

- The aspects to be conserved (sites, specimens, materials, etc.);
- The types of activities that will have to be controlled, restricted and permitted;
- The key threats and impacts to the site, specimen, material, etc. as well as actions to be undertaken to address them;
- Competing and conflicting interests in relation to the land, site or material or specimen on or in the location that has been identified for either conservation or development; and
- Land status, with special focus on rights to land or site or material or specimen etc., and the scope to modify or restrict or vary such right accorded to the owner or occupier.

AUTHORITY OVER AND IN RELATION TO LANGKAWI GEOPARK

Langkawi archipelago, has been declared a geopark, and has undergone its first assessment in June 2011. In the earlier mentioned series of studies on Langkawi Geopark Governance and formulation of a Langkawi Geopark Management Plan, it was noted from the exercise conducted in profiling the statutes that can be linked to the geopark, the one aspect that came through was the need to determine the appropriate mandates and means to link the different mandate holders to ensure that the governance structure and system for Langkawi Geopark is made clear. This would then contribute to a partnership setting where authority is concerned (as recommended by the GGN guidelines), as Malaysia adopts a federated system of government guided by the provisions of the Federal Constitution of Malaysia 1957. This simply means that in Langkawi, there is three tiered government system in place, i.e. Federal government, State government and Local Authorities. Each level of government is represented by their respective agencies or designated authority, drawing their mandates form existing legislative provisions.

The Federal Constitution 1957 ("the Constitution"), being the supreme law of the land (Article 4), sets out the matters over which the levels of government will have jurisdiction, both in its legislative capacity (specific to Federal and State governments) and executive capacity (again, specific to Federal and State governments). This can be seen in Articles 73 to 81, as well as Articles 92 to 95 of the Constitution. The Local Authorities draw their mandates from either Federal or State government mandates.

Without over-generalising it can be said that resources and materials in addition to activities pertaining to the resources wholly within a particular Federal or State territory would be within the power of the government of that territory. This includes the environment and all matters pertaining to land, water (not supplies, services or distribution), Malay reservation, local government and administration (except in Federal Territories) including forestry, mining and agriculture. Matters pertaining to administration of information, survey, trade, industry, shipping, communication, transport, infrastructure (as long as it is federal works), industries, health and education among others would fall within the ambit of the Federal government legislative (Article 74) and executive jurisdiction (Article 80). There are instances, where the jurisdiction and mandates are concurrently shared such as protection of wild animals and birds, national parks, town and country planning, public health and sanitation, drainage and irrigation.

The Constitution does not provide a clear definition on what is meant by development, but does mention conservation in the context of a development plan in Article 92. The said Article actually provides a platform for the Federal government to publish and put into operation a development plan in one or more areas in one or more States. In this Article, "development plan" means a plan for the development, improvement, or conservation of the natural resources of a development area, the exploitation of such resources, or the increase of means of employment in the area. What is interesting to note here, is that the Federal government in pursuit of national interest can proclaim a whole area as a development area, which in this case, an area reserved for the purposes of conservation of natural resources within the context of development.

As Langkawi islands sit cusped within the state of Kedah, it is bound by the legislative and executive purview of the state; in as far as land is concerned. The Laws of the Constitution of Kedah 1959 ("Kedah Constitution 1959") states that the executive authority of the State rests with the Ruler of the State, and exercisable by him or the State Executive Council or Menteri Besar (Chief Minister), and the Legislative Assembly may confer executive functions on other persons as well (Article 34).

Referring to the Constitution, executive authority rests with the Ruler, who can refer the said powers to the State Executive Council or Menteri Besar, and the legislative powers over matters set out in the Constitution rests with the Kedah State Legislative Assembly, which passes enactments for gazettal, upon approval of the Ruler. The earlier mentioned research identified more than 120 statutory instruments both Federal and State that have bearing on matters, either directly or indirectly, on Langkawi Geopark. This article will not even attempt to sift and discuss all the instruments identified, but instead will focus on the aspects identified in the earlier discussions on building blocks with specific focus on land use planning.

BUILDING BLOCKS, KEY LAND USE RELATED STATUTES AND LANGKAWI GEOPARK

Taking a standpoint grounded in land use planning, the link between law and land use planning as noted by Needham (2007), Moroni (2007a, 2007b) and Booth (2007) can be divided into several types, i.e.: when it is used to either directly intervene in the way someone uses his or her land, either through prohibitive measures, or permit based measures, or restrictive measures or remedial measures; and indirectly, through means of influencing the use of the land, such as providing infrastructures or facilities. Focusing on the earlier discussed building blocks from the perspective of conservation and development, land use planning can serve as powerful means to seek to recognise boundaries, set out 'controls' to facilitate conservation and 'guide' development, advocate sustainable tourism and economic development as well as ensure heritage is protected, conserved and serve as means to educate and inculcate a sense of place. This section will look at specific selected Federal statutes which special emphasis on land, land use and planning only.

Designation of Boundary or Area

The term land is interpreted in the National Land Code 1965 ("NLC 1965")(Section 5) as including the surface of the earth and all substances forming that surface; the earth below the surface and all substances therein; all vegetation and all natural products, whether or not requiring periodical application of labour to their production, and whether on or below the surface; all things attached to the earth or permanently fastened to any thing attached to the earth, whether on or below the surface; and land covered by water. It would seem that this include what can be termed as geodiversity, i.e. the natural range of geological and soil features and aspects related to biodiversity when the terms 'all things attached' are read broadly.

For land situated within the jurisdiction of a State, Section 40 of the NLC 1965 provides that property to lands within the territories of a State and all minerals and rocks lies with the State Authority (Section 5 interpret this to mean Ruler or Governor), including all matters related to disposal (Sections 41 to 50). Land above the shoreline is classified into three types (Section 51), i.e. town land, village land and country land. Categories for land use are as set out in Section 52, i.e. agriculture, building and industry, and this is specified in a gazette that also spells out conditions requiring its use for a particular purpose. Implied conditions for alienated agriculture land (Section 115) includes maintenance and cultivation according to good husbandry rules, no building shall be erected unless it is for the purpose of dwelling for the proprietor or purposes related to agriculture. Regarding alienated lands categorised for buildings, conditions can be set for various purposes,

such as residential, commercial, administrative or for purposes of providing educational facilities or recreation (Section 116).

It is important to note that the State Authority also has the right of use or access to alienated land (Section 57), which could include carrying out or laying or removing drains, sewers, pipes, cables or wires. With regard to boundary setting, an option lies with the power of the State Authority to reserve any land for public purpose (Section 62), by gazetting the same and describing the purpose. However, the State Authority can revoke the reservation. As far as boundary setting the NLC 1965 can be useful for purposes of reserving areas that have been identified as heritage sites or areas to be used for educational purposes (in this case for demonstration of geological heritage sites and scientific research areas).

Another option for setting the boundary lies with the Town and Country Planning Act 1976 (TCPA 1976), which adopts the interpretation of land as that in NLC 1965 with an additional inclusion of any estate or interest in, or right over, land (Section 2). The TCPA 1976 provides the platform to effect conservation, use and development of all lands within a territory of a State (Section 4) and to an extent even areas between two states or more (Section 6A). Section 7 provides the means of establishing a boundary in that a survey can be undertaken to establish the limits of the area to be subjected to a land use plan, taking into review the principal physical, economic, environmental and social characteristics including principal land uses of the area. The boundary so determined can be delineated in either a structure plan (Section 8), a local plan (Section 12) or special area plan (Section 16B). The setting of the boundary in either of the plans mentioned would then set the perimeter in which measures to regulate and control land uses will be instituted.

Designation of Authority

From the perspective of land use planning, there are two operating considerations; that there are legal provisions to mandate an authority to regulate matters pertaining to land use planning or legal provisions that enable the execution of authority through a partnership arrangement. It is clear in respect of land, in this case Langkawi, the authority over land rests with the State Authority pursuant to Section 40 of the NLC 1965.

For land use planning, the TCPA 1976 becomes the point of reference. The term 'authority' here perhaps can be read to mean the responsibility and power to execute and undertake actions over a particular subject matter or activity. With regard to land use planning authority, in the state of Kedah, the authority rests with the State Planning Committee, in as far as it exercises its function to promote the conservation, use and development of all lands in the State; regulate, control, plan and coordinate all development activities

in the State; advise the State Government on matters relating to conservation, use and development of land in the State; and assist in the collection, maintenance and publication of statistics (Section 4, TCPA 1976). The Committee may also give local planning authorities directions; and cause local inquiry or hearing (Section 4). The principal advisor the Committee is the State Director of Town and Country Planning (Section 4), who is also responsible for carrying out decisions and implementing policies set by the Committee.

At the local level, the local authority serves as the local planning authority, unless an area is deemed not forming part of an area under a local authority, then the State Director of Town and Country Planning serves as the local planning authority (Section 5). This local planning authority holds great powers (Section 6) in that it can regulate, control and plan the use of land and buildings within its area, in addition to collecting, maintaining and publishing statistics. The authority to make rules pursuant to the TCPA 1976, rests with the State Authority (Section 58), which can include the regulation of the development of land in accordance with proper planning; classes of use of land and buildings; control of density, be it plot ratio or use of land; regulation of height, design, appearance and siting of buildings, set backs and open spaces; protection of ancient monuments and lands of historical and architectural interests; the details of the forms and content or a structure plan and local plan and the procedure to be followed in the preparation, submission and approval as well as the qualification of persons submitting such plans. It is perhaps from this provision, as well as the provisions of the Ministerial Functions Act 1969, that a one stop centre is established to aid the consolidation of various assessments, evaluation and remedial aspects for land use, ensuring that decisions and interventions made by the local planning authority are informed. It is important to note here that geoparks, its existence and sustainability are highly dependent on how the land where the area designated as a geopark sits is use and planned for use. In this respect the State Planning Committee and the local planning authority play a pivotal role in ensuring that all aspects of geopark conservation and development (as suggested in Table 1) are considered and taken into account when decisions and interventions are made with regard to land use planning.

Sustainable Tourism and Sustainable Economic Development

Taking off from the sustainable economic development standpoint, from a land use planning perspective, much would rest on how the economic activities are planned to suit local conditions and infrastructure support. It is however influenced by the policies that determine and direct the trends for economic development, and in Langkawi, the duty free status and tourism destination has been the primary economic driver. This is evident by the establishment of the Langkawi Development Authority, under the Lembaga Pembangunan Langkawi Act 1990, to promote, stimulate and undertake economic and social development in the *Kawasan Lembaga Pembangunan Langkawi*

(Langkawi Development Authority Area hereinafter referred to as "LDAA") as a tourist destination and duty free area, subject of course to two factors, that they consult the State Government and that the activities are confined within the LDAA (Section 4 of the LPLA 1990). *Kawasan Lembaga Pembangunan Langkawi* is stated in Section 9, as areas notified in a Gazette with the concurrence of the State Government, within which the Lembaga Pembangunan Langkawi shall perform its functions.

The same Section 4 also provides for the promotion of tourism and infrastructure as well as residential, agricultural, industrial and commercial development, but confined again to the determined development area. It can (Section 4) carry out activities related to tourism; even research and training; initiative preliminary studies of possible development and redevelopment areas; act on behalf or carry out activities on behalf of the Federal and State Governments; provide assistance to any public authority including financial assistance, subject to approval; require government departments or agencies carrying out activities within the LDAA to submit reports of their activities; impose fees or charges it deems fit to give effect to any of its functions; and regulate, coordinate and undertake development in the LDAA. It important to note, in as far as the LDAA is concerned, that the Lembaga Pembangunan Langkawi holds the mandate to carry out its function, but the exercise of the same beyond the LDAA is unclear.

The TCPA 1976 however, provides a wider ambit, as it can set out the planning directions particularly in relation to land use planning that can support sustainable economic development and tourism, through either the incorporation of key aspects, factors and points for consideration when developing or conserving an area, at the structure plan, local plan and special area plan stage. This can be read from Sections 8 (structure plans), 12 (local plans) and 16B (special area plan) of the TCPA 1976, as discussed earlier, which takes into consideration the current policies in respect of social and economic planning and development as well as environmental protection of the State and nation as a whole. The development of the plans pursuant to Sections 8, 12 and 16B are done with consultations with public, and draft plans are published to facilitate views. In the preparation of local plans (Section 12) the considerations are even more extensive, with plans taking into account factors such as the protection and improvement of the physical environment; preservation of natural topography; improvement of landscape; preservation and planting of trees; open spaces; preservation and enhancement of character and appearance of buildings.

It would seem that the TCPA 1976, can serve as an ideal vehicle to capture all the necessary inputs prior to developing or regulating the development and conservation of land, focusing on the key needs to boost sustainable economic development and tourism. Besides highlighting the key factors and aspects to be considered and factored, the TCPA 1976 also takes into account the public consultation procedure to improve and revise a

draft to ensure that benefits and trade offs can be better addressed either through direct intervention of control, restriction and regulation or through the provision of planned infrastructure support to foster sustainable economic development and tourism.

Conservation of Geological, Biological and Cultural Heritage

Regarding the conservation of geological, biological and cultural heritage, the TCPA 1976, through Sections 8, 12 and 16B provides a wonderful backdrop to expand the factors for consideration as proposed in Table 1. For example, Section 35A can be invoked to ensure that when it appears to the local planning authority, it is expedient in the interest of amenity to preserve any tree, trees or group of trees in its area, it may make a tree preservation order with respect to such tree, trees or group, which can seek the prohibition of felling subject to permission or securing of planting of trees in replacement. However, more importantly, Section 16B should be considered, where a special proposal can be made for the designation of a special area for special and detailed treatment by development, redevelopment, improvement, conservation or management practice, or partly by one and partly by another method, of the whole or part of such special area, and the nature of the treatment proposed. This is crucial, as it can perhaps be used to influence areas where land has been alienated to structure measures that will help facilitate conservation. This is something that requires further exploration, and would require specific directives from the State Authority, leveraging on the authority of the State Authority under section 57 of the NLC 1965 to have access and use over alienated lands. This is one way to be explored apart from outright acquisition of land alienated under the Land Acquisition Act 1960 (revised 1992).

The National Forestry Act 1984 (NFA) also provides an avenue for the protection of all three components, as a blanket that wraps the bands of protection over materials and specimens within the forests itself. This has been put to practice in Langkawi, where geological heritage does draw some protection from the NFA 1984 for example under Section 81 that sets out acts that are prohibited in protected forests. As for biological heritage it can draw comfort from having specific areas classified as permanent forest reserves for purposes such as forest sanctuary for wildlife, amenity forest, education forest or research forest (this would to an extent help fulfil the component on geoparks and education).

CONCLUSION

All in all, land and its use is the critical factor in geopark conservation and development.. The selected statutes discussed above, indicate that it is possible to use the land use planning regulative mechanism to effect provisions that will ensure geoparks are conserved and developed sustainably. The role that can be played by the TCPA 1976 is

pivotal, as it set the tone or set the point for intervention in as far as land use planning is concerned, particularly in setting out measures to facilitate geopark friendly review, evaluation, assessment, rehabilitation and remediation processes and procedures.

Initial steps can be taken to re-look at how processes and procedures can be reframed to incorporate the components, aspects and factors that make up a geopark, its conservation and development. As large areas of Langkawi has been alienated to private ownership, the drawing of a boundary that gazettes the area as geopark reserves under the NLC 1965 may not be feasible, save certain areas under the control of the State Authority. Instead, what can be done is that the boundary be incorporated in either the state structure or local plan, to indicate which planning controls will come into effect for the area. In addition for identified heritage sites, Section 16B can serve to set out the planning measures to ensure that such sites can be better protected, conserved and properly developed without compromising the heritage value and integrity.

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Town and Country Planning Act 1976

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POTENTIAL BIOSITES OF SIGNIFICANT IMPORTANCE IN LANGKAWI GEOPARK: TERRESTRIAL VERTEBRATE FAUNA

Norhayati, A.[1,2], Chan, K.O.[3], Daicus, B.[2,4], Samat, A.[1], Grismer, L.L[2,5], and Mohd Izzuddin, A.[2]

Abstract

Langkawi Geopark was bestowed the status of a global geopark by the Global Geoparks Network (GGN) and endorsed by the UNESCO as the 52nd member of the GGN in 2007, making it the first in Malaysia and South East Asia to be given the status. The status is due to its many unique and significant geological, biological, and cultural features in Langkawi. There are four types of geoheritage conservation mechanism in Langkawi Geopark, namely geosites, geological monuments, landscapes of scenic beauty and Geoforest Parks. These proposed geoheritage conservation mechanisms are being implemented at various stages from planning to establishment and monitoring. So far, 97 geosites have been identified in Langkawi Geopark, but there has not been any biosite identified, even though Langkawi Geopark is known for the high biodiversity of flora and fauna, many of which are endemic and rare. This article highlights nine potential biosites for biological conservation in Langkawi Geopark. These biosites are identified based on the presence of rare and endemic species and/or based on type locality, which is the original location where the species was found and described. The nine biosites are Gunung Raya, Wat Wanaram, Lubuk Semilang, Telaga Tujuh, Pulau Singa Besar, Sungai Kilim/Kisap, Sg. Temurun, Gua Kelawar, and Teluk Datai. Each biosite is accompanied by description of the area, species, threats, conservation values, and potential for development and conservation measures. Although only nine biosites are identified so far, this number is bound to increase in future when more sites for the biologically important flora, invertebrate fauna and marine flora and fauna groups are included.

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Keywords: Biosites, biological conservation, biodiversity, Langkawi Geopark

INTRODUCTION

The Langkawi Archipelago is a cluster of 99 tropical islands in the northwestern Peninsular Malaysia. The archipelago covers an area of approximately 47.84 km^2, located between the latitudes 6^o 10' N to 6^o 30' N and longitudes 99^o 35' E to 100^o E. Its islands range in size from 0.01–328 km^2 and for the most part, are covered by primary forests. The largest of these islands, Pulau Langkawi (328 km^2), is also the most environmentally diverse. Its interior is mountainous and covered with mixed dipterocarp forest and its highest peak, Gunung Raya, reaches 881m above sea level. Its second highest peak, Gunung Machincang, reaches 701 m and is one of the oldest geological formations in Southeast Asia (Jones 1981; Stauffer and Mantajit 1981). Broad, flat, low-lying expanses fringe the interior mountains providing suitable relief for agricultural areas, as well as lowland dipterocarp forest, coastal vegetation, and mangrove communities.

On June 2007, Langkawi Island was accorded by the GGN and endorsed by the UNESCO as the 52nd member of the Global Geopark Network, the first member in South East Asia to be given the status. Such an accomplishment can be basically attributed to the many unique and significant geological features, such as the oldest rock formation and the most complete sequence of Paleozoic to Mesozoic sedimentary formation in Malaysia, which represents the early history of the formation of the Malay Peninsula (Komoo et al. 2001). Langkawi Geopark falls under the jurisdiction of many government agencies by virtue of its multi-facet features which fall under the respective responsible bodies. However, Langkawi Development Authority (LADA) under the Ministry of Finance Malaysia has been given the task of a coordinator for the care, control and management of Langkawi Geopark, offshore islands and coral reefs.

In Langkawi Geopark there are four types of identification for geoconservation: namely geosites, geological monuments, landscapes of scenic beauty, and Geoforest Parks (Komoo 1999). Efforts to conserve these geoheritage units are at various stages of implementation from identification to site/material description, and monitoring. A geosite is a potential protected site which contains one or several geological or landscape features of outstanding heritage value. The status of a protected area to some of these geosites will be determined after more detailed studies. Currently, there are 97 geosites in Langkawi Geopark. A geological monument (GM) is an area or site which represents a single geological or landscape system of outstanding heritage value, such as Pulau Ular GM, Pulau Singa Kechil GM, and Pulau Langgun GM. A landscape of scenic beauty is an area of aesthetic beauty that has geologically important features (Tanot 2011). A Geoforest Park (GFP) is a protected area of nature conservation in which both biological

and geological resources within the forest reserves are conserved hand in hand in order to promote integrated nature conservation and sustainable ecotourism (Shaharuddin et al. 2004). Three Geoforest Parks were established in 2005 under the jurisdiction of the Kedah State Forestry Department (Shaharuddin et al. 2005). These three Geoforest Parks are the Machincang Cambrian GFP, Kilim Karst GFP, and the Dayang Bunting Marble GFP.

The geopark definition by GGN (2010) includes the protection, conservation, management and promotion for tourism products not only of geo heritage but also of biological and cultural heritage types. However, since the establishment of Langkawi Geopark in 2007, no biosite has been identified, even though Langkawi is rich in biodiversity, many of which are endemic. A biosite is a physical area of land or water containing biological assets with particular attributes, such as the presence of rare or threatened flora, fauna or habitat required for their survival and/or rare or threatened vegetation communities (DSE 2005).

The rich biodiversity of Langkawi Geopark supports a high level of endemic and significant species and communities. Due to their isolated geographic locations, small sizes of surrounding islands, and limited access, there are a number of identifiable and common threats to biodiversity that need to be addressed. A number of terrestrial species and ecological communities occurring on Langkawi Geopark are listed as Critically Endangered, Endangered, or Vulnerable under the IUCN (2011) Red List Data or Protected or Totally Protected under the Wildlife Conservation Act 2010. This article highlights the profile of the unique terrestrial vertebrate fauna of Langkawi Geopark for identification of potential biosites of significant heritage value as part of the conservation entities in Langkawi Geopark. The profiling encompasses threats and management actions relevant to the Langkawi Geopark's overall biodiversity, with emphasis on rare and significant species and communities of Langkawi Geopark. This approach would enable a more holistic and cost-effective management of Langkawi Geopark's biodiversity. The aim of this project is to continue the inventory and database of biosites in Langkawi Geopark to fill the information gap in the knowledge regarding the location of high conservation value areas. This knowledge would then be able to provide strategic guidance for the managers and administrators, planners, enforcement officers, communities and tourists for future investment in biodiversity conservation in Langkawi Geopark. This knowledge would also enable all key land managers and stakeholders to improve protection and management of these biosites.

OVERVIEW OF SPECIES: VERTEBRATE FAUNA

Studies on vertebrate animals in Langkawi have had a long history since the early 1900s. The earliest known report on avifauna in Langkawi was in 1910 (Robinson and Kloss,

1910). Most of the works were concentrated on four main islands: the main island of Pulau Langkawi, Pulau Singa Besar, Pulau Dayang Bunting and Pulau Tuba. The rest of the archipelago until now remains relatively untouched and unexplored. Thus, the potential for research for new discoveries of flora and fauna is huge. This article discusses the four main groups of fauna, namely fish, birds, herpetofauna, and mammals. A brief summary of the works done on each group is given below.

Fish

A number of stream fish collections were conducted in Pulau Langkawi by Tweedie (1936), Alfred (1969) and most recently by Amirrudin and Lim (2006). There was no particular report regarding the stream fishes of Pulau Langkawi between the years 1969 and 2006 except as part of a limnological survey by Ng and Ping (1989). Forty one fish species are presently known from the stream waters of the island (Amirrudin and Lim 2006) whereby 24 species are primary freshwater fishes. Thirty species were recorded for the first time in Pulau Langkawi, of which two species (*Oreochormis mossambicus* and *Trichogaster pectoralis*) were introduced. *Anguilla marmorata, Acanthocobitis zonalternans* and *Dermogenys sumatrana* were the three species recorded for the first time in Peninsular Malaysia (Izzati and Samat 2010).

Birds

The earliest known works on avifauna of Pulau Langkawi were by Robinson and Kloss (1910, 1911), followed by Robinson (1917), and Wells (1974). Local researchers came into the scene in the early 1980's by Siti Hawa (1984), Jeyarajasingan et al. (1999), Noramly (1998), Shukor et al. (2005). The most comprehensive compilation of the avifauna was by Yeap et al. (2005) who listed bird species recorded in Pulau Langkawi from the earlier researchers back to the 1900's. A total of 221 species from 58 families was generated. The total number of bird species in Langkawi is 238 species, which is about 32% of the total bird species in Peninsular Malaysia (Yeap 2005).

Herpeto Fauna

Out of the total 104 islands in the Langkawi Archipelago, only three islands - Pulau Langkawi, Pulau Tuba, and Pulau Singa Besar - have been surveyed for amphibians and reptiles (Ibrahim et al. 2006; Grismer et al. 2006; Grismer 2008; Grismer and Norhayati 2009; Lim et al. 2010; Norhayati et al. 2007; Zimmerer 2004). There are a total of 106 species of herpetofauna from the latest checklist in Langkawi (Lim et al. 2010). This total comprises 26 species of amphibians, 6 species of chelonids, 9 species of agamid lizards, 1 species of butterfly lizard, 10 species of geckoes, 8 species of skinks, 2 species of varanid lizards, and 44 species of snakes. Since that checklist, three new species of

geckoes have been discovered and described: *Cyrtodactylus macrotuberculatus* (Grismer and Norhayati 2009), *Cnemaspis monachorum* (Grismer et al. 2009) and *Cnemaspis roticanai* (Grismer and Chan 2010), thus, increasing the total number of herpetofaunal species to 109. However, in comparison to the much smaller Seribuat Archipelago off the southeastern coast of Peninsular Malaysia, the Langkawi Archipelago is relatively low in its herpetological composition, having 15 times fewer species per area of landmass than the islands of the Seribuat Archipelago (Grismer and Norhayati 2009).

Mammals

Medway (1986) reported 16 species of terrestrial mammal species and 20 species of bats (Medway 1983) from Pulau Langkawi. The recent survey by Shukor et al. (2007) added three new records of murids and five new records of bats. For insectivorous bats, the total number from Pulau Langkawi is 21 species, which is comparably higher than those from Singapore (Yang et al. 1990) and Pulau Tioman (Medway 1966). The noteworthy species are the bats that roosts in all the caves, all three species of primates (*Trachypithecus obscurus, Macaca fascicularis, Nycticebus coucang*) and all the protected species listed in the Wildlife Conservation Act 2010.

IDENTIFICATION OF POTENTIAL BIOSITES

Nine potential biosites are identified so far, but this number is bound to increase in future when more sites for the biologically important flora, invertebrate fauna and marine flora and fauna groups are identified. The locations of the biosites are shown in Figure 1. Besides the physical description about each biosite, information about important species of fauna, status and potential threats found in each location are also provided.

BIOSITE 1: GUNUNG RAYA

Gunung Raya is the highest peak in Langkawi (881m), with a clear 180O view over the island and even Thailand on a clear day. The road from the foothill leading to the peak is winding, and at the top is a watch tower, where the scenic landscape of the archipelago can be viewed for a small fee. The vegetation is primary hill dipterocarp forest. Gunung Raya is the type locality for two species of geckoes described below. Other than these two species, sightings of all the three hornbills in Langkawi, the Pouched Hornbills, Great Hornbill and the Oriental Pied hornbill are frequent here. Since there is only one resort at the peak, which caters for low volume tourists, there is not much threat for the native fauna there. The problem lies in the fact that many reptiles, especially pit-vipers found along the way to the peak are being collected frequently for trade, even though Gunung Raya is situated in a Forest Reserve. The good road access to the peak is the main reason for this. The authority could step up monitoring and enforcement along this road to curb these activities.

Cnemaspis roticanai Grismer& Chan 2010
Roticanai Rock Gecko/Cicak Batu Roti Canai (Appendix 1)

Cnemaspis roticanai is known only from the type of locality in the upper regions of Gunung Raya, Pulau Langkawi, Kedah, Malaysia (6° 22' 08.00"N; 99° 49' 07.00" E). The natural vegetation where it occurs is primary hill dipterocarp forest on a steep hillside (Grismer and Chan 2010). This species has adapted to live on vegetation (leaves and tree trunks) as opposed to most of its other congeners which have a scansorial lifestyle.

Cyrtodactylus macrotuberculatus Grismer & Norhayati 2009
Tuberculate Rock Gecko/Cicak Batu Tuberkul (Appendix 1)

Cnemaspis macrotuberculatus was first described from Gunung Raya (06°23.023 N, 99°49.126 E; 621m asl.; Grismer and Norhayati 2009). Since then, this scansorial species has been found in nearly all forested habitats ranging from sea level to the summit of Gunung Machincang at 700m. Specimens have been observed abroad only at night and have been found in karst formations, taking refuge in the rock cracks on Gunung Machincang, on granite boulders along water courses at Lubuk Semilang and Telaga Tujuh, crossing the road leading to the summit of Gunung Raya, beneath overpasses and on road cuts along this road.

BIOSITE 2: KARST FORMATION AT WAT WANARAM

Wat Wanaram is the location of a Buddhist temple with a karstic landscape setting as its background (06°20.275 N, 99°52.507 E; elevation 35m). The karstic landscape is characterised by the Setul Formation, which is the oldest carbonate rock in the Malay Peninsula and the neighbouring region (Scrivenor and Willbourn 1923). This Ordovician-Devonian rock comprises impure limestone, dolomitic limestone and two clastic members consisting of shale, highly silicous mudstone, siltstone and chert. According to Che et al. (2003), the rock formation forms a unique and fascinating morphology full of well preserved fossils exposed on rock surfaces, which are rarely found elsewhere in Peninsular Malaysia and should be considered as natural heritage. This site is also the type of locality for *Cnemaspis monachorum*, which have been found on the karst formations behind the temples. Besides that, *Cyrtodactylus macrotuberculatus* also occurs here together with *C. pulchellus*. Another important species found here is *Trimerusurus venustus*. Threats are considered low in this area due to low human contact since the site is under the care of the Buddhist monks. The limestone hills where the unique animals are found are frequented by Buddhist monks for meditation. Thus, this area is unlikely to be exploited by collectors/hunters.

Cnemaspis monachorum Grismer, Norhayati, Chan, Daicus, Muin, Grismer & Wood, 2008 - Monks Rock Gecko/Cicak Batu Sami (Appendix 1)

Cnemaspis monachorum is known only from the karst formation at WatWanaran, Pulau Langkawi, Kedah, Peninsular Malaysia (Grismer et al. 2009). *Cnemaspis monachorum* is a lowland, saxicolous species that appears to be restricted to the karst outcropping of WatWanaram near the town of Kuah in a region dominated by a mixture of primary coastal and lowland dipterocarp forest. Here, several specimens of this swift, agile, diminutive species were observed during the day along the periphery of the karst formation in broad view near the edges of cracks as well as on the surfaces of rocks in shaded areas.

*BIOSITE 3: LUBUK SEMILAN*G

Lubuk Semilang Recreration Park is about 8 km from Kuah town and is located within the Gunung Raya Forest Reserve (06°21' 50.02" N, 99° 47' 27.85" E; elevation 53m). The vegetation is primary lowland dipterocarp forest. There is a trail leading up to the peak of Gunung Raya known as the "Eagle Stair of a Thousand Memories" and also connects to Durian Perangin Recreation Park, which is about 10 km long. Among the rare species that occur here are the Large-headed frog (*Limnonectes macrognathus*) and the Yellow-eyed litter frog (*Leptobrachium smithii*). Threats to the fauna here are considered low since this area is within the jurisdiction of the Forestry Department as a Recreation Forest and illegal collection of animals is prohibited. However, the impact of tourists has put a toll on the environment due to the amount of rubbish that are not properly disposed. This might be the reason behind the outbreaks of Leptospirosis, which occurred here recently.

Limnonectes macrognathus Boulenger 1917
Large-headed frog/Katak Kepala Besar (Appendix 1)

Limnonectes macrognathus is distributed from Myanmar through northwestern and southern peninsular Thailand to Pulau Langkawi, Malaysia (Grismer et al. 2006). It can be considered as uncommon or seasonal because of the difficulty of finding it even in its known range in Langkawi. This is a predominantly Thai species that has found its way to Pulau Langkawi due to its close proximity with Thailand. It does not occur in Peninsular Malaysia and Pulau Langkawi appears to be the southernmost limit of its distribution.

BIOSITE 4: TELAGA TUJUH

Telaga Tujuh or the Seven Wells (06°22' 35.74" N, 99°46' 41.70" E; elevation 39m), is a well-known tourist site at Compartment 8, Machincang Forest Reserve. It is about 20 km from Kuah town and is accessible by road. The vegetation here consists of lowland

dipterocarp forest. The seven-step waterfall originates from Sg. Perangin at the peak of G. Machincang. This is one of the areas where *Leptobrachium smithii* occurs naturally. Since, this area is within a Forest Reserve, threats to the faunal life here are considered minimal.

Leptobrachium smithii Matsui, Nabhitabhata, and Panha, 1999
Smith's litter frog/Katak Serasah Daun Smith (Appendix 1)

Leptobrachium smithii is distributed from Southern Thailand and adjacent southern Myanmar; Sayaboury and Vientiane provinces, Laos; seemingly isolated population in Meghalaya, Assam, and Mizoram, India, and southeastern Bangladesh. In Malaysia, it is only found at Pulau Langkawi (Grismer et al. 2006). Prior to this, it is much confused with *L. hasseltii* (Berry 1975), but later on Iskandar (1998) and Matsui et al. (1999) suggested that true *L. hasseltii* was likely restricted to Java and adjacent islands. In addition to Telaga Tujuh, other localities where this species can be found are Sg. Sepetang (06°22' 35.74" N, 99°46' 41.70" E; elevation 39m), Lubuk Semilang and Gunung Raya.

BIOSITE 5: PULAU SINGA BESAR

Pulau Singa Besar is a small island of approximately 11.3 km2 among the 99 islands in the Langkawi Archipelago, and is located off the northwest coast of the state of Kedah, Peninsular Malaysia. The work by Grismer (2008) reported a checklist of the herpetofauna of Pulau Singa Besar, totaling 12 species, comprising one frog, nine lizards, and two snakes. Lim et al. (2010) produced an updated checklist of the herpetofauna on Pulau Singa Besar, totalling 50 species. It is also the type locality for *Sphenomorphus langkawiensis*, described by Grismer (2008). Some parts of Pulau Singa Besar is a State land reserve area for public use and a part of the island is protected under the jurisdiction and management of the Department of Wildlife and National Parks. Thus, threats to the faunal life here are considered minimal.

Sphenomorphus langkawiensis Grismer, 2008
Langkawi Island forest skink/Mengkarung Hutan Pulau Langkawi (Appendix 1)

Sphenomorphus langkawiensis is known only from Pulau Singa Besar, reportedly found on the Cicada Trail. This trail starts with a small section of boardwalk proceeding along the sandy beach. It is about 2 km long. The trail is flanked on the left by disturbed forest and the right by the coast. This trail is popular among tourists from the main island during weekends and public holidays. This species, however, may occur throughout all forested areas on the island (Grismer 2011).

BIOSITE 6: SUNGAI KILIM/KISAP

Sg. Kilim basin is dominated by the oldest rock formation of the area, i.e. the lower Ordovician to Middle Devonian Setul Formation (Kamal Roslan et al. 2005). This formation is placed on top of the Kisap Thrust Fault, thrusted over the younger rock units west of the fault plane. Underneath this fault are shale, mudstone and sandstone of the Early Permian Singa Formation, and the overlying Middle Permian limestone of the Chuping Formation. Thus, Sg. Kilim basin supports unique mangrove vegetation on top of a limestone substrate. The karst hills along the coastline come in various heights up to 300m, and can be seen protruding from the mangrove forests. The karst hills are formed by a combination of dissolution and horizontal denudation processes due to rock falling process (Tanot and Komoo 2005). Many species of vertebrate animals use the mangrove and karst habitats here as their foraging grounds and breeding nests/dens. The notables species are the the White-bellied sea eagle (*Haliaeestur leucogaster*), Brahminy kite (*Haliastur indus*), Brown-winged kingfisher (*Pelargopsis amauroptera*), Smooth otter (*Lutrogale perspicillata*), Mangrove pit viper (*Cryptelytrops purpureomaculatus*), Dusky leaf monkeys (*Trachypithecus obscurus*) and Water Monitor lizard (*Varanus salvator*). The Brown-winged kingfisher is a near-threatened species and Totally Protected under the Wildlife Conservation Act 2010, confined to Pulau Langkawi, preferring mangroves (Jeyarajasingam and Pearson 1999). Most records are of single birds.

At present there is no evidence of any planning for physical development in this area. However, there could be problems related to the high volume of tourists that flock to the area. Although tour boats have speeding limits to adhere to, some errant boatmen choose to ignore this. Some of the riverbanks are heavily eroded due to backwash effects, but efforts to rehabilitate by replanting with mangrove seedlings are already in place, although the effectiveness of these programmes are still in question.

BIOSITE 7: SG. TEMURUN RECREATION FOREST

Sg. Temurun (06° 25.5' N; 99° 42.5' E) flows through the Sg. Temurun Recreation Forest, located just off the road to Datai Bay. The well-known Temurun Waterfall is a suitable habitat for many amphibians and reptiles, and fishes. It is a fast-flowing 2nd order river with a low gradient bank slope and the substratum is mainly rocks, gravel and sand. This site harbours many flying lizards, such as *Draco melanopogon, D. taeniopterus, D. maculatus, D. blandfordii, and D. quinquefasciatus*. This area is within a Recreation Forest, threats to the faunal life here are considered as low in terms of illegal collection.

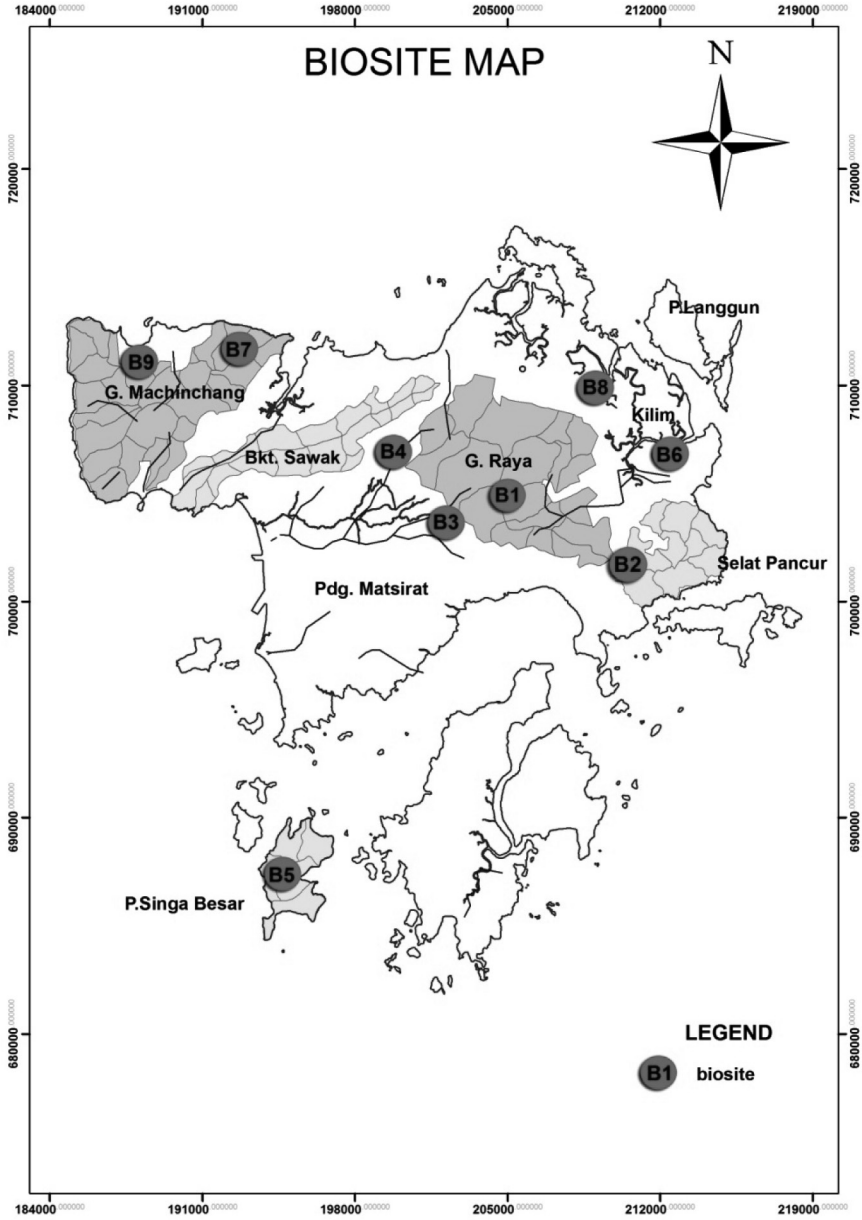
BIOSITE 8: GUA KELAWAR

Gua Kelawar is located at the north-east of Langkawi (6o24.102'N 99o51.544'E), within the mangrove swamps of Sungai Kilim in Kisap Forest Reserve. The cave is about 60m long and was named as such because it supports hundreds of fruit bats. The forest type here is estuarine mangrove forest, with vegetation mainly consisting of *Rhizophora spp*. and *Brugueira spp*. trees. There were three species of bats that seek refuge in GuaKelawar. They are *Hipposideros armiger, Hipposideros larvatus* and *Miniopterus medius* (Norhayati et al. 2007). Among these three species, Hipposideros armiger is the largest, while Miniopterus medius is the smallest. This area is within a Forest Reserve, and threats to the faunal life here are considered as low in terms of illegal collection. However, there are issues concerning the carrying capacity of the cave since the number of tourists visiting the cave has increased each year. Signboards have been put up to warn tourists not to make noise or shine their torch lights directly towards the bats. However, there is a lack of regulatory measures, enforcement and public awareness in place to ensure that the guidelines are adhered to. Nevertheless, workshops and seminars have been organised by LADA from time to time to create awareness among tour operators about how to handle tourists in sensitive areas/sites. One way to overcome this problem actually depends on tour guides who must be aware of the rules and regulations and keep a watch on their groups.

BIOSITE 9: TELUK DATAI

Teluk Datai is located at the north coast of Pulau Langkawi (6o25' 29.72" N; 99o 40' 14.7"E; elevation 25m). The bay is one of the two areas where the Mountain Hawk-Eagle was reported from. The other locality is Gunung Raya. The Mountain Hawk-Eagle or Hodgson's Hawk-eagle or *Nisaetus nipalensis* [earlier treated under *Spizaetus*; (Helbig et al. 2005)] is under the Family Accipitridae. It was recently discovered as resident only on Pulau Langkawi, and this represents the first country record (Yeap 2005). The area has low development impact with few resorts. Monitoring programme, however, is essential for this species to check for population viability.

FIGURE 1 : Locations of biosites of significant importance in terms of conservation and management of vertebrate fauna.



DISCUSSION AND CONCLUSION

Four years have passed since the announcement of Langkawi Geopark as a member of the UNESCO Global Geopark Network in 2007. To this date, no single biosite has been identified although Langkawi Island is rich with biodiversity of flora and fauna, many of which are endemic. Since the discovery of the first endemic reptile in Langkawi by Grismer et al. (2006), many new findings, mostly endemic species, have been discovered and reported. Many of the new species occur in certain habitats and do not occur elsewhere. Thus, these animals must be conserved based on their rarity alone. By identifying these species, their conservation status, threats, and conservation measures could be formulated. The conservation measure can be in the form of a biosite. These biosites could then be included in the Langkawi District Local Plan to aid in processing planning applications for future development. When biosites have been identified, policies related to biosites could be formulated and recommended to be included in the Kedah State Structure Plan.

Although the biosites identified in this article are within either Forest Reserves or protected areas under the State Land, there are other issues and challenges to overcome, mostly related to increased human contact due to high volume of tourists to the areas. Many of the identified biosites are also within the high impact tourist areas which require carrying capacity studies to assess the impact of tourism, such as Gua Kelawar, and Temurun Waterfalls. Other impacts include excessive collection of animals for trade.

There are many stakeholders involved in establishing biosites, but generally, if a biosite is within a forest reserve, jurisdiction of the biosite should be the respective authority of the area. However, if a biosite is situated outside protected areas, then the landowner should be advised on the existence of the biosite and his roles should be defined. Some sort of acknowledgment for his understanding and cooperation from the authority should also be defined. Management and proper planning can contribute to retaining and enhancing biological and ecological values. However, they are only one of a range of 'tools' and actions that can contribute to this. Importantly the role of landholders in retaining and maintaining biosites in their current or enhanced condition needs to be acknowledged. In order to achieve biodiversity outcomes, positive landowner attitudes supported by appropriate management regimes and legislation designed to protect biodiversity are very fundamental. Several of the main legislations/acts/policies include:

- Environmental Quality Act 1974 (amended 1985)
- Fisheries Act 1985 (Act 317)
- Land Conservation Act 1960
- National Conservation Strategy 1993
- National Ecotourism Plan 1995

- National Parks Act 1980
- National Policy on Biological Diversity 1998
- The National Forest Policy 1978; revised in 1992
- Town and Country Planning Act 1976
- Wildlife Conservation Act 2010

For future plans, actions to be taken to ensure sustainable development of ecotourism pertaining to natural resources at and neighbouring protected areas should also be identified. For ensuring long-term viability of threatened and significant species and communities of Langkawi Geopark, recovery actions should be detailed including the parties who will undertake these actions. The recovery actions may include: (i) protecting existing native vegetation; (ii) revegetation of priority sites; (iii) control and/or eradication of introduced verterbrate and invertebrate fauna; (iv) research and monitoring of species' ecology and management options; (v) monitoring the impacts of climate change; (vi) surveys of potential habitat; and (vii) community awareness. However, at this identification stage, the main emphasis is on the establishment of biosites for integration of cultural and natural heritage to complement the emphasis on geotourism for Langkawi Geopark. In the meantime, efforts must be stepped up to conduct surveys and inventories to other islands in the archipelago. This is to ensure discoveries of more new and endemic species.

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Appendix 1 : Vertebrate fauna of high importance values at langkawi geopark.

Cnemaspis roticanai. Upper: holotype ZRC 2.6860 (male). Lower: paratype LSUHC 9453 (male).
(Photo: L.Lee Grismer).

Cnemaspis macrotuberculatus
(Photo: Norhayati, A.)

Cnemaspis monachorum
(Photo: Norhayati, A.).

Trimerusurus venustus
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Limnonectes macrognathus
(Photo: L.L. Grismer)

Leptobrachium smithii
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PLANNING FOR HERITAGE TOURISM: THE CASE OF LANGKAWI GEOPARK

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Abstract
The principal building blocks underlying Langkawi's status as a tourist destination and a geopark are its nature and culture. Both these resources provide the platform for Langkawi to grow as a tourist destination since 1980s and receiving the geopark status by GGN and UNESCO in 2007. This paper discusses that while tourism is a commercial enterprise, it has an important role in ensuring Langkawi's natural environment is well-protected, and local communities' cultural traditions safeguarded. Central to this need for protection is 'heritage' - the basic ingredient in sustaining Langkawi as a premier tourism destination. This necessitates the need to view tourism and heritage management as interdependent, as both rely on the same 'heritage resources'. Planning can act as the bridge to connect tourism, whose products are identified for their extrinsic values as tourist attractions, and heritage in which assets are identified for their intrinsic values to a community, state, country and the world .

Keywords: Heritage tourism, heritage conservation, geopark heritage management, planning

INTRODUCTION

The tourism sector is one of the world's top job creators and a lead export sector, especially for developing countries. According to the April 2011 Interim Update of the United Nations World Tourism Organisation (UNWTO) *World Tourism Barometer,*

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international tourist arrivals grew by close to 5% during the first two months of 2011, consolidating the rebound registered in 2010. Over the past six decades, tourism has experienced continued expansion and diversification, becoming one of the largest and fastest growing economic sectors in the world. Despite occasional shocks, international tourist arrivals have shown virtually uninterrupted growth: from 25 million in 1950 to 277 million in 1980, 435 million in 1990, 675 million in 2000 and 940 million in 2010 (UNWTO 2011).

As a service industry, tourism involves a network of different but inter-related segments that have their respective needs, capacities and roles. These segments are located both in the tourist generating (tourists, home government, tour businesses) and tourist receiving (host population, host government, tour businesses) countries. The study of tourism is incomplete if it disregards this wider, multi-dimensional context. An integrated and holistic approach is necessary because tourism is "a bilateral exchange" (Lanfant 1993: 77); "a give-and-take transaction" (Nash 1981: 467); and "a journey of people, organised by people for the benefit of people" (Baswedan 1993: 42).

In the context of Langkawi Archipelago as a tourist destination and a geopark, the principal building blocks for Langkawi's tourism industry are the islands' nature and culture. Both these natural and cultural resources provide the platform for Langkawi to grow as a popular tourist destination since the 1980s and to be bestowed the geopark status by GGN-UNESCO in 2007. Tourism is undoubtedly a fast growing industry in Langkawi but it should be regarded as more than an economic, pleasure-based activity. This paper discusses that while tourism is a commercial enterprise, it has an important role in ensuring that Langkawi's natural environment is well-protected, and local communities' cultural traditions safeguarded. Central to this need for protection is 'heritage' - the basic ingredient in sustaining Langkawi as a premier tourism destination. This calls for the need to view tourism and heritage management as interconnected and mutually-interdependent, and not as two different and unrelated sectors. Planning can act as the bridge to connect tourism whose products are identified for their extrinsic values as tourist attractions, and whose assets are identified for their intrinsic values to a community, state, country and the world.

For the above to happen, that is, for planning to play its role in bridging tourism and heritage management, there is a need for a shift in perception and practice for both tourism authorities, developers and managers of natural and cultural heritage in Langkawi. A shift in perception entails understanding both parties' needs and aspirations and the clientele they serve, while a shift in practice requires both sides to come together to work as partners, rather than as separate entities or competitors.

THE EPISTEMOLOGY OF TOURISM

A change in perspective towards a better understanding of making 'heritage' the central subject of 'responsible tourism' i.e. a non-destructive utilisation of geological and landscape resources and biodiversity and cultural resources [Wong 2008: 107] which Langkawi is promoting and advocating through its geopark status,, calls for a reflection on the epistemology of tourism. This understanding is important in the context of tourism industry's interconnectedness with heritage management. Writing about cultural tourism and cultural heritage management, McKercher and du Cros (2008: Preface) argue that cultural tourism and cultural heritage management operate as parallel activities in most places, with remarkably little dialogue between the two. There seems to be a lack of mutual cooperation or partnership between these two inter-related activities, even though both cultural heritage management professionals and the tourism industry have mutual interests in the management, conservation and presentation of cultural and heritage assets. The result, McKercher and du Cros argue, is many lost opportunities to provide quality visitor experience while managing rare and fragile resources in a socially, environmentally and ethically responsible and sustainable manner. Following McKercher and du Cros' argument (2008: 6), there is a need for people involved in cultural heritage management to understand that cultural tourism - in Langkawi's case, including geotourism and biotourism - is *a form of tourism*, and not a form of cultural heritage management. As a form of tourism, cultural tourism must be based on sound, commercial tourism reasons first and cultural heritage management second.

In pre-industrial era, travel was predominantly confined to the upper classes or elites who travelled individually or in very small groups for trading purposes, educational intentions, cross-cultural alliances through marriages (Walji 1990) or for pleasure, culture and pilgrimages (Urry 1990: 4). Few people outside the upper classes travelled to see objects unconnected with work or business. After the Industrial Revolution, travel gradually developed into a mass, popular leisure activity. People in post-industrial societies have opportunities for travel or tour with their accumulation of disposable incomes and time, facilitated by the increase in infrastructure and organised travel services.

In modern or post-industrial societies, travel or tour becomes a non-work, non-remunerative pursuit. Travel gives the people an opportunity to leave their structured, established routines for a short period in pursuit of rest, recreation and fantasy (Urry 1990: 2). Travel takes on an added dimension. Travel for pleasure and recreation becomes a mean to a greater end, i.e. self-fulfilment and spiritual renewal. A new perspective on travel begins to take shape. Travel for pleasures as a means to an end becomes a 'tour'. 'Tour' denotes a circular movement: the individual leaves his or her usual place of residence and daily routine to go to a place (outside the usual residence) that is different from the home environment for the purpose of pleasure, recreation and self-fulfilment and after a duration (more than a night and less than a year), returns to his or her usual

place of residence and resumes the daily routine. The traveller who embarks on this circular movement not for work or cash remuneration purposes is a 'tourist'. He or she is free from primary obligations, gainful employment, study, family and community responsibilities (Nash 1981: 461-462).

THE SOCIALITY OF TOURISM

The rise of tourism as a major social phenomenon in contemporary era has encouraged many governments, especially in developing countries, to harness its potential in assisting the process of development. To take advantage of rising statistics in tourist arrivals, these developing countries invest heavily in the tourism sector without giving careful and sustained consideration to its potential impacts and demands. In principle, a nation's tourism policy aims to integrate the economic, political, cultural, intellectual and environmental benefits of tourism cohesively with the local people and the nation in order to improve the quality of life and provide a foundation for peace and prosperity. In practice, however, national tourism strategies are often detached or not integrated with local needs and conditions. This is so because the authorities believe that the success of the nation's economic and development aspirations through tourism depend directly on customer satisfaction with the products the nation has to offer. Each nation therefore strives to have the competitive edge in the 4 Ps - product, presentation, pricing and promotion.

The outcome of the preoccupation with product development that caters to customer (tourist) needs and satisfaction is the replication of prevailing conditions from the already established industrial countries to the industrialising tourist destinations, a paradoxical situation clearly noted by Turner and Ash (quoted in Urry 1990: 7): 'These national tourism productions reflect universal communality whereby the pursuit of the unique and unrivalled ironically ends in uniformity'. The paradox is that to survive in the 1990s and beyond, the tourism industry must provide top quality tourism products, superior service, achieve extraordinary responsiveness to the consumer, have an international outlook, create uniqueness, make sales and service forces into heroes, pursue fast-paced innovation and launch into a customer revolution (Edgell 1991: 194-196). Tourists have come to expect more from every country, business, organisation and person employed in the tourism industry with respect to quality, accuracy, variety, convenience, value and professionalism.

From a tourism perspective, this creeping homogenisation has led to some concern that one of the most fundamental motivations for travel, i.e. the desire to observe and be part of a different environment for a short period of time, may be threatened. At the same time, many societies and cultural groups are consciously undertaking efforts to create and re-create unique and unrivalled cultural packages for tourist consumption. So there emerges a paradoxical situation in which cultural diversity is thriving in a sea of homogenisation.

The question is how do the respective countries develop tourism packages that promote uniqueness in their cultural makeup, heritage and indigenous resources?

The alternative approach to tourism as a factor of change in community development recognises the 'sociality of tourism'. Since tourism involves the movement and meeting of people of different backgrounds, it is a sociological and anthropological object and the subject matter of sociology and anthropology. Indeed, tourism is necessarily a form of ethnic relations in so far as tourists and the people of the host country belong to different ethnic groups, cultures and religions. The sociological and anthropological perspective on how people define themselves and how they relate with people from their own community and from other communities becomes more significant in the context of international tourism and globalisation.

In the wake of globalisation and a globalising economy, the sense of oneness that results from the ideology of modernisation, homogenisation and universal applicability (one size fits all) has put human cultures and historical heritages at risk. In natural sciences, natural phenomenon such as gravity can be globally defined and applied (Yearly 1996) because gravity is a natural law. Globalisation, as a human phenomenon, cannot be based on this 'science' or 'natural law' paradigm. In a similar context, tourism as a social-cultural phenomenon cannot be based on this science paradigm and subjected to a universal application of planning and development.

Human beings are reflective, thinking people, able to distinguish, compare, categorise, evaluate, create and recreate. People do not just live in a society; they produce the society in order to live (Carrithers 1992: 1). Peaceful co-existence between people and their natural environments have been sustained for millions of years. The people have learned through time to carve a symbiotic relationship with their environment and develop a way of life or culture that illustrates their connectivity with the world around them. Human society thus has a history and a past that has shaped the present. Changes imposed onto a society for the sake of global tourism disregard the local history and local context. To present a society and its environment as unchanged is to take away the essential human capacity to change and adapt, replacing it with a belief that "human societies come into being spontaneously" (Carrithers 1992: 9).

Tourism stakeholders play a key role in developing environmental, cultural and social awareness, and contributing to the sector's capacity to promote sustainable and responsible development (UNWTO 2010). Indeed, such is the growing importance of recognising the sociality of tourism and its role in providing the space and platform for people to interact and learn about one another that the UNWTO has chosen the theme '*Tourism – linking cultures*' for World Tourism Day 2011, celebrated on September 27.

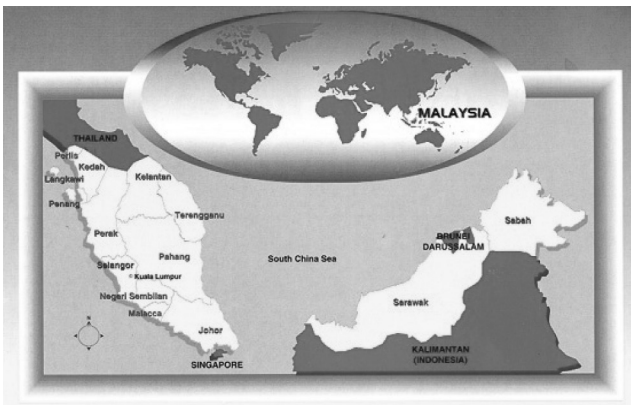
The foregoing narration of the epistemology and sociality of tourism is intended to bring forth the fact that tourism (whether cultural, eco, nature adventure, educational, or health etc.) is 'essentially a commercial activity' (McKercher & du Bois 2008: 26). Speaking for cultural tourism, (the same principle could also be applied to other forms of tourism), McKercher & du Bois state that as a tourism activity, cultural tourism will attract nonlocal visitors (or tourists) who are travelling primarily for pleasure on limited time budgets and who may know little about the significance of the assets being visited. Successful cultural tourism products must be shaped with this type of visitors in mind (McKercher and du Bois 2008: 7).

The discussion above on the increasing significance of the tourism sector in the development of countries world-wide, and on the need to understand the meaning of tourism as a commercial activity as well as its connectedness with heritage management reflects the situation in Langkawi Island, the first GGN-UNESCO recognised 'global geopark' in Malaysia and Southeast Asia.

LANGKAWI, MORE THAN A TOURIST DESTINATION

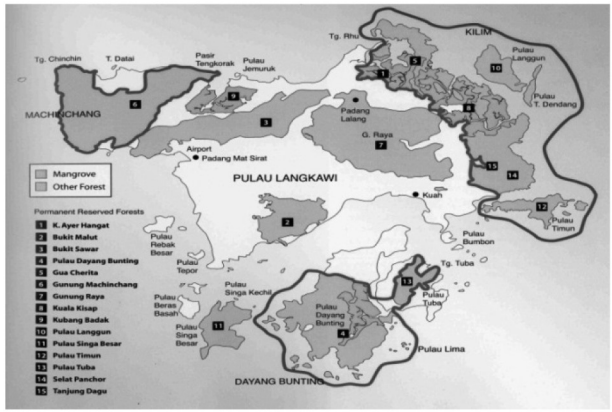
Comprising 99 islands, Langkawi archipelago is one of eleven administrative districts within the State of Kedah. It is divided into six *mukims* or sub-districts, each with their respective features and traditions that, taken together, contribute to Langkawi being known as '99 Magical Islands', 'Isles of Legends', 'Duty Free Islands', and 'Tourism City'. Three out of the 99 islands have human inhabitants; they are Pulau Langkawi (main island), Pulau Tuba and Pulau Dayang Bunting (Maps 1 & 2 below).

MAP 1 : Location of Langkawi Island in Malaysia



Source: Yoong (1999).

MAP 2 : Langkawi Island



Source: Mohd Shafeea Leman et.al. (2007)

The Langkawi archipelago, with its unique island and karst landscapes, and diverse geological features and landscapes that are of high heritage and aesthetic values, epitomise an incomparable national treasure that can help to meet the three components of a geopark and its sub-components as stated above. In addition, the attractiveness of Langkawi also lies in its local culture and traditions (Anwar Abd Rahman et.al. 2004, 232).

These natural and cultural assets of Langkawi have been capitalised by the tourism authorities and media. Tourism Malaysia, in its official website, tries to capture the European market by promoting Langkawi as follows:

> More than just clear waters and age-old legends. If you're longing for an unforgettable eco-adventure, then your next holiday must be at Malaysia's spellbounding Langkawi Geopark, the first UNESCO geopark in Southeast Asia and recently acclaimed as one of the few geoparks in the world! Marvel at its natural beauty – all of 478 sq km of it. Explore its diverse landscape and intriguing rock formations formed 550 million years ago. Float down mangrove forests and take in all the flora and fauna the 99 islands of Langkawi have to offer. There's truly more with every visit. It must be Malaysia, where you can experience the warm welcome from people of Asia's three greatest civilisations and other indigenous cultures (Tourism Malaysia Corporate Website (2011).

Other tourism media likewise promote Langkawi in superlative terms:

> Located in the northern state of Kedah, it is unique in the sense that it was formed on 99 islands that made up the legendary Langkawi Archipelago … Langkawi has been dubbed as the birthplace or the fetus land of the region … (LADA brochure Undated)
>
> Langkawi Geopark … unfolding hidden wonders … a complete nature experience. (Galeria Perdana brochure Undated)
>
> Langkawi, intriguing legends and nature's wonders. The Langkawi archipelago consists of 99 islands situated in the Andaman Sea, south of Thailand. Tourists flock here for the delightful beaches, superb resorts and refreshing nature-based activities … Most tourists agree that Langkawi's biggest attraction is its natural, undisturbed state (Tourism Malaysia 2008)
>
> Discover the natural beauty and tranquility of the island. Langkawi has approximately 8000 hectares of untouched mangrove (Ken Makmur Enterprise brochure Undated)

Are these tourism media misleading the market? A review of the 'what's there in Langkawi' will perhaps allow the truth behind the media's claims of the uniqueness and 'specialness' of Langkawi to be acknowledged:

a) The nature of Langkawi, including its rocks, landscapes, flora and fauna have been its biggest assets for thousands and millions of years (Mohd Shafeea et.al 2007: 23);
b) Vegetation at the top of Gunung Machincang is unique because most trees are short, similar to the heath forest type. A total of 60 species from 40 families were recorded at Gunung Machinchang (Mohd Shafeea et.al 2007: 27);
c) Langkawi is also home to one of the richest mangrove communities in Malaysia. In the Kilim mangrove complex, a total of 55 species from 40 genera and 27 families of mangrove plants were recorded. This represents about 53% of the total species of mangrove flora in Malaysia and about 48% of the world's total mangrove species (Mohd Shafeea et.al 2007: 27);
d) Faunal diversity in Langkawi is represented by a total of 44 species of mammals and 79 species of herpetofauna The famous Crab-eating Macaque is perhaps the most interesting as the generic name implies it can dive and swim in the sea to catch crabs and other marine life forms. On higher grounds, the Spectacled Monkeys swing effortlessly from one tree to another searching for food or simply playing around (Mohd Shafeea et.al 2007: 27);
e) There are also several archeological sites found in Langkawi. These sites are the ancient tombs of Ulu Melaka and Padang Mat Sirat and the ancient inscription at Gua Cherita (Mohd Shafeea et.al 2007: 29);

f) There are fishing villages (about 20 villages with 2671 active fishermen, according to Annual Fisheries Statistics 2005 [quoted from Sharina Abdul Halim & Hood Salleh 2007: 33), with four Fishermen Economic Groups (KEN) that were formed to venture into fishing and water-related tourism activities. The four KEN groups are located at Kubang Badak, Kuala Teriang, Kilim and Kuala Chenang (Sharina Abdul Halim & Hood Salleh 2007: 33);
g) Myths and legends that make up the cultural landscape of Langkawi, with the Mahsuri legend providing the historical trajectory and mystical aura of Langkawi, and the Machincang and Mat Raya saga providing the tapestry of place names in Langkawi (please refer Rahimah Aziz & Ong's paper in this volume);
h) Traditional Malay houses (Sharina Abdul Halim & Ibrahim Komoo 2007: 36) which symbolise the master craftsmanship of housebuilders in Langkawi in days gone by; and
i) The minority Thai, Achehnese, Chinese, and Indian communities whose history and culture add to the richness of Langkawi's socio-cultural history and landscape but not given much attention

The above array of natural and cultural attractions stand in good stead for the development of Langkawi's heritage tourism industry. With a population of about 99,000 in 2010, Langkawi has seen a steady rise except in 2002, 2005, 2008) of tourist arrivals through the years, often reaching a figure higher than the local population, as shown in Table 1 below:

TABLE 1 : Increasing tourist Arrivals to Langkawi, 2000-2010

Year	Total
2000	1,810,460
2001	1,919,113
2002 *	1,916,113
2003	1,981,946
2004	2,179,629
2005 *	1,835,287
2006	2,161,937
2007	2,334,362
2008*	2,303,157
2009	2,376,736
2010	2,450,000

NOTE : *indicates drops in the figures which generally show a rising trend.
SOURCE : Langkawi Development Authority (2009, 57); Langkawi Development Authority (2011, online)

With the rapid development of the tourism industry and its related infrastructural development, one would be surprised to read that Langkawi Islands were once considered a sleepy hollow or dead island. The late 1980s witnessed the growth of Langkawi into a tourism destination and a duty free island (1987) (Mohd Shafeea et.al 2007: 29-30). Langkawi has emerged from the backwaters and gained reputation as a popular tourism destination worldwide, enhanced by its geopark status. Nevertheless, such accolades inevitably come with consequences, as Langkawians and Malaysians, as well as visitors in general, are witnessing a rapid transformation of Langkawi through infrastructural and industrial development projects, especially with the formulation and launching of the Northern Corridor Economic Region (NCER) in 2008.

The NCER development plan states that its main focus is tourism and logistics services, leveraging on the Northern Region's strengths such as Langkawi and Pulau Pinang as premier tourist destinations, and the strategic location of the Northern Corridor with respect to the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT). The plan enhances Langkawi's position as a world-class tourist destination. The NCER Implementation Authority (NCIA) which was formed made several key decisions as follows: (a) to attract world-class hotels and holiday resorts to be set up on the island, so designed to increase the length of stay of both foreign and local tourists; (b) with government's approval, the NCER Tourism Development Incentive Package will be established, which shall include fiscal incentives, provision of key infrastructure and waivers from meeting certain government requirements; (c) certain qualifying criteria have to be met before investors can be eligible for these incentives. These include the minimum size of the initial investment, the type of investment expenditure and the benefit that the project is expected to bring, e.g. in terms of the number of foreign tourists and the anticipated tourist spending; (d) the NCIA will work with existing agencies to plan, facilitate and monitor all investments made in Langkawi to ensure sustainable development of the tourism industry on the island; and (e) efforts are planned to broaden the range of attractions in Langkawi.

The fact that Langkawi is targeted for high level development illustrates the confidence the Federal and State governments have towards Langkawi's potential. To understand the prominence of tourism in Langkawi, it is imperative to see how the sector has developed over the years.

BACKGROUND TO LANGKAWI TOURISM

The Tourist Development Corporation (TDC) was established in 1972 (Parliament Act No.72 of 1972) to promote tourism in Malaysia. Langkawi Islands was among the places identified to have the physical potential for development as a resort destination area. In early 1976, the Federal government asked TDC to prepare a master plan for the

visitor development of the Langkawi Islands. TDC engaged a consulting team headed by Peat, Marwick, Mitchell & Co. (PMM&CO.) in November 1976 to conduct a master plan study for the development of the Langkawi Islands into a visitor destination area (Yoong 1999).

In 1984, the first announcement was made that Langkawi was to be developed as a major tourist centre of the country. In relation to the Federal policy to turn Langkawi into a major island resort, the Federal Government proclaimed that, effective 1 January, 1987, Langkawi would be declared a free port under the Financial Act (No. 2) of 1986. The Federal Government's direct involvement in accelerating the growth of the tourism industry and the socioeconomic development of Langkawi was further demonstrated by the establishment of the Langkawi Development Authority (LADA) under the chairmanship of Tun Daim Zainuddin, the former Finance Minister and Economic Adviser to the Malaysian Government. LADA was incorporated by an Act of Parliament, Act 423, on 1 January, 1990 (Yoong 1999). LADA, being the foremost authority in the development of Langkawi as a tourist destination, has set out to achieve the following objectives, as stated in its Annual Report (LADA 2009): (a) to spearhead the socioeconomic, infrastructural and product development; (b) to provide investment opportunities to develop the economic and tourism sectors; (c) to encourage community participation in the socioeconomic and cultural activities; and (d) to promote Langkawi as an international tourism destination.

In view of these developments, the State Government of Kedah adopted the Langkawi Structure Plan 1990-2005 that was prepared under the Town and Country Planning Act 1976 (TCPA 1976). As a planning document, it stresses the preservation of the natural environment and landscape, keeping in line with the Langkawi Declaration on Environment (1989) to transform the island into a 'nature paradise'. The Langkawi Structure Plan was prepared to encourage, control and guide development in Langkawi. Primary concerns were the established framework for planning tourism, land use patterns, environmental improvement measures, public facilities and utilities as well as transportation up to the year 2005 (Yoong 1999).

Tourism's status as a major driver of economic development and revenue is further strengthened when it is listed as one of the 12 NKEAs (National Key Economic Areas) in the Tenth Malaysia Plan (2011-2015), designed to contribute to high income, sustainability and inclusiveness. To achieve tourism revenue of RM115 billion to Gross Domestic Product (GDP) through the creation of two million jobs, the government is working towards attracting more high spending tourists and expansion of markets from high growth countries, such as Russia, India, China and the Middle East. For Langkawi, the tourism industry is seen as one of the foremost sectors in pushing Langkawi to be the premier tourist destination as envisaged by the Malaysian government.

The high profiling of Langkawi's tourism industry in the government agenda is evidenced by the announcement (on April 10, 2011) of the Minister in the Prime Minister's Department, Tan Sri Nor Mohamed Yakcop, that the government is planning several proactive measures to give a new lease of life to Langkawi's tourism industry. The Minister said focus would be given to the development of eco-tourism as Langkawi has several advantages and uniqueness (The Star Online 2011).

Such seriousness in wanting to develop Langkawi into a premier tourist destination calls for a critical reflection on the intensity of tourism development as well as the types of tourism the government (through NCER) will be promoting. With increasing efforts to develop tourism in Langkawi, it is most likely that there will be increased land clearance for hotel development, real estate development, destruction of existing structures, damage to the environment and ecology, commoditisation of products, and at the same time, increasing number of tourist arrivals.

The NCER Development Plan and the NKEAs are all 'economic plans' aimed to transform Langkawi into a premier tourist destination through high investments, massive infrastructural development, widening the range of attractions, so as to attract high end, high spending and long stay tourists to Langkawi. With a land area of about 478,848 hectares, such planned and 'authorised' massive transformation will most likely change the natural landscape of Langkawi and the cultural milieu of the local people.

Pertinent and worrying questions arise. Will due consideration and emphasis be given to conservation of Langkawi's natural and cultural heritage? Is there a clear policy definition on heritage and clear guidelines on tourism development vis-à-vis heritage conservation? Will there be a sustainable tourism development model that will integrate planning for tourism and heritage management? In addition, what is the position of Langkawi's status as a geopark? As a GGN-UNESCO recognised geopark, the main ingredient of Langkawi's appeal is its 'three-in-one' heritage' – geo, bio and cultural heritage.

In Chapter Four of the NCER Development Plan, titled Services: Building World-Class Offerings in Tourism and Logistics Services (Northern Corridor Economic Region 2011), which focuses on developing tourism in the Northern Corridor, there is no mention of heritage conservation and of Langkawi as a geopark and how tourism development planned for Langkawi will take into consideration its geopark status. The NCER development plan, for example, states that its implementation organisation will work with existing agencies to plan, facilitate and monitor all investments made in Langkawi to ensure sustainable development of the tourism industry on the island. Note here the phrase '*sustainable development of the tourism industry on the*

island'. Earlier sections of this article have mentioned that Langkawi's development is synonymous with tourism. Eighty per cent of Langkawi's economy is linked to tourism, since its promotion as a major tourism destination in the late 1980s by the Malaysian government. Langkawi has since then been exposed to tremendous physical development to provide improved tourism infrastructure and facilities (Langley 2002), and will be further subjected to more development with the implementation of the NCER Development Plan of 2008.

Hence, while the government aims to ensure sustainable tourism industry in Langkawi, it also has to bear in mind that attention has to be given to Langkawi's heritage as well as having a management plan for the protection and conservation of this heritage. Tourism and heritage conservation are like two sides of the coin, but as mentioned earlier in this article, these two fields often operate in isolation and not in partnership. Corresponding to having a sustainable tourism development policy, the government should also think of a sustainable heritage conservation policy in order to ensure that the use of heritage assets (geo, bio, cultural) for tourism will be sustainable, benefitting both the tourism industry and heritage conservationists. Instead of having two separate policies, the two policies can be merged into a policy to be termed as a *sustainable heritage tourism development policy*.

'Heritage tourism' is emphasised in view of Langkawi's status as a tourist destination and as a geopark. The significance of tourism in Langkawi, and the understanding of the value of heritage that is attached to Langkawi's status as a geopark is acknowledged. Nevertheless, the concept of geopark need to be understood, and how Langkawi came to earn such recognition from GGN-UNESCO in 2007 and which has since then been extended for another four years [2011-2015] after Langkawi was given the 'green card' when it was revalidated by GGN-UNESCO evaluators in June 2011.

LANGKAWI ISLAND AS A GLOBAL GEOPARK

The beginning of the 21st century saw the introduction of a new concept for 'sustainable heritage tourism' by geologists or Earth scientists - a concept that promotes protection and conservation of specially designated geological sites recognised as 'heritage', but at the same time, promoting sustainable economic activities for the local communities living at or around these special sites. Upholding the idea of sustainable economic development for the local communities living at these sites means ensuring the communities' involvement in the conservation process from the very start. These specially designated geological sites are called 'Geoparks' (McKeever 2009: 14).

The word 'geo' in the term 'geopark' may cause many readers to think of 'geology', and 'geography'. However, the word 'geo' means more than geology or geography.

Geo is an inclusive term to include Earth's fundamental assets of nature (bio-geo) and anthropos/people (socio-culture). Protecting these bio, geo and sociocultural assets means protecting Earth's heritage. By understanding the workings of the Earth through this tripartite heritage, people can learn and better understand their place and their role in helping to protect the Earth. The interdependence between this tripartite heritage of geo, bio and cultural is eloquently captured through GGN-UNESCO's definition of a geopark, which is

> … a geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development. The geopark should take into account the whole geographical setting of the region, and shall not solely include sites of geological significance. The synergy between geodiversity, biodiversity and culture, in addition to both tangible and non-tangible heritage are such that non-geological themes must be highlighted as an integral part of each geopark, especially when their importance in relation to landscape and geology can be demonstrated to the visitors. For this reason, it is necessary to also include and highlight sites of ecological, archaeological, historical and cultural value within each geopark. In many societies, natural, cultural and social history are inextricably linked and cannot be separated (GGN April 2010).

This GGN-UNESCO geopark concept recognises the relationship between people and geology as well as biology and the ability of a geoheritage or bioheritage site to serve as a focus for economic development. This concept agrees closely with the trend for integrating science and culture whilst recognising the unique importance of the physical landscape. Hence, tourism activities in a geopark can use the unique heritage features in terms of the synergy between the geo, bio and cultural landscapes, and create a special brand of tourism for geoparks called 'geo-bio-cultural heritage tourism', or 'geotourism' (Ibrahim Komoo 2004: 224).

The promotion of geo-bio-cultural heritage tourism or geotourism through geoparks will help to develop knowledge-based tourists who will come to share similar values of the geological and cultural heritage of the places they visit (Ong & Sharina 2009). As geo-bio-cultural heritage tourism or geotourism is based on the concept of utilisation without destruction, there is no conflict between geoconservation and tourism promotion. Therefore, according to Ibrahim Komoo (2004: 225), the inclusion of geotourism activities within sustainable tourism schemes should be encouraged. The adoption of geotourism as part of geoconservation should build support for a particular geoheritage site and generate some funds for its upkeep, the key elements of which are site-based preservation measures, together with heritage tourism promotion. As a geopark, Langkawi has the unenviable task of ensuring that it fulfils the criteria set

by GGN-UNESCO, that is having a management plan that looks into the protection and conservation of its geo, bio and cultural heritage sites, tourism-related infrastructural development and sustainable socio-economic development. One important element to ensure that the geopark concept works for Langkawi is the existence of a common understanding among stakeholders regarding Langkawi's concomitant status as a geopark and tourist destination.

TOWARDS SUSTAINABLE HERITAGE TOURISM DEVELOPMENT IN LANGKAWI

Tourism plays an important role for many local economies, particularly in developing countries and small island states. However, there is often a price to pay: uncontrolled tourism development can have major negative impacts on the local environment and society. Thus, conservation of natural resources and the sustainable development of host communities will depend on the way the tourism industry evolves (de Larderel 2003).

This situation is especially true for Langkawi Islands. Tourism is Langkawi's biggest selling point and the mainstay of Langkawi's progress and development since the 1980s. Langkawi's main tourism attractions are its natural and cultural heritage. Nevertheless, excessive or poorly managed (ICOMOS 2003) tourism related development in Langkawi can threaten the significant characteristics of its nature and culture. Success in both heritage conservation and tourism development can be attained when the stakeholders of both sectors realise they are both dealing with the same asset i.e. natural and cultural heritage. Hence, there is a need for these stakeholders to understand what heritage means and what conservation means, and their interrelated purposes.

Ahmad Sarji, in his keynote speech on Heritage Conservation: From Past to Present (2008), mentioned that the National Heritage Act 2005 is an act to 'provide for the conservation and preservation of National Heritage - encompassing natural heritage, tangible and intangible cultural heritage, underwater cultural heritage, treasure trove and for related matters'. The National Heritage Act defines cultural and natural heritage as follows:

> Cultural heritage includes tangible and intangible property, structure or cultural artifacts and can include things, objects, artifacts, dance presentations and performances, songs, traditional music that is significant to the lives of Malaysians, in the past or present, above land or inside the land, or cultural heritage below water but not including natural heritage. Natural heritage includes natural characteristics of any places in Malaysia, and encompassing land formation through geologi or biological forces, or others, geological

> features, mountains, rivers, tributaries, rocks, coastal shores or any natural sites that have value from the natural sciences point of view, history and beauty of landscape including flora and fauna (Akta Warisan Negara 2005).

The International Council on Monuments and Sites [ICOMOS] through its International Cultural Tourism Charter provides the following definition for heritage (International Council on Monuments and Sites [ICOMOS] 2003):

> Heritage includes the natural and cultural environments, encompassing landscapes, historic places, sites and built environments, as well as bio-diversity, collections, past and continuing cultural practices, knowledge and living experiences. It records and expresses the long processes of historic development, forming the essence of diverse national, regional, indigenous and local identities and is an integral part of modern life. It is a dynamic reference point and positive instrument for growth and change. The particular heritage and collective memory of each locality or community is irreplaceable and an important foundation for development, both now and into the future.
>
> Conservation is in tandem with heritage, as it operates in safeguarding a cultural or natural resource, retaining its heritage values and extending its physical life. It includes all work undertaken to remedy and mitigate deterioration in the condition of cultural or natural resources. In this context conservation includes not only preservation but more interventionist work, such as restoration or adaptation (adapted from New South Wales National Parks and Wildlife Service Department of Natural Resources and Environment, Victoria 2001).

As mentioned earlier,, tourism and heritage management (be it natural or cultural) are usually seen as two different and disparate sectors. As noted by McKercher and du Cross (2008, xi), '… in our journeys around the world over the past number of years, we have been continually amazed that cultural tourism and cultural heritage management (CHM) operate as parallel activities in most places, with remarkably little dialogue between the two. This fact remains even though CHM professionals and the tourism industry have mutual interests in the management, conservation, and presentation of cultural and heritage assets. Instead of working together to produce truly outstanding products, this historic isolation results in cultural tourism that is poorly provided for and executed …'.

McKercher and du Cross (2008, xi) went on to say that ' ... the result is many lost opportunities to provide quality visitor experiences while managing rare and fragile resources in a socially, environmentally, ethically responsible and sustainable manner

…'. In their book, McKercher and du Cross (2008, xii) aim to bridge the gap between cultural heritage management and tourism, and to show how both can work in partnership to achieve mutual benefits. The challenge posed to tourism, according to McKercher and du Cross (2008, 9), is to find a balance between tourism and cultural [and nature] heritage management – between the consumption of extrinsic values by tourists and conservation of the intrinsic values by cultural [and nature] heritage managers (McKercher and du Cross 2008, 10).

Although McKercher and du Cross wrote for the case of cultural tourism in particular, we can apply their argument regarding the partnership gap between tourism and cultural heritage management to the situation in Langkawi. While Langkawi's biggest selling point is its nature and scenic landscapes, it also has cultural attractions in the form of archeological sites, architectural structures as well as myths and legends. However, the responsibility to ensure that this natural and cultural heritage remain in good condition for present and future generations through conservation is not the sole responsibility of LADA or other government agencies rather it is a shared responsibility of all parties, whether government, private businesses, local communities, NGOs, or visitors. Hence, the formulation of a tourism policy and planning for tourism using 'heritage assets' have to be inclusive and sustainable, grounded in the principles of heritage conservation, environmental protection and community participation.

The International Council on Monuments and Sites (ICOMOS), in its International Cultural Tourism Charter adopted in 1999, aptly describes the challenging task to encourage co-operation among the diverse stakeholders: … 'Tourism should bring benefits to host communities and provide an important means and motivation for them to care for and maintain their heritage and cultural practices. The involvement and co-operation of local communities, conservationists, tourism operators, property owners, policy makers, those preparing national development plans and site managers is necessary to achieve a sustainable tourism industry and enhance the protection of heritage resources for future generations' (ICOMOS 2003).

De Larderel (2003), in her Foreword on the role of local authorities in sustainable tourism, notes that the responsibility of tourism development lies more and more with local authorities, as governance structures become more centralised. Many important policies that have an effect on sustainable tourism development such as zoning, environmental regulations, licensing, and economic incentives, are often in the hands of local authorities, acting within the framework of national policies and strategies.
The two objectives mentioned by ICOMOS above - 'to achieve a sustainable tourism industry and enhance the protection of heritage resources for future generations' and the role of local authorities in ensuring sustainable tourism development as mentioned by de Larderel above, are the core composition of what this article advocates – a sustainable heritage tourism development policy.

Mohd Shafeea et al. (2007: 91) acknowledge that '… conservation and tourism development are two conflicting activities, particularly in rural areas where agriculture and cultural landscapes are predominant. Thus, management plans and policies are necessary to conserve the natural characteristics of the area, and to take into consideration the social, economic and cultural needs of the local communities. Tourism, in general, is a very important element in the propagation of sustainable development in Malaysia, compared with industrial development. This is especially true in Langkawi, in which the main focus of tourism is its scenic beauty and recreational opportunities associated with nature … '.

It is thus heartening to note that both the Kedah Structure Plan (2002-2020) and the Langkawi District Local Plan (2001-2015), gazetted under the TCPA 1976, place emphasis on the protection and conservation of heritage in Langkawi. Chapter Four of the Kedah Structure Plan, for example, is dedicated to the tourism sector (pgs. 4-79), focusing on the plan to develop Langkawi into an international and domestic tourist destination vis-a-vis the intention to transform Langkawi into a highly reputable geopark in the world. Towards this end, the implementation plan includes conserving and protecting the physical environment and heritage of Langkawi, which are its main tourism products (pgs. 4-80), as well as protecting and safeguarding development in Langkawi Geopark so as to maintain its tourism attractions and natural heritage (pgs. 4-28).

Correspondingly, the tourism sector is also the main focus of the Langkawi District Local Plan (2001-2015). The Draft Executive Plan 2020 is formulated based on the development vision to make Langkawi a tourist destination with international status, environment-friendly and with a local identity, as well as improving the quality of life of the local people. Among the strategies to achieve this vision include: enhancing quality tourism development; implementing development which is in balance with local ecology; emphasising beautification and strengthening local identity image; and protecting and conserving natural resources and environmentally-sensitive areas (pg. 3).

It is also heartening to note that the Langkawi District Local Plan gave equal emphasis on both natural and cultural assets of Langkawi (pgs. 2-12). Langkawi's image as Isle of Legends will be strengthened through the promotion of its legends and myths, while its '99 Magical Islands' tagline will be sustained and its natural assets of forests, mountains and mangrove swamps will be protected and conserved to ensure that the ecological balance/equilibrium is not threatened. At the same time, the emphasis is also on consumers, i.e. attracting quality tourists who are not only willing to spend and stay longer, but also willing to experience and help protect Langkawi's cultural and natural heritage.

CONCLUSION

In the wake of the NCER development plan and the emphasis on tourism in the NKEAs, much remains to be seen whether the noble aspirations of both the Kedah Structure Plan and Langkawi District Local Plan will be heeded. Planning for economic development through tourism needs to work with planning for heritage conservation, as both sectors are dependent on the same resource, i.e. 'heritage assets'. There is therefore much potential for research in this area.

As geo-bio-cultural heritage tourism is based on the concept of utilisation without destruction, there is no conflict between this tripartite heritage conservation and management with tourism promotion based on these heritage assets. The promotion of geo-bio-cultural heritage tourism which includes geotourism through Langkawi's status as a tourist destination and also as a geopark will help to develop and promote knowledge-based tourists who will come to share similar values of the geological and cultural heritage of the places they visit (Ong & Sharina 2009), as well as culturally-informed local residents who feel a sense of ownership and responsibility towards caring for their own heritage.

It is hoped that the NCER and the NKEAs will see the need for the promotion of a particular brand of tourism in Langkawi, that is, 'sustainable heritage tourism', which entails (i) visits to geo, bio and cultural sites; (ii) 'edutourism' of geo, bio and cultural diversity; and (iii) understanding the symbiotic relationship or synergy between the geo and bio landscapes with the culture of the local people.

For the above to happen, a strong partnership between tourism planners and managers of heritage conservation has to be developed and sustained.

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PLACEMAKING, PLACE NAMES, AND LOCAL MYTHS AND LEGENDS

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Abstract
Place names can reveal a great deal about the history and cultural heritage of any populated area, besides unlocking a valuable store of information. Place name is also an important element in placemaking. It employs imagination, experiences etc which are then narrated and shared. These place names contribute towards creating a sense of place and identity and when they are erased or changed would lead to a loss of valuable heritage. As such, when engaging in placemaking of built environment or changing place names planners should build upon origin of place names, which form part of cultural heritage. Focusing on the origin of some place names found on the Langkawi island such as 'Kuah' ('gravy'), 'Belanga Pecah' ('broken pot'), and 'Air Hangat' ('hot water'), this article recommends that planning and placemaking in Langkawi Geopark be built upon these names, thus enhancing the sense of place as well as the sense of history of the local population.

Keywords: Cultural heritage, placemaking, place names, local legends, Langkawi Geopark

INTRODUCTION

Placemaking as a concept is generally regarded as the product of interaction between people and planning, management and use of the built and natural environment around

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them. It refers to the social practices of constructing a place and inscribing collective memories (Rubertone 2008:13). A place, on the other hand, is a physical geographical entity with a definable location or can be referred to as a 'portion of space in which people dwell together' (Agnew & Duncan 1989:1). However, what is remembered about a particular place is triggered, guided and constrained largely by visual 'landmarks', verbal accounts and other sensory stimuli (Tilley 1994, Bender 2001). As such places are both real and imagined, encompassing not only physical shape and character, but also mental associations. Harvey (1993) had said, that a place is both a physical reality and a social construct. Bird (2002) suggests that there are places (such as particular buildings, landscapes etc) that invite stories. The stories came to because there is something about the place that requires explanation. In this process of the making of place people are active participants. Within the context of their times, they construct places by investing them with human meanings. Leach (1984:358) wrote … "it is not just that "places" serve to remind us of stories associated with them; in certain respects, the places only exist (in the sense that they can be identified by name) *because* they have stories associated with them…"

Place names are created by people and as such can reveal a great deal about the fascinating history and unique cultural heritage of any populated area. It can unlock a valuable store of information, and even reflect the culture and heritage of the inhabitants. Cultural heritage can be broadly considered to include both the tangible and intangible aspects of human lives. Intangible heritage generally encompasses the general norms, values, beliefs and worldviews of a community and enshrines a community's character and identity. Through meanings, associations, values and ways of life, people individually and collectively create meaningful relationship with a place.

Place names also provide added attraction to particular destinations as they would provide certain captivating allure and appeal to potential visitors and tourists, especially to those who are interested in tracing the origins of place names. Sometimes the origin of place names is a mystery. Some can only be guessed, while other names are beyond imagination on how they had come about. Some of the narrations behind place names are grounded in myths and legends as much as in historical facts. Thus, place names form a rich heritage that makes up a large part of the popular and traditional culture. As such, when engaging in placemaking of built environment or changing place names planners should build upon the existing cultural heritage. Such is the case with the Langkawi island of Malaysia, an island known for its unique geological formation of more than 500 million years old, rich in history and culture as well as abound with myths, legends and folklores. This article is about the origin of some place names found on the Langkawi islands such as 'Kuah' ('gravy'), 'Belanga Pecah' ('broken pot'), and 'Air Hangat' ('hot water') within the context of placemaking. The qualitative approach employed in the research on which this article is based included document analysis (both

printed and narratives) of specific geographical locations, semi-structured interviews and observations. Document analysis of relevant articles, brochures and websites was used to uncover primary themes regarding place names. Semi-structured in-depth interviews were also conducted with key informants drawn from among tour operators, tour guides, local historical and cultural experts as well as local residents. To ensure data integrity, interviews were audio-recorded and supplemented with field notes.

PLACEMAKING AND PLACE NAMES

Since the dawn of time humans have always wanted to know their place in the universe. Attempts are made to discern meaning and order of the surrounding environment, that are then communicated via stories, rituals, layout of homes, sacred objects etc. Naming a place is a pre-eminent act of placemaking (Rubertone 2008). A place needs to be given a name in order to situate it within a knowable universe. It is also an attempt to make familiar what might otherwise be foreign, unfamiliar or even threatening and to a certain extent assert a form of possession. Through narratives or stories spatial features are turned into something that have meanings. This is because the environment is inseparable from human culture and place names are a reflection of the interplay between man and nature.

Environment in general – natural or built – are shaped or traversed in accordance with the needs, practices and desires of particular societies. Culture is that which enable people to survive in a particular environment – to express themselves in relations to it – although there is no guarantee that they will operate in harmony with it. People are always looking for narratives to make sense of themselves, consciously or unconsciously. This is as Somers had said (1997:83) it comes from the effort "… to make sense of the social world and through which we constitute our social identities…" By giving a place a name would also contribute towards creating a sense of place, identity and history. Sense of place involves the human experience in an environment, the local knowledge and the folklore. Sense of place grows from identifying oneself in relation to a particular area. Thus "… what begins as an undifferentiated space, become place as we get to know it better and endow it with value…" (Tuan 1977:6) and as Frake (1996: 235) suggested "... places come into being out of spaces by being named..."

Entwined in historical narratives and personal experience, a place can evoke memories and thus be remembered. Landscapes could also play an important role in how a place or location is remembered. Majority of place names have arisen as expressions describing certain properties of the locality that has been given the name. The names then could provide information about the natural and cultural circumstances at the time the names were given in the areas to which they belong. The place names provide some information about the locality of which they are named. Stories - folktales, myths or legends - are frequently recalled as people are passing by a specific geographical feature or the exact

place where a story takes place (Silko 1992:252). This is because once a place has acquired the story-based existence the landscape itself acquires the power of 'telling a story' (Leach 1984:358). Through stories about a place spatial boundaries are also drawn around a particular place. The boundaries may extend over a whole town, an area or just a particular space depending on where the story is situated.

In the process of naming a place in placemaking, in order to distinguish one place from another, imaginations, experiences, events, interactions with particular landscapes are employed. Explanations are then narrated and shared. In this article imaginary is understood in a broad sense. It refers to the way ordinary people 'imagine' their social (and physical) surroundings and this is often not expressed in theoretical terms, but is carried in images, stories and legends. It is shared by a large group of people if not the whole society (Taylor 2002:106). Imaginary also refers to how people perceive or imagine things to be, that is "… to see a thing what it is not, to see it other than it is…" (Castoriadis 1987:127).

Thus, imaginaries are not necessarily based on facts or correspond to acknowledged facts or criteria. It does not necessarily constitute an established reality although it can be understood as a social construct. Rather, it could be a manifestation of how the ordinary people think or imagine their surroundings to be that are then shared by certain groups of people. Anderson, in his work on the '*Imagined Communities*' (1991) uses the term 'imagined' because "… the members of even the smallest nation will never know most of their fellow-members, meet them, or even hear of them, yet in the minds of each lives the image of their communion …" (Anderson 1991:6). This is the same with place names. Inhabitants of a particular place for example have a shared understanding/ knowledge of the origin of the name of their place of residence.

PLANNING, PLACEMAKING AND PLACE NAMES

Generally planners deploy site-specific placemaking as an economic development and tourism strategy, while cultural institutions and community-based organisations operate through activities that reflect the specificity of place, culture, history and community. Planners often employ the most visible aspects of placemaking to promote tourism for instance and external recognition at the expense of the locals. At the same time the locals may seek to derail those efforts if planners fail to align with the local definitions of a place and thus give rise to community concerns. Thus, oftentimes there exist tensions between these place marketing and community building that tend to obscure or defeat common goals and interests. As such, there is a need to ease the tension through consensual strategies for change in order to preserve an important and valuable site or heritage - be it cultural, physical or geological.

Planners should be aware that a place has truth not just based on the facts of its existence, but also on the things believed to be true about it (Wortham-Galvin, designobserver.com/media/pdf/mythologies_of_497.pdf). As they seek to shape the built environment of a place, they must seek to legitimise their actions by infusing them with local qualities that can attract those who seek authentic, place-based experiences. Myths and legends can become a powerful design and planning tool if deployed judiciously. This is because myths and legends are always embedded within a place. Changing names or reducing a neighbourhood to rubble in order to make way for a more profitable project can mean having committed a sacrilege even if the planner is unaware of the implication. This is because the erasure of places or change of place names would mean established patterns of human relationship could be destroyed. Therefore, planners should directly engage those who reside in the vicinity before making changes, or build upon the existing cultural heritage (myths, legends, relationships etc) in shaping or remaking a space. Within this context, Langkawi is at present undergoing rapid change and development, after its seven-generation long hiatus as a result of the "Mahsuri's curse". In line with the objective to develop and transform new places are planned and created and given new names, while some existing ones are redeveloped or recreated and renamed. In the process the myths and legends that underlie the place names could be placed under threat or even be lost if planners are not sensitive to this invaluable cultural heritage. Should that happen the taglines such as "99 magical islands" or "isles of legends" that have been accorded to Langkawi islands could become meaningless.

LANGKAWI ISLAND: LEGENDS AND ORIGIN OF PLACE NAMES

Langkawi – an archipelago of 99 islands – located just off the shores of the Northern Kedah State in Peninsular Malaysia is famous for its beaches and its tranquillity besides having been conferred the global geopark status by Global Geopark Network (GGN) and endorsed by UNESCO besides having been declared a duty-free island by the Central Government of Malaysia. Of the 99 islands only three are inhabited – Langkawi islands, Tuba islands and Dayang Bunting island (island of Pregnant Maiden). Most of the islands' population is found on the largest and main island – Langkawi Island that measures 478.5 sq km. The Langkawi archipelago has a total population of approximately 103,075 (Langkawi Development Authority 2010).

The island landscape is painted with mountains, towns, villages, paddy fields, sandy beaches, caves and rainforests dating back millions of years. The sedimentary rocks on this island are reputed to be among the oldest in Malaysia dating back some 500 million years. The island encompasses historical sites, geological wonders, beautiful natural landscapes and a wealth of local culture and traditions.

The island possesses long geological history that dates back to the early Cambrian period (Mohd. Shafeea Leman et al. 2007), with unique geodiversity and geological landscapes, which form many geoheritage sites. Among the main attractions of Langkawi Geopark are its oldest rock formation of high geological value, pristine beaches and education based tourism. Within the Langkawi Geopark are located three geoforest parks: the Machincang Cambrian Geoforest Park, Kilim Karst Geoforest Park and Dayang Bunting (trans. Pregnant Maiden) Marble Geoforest Park.

Picture 1 & 2 : Gunung Raya - highest mountain on Langkawi islands formed of granite rock

Source: Courtsey of Tanot Unjah 2011

Forming the backbone of the island are two prominent mountains called *Gunung Raya* (Raya Mountain) – the highest mountain on the island standing at approximately 881 meters (Picture 1) and Gunung Machincang (Machincang Mountain) – the oldest geological formation - standing at 708 meters (Picture 2). Gunung Machincang with its rugged topography was the first part of Southeast Asia to rise from the seabed in the Cambrian period more than 500 million years ago. In-between the two mountains and seemingly to separate them is a third and smaller mount called Bukit Sawar (Sawar Hill) (Picture 3). Local legend believed that the three were actually local giants named Mat Chincang, Mat Raya and Mat Sawar who had been turned into rocks in the form of mountains. The story of how these three giants became 'mountains' provides the backdrop of this article on the origin of some place names in Langkawi islands within the context of cultural heritage and planning for placemaking.

Picture 3 : Locations of Mount Machincang, Mount Raya and Sawar Hill

Source: Courtsey of Tanot Unjah 2011

Langkawi is a bound with myths and legends. However, many of these tales exist in the form of oral traditions, although efforts have been made to document them (eg. Mohamed Zahir Haji Ismail. 2000). Many of the early attempts on documenting the myths are mainly in the form of anecdotes or brief descriptions of particular myths and legends, which focus on the magical or supernatural aspects (Norhanim Abdul Razak 2010). While some of the legends have some basis in truth and historical events, others have made the natural landscape come alive with fantastic beings. It is believed that centuries ago skilled storytellers spun wondrous tales of folklores, history, myths and legends regarding celestial beings, demons, giants, warriors, heroes and beautiful maidens. These stories were then handed down from generation to generation mainly through oral tradition. These myths, legends etc are still strongly woven into the lives of the local people who are quite convinced of their authenticity. Also there could be more than one version of the narration to explain the possible origin of a place name.

The name Langkawi for instance is believed to have originated from the combination of the presence of the many eagles on the island and the geological wonder of its landscape. The most dominated faunal species in the area is the Brahminy Kite, while marble or kawi (in Sanskrit) is found in excess on the islands. The combination of the two words 'helang' (eagles in Malay) and 'kawi' had produced the moniker 'helang-kawi', which was eventually shortened to 'Langkawi'. In his book *Legends of Langkawi* (2000), Mohamed Zahir Haji Ismail narrated that the name of the Langkawi islands originated from a combination of two words to mean many beautiful islands. 'Langka' is Sanskrit for beauty and 'kawi' means innumerable.

TRACKING THE LEGEND OF *GUNUNG MACHINCANG* AND *GUNUNG RAYA*

As mentioned earlier Langkawi is rich with myths and legends. The fact that many are not scientifically or historically proven only enhances the mystery that surrounds the island. Of the many myths and legends, the fight between two giant warriors Mat Chincang and Mat Raya is the most dramatic. It is said that the damage caused by the fight gave rise to the names of many places in Langkawi including Gunung Machincang, Gunung Raya, Kuah, Ayer Hangat, Tanjung Chincin, and Belanga Pecah. However, this article only highlights the place names that are believed to have their origin in Gunung Machincang and Gunung Raya.

As the legend goes, centuries ago there lived two feuding giants called Mat Chincang and Mat Raya. A third giant, Mat *Sawar* (*sawar* is colloquial for *sabar* or patient), attempted to reconcile them. As fate would have it, Mat Raya's son and Mat Chincang's daughter fell in love with each other and wanted to marry. Although Mat Chincang was not in favour of the plan, he nevertheless consented. Mat Raya, on the other hand, welcomed the union as he thought that it would help heal the animosity that had long existed between the two families. However, during the marriage ceremony an argument broke out between the two giants, which then led to a fight. The ferocity of the fight resulted in the pots and pans and other utensils used to prepare the wedding feast being flung to

PICTURE 4: Sculpture located at Legend Park symbolises the fight between Mat Chincang and Mat Raya

The fracas and pandemonium disturbed the sleep of *Sang Gedembai* of Gua Cerita (Cave of Legends), a wicked giantess witch who would cast deadly spells on anyone who displeased her. Furious on being disturbed from her sleep she cursed the brawling giants and transformed them into the island's major stone mountains. Mat Chincang turned into Mount Machincang and Mat Raya became Mount Raya. It is believed to this day that they still remain locked in stone watching over the island (Picture 4). Mat Sawar who had tried to mediate between them and break up the fight was unfortunately caught in the process and was transformed into the hill called *Bukit* (hill) *Sawar* that now separates the two mountains.

various parts of the island. Where the pots and pans and their contents landed emerged villages, towns and island with names to commemorate the events.

The jagged bare look of Mount Machincang gave rise to the story that Mat Chincang was slashed and chopped to death by Mat Raya. By contrast, Mount Raya has a smooth formation that has been used to support the story that Mat Raya had welcomed the marriage between his daughter and Mat Chincang's son. Also, he did not start the ill-fated fight.

LEGENDS AND THE ORIGIN OF PLACE NAMES

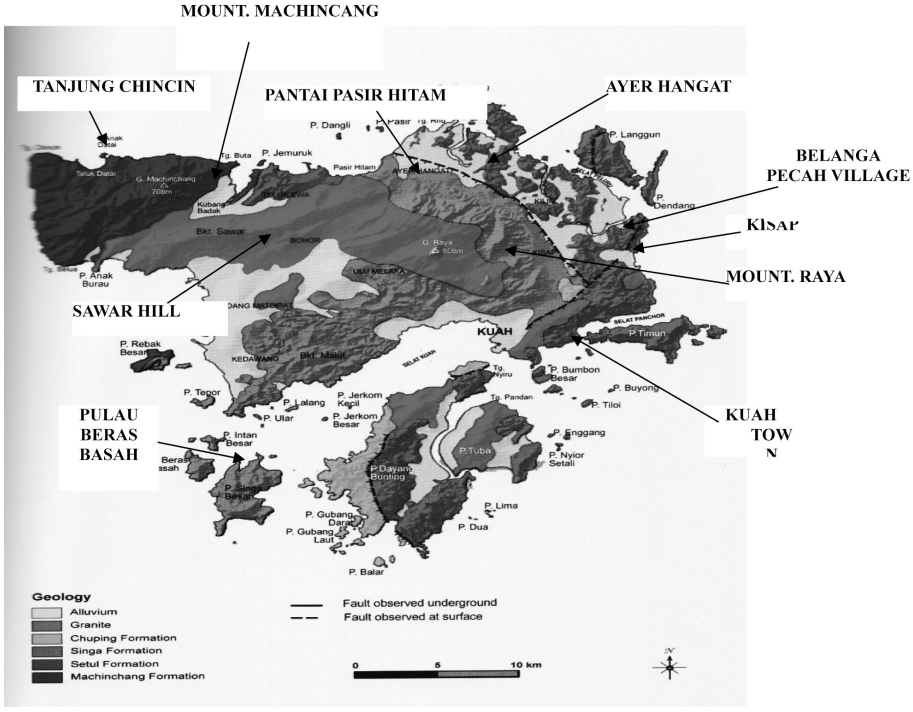
As mentioned earlier, so intense was the fight between the two giants that pots and pans flew and the earth shook. On being kicked a big pot containing gravy broke and its contents spilt to the ground. The spot where the contents spilt grew into a place known as *Kuah* (gravy) and where the broken pot landed emerged the village called *Belanga Pecah* (broken pot).

Kuah, situated on the south-western tip of the main island, is the largest town and port, where ferries from the mainland and the island of Penang anchor (Picture 5). Meanwhile during the tremor that resulted from the fight, a cauldron tipped over, spilling the hot water inside it. The spot where the water spilt has since been known as *Ayer Hangat* (hot water) where hot springs can be enjoyed.

As has been illustrated for the population of Langkawi Island, particularly the local residents, the towns described have stories, or narratives that bring these places to life. They are narratives of places that are shared among people about specific geographical locations (Bird 2002:521) and which had given them and the place their social identities.

Picture 5 & 6 : Tanjung Chincin

MAP 1 : Place Names that are Believed to Have its Origin in the Legend of Mount Machincang and Mount Raya

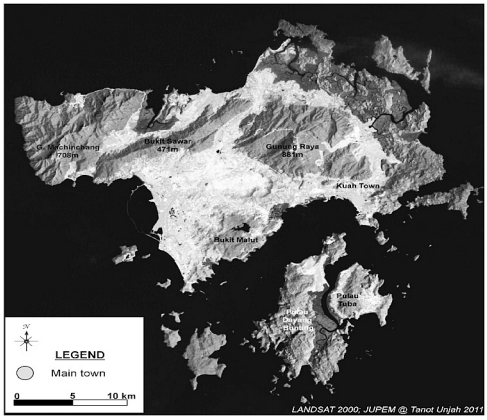


Source: Mohd Shafeea Leman et al. 2007: 47

PLACE NAMES: LEGENDS AND GEOLOGICAL EXPLANATIONS

For the sceptics, the origin of these curious place names may be pure fiction, a figment of the imagination. However, before scientific explanation was discovered Man had to make sense of their surroundings so as to have some form of identification and some sense of identity. Based on the people's beliefs at the time and the lack of scientific explanation had probably led them to visualise what could possibly had happened and gave an explanation that stretched beyond human knowledge and into human imagination. The legend of Mat Chincang and Mat Raya, like most of Langkawi myths and legends not only persist but, actually grow stronger. These legends, myths and folklores have not only become part of the local intangible heritage, they have also become another tourists' attractions of Langkawi islands.

MAP 2 : Map Showing the Geological Formation of Langkawi Island



Source: Courtesy of Tanot Unjah 2011

If we are to base on scientific explanation of place names, observation of the geological landscape of Langkawi shows that some of the landscapes that are related to the legends can be classified based on the various types of rocks to be found on the island, particularly where the places are located. The rocks have different structures, the result of the different weathering processes involving the various natural elements. For example Mount Machincang probably got its name from its jagged peak – naturally eroded fractured sandstone layers that have often been related to the legend of Mat Chincang and the possible origin of the name Machincang (Mohd Shafeea Leman et al. 2007:50). Mount Raya, on the other hand, is of granite rock from the igneous stock represented by broad conical hill with gently concave flanks (Mohd Shafeea Leman et al. 2007:60).

The movement of the Kisap Thrust Fault can be related to the existence of the hot salt-water springs at Ayer Hangat (hot water). Based on the geological explanation, Tanjung Chincin forms part of the anticline fold in the Machincang rock formation (Tanot Unjah 2011). A ring-shaped formation found in this area is the result of a fault on the sandstone layer due to sea erosion. The ring is said to be visible only during low tide (Picture 6).

The geological explanation shows that there is a close relationship between the natural landscape and the local people's desire to make sense of their environment. Based on observation and imagination stories to explain were then given, which were then handed down from generation to generation in the forms of folklores, myths or legends.

CONCLUSION

A place and placemaking do not exist in a cultural vacuum. It is always undertaken in relations to the realm of cultural practices and human experience. The practices of placemaking and the experiences of a place must be understood as socio-culturally and politically organised. It is a dialectical engagement of socially, historically, and culturally constituted schemas of practical activity with worldly circumstances. In that regard place names are an important part of the geographical and cultural environment and care must be taken to protect the place name heritage. This is because place names identify geographical entities and represent irreplaceable cultural values of vital significance to the people's sense of wellbeing and sense of place. In a rapidly changing and developing society planners and the society in general must ensure that in place naming process by planners and administrators, cultural heritage is protected and taken into serious consideration. In fact planners should harness and capitalise on the existing myths and legends of Langkawi islands to enhance and sustain the sense of place, the sense of belonging and even the sense of history of the local population.

The history of Langkawi is intricately entwined with the many tales, myths and legends, many of which have been handed down by word of mouth from generation to generation. The legend that is associated with Mount Machincang, Mount Raya and other related places demonstrates the imaginaries and visualisation regarding mountains that have been handed down through generations. Each tale relates to the shapes of the respective landforms thus giving reality to the stories told. Such imaginaries of place names and their association with the natural landscapes contribute to the richness of the local cultural traditions. Although the narrations are regarded as mere myths, legends or folklores, the references still suffuse life to this day in the island of Langkawi despite the scientific explanations given. These stories besides making fascinating reading also tell us a great deal about how people in the past saw and understood the world around them. These stories also give an insight into the richness of traditional cultures in associating themselves with nature and environment.

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INTRODUCING NETWORKS IN PLANNING: AN EXAMPLE FROM LANGKAWI

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Abstract
This article introduces networks as a potential technique in participatory planning and implementation activities, including community activities, social events, projects, and conference events. This recommendation is backed by findings of some networks-like characteristics indicated in past and present work relationships between relevant government and private stakeholders in a study of a few Langkawi Geopark activities. The findings were obtained from an analysis of some geopark activities and interview data given by various public and private stakeholders. The relationships had led to the successful completion of various geopark activities. This article argues that the relationships have the potential to be developed into effective networks of relationships in future geopark activities. Therefore, relevant authorities, policy makers, managers, administrators and planners could consider developing existing stakeholder relationships into actual networks in their future consultation programmes with all stakeholders. This could be achieved by using networks as a technique in planning and development.

Keywords: Langkawi Geopark, networks, networks technique, networks characteristics, planning

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INTRODUCTION

Langkawi is an archipelago of 99 islands. It is situated in the northern part of Peninsular Malaysia in the state of Kedah. Most local economic, social, cultural and political activities take place on the main island i.e. Langkawi Island. Langkawi has the oldest rock formations in Malaysia with the age of the rocks and other geological resources being about 500 million years old dating back to the Early Cambrian period (Mohd Shafeea Leman et al. 2007). Langkawi is also rich in cultural, historical and ecological heritage. The whole archipelago was declared a geopark by the Global Geopark Networks (GGN) initiatives under UNESCO in June 2007. By end of September 2011 there is a total of 87 global geoparks in 27 countries that are currently members of the Global Geopark Network (GGN) with about 32 geoparks in Asia Pacific. Langkawi is the only geopark in Malaysia and it is the first geopark in Southeast Asia.

A geopark is "… a geographical area where geological heritage sites are part of a holistic concept of protection, education and sustainable development" (UNESCO 2010). Sustainable development requires local awareness of geo-bio-cultural heritage values and the need to preserve and conserve the related resources. It is imperative for Langkawi to maintain the geopark status for years to come. Langkawi has to consistently demonstrate its capability in improving sustainable conservation and development of its islands through good conservation and development activities, programmes, projects and others. The authors of this article, with other research team members, conducted a qualitative study from 2009 to 2011 to understand the current governance of heritage conservation and sustainable development in Langkawi Geopark. Semi-structured interviews were conducted with various key stakeholders. A baseline study was also carried out to measure the locals' understanding and awareness of geopark. Besides that, stakeholder consultation workshops, non-participation observations and analysis of some geopark activities were also carried out between 2009 and 2011 (Chan et al. 2010, Halimaton Saadiah Hashim et al. 2010, Ong et. al 2010a, Ong et al. 2010b, Rahimah Abdul Aziz 2011, Sharina Abdul Halim et al. 2010). The semi-structured interviews were conducted with Langkawi Development Authority (*Lembaga Pembangunan Langkawi* in Malay or LADA), Kedah state government agencies and Langkawi local authorities, NGOs, retailers and hoteliers, school authorities and students, and village communities. The workshop consultations, conducted from January 2011 to May 2011, involved interpersonal dialogues with LADA, some Kedah State government sectors, key Langkawi local authorities, some NGOs, some private sectors (i.e. hoteliers), many village community organisations and teachers and primary and secondary schoolchildren. LADA, an entity under the Ministry of Finance Malaysia, is the main coordinator of Langkawi Geopark and socio-economic development.

Various viewpoints given by the interviewees and stakeholders cover the following issues: 1) geopark management; 2) the role and nature of LADA; 3) the role and nature of other stakeholders' participation in geopark activities; 4) geopark development action plans of participants and other stakeholders; 5) problems and challenges faced by other stakeholders and the public in terms of participation in the activities and geopark management; and 6) suggestions for improvement of stakeholder participation in geopark development.

The study on geopark activities focused on stakeholder work relationships and cooperation in carrying out the activities. Data was obtained from face-to-face meetings with some key officers from LADA which was the main organiser. For practical reasons, this article only quotes two examples to support its arguments. The first example is the Langkawi Geopark Carnival (*Karnival Langkawi Geopark* in Malay language) that was recently held in Langkawi on 31 May-4 June 2011 and ended successfully. The second event is the 4th International Conference on Global Geoparks by the main organiser LADA and held in Langkawi in April 2010. Both activities generally revealed the presence of a series of work relationships between LADA and several local level agencies, Kedah state authorities, non-governmental organisations (NGOs), some village community organisations, hoteliers, schools and the local people of Langkawi. Some evidences of good cooperation between these stakeholders were revealed. Data from interviews and workshop consultations also confirmed the presence of work relationships between LADA and some stakeholders. The data confirmed that these stakeholders are always involved and cooperating in various similar activities organised by LADA. Because of that, they always meet, interact and are closely connected and interlinked. They also share some viewpoints, ideas, principles, sentiments, understanding and awareness concerning Langkawi Geopark, and their roles, functions and involvement in geopark development.

Although the existing relationships have not been explicitly recognised by the stakeholders (or anybody for that matter) as taking the form of "networks", in the view of this article, some relationship features resemble particular networks-like characteristics conceptually, theoretically and empirically. For a start, the work relationships demonstrated "connectedness" (ties) between people who were working together. Connectedness can lead to networks formation. This suggests that the existing work relationships have the potential to develop into proper networks relationships that would eventually bring about more effective geopark development in Langkawi. This article proposes that existing work relationships can be improved and would be more effective if they are in the form of networks. Planners, administrators, managers, policy makers or any relevant authorities can take cognizance of networks as a potential technique in the planning, managing, directing, implementing and monitoring of any geopark activity; that is in the governing of the activity. If this technique has yet to be applied in the planning of sustainable development and heritage conservation activities in Langkawi Geopark, then

it is probably a novel effort in the geopark context. Not many academic studies have been conducted about networks in relation to planning, sustainable development, heritage conservation and generally geopark contexts. Therefore this article is an early attempt to propose networks as a technique for effective planning, particularly of future geopark activities in Langkawi or of participatory planning and implementation in general.

PLANNING FOR NETWORKS, NETWORKS FOR PLANNING

Networks are about connectedness. They are ties or relationships, or social ties if they are between people. But, why networks as a technique in planning? Why must planners, administrators, managers, policy makers, relevant authorities, researchers, or simply anybody pay attention to networks? What is so important about networks? In Christakis and Fowler's words (2009: xi), "… The key to understanding people is understanding the ties between them ..." and, "… To know who we are, we must understand how we are connected …" (2009: xiii). They opined that "… connections affect every aspect of our daily lives …" (Christakis and Fowler 2009: 7). Social networks are all around us, "... exerting both subtle and dramatic influence over our choices, actions, thoughts, feelings, even our desires …" and our "… connections do not end with the people we know …" because beyond "…our own social horizons, friends of friends or friends can start chains of reactions that eventually reach us ..." (Christakis and Fowler 2009: 7). For Field, (2003: 1) "… relationships matter …". For Christakis and Fowler (2009: xiii), "... our connections to other people matter most, and that by linking the study of individuals to the study of groups, the science of social networks can explain a lot about human experiences …".

In a basic networks theory, we shape our networks, and at the same time, our networks shape and affect us. Shaping our networks means we establish ties or networks with people who share our interests, histories, dreams, aspirations, views, ideas and others. This is the homophily theory of networks. We determine who we want to connect with, who and how to influence, who to learn from, how many ties and connections we want to create, how to achieve our goals, and we also control how central we are in the social networks. At the same time, the people whom we connect with (our networks) influence and affect how we think, what we do, how we feel, what we want, how to achieve our goals, what choices to choose, who to copy or learn from, and others. Networks allow people to do more things and different things than they can do as individuals; it is like saying the whole is greater than the sum of its parts (Christakis and Fowler 2009: 9). People who connect into groups (networks) are able to do things that a disconnected collection of individuals cannot. For Field (2003: 1), "… by making connections with one another, and keeping them going over time, people are able to work together to achieve things that they either could not achieve by themselves, or could only achieve with great difficulty …". Hence, networks bring benefits to the connected people. However, networks can also be destructive if not well managed.

Two fundamental aspects of networks exist – 'connection' and 'contagion' (Christakis and Fowler 2009: 16). Connection is just ties between entities, e.g. people. Contagion pertains to what flows through the connections and the reasons for the flows to occur. To understand why and how networks (i.e. social) exist, why people connect and why networks is important in planning and implementation, we must first understand certain fundamental rules regarding the connections and contagion, i.e. the *structure* and *function* of networks. Structure is about how connections are assembled and configured. Function is about the connections, i.e. about what the connections are for, how do the connections spread, why people make connections, what they 'use' to make connections, and what benefit they can get from the connections.

Since the beginning of the twentieth century, many researchers, anthropologists, sociologists, political scientists, mathematicians, economists, managers, administrators, medical practitioners, psychologists, criminologists and others use networks to understand and explain various aspects of social and daily lives. The aspects include social interactions; social group unity; ethnic conflict; organisational behaviour and growth; work productivity, behaviour and motivation; managerial performance; spread of diseases; love and romance; deviance and criminal behaviour; friendship development; education issues; job seeking and recruitment; corporate elite power; work citation; community development; community participation; emotional contagion or spread of emotions; communication process; inter-organisational relations; immigration patterns; work cooperation; marriage and family lives; personality development; business-politics relations and gangsterism.

The famous Hawthorne studies by psychologist Elton Mayo conducted in the Western Electric Company in the 1920s utilised sociograms to study patterns of social interactions and group behaviour among a group of workers in the company (Mayo 1933). Sociogram, which is a visual networks representation of patterns of social interactions, is an outcome of the mapping and analysis of the interactions in a systematic manner. The workers who were found to be closely connected to one another and mutually influencing had a higher level of work productivity compared to those who were not. Anthropologist Bruce Kapferer analysed social interaction, change and conflict in African workplaces such as a garment factory using sociograms and networks theory (Kapferer 1972). Kapferer's mapping of social interactions using networks analysis allowed him to predict worker strike activity, and uncover particular flows of organisational power and influence that had facilitated effective worker mobilisation. Chan's (2004, 2005, 2007, 2008, 2009) utilisation of networks method led to her discovery of big business formation (patterning of the business group structure) in Malaysia based on formal organisational networks (i.e. interlocking directorships) established in conjunction with particular types of social networks such as friendship ties, ties to the state as ex-state bureaucrats and ties based on professional organisation memberships. The networks also indicated particular patterns

of business-politics relations primarily evident at the top corporate sector in Malaysia. For Chan, social networks are a potential form of social capital. Nicholas Christakis, a medical doctor, and James Fowler, a political scientist, collaborated to apply the networks method to study the spread of happiness, disease epidemic, weight gain, friendship ties, loneliness, the finding of partners and others through social networks (Christakis and Fowler 2009). They found that people's connections affect the way they think and do but at the same time, they shape their networks to determine how to and what they think and what to do. Granovetter's (1973) interesting networks study among a group of technical, managerial and professional workers in a Boston suburb on job recommendation based on personal contact discovered that people with relatively weak networks established with distant friends and strangers got recruited at a relatively faster rate than people with relatively strong ties formed with close friends. His famous 'strength of weak ties' theory still stands strong even today. Burt (2010) found that an actor' position in an organisational networks has an impact on its power, influence and reputation, and peer evaluation, be they a manager, chief executive officer, banker or analyst. Positions may be in terms of bridging between different networks or staying put in a single network.

Promoting planning for networks and networks for planning shall begin by firstly elaborating the structure and functions of networks. Elaboration on the application of networks technique into geopark activity planning follows. In this article, planning refers to general planning in various fields such as infrastructure and utility planning, neighbourhood planning, land use planning, community planning, tourism planning, public participation process in planning, project planning and others.

UNDERSTANDING NETWORKS

Anyone who wishes to engage networks as a technique in planning should be aware of the following aspects of networks: key networks elements, networks formation and maintenance (networks stability), networks structural qualities, and networks merits. They explain the *structure* and *functions* of networks.

Key Networks Elements

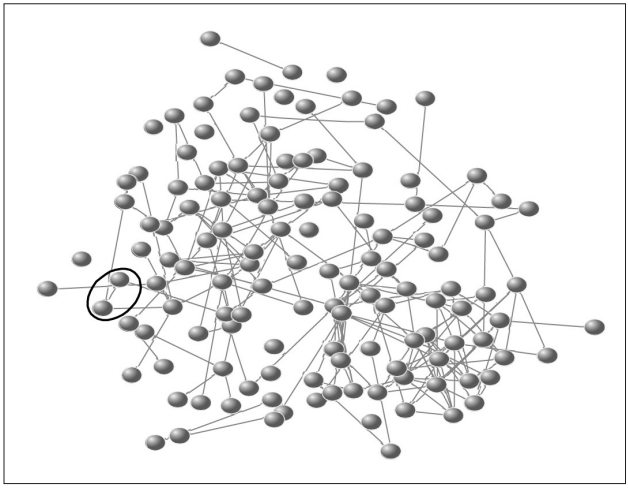
Barney (2004: 2) stated, a network exists when many people interact and are interlinked, and also interact with and interlinked to many other people simultaneously, normally at one point in time and usually by many ties or a series of ties, which cross the ties connecting other people (see also Scott 1991). At the most basic organisational level in any social reality, two persons create a dyadic tie when they interact but a network emerges when those two persons and others are simultaneously interlinked and create a series of relationships or linkages (Scott 1991, Wasserman and Faust 1994).

In networks terms the people who are interlinked are called 'nodes'. Nodes could be firms, organisations, computers, events and others (Barney 2004, Scott 1991). The ties are 'relationships' or connections established between the nodes; called 'social relationships' if they are between people or organisational networks if they are between organisations (Barney 2004, Scott 1991). Figure 1 reveals a hypothetical visual representation of networks graph (networks of connections between nodes e.g. persons) (Christakis and Fowler 2009 http://www.connectedthebook.com/pages/slides.html 21 October 2011). Various patterns and types of relationships are visible in networks. For Wasserman and Faust (1994: 6), patterns of interactions revealing regularities lead to the emergence of a 'structure' of networks. 'Ties' also reveal the roles that nodes play in the networks. 'Nodes' and 'ties' are two of three key networks elements. Networks formation, maintenance and stability may be ensured through frequency of interactions and meetings, and regularity of actors' participation. This means that the same actors meet one another in various different meetings or events.

Figure 1: A Hypothetical Example of a Network Graph based on Connections between Network Actors (Nodes)

Node = a network actor (e.g. person)

Lines = connections or ties between nodes



Dyad – a connection between two persons

NOTE: The network graph shows that most nodes are connected. However, some nodes are connected to several or many nodes establishing series of connections. Some nodes are isolates (not connected to any node). The graph demonstrates various pairs of nodes creating dyads and various dyads creating the connections.

Source: Christakis & Fowler 2009 http://www.connectedthebook.com/pages/slides.html 21 October 2011

The third networks element is 'flows' which show what pass between and through the nodes along ties (Barney 2004: 26). This is the contagion aspect of the network, which demonstrates the function of networks. Flows can be in the form of gossip, data, money, camaraderie, support, emotions like love or hate, aid and others (Barney 2004: 26); all tangible and intangible in nature. 'Flows' indicate the reasons behind networking or function of networks, e.g. why people establish networks. Therefore, to understand our own human and social action and behaviour, we must understand the connections and their characteristics, i.e. the 'flows' and their functions that define the connections. For instance, 'flows' may inform that people interact and establish networks because they want to get something from each other or exchange something with one another. Moreover, similar 'flows' may facilitate the networking, for instance, similarities in terms of knowledge; need for mutual support and respect; emotions; interests; backgrounds; economic status; viewpoints; mindsets; principles, beliefs and values; and others. As mentioned earlier, we tend to connect with people who have something in common with us. Similar 'flows' may then encourage actors to use their connections to achieve or obtain something together that may otherwise be difficult to achieve if they are on their own. If they do not establish networks, 'flows' that are similar may just stabilise, support or sustain the networks.

Another aspect to consider about networks is that levels of networking vary. Individuals can network with other individuals, individual can network with formal social systems (organisations) or informal social systems (groupings), or organisation can network with other organisations. In short, levels of networks are seen at the individual and systemic levels. Formation of networks can begin from the individual level, i.e. a single individual forming a series of network links with other individuals. The resulting networks are called ego-centred networks. Anyone using the networks technique or analyse a network would need to start tracing the network from that particular single individual, or encouraging that single individual to establish networks with others. In comparison with the ego-centred networks, their formation at the systemic level requires several or many individuals making effort to form networks with many other people at the same time. This is a networking technique at the systemic level. Network formation is encouraged by getting several people to form networks with each other at the same time or in one instance. Analysts who study networks or use the networks technique would also need to trace all those people who conduct the networking. Besides, network actors can build networks with other actors regardless of social and economic status, level of education, gender, age, social backgrounds, level of positions or roles, ethnicity, nationality, seniority, and others. Networks cross cut all these aspects, thus making them horizontal and vertical or top-down and bottom-up in nature, across space and time.

NETWORKS STRUCTURAL QUALITIES

The following paragraphs further elaborate the structure and functions of networks. The nodes, ties and flows have distinctive structural qualities. For Barney (2004: 26-27), the qualities are "… centralized, decentralized (i.e., multicentred), or distributed (i.e. centreless); hierarchical or horizontal; bounded or boundless; finite (i.e., with fixed limits on the number of nodes and ties) or proliferating (i.e., with no limit on the number of nodes and ties); accessible or inaccessible; inclusive or exclusive; intensive (i.e., few nodes linked by a multiplicity of dense, strong ties) or expansive (i.e., many nodes linked by relatively sparse, weak ties); interactive (i.e., enabling reciprocal, multidirectional flows) or non-interactive (i.e., enabling only one-way, uni-directional flows) … ". Beside 'nodes', 'ties' and 'flows', sub-networks can exist within a network and many networks can be connected to many other networks. Moreover, some networks may overlap with one another. The meanings of these qualities are generally about networks actor centrality (seen through network positions and roles), networks density and centralisation, networks cohesion, networks groupings and sub groupings (cliques) and others. They indicate nature of social roles, liaison, prestige, social cohesion, reciprocity, mutuality, exchange, influence, dominance and conformity. Network structural qualities and their meanings explain a lot about network functions and benefits.

NETWORKS FUNCTIONS AND BENEFITS

Apart from knowing the three main networks elements and their structural qualities, anyone who utilises networks as a technique also ought to be aware of the functions of those structural qualities. Generally, the awareness of networks significance in social living is highlighted by the fact that we, human beings, tend to organise many forms of social living, daily and working lives around relationships specifically in the form of networks, and are able to get things done through those networks. In other words, in order to live and survive in the social world, we create, shape, affect and influence networks, but at the same time, networks also affect, influence, shape and even control us as we are always surrounded, affected and influenced by other humans, including the ones we build networks with.

In most cases, characteristics of our human and social action (human and social behaviour) arise out of structural or relational processes in our networks of relationships and interactions and not independently of that. Our human ability to get things done arise out of our networks and interactions in a social context. This means that our human behaviour is not always reduced to our individual properties (not innate or in-born) but to the structural properties of our networks; in simple understanding, who or what we are, what we do and the way we get things done is determined by who we interact and have relationships with, and the sort of relationships that we have. It is like saying the whole

is greater than the sum of its parts. People connected into groups (networks) are just able to do things that a disconnected collection of individuals sometimes cannot. Therefore, to understand our own human and social behaviour and action, we must understand the characteristics of our connections or networks. The explanation of various network functions and merits directly relates to this basic networks theory.

Depending on the kind of structural qualities and the related meanings and levels of networking, networks in one way or another function to help people get involved in the networks to better achieve individual/personal, organisational, social (e.g. groupings, communal), economic, business and political goals. Networks (social context) may enable and/or constrain human and social actions and outcomes. Wasserman and Faust argue that the difference between a social network's explanation of a process or phenomenon and a non-network's explanation is the "… inclusion of concepts and information on relationships among units …" (e.g. people) in a study (Wasserman and Faust 1994: 6). For them, the task of networks researchers is to identify "… properties of the social (economic or political) structural environment, and how these structural properties influence observed characteristics and associations among characteristics …" (1994: 8).

If effectively utilised, networks have 'emancipatory potential' whereby they can "… inform actors of non-obvious constraints and opportunities inherent in patterns of social connections …" (Kilduff and Tsai 2003) or networks. General functions/ merits of networks are the following: (1) networks can assist in obtaining resource or resource exchange (e.g. information/data, knowledge, money); (2) increase resource-sharing; (3) ensuring cooperation, coordination and collaboration; (4) bringing about social or organisational unity; (5) preventing group fragmentation; (6) building and maintaining trust between people; (7) generating or constraining interpersonal, social and organisational influence, power and control; (8) moderating and mediating conflict; suppressing or advancing individual interests; (9) developing strong or weak bonds of moral support in communities and organisations; (10) improving social interaction; (11) producing effective social mobilisation and social movement; developing or constraining social and interpersonal communications; (12) improving communication flows; (13) increasing business profits; (14) enhancing organisational growth; (15) promoting social identification and friendship formation; (16) enhancing work performance and productivity; (17) providing the opportunity to adopt opinions and acquire skills; (18) to strive for outcomes; and (19) enhance social capital (see Kilduff and Tsai 2003 for details of the theories, concepts and theoretical ideas).

NETWORKS IN PLANNING, PLANNING FOR NETWORKS IN LANGKAWI GEOPARK

Planners undertaking participatory planning of Langkawi Geopark development activities can incorporate networks technique into their mandatory and non-mandatory consultations: interpersonal dialogues, workshops and others with stakeholders. The planners' personal contacts with consultation participants can stimulate networks formation and maintenance through firstly influencing all participants on the benefits of sustainable development and heritage conservation. At the same time, they can influence those people about the need to work together in every single geopark development regardless of socio-economic backgrounds. The resulting networks possibly established between them and the participants as well as between the participants themselves will be used to effectively develop and implement geopark plans.

This article proposes several key network features for effective networks formation, stability, sustainability in future geopark activity planning and implementation. They are: series of relationships and interactions established simultaneously, inclusivity, intensity and density, accessibility, interactive, proliferating, intensive and expansive, hierarchical and vertical, top-down and bottom-up, and centralised and decentralised. These features represent the potential conscious effort of planners and stakeholders to shape and influence forms of networks suited to their needs in the Langkawi Geopark context. However, for Langkawi Geopark, the features are also influenced and bound by an institutionalised framework suited to Malaysian socio-political context, in which, adapting Sorensen and Torfing's idea, is constituted by regulative, normative, cognitive and imaginary dimensions (2001: 10). Therefore, the features are discussed in relation to these dimensions and their aspects (see Table 1). However, while some of those aspects have existed prior to geoparks context, some others can be developed by planners and stakeholders in their conscious networking efforts. Some similar aspects also have the potential to facilitate, shape and influence networks. These arguments are backed by examples of existing stakeholder work relationships in geopark activities that indicate the presence of particular networks features that have the potential to be developed into full blown networks of relationships. Planners can learn from those relationships and use the networks technique to further develop them for effective future Langkawi Geopark development. The examples came from the authors' findings obtained from semi-structured interviews; workshop consultations with several government, private business sector, NGOs and community stakeholders; and analysis of some geopark activities.

Table 1 : Essence of Networks for Effective Langkawi Geopark Development

ESSENCE OF EFFECTIVE NETWORKS				
Key Networks Features (Structural)	**Regulative dimension**	**Normative dimension**	**Cognitive dimension**	**Imaginary dimension**
Series of Relationships and Interactions (established simultaneously)	Formal rules, procedures, mandates, policies, constitution (COMMON-ALITIES & VARIATIONS)	Informal rules, social norms, social values, Standards (COMMON-ALITIES)	Codes, concepts, knowledge (Understanding Awareness) (COMMON-ALITIES)	Common sense of belonging Common identity about being a "geoparkian" Common hopes and aspirations Common emotions/ sentiments (COMMON-ALITIES)
Inclusivity				
Intensity + Density				
(Frequency & Regularity of Interactions)				
Accessibility				
Interactive (Reciprocity, Mutuality)				
Intensive + Expansive				
Proliferating (Many ties allowed)				
Hierarchical + Vertical				
Top-down + Bottom up				

Source: Adapted from Sorensen & Torfing 2007 and Barney 2004.

In reference to Table 1, the 'regulative' dimension includes rules, mandates, procedures and policies stipulated within the Federal and Kedah state constitutions. Rules, procedures, mandates and policies of LADA and those of other organisational stakeholders are also included (Sarah Aziz 2010). They may be varied but they can still be integrated and synchronised for effective geopark development. The 'normative' dimension comprises norms, values and standards that are formal, cultural and social in nature. The institutionalised framework also has a 'cognitive' aspect because it produces codes, concepts and specialised knowledge, for instance about activities and projects. Finally, negotiations for any geopark planning even have an 'imaginary' aspect whereby identities, ideologies and common hopes about the geopark may be generated (Sorensen and Torfing 2007). The imaginary level has emotive and sentiment components. The imaginary, cognitive and normative dimensions, namely the informal ones, also regulate networks behaviour in addition to rules, regulations and procedures. Moreover, some of the regulative, normative, cognitive and imaginary aspects can be conceptualised in this article as network 'flows'. Similar or common aspects ('flows') found in the regulative, normative, cognitive and imaginary dimensions facilitate the networks.

SERIES OF RELATIONSHIPS AND INTERACTIONS, EXCLUSIVITY AND PROLIFERATING

The utility of the networks technique firstly requires planners to get everybody or stakeholder involved in the consultations, dialogues, workshops and other face-to-face interactions, not just people of certain high positions or social statuses. This would demonstrate the **inclusivity** and **proliferating** nature of the relationships. Inclusivity means everyone or every organisation can be involved in networks. Proliferating means there is no limit on the number of nodes (networks actors) and ties in the networks. In following Sorensen and Torfing's words (2007: 9), the technique will allow the articulation of a series of " …a number of private, semi-public and public actors …" who are "… *dependent* on one another's resources and capacities …" and who are "… operationally autonomous in the sense they are not commanded by superiors to think and act in a certain way …". Everyone is important in development as each of them has, in Sorensen and Torfing's words, "… a stake in the policy issues at hand … can contribute resources and capacities of a certain value to the other actors …" (Sorensen and Torfing 2007: 9). Examples of stakeholders are the Federal Government, Kedah State government, local agencies, NGO's, village communities, local and foreign tourists, visitors, retailers, school children, university students, senior citizens, industrialists, researchers, academics and others (see Nor Zaini Azman et al. 2010 on school children, Ong et al. 2010a and Ong et al. 2010b on tourists, and Rahimah Abdul Aziz 2011 and Sharina Abdul Halim et al. 2010 on community members and villagers). All these people either represent organisations, institutions, communal or themselves as individuals. Their

involvement is due to formal organisational duties and responsibilities or public sector work obligations, corporate goals, socio-cultural norms and values of particular social collectivities, cultural or religious traditions or voluntary intentions.

To quote an example of stakeholder involvement based on formal duties and goals in a recent geopark activity, 'Langkawi Geopark Carnival 2011', stakeholders were LADA (main organiser), local agencies, NGOs, schools, colleges, hoteliers and businesses. Some of the government sectors were LADA, Majpeba, Pejda, Japam, Podiram, Kema, Marim, Beliasu, and Tubacom. Some NGOs were Latga, Lata, Kumperika, Fotoclu, Pasamal, Motoclas, Atiskeb, Wayaku, and Mahot, while Srigenda and Koleko were the education organisations. Hotbellvist and Azdaent were hotelier and business sectors involved in the activity, respectively. A local mosque was also involved. Except for LADA, the names of these organisations are not actual names. Their actual names are concealed for ethical reasons. These stakeholders were all involved in the activity in terms of decision-making and/or planning and/or implementation. The level of cooperation given by these stakeholders to LADA was generally good. In another example of activity during the 4th International UNESCO Conference on Geoparks (Geopark Conference in short) held in April 2010 and mainly organised by LADA, some of the government stakeholders who participated were Majpeba, Pejda, Minedip, Forsdip, Watdip, Landip, Edudip, Podiram, and Ukem. Some of the NGOs were Latga, Lata, Mahot, Natusoc and Mat. Several schools in Langkawi also participated.

A plurality of public and private actors was indeed visible in those activities. Besides cooperation, the findings revealed that most stakeholders in the two activities generally demonstrated motivation in their involvement from the beginning to the end of the activities. A common idea of work commitment and its importance to geopark development presumably existed among those stakeholders. The presence of mutual moral support among some of those stakeholders, presumably sharing common ideas, values, beliefs, knowledge and hopes concerning geopark development was also recorded. Moreover, some similarities in terms of understanding and awareness of the meaning of geopark, its importance to Langkawi and socio-economic benefits were uncovered. Findings from the authors' baseline study also revealed a large majority of the 540 village respondents from six Langkawi districts demonstrated similar understanding and awareness of geopark and geopark benefits, and similar acceptance of the geopark concept (see Rahimah Abdul Aziz 2011). Therefore, planners can learn from the sort of work relationships found in the carnival and conference activities and findings from the interviews and baseline community study, and incorporate all those people and many more stakeholders, while retaining the existing ones, in the planning and implementation of future geopark activities.

All stakeholders, including the ones who have never been involved in geopark development, could be encouraged to be involved in many different future geopark

activities. The findings from interviews and stakeholder consultations with Kedah state government authorities, various NGOs, hoteliers, retailers, primary and secondary schools, village communities and association, and the writers' and the research group's baseline study generally revealed that most stakeholders expressed their desire to be involved in geopark development activities in cooperation or collaboration with the public government sector, including LADA and local authorities (see Rahimah Abdul Aziz 2011, also Ong Puay Liu et al. 2010b).

INTENSITY, DENSITY AND ACCESSIBILITY

The level of networking that planners can facilitate through geopark stakeholder consultations are individual to individual, individual to community and formal organisations, community to community, and organisation to organisation. Ego-centred and systemic levels of networking may emerge. A series of relationships either at the ego or systemic levels simply mean that the relationships should not be on a one-to-one basis but between several or many people or parties at one point in time. These should not be on 'one-off' contacts, but there should be constant contacts throughout the whole activity or project, bringing about closeness of relationships and establishing mutual moral support for the sake of effective networking. Apart from the networks being **inclusive** and **proliferating**, they may also be **intense** and **dense** in nature. **Intensity** and **density** are seen through frequency of meetings and regularity in patterns of interactions. Density also indicates the presence of strong ties while intensity is indicated by multiplicities of ties formed as a result of frequent meetings and interactions in one or many different geopark development projects. There is also **accessibility** as many people and stakeholders have the opportunity to get access and be involved in networks regardless of their organisational and socio-economic backgrounds, and sectors. In other words, there should not be networks boundary limitations.

For any geopark activity, planners can even encourage stakeholders participating in the consultations to personally establish a series of social networks with the planners and among themselves. Again, the networks' features of **accessibility** and **inclusivity** circumscribed by norms and values concerning mutual frequent contacts can be demonstrated. Equally important is for the planners to make the participants see, be aware and recognise that their work relationships can take the form of networks and particular norms and values concerning effective networking may be created by themselves. If networks are formed or recognised, then there will be a series of work relationships in the form of networks between the planners and the participants, and also between the participants themselves. As such, the participants, including the planners, can establish **accessible** and **inclusive** networks disregarding their organisational positions, social statuses and sectors.

HORIZONTAL, VERTICAL, CENTRALISED AND DECENTRALISED

Horizontal relations may also be established and maintained in conjunction with **vertical** relations. The horizontal relations do not mean that people are equal in terms of authority and resources as there will still be parties who hold some high level of power and control, namely the government authorities in charge of Langkawi socio-economic and geopark development. Nonetheless, some level of power and control can be given to the participants bringing about **decentralisation** while maintaining **centralised** command and control by LADA and the local level agencies within the bounds of rules, regulations and procedures (see Kjaer 2004, and Ingraham and Lynn 2004 for ideas on decentralisation and devolution in governance networks). Planners can request for **bottom-up** interactions between the participants in addition to the usual dominant top-down ones. While **top-down** command and control is to be maintained, it can still be reduced to give room for the non-government stakeholders situated in the bottom ranks of social and political hierarchy to learn to take control and have some level of authority over the planning process, management, implementation and monitoring of the activity or project. People's empowerment will gradually emerge. Processes of personal and organisational development may follow suit.

To quote the Langkawi Geopark Carnival example again, horizontal relationships were evident between government authorities such as LADA, Majpeba, Pejda, Japam, Podiram, Kema and Maritm while the vertical relationships were formed between these authorities, and the NGOs, schools, colleges, businesses and hoteliers. Government authorities were involved in planning and implementation while LADA was the main decision maker. Other stakeholders were involved in the implementation process. Horizontal and vertical relationships were also evident in the Geopark Conference activity. LADA, being the main organiser, was the main decision maker while government stakeholders, NGOs and schools were involved in planning and implementing the event. In future planning for geopark activities, it is possible for all these types of relationships to exist again, in fact further developed, intensified and expanded. All if not some relevant stakeholders must also be involved in decision making with some level of power and control given to them. Hence, **horizontal and vertical, top-down and bottom-up,** and **centralised and decentralised** networks may exist, all of which are bound by rules, regulations, procedures, social norms and social values. After all, the villager respondents from the baseline study and also interviewees from NGOs, hoteliers, retailers, schools and village associations have generally shown their interests to be involved in geopark development in cooperation or collaboration with local agencies and LADA. It is only right to get them involved in the potentially networked relationships for any future geopark activities.

In stakeholder consultations for geopark activities, planners can encourage the potentially networked participants to interact through negotiations that are based on bargaining and

deliberation. Bargaining can take place within a framework of deliberation that "… facilitates learning and common understanding …" within the regulative, normative, cognitive and imaginary dimensions (Sorensen and Torfing 2007:9). Planners can encourage participants to create particular shared norms, values, codes, knowledge and sentiments concerning geopark in their negotiations. At the same time, laws, mandates and procedures that govern geopark development in Langkawi should be made clear, reminded and adhered to. The negotiation process may be better facilitated in that way. In simple terms, ideally networks can better facilitate negotiations as everyone should know everyone else in close proximity and contact, and all of them would have and be aware of some common shared hopes, values, ideas, beliefs, knowledge, concepts, norms and others concerning geopark development and benefits while playing their formal roles and responsibilities. If they do not, then planners may evoke and highlight the commonalities to the participants and argue for their significance in geopark context. In short, planning consultations based on networks technique would encourage a new form of public governance of Langkawi Geopark that emphasises more on public-private partnerships and networks; less command and control on the part of the government; an integration of horizontal and vertical relationships; steering and facilitating state roles; relative autonomy and empowerment for all stakeholders; and negotiation, persuasion and collaboration and not just the usual top-down coordination (see Ingraham and Lynn 2004, Francesch-Huidobro 2008, Kjaer 2004, Kooiman 2007 and Sorensen and Torfing 2007 on new definitions of governance, public governance and networks governance).

In the consultation of any geopark event or activity, planners may already know the formal roles and functions of the governmental participants in the consultations. However, perhaps the new networks between them and the participants may give them the opportunity to sit down, discuss and identify together any overlapping roles or functions detrimental to geopark development and clearly identify roles and functions that can be effectively integrated and synchronised for geopark development while not omitting them altogether. That task may not be difficult if there would have been frequent and regular meetings and interactions, and creation of norms and values on closeness of relationships and personal familiarity, from the beginning to the end of the consultation and networking process. In fact, the authors and their team members learned from their interviews that some of the stakeholders involved in the carnival and conference were already familiar with one another and have worked with one another before. Hence, newly established networks may allow the planners and consultation participants to better negotiate, bargain and even comfortably persuade one another without or with less animosity concerning the nature of role and functions overlap and integration. Through the networks, the planners may better communicate key geopark (i.e. heritage conservation and sustainable development) principles such as environmental protection, resource conversation, quality of life, intergenerational obligations, social justice and the significance of participation for development to all the participants. Convincing

participants of the importance of geopark principles will not be stressful and challenging due to potentially evoked similar mindsets, norms, values, beliefs concerning Langkawi Geopark significance among the networked participants.

LESSON FROM SIMILARITIES

Once the networks have been established, they need to be maintained and stabilised. To do that, planners can urge for many more frequent meetings (face-to-face if possible) between the participants throughout the planning process, and consequently, in managing and implementing the activities. The networks ought to be constantly **interactive** and on-going. The Geopark Carnival and Geopark Conference as exampled demonstrated that most of the participants always attended meetings conducted by LADA, prior and during the activities. **Frequent** interactions definitely occurred between them. In fact, such frequent interactions and meetings can serve as a good lesson in networking for future planning of other geopark projects. Planners can learn from the achieved benefits of such interactions and networking. In any networks established through consultations, frequency of meetings and on-going interactions may be sustained depending on patterns of **similarities** or **commonalities** between the participants that planners can identify and draw out during the consultation process, for example, similar values (cultural or social), beliefs, knowledge, norms, viewpoints, mindsets, and sentiments concerning geopark development. As noted earlier, some patterns of similar ideas, knowledge and awareness about geopark concept and benefits were discovered from the informants and respondents of the studies. These may be drawn out to evoke a strong sense of similarities among the stakeholders that would convince them to see the importance of their similarities for effective networking, and consequently, effective work cooperation and success of future geopark activities. Planners could even make the effort to evoke a strong (or stronger) sense of belonging and 'geoparkian' identity among the stakeholders. Findings from semi-structured interviews with some local Langkawians uncovered that a strong sense of geoparkian identity has already existed among them (see Ong 2010b). This feeling can be further fostered and spread through potential networks among many other local people and authorities who could be involved in future geopark development projects.

In the Geopark Carnival and Geopark Conference examples, at the cognitive level, the stakeholders projected similar viewpoints concerning their understanding of the meaning of geopark, and awareness of the importance of the geopark status to Langkawi socio-economic development, geological heritage conservation, ecological heritage conservation, and to socio-cultural heritage conservation in Langkawi. That had a positive impact on their work cooperation. They also demonstrated particular similar behavioural orientations depicting positive work attitude in terms of cooperation. For instance, most of the stakeholders made similar efforts to understand the information and messages conveyed by the organiser, and to always communicate with the main

organiser, always refer and contact LADA in case of doubts or problems about the activity, and finally, always comply and follow LADA's work orders. These would be the work norms and related values that emerged in both activities and had led to positive work motivation and cooperation. As noted earlier, mutual moral support was also confirmed to be present among some stakeholders and even social cohesion that was indicated by the intensity, density and interactiveness of the work relationships. In future planning of geopark activities, planners may learn from the carnival and conference to develop those similarities at the normative, cognitive and emotive levels, develop relevant social norms and values, and then 'use' them as a mechanism to develop new work networks and ensure cooperation and commitment from every participating stakeholder.

Through any networks created from geopark activity, planners may also learn about how the stakeholders get on with their daily lives and activities, e.g. how they do things effectively in their own ways, how they communicate among themselves, and how they may networked between themselves in everyday lives. Trust, a social value at the communal level, may have already existed among those people on a daily basis prior to any planning consultations or face-to-face meetings or geopark involvement. As mentioned earlier, some of the stakeholders already know one another on a work and personal basis prior to their involvement in the carnival and conference. Some of them may be friends, neighbours or even relatives. Nonetheless, the power of social networks in daily communal and organisational lives may still be uncovered, learned and utilised by the planners in their consultations with those people, especially in their efforts to encourage new networks formation and maintenance among them. Examples of potentially effective social networks are friendship networks, family ties, religion-based ties, village networks, neighbour networks, old school networks, club membership networks and others. The already existing social networks among the stakeholders may become a means to maintain, stabilise and even strengthen their new work relationships and networks in future involvement in geopark activities. For effective networks maintenance and stability, the informal networks and their cognitive, normative and imaginary dimensions maybe as effective as the formal bases normally based on formal organisational roles, positions and public sector obligation, and rules and regulations. If those people are to be involved in new geopark activities and their mutual trust already known to the planners, the planners may then know what to do and how to cement their new work relationships to bring about successful planning and implementation of new geopark activity or project. The planners may just need to further strengthen the trust between the stakeholders throughout the planning process. Even better work commitment may be ensured; social cohesion better still.

Still on the subject of trust, in the Geopark Carnival and Geopark Conference cases, its presence between LADA and some stakeholders was indicated through the participation of similar stakeholders in both the Geopark Carnival and Geopark Conference activities,

such as LADA, Majpeda, Pejda, Podiram, Watedip, Latga, Lata and Mahot. Of course, one can argue that Majpeda, Pejda, Podiram and Watdip ought to be involved in the geopark activities by virtue of them being local authorities and government agencies performing their work responsibilities and public duties. However, it can be assumed that trust may have already existed between them and LADA considering the frequency of their meetings and interactions in various different geopark activities in the past, as discovered by the authors in their interviews and analysis of both the activities. In both activities and many others not cited in this article, trust may have acted as a social capital that may have contributed to those activities' past successful implementation. In general, planners can regard trust as a social capital for future effective planning and implementation of geopark activities, and for the same stakeholders and others to continue coming together to carry out new geopark activities and projects effectively and successfully.

RECIPROCITY, MUTUALITY AND EXCHANGE

Once new networks are established through geopark activities consultations, they may allow the interacting planners and stakeholders to **exchange** resources such as information, knowledge, ideas, and others that are important to get the activities going. Norms and values relating to **reciprocity** and **mutuality** would then be assured in the networks. Exchange of resources between LADA and the stakeholders in both the Geopark Carnival and Geopark Conference activities was undoubtedly present, more so through the professed frequent meetings and interactions between them throughout the planning, managing and implementing processes. Planners can learn from these two examples, i.e. to incorporate stakeholder exchange behaviour in their planning of geopark activities, at best to further increase the flow and content of resource exchange relevant to geopark development. Ideally, if any resource exchange were to take place through networks of planners and participants, the planners can better communicate their planning intentions, goals, strategies, perceived effects of the plans and problem solving to the stakeholders through the networked participants throughout the planning process. Instead of forecasting and imagining potential problems and challenges independent of a social context, the planners may be able to identify signs of problems and challenges right from the beginning of the planning stage and plan appropriate action to counter them.

To elaborate on more networks qualities, planners may learn even more about the structural positions of the actors in the networks and make the most out of that. They may learn to identify who are important or central persons or potentially important persons in the networks, who can become good channels of communication, who can bridge links between people, which top level person can communicate and get along with lower level people, who is dominant in the networks, who is influential and powerful in the

networks, cliques found in the networks, what connects the cliques, who can establish social cohesion, who is the trouble maker or destructive to the networks, who can resolve conflict, and others. In the Geopark Carnival and Geopark Conference examples, key networks actors identified would be LADA, Majpeda and Pejda by virtue of their main positions as Federal Government agencies (LADA) and key local authorities (Majpeda and Pejda) in charge of socio-economic development in Langkawi, specifically the geopark. In terms of their active participation in the geopark activities and high motivation for involvement and frequent attendance of meetings, Lata and Latga also seem to be key NGOs networks actors from the non-governmental side.

CONCLUSION

This article has introduced networks as a technique in the planning of Langkawi Geopark activities, e.g. in development planning activities, community activities, social events, projects, conference events and others. A study of some geopark activities and stakeholder interview data has revealed the presence of work relationships between some public and private stakeholders who participated in the activities. The relationships led to the successful completion of the activities. Interestingly, some features of the relationships indicated some semblance to certain characteristics of networks of relationships and have the potential to be developed into effective future networks of relationships. The findings have thus offered an early argument on the feasibility of networks as a normed technique for effective governing of future geopark activities, including land use planning. Relevant authorities, policy makers, managers, administrators and planners could consider developing stakeholder relationships into actual networks in their future planning consultations for the planning and implementation of new development activities in Langkawi Geopark.

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PARTICIPATION TOWARDS HERITAGE CONSERVATION: CASE OF A FISHING COMMUNITY IN LANGKAWI GEOPARK

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Abstract
There is an increasing movement towards acceptance of public participation as a logical approach to heritage conservation and sustainable use of natural resources. In conservation initiatives, to ensure effective participation is to see it as a social process. Thus, the importance of community participation and consultation in planning for heritage conservation is emphasised using an example from fishing community involvement in community-based fisheries management in Langkawi. The setting up of cooperative community resource management *Komuniti Pengurusan Ekosistem Perikanan* (KPEP)

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is a significant attempt that acknowledges the value of local involvement in natural resource management. It aims to understand local fishers' participation in resource management activities towards heritage conservation. One of the findings revealed that although the resource management activities did not mentioned explicitly the importance of heritage conservation. However it could be assumed that intention for heritage conservation is at the heart of the initiatives. Implicit in such an approach is a sense that local fishers' participation in managing resources would utilise local knowledge gained from past down traditions of previous generations. The application of local knowledge encourages them to become aware of their fishing cultural heritage and to encourage them to conserve it. It is crucial for development activities surrounding the area of KPEP Kuala Teriang are compatible and complementary to the existing activities of fisheries heritage conservation and promotion of social well-being.

Keywords: Langkawi Geopark, public/community participation, heritage conservation, community-based fisheries.

INTRODUCTION

The importance of community participation throughout the decision-making, implementation and enforcement processes has gained recognition among policy makers and planners (Goodwin 1998). The realisation stemmed from the concern over the inability of development projects to achieve its targets due to the lack of attention in ensuring holistic participation among stakeholders (Rahnema 1992). At the same time, there has been an increased focus on building partnerships among stakeholders at different institutional and society levels as an attempt to move away from simple form of consultation to more participatory and collaborative resource management (Izurieta 2007).

In conservation initiatives, to ensure effective participation is to see participation as a social process. Participation as a social process means communicating and working together in groups and with different people in order to achieve common goals as well as learning and sharing from each other's experiences. However, it is important to note that both conservation and participation are concepts and physical practices that are matters of contest and interpretation between policy and social actors (Goodwin 1998:483). There is an implicit assumption by conservation organisations that local people and conservation professionals have shared expectations surrounding the informing ideas, organisational form and subsequent outcomes of local participation. Thus, to ensure success in participatory conservation initiatives is to ensure that 'people have the institutional framework and resources required to act upon the knowledge they generate and receive, and to be heard as well as consulted' (Goodwin 1998:495). In this article, the importance of community participation and consultation in planning for heritage

conservation in Langkawi is emphasised using an example from the fishing community involvement in community-based fisheries management.

CONTEXTUALISING PUBLIC PARTICIPATION IN HERITAGE CONSERVATION

The word heritage has a clear and relatively simple relationship with the concept of inheritance (Howard 2003). Heritage includes both tangible and intangible elements of who we are and how we identify ourselves. There appears to be some correlation between level of identity and the type of heritage involved. Personal, family and local heritage seem to put more emphasis on activities and people, while national and international levels, or at least their official representatives, concentrate on more solid and conservable objects. All of these ways of dividing heritage-by type, by market and by identity level- only serve to reinforce that heritage is a process rather than a product. The heritage process depends on the values that people invest in the heritage phenomena, on the different kinds of ways in which things are viewed. Such values will differ between people according to a whole range of lenses that give biases to particular views of attractiveness. To understand the heritage value of any particular item we need to grasp where all the stakeholders are coming from and what values they bring to it (Howard 2003).

Heritage conservation aims at safeguarding the cultural and natural properties for the future. In a sense heritage conservation is really "… a possession of the community, and a rich inheritance that may be passed on, which invites our recognition and our participation…" (Deschambault Declaration 1982). Participation is crucial in heritage conservation as it is regarded as the involvement of various communities and interest groups, with opportunities to have a say and contribute actively in the construction of their own future (Eversole and Martin 2005). Two values of participation can be derived from this definition. First, giving people a say in decisions that affect them involves a normative value relating to the right to control their own lives (Chambers 1994). The second value is instrumental where local knowledge and local inputs contribute to a more effective and efficient achievement of sustainable development projects or programs (Webler et al. 1995).

One way of thinking about heritage is succinctly mentioned by Howard (2003:19) as, "…Heritage is not about the past. The objects are but the issues are always about what we do with them now …". However, in most cases of heritage conservation, the notion of culture, heritage, identity and sense of place could be difficult to model and quantify, thus are often overlooked in planning, management and policy (Urquhart et al. 2011). It is crucial for any planning process to include people inside the plans. Planning should include the informal sectors, farmers, fishing people, women and ethnic minorities,

requiring capital, training and new way of thinking (Wall 1996:135). Some insights into the new way of thinking in planning could be observed in Chamber's (1983; 1997) participatory methodologies.

PLANNING AND POLICY RELEVANCE IN HERITAGE CONSERVATION

In the context of planning, Getz (1987) summarised four conventional approaches: boosterism, economic/industry based, physical-spatial based and community-based. The experience in Borobudur, Indonesia as illustrated by Hampton (2005) indicates planning approach is geared more towards economic/industry based due to the emphasis on economic impacts. Hall (2000) noted that this planning approach prioritises economic goals over social or cultural aspects and thus risks taking little note of who actually benefits or loses. This leads to the question of how the concept of encouraging local participation may be implemented. According to Tosun (2000:626), specific and deliberate strategies are needed at local, national and international levels for meaningful participation of local people to take place.

In heritage conservation, planning process emphasise the active involvement of local community in preserving and conserving heritage (Aas et al. 2005). The participation process allows local community to share information, expressions, and rituals deemed to be important to conserve and pass on to future generations. An example from Kalimantan, Indonesia, illustrate indigenous groups taking the lead in observing, collecting and recording data of their indigenous knowledge in order to ensure it remains as a vibrant and self-identified part of community life (Czermak et al. 2003). Meanwhile, external researchers could provide assistance in methods of preserving their cultural heritage. This innovative approach of conserving cultural heritage concurs to a statement made by Condominas (2001:22) that, "… a traditional popular culture should be considered from the standpoint of the group which created it and which keeps it alive…".

In Malaysia, the first sparks of heritage awareness began with the founding of *Badan Warisan* in 1982. Since then progress has been made with much more public discourse on the subject and the development of National Heritage Act 2005. However, more improvements are needed in creating a system which promotes framework of consultation with public, owners, and local planning authorities to enable us to better manage our rapidly changing environment and yet sustain our historic identity and built heritage (Ahmad Sarji Abdul Hamid 2008).

FISHING COMMUNITIES IN LANGKAWI GEOPARK

Previously the economy of the villages in Langkawi is primarily based on fishing and on rice cultivation second. However, since the inception of duty-free status in 1987, the

advent of tourism has influenced the socio-economic landscape on the island, whereby a majority of villagers are now in one way or another involved in tourism related activities. Even with the changing and diversification of socio-economic activities, fishing remains as one of local community livelihoods strategies. This is because fishing not only generates income but also social capital. As suggested by Jacob et al. (2001:17-18), fisheries dependence relates to the "… character of the community which supports the sense of community and the history of that community…". Fisheries dependence is considered in terms of not just economic dependence but social and cultural dependence (Urquhart et al. 2011). In a sense, the fishing villages in Langkawi is a 'way of life', whereby community bonds, values, knowledge, language and traditions are established, confirmed and passed on to future generations.

The need to control loss of coastal habitat and over-exploitation of fishery suggest the urgent need for innovative approaches in managing fisheries and coastal resources. Previously community-based fisheries management was practiced among Southeast Asian countries. However, it was with minimal success due to legal constraints and individual limitations (Nasuchon and Charles 2010). The lack of success is based on the assumption that when people are focused on meeting the needs of day to day survival, conservation of natural resources for future generations becomes less important. In Langkawi, community-based fisheries management initiative has been revitalised with the support and collaboration between international agencies and local authorities together with local communities. The early stage of co-management has been observed with the establishment of co-operative community fisheries resource management (KPEP) to monitor, control and surveillance of coastal areas in a more effective manner.

Currently there are six co-operative community fisheries resource management (KPEP) (previously known as KEN and KPSP) programmes located in four sub-districts of Langkawi Island, namely Padang Mat Sirat, Ayer Hangat, Kedawang and Kuah. These KPEP's programmes are KPEP Kuala Teriang, KPEP Kilim, KPEP Sg.Chenang, KPEP Tg. Rhu, KPEP Kuala Temoyong, and KPEP Pulau Tuba. Currently there are approximately 2500 licensed fishermen in Langkawi registered under the Langkawi Fishermen Association (Persatuan Nelayan Kawasan Langkawi 2011). Most of the Langkawi fisher folks involved in the co-operative community resource management (KPEP) are still using traditional fishing methods such as trammel shrimp gill net, bottom fish gill net and hand lining. The co-operative group is placed under the responsibility of the Department of Fisheries (DOF), and is used as a platform by fisher folks to voice out their opinions and share their experience pertaining to their livelihood and fishing activities in the area.

The activities undertaken by the co-operative group require a combination of knowledge from local fishers and technological support from agencies. The success of the group

relies on local fishermen's participation as many of them who have worked in the fisheries sector all their lives, would be able to advice on aspects of spawning seasons and fishing groups. For planning purposes, it is important for planners to study and understand the activities in the fishing villages and how local people are working together to conserve and manage their resources. Having these perspectives would assist planners to consider local needs in their plan to enhance these villages and surroundings.

KUALA TERIANG COMMUNITY-BASED FISHERIES MANAGEMENT

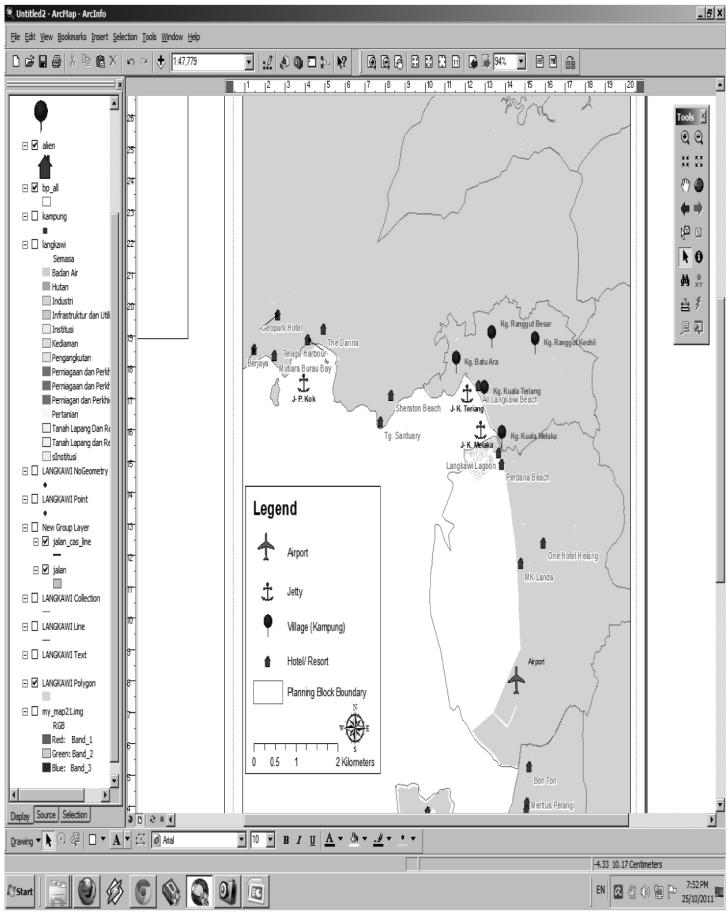
KPEP Kuala Teriang (Table 1) has been selected as a case study to emphasise the importance of local participation in resource management towards heritage conservation. This is because of its pioneer fisheries collaborative project that was established in 2003 between local fishing communities, Department of Fisheries, Malaysia, and Southeast Asian Fisheries Development Center/ Training Department (SEAFDEC/TD). The overall objectives of fisheries collaborative project consists of three main components. First, establishment of sustainable coastal fisheries management at local level, second, rehabilitation and conservation of coastal fisheries and third, alleviation of poverty in coastal fisheries communities.

TABLE 1 : General information on the KPEP Kuala Teriang

Items	Kuala Teriang	Kuala Melaka	Kuala Chenang	Pantai Kok/Sg.Kok
No. of fishermen	386	268	220	13
No. of KPEP members	47	13	105	-
No. of Women Group Members	17	-	-	-

The surroundings area of KPEP Kuala Teriang is situated in the active zone of tourism development activities. As observed in Map 1 there are prestigious hotels and resorts being built along coastal areas. The over-development of hotels and resorts along the coastal areas has a direct consequence to the fisheries resources and heritage conservation initiatives. How do they affect each other? In this regard, it is important to assess how fishing links to the rest of society, both in the economic and cultural sense as aptly suggested by Urquhart et al. (2011:245). The fishing community way of life can give rise to strong sense of belonging among locals to appreciate their own heritage. Planning for development in the surroundings of KPEP Kuala Teriang should consider the place-based identity and common social activities associated with fishing such as eating out in a local seafood restaurant, watching fishermen land their catch and buying fresh fish from fishermen. Understanding the meanings of these activities will harmonise the need to develop for tourism provision and the need to conserve heritage for the sake of future generations.

MAP 1 : Location of villages in KPEP Kuala Teriang Project surrounded by tourism development infrastructure



KPEP KUALA TERIANG RESOURCE CONSERVATION INITIATIVE

The findings of the study revealed the local fishermen's that are involved are working to enhance their life by working on a range of inter-connected issues, for instance surveillance by local monitoring unit to control illegal trawlers and assisting in putting up the artificial reef device for coastal environment rehabilitation (Sharina Abdul Halim et al. 2011).

The local fishermen work together with local authorities to manage natural resources, ensuring carrying capacity of the area and improving the socio-economic conditions of the local community. Active local participation in resource management would allow them to learn and such learning outcomes can lead to concrete actions on the ground towards sustainable solutions (Marschke and Sinclair 2009; Diduck and Mitchell 2003).

CHALLENGES, INTERESTS AND EXPECTATIONS

The fishermen of KPEP Kuala Teriang shared their views of the challenges they faced mostly due to the intrusion by illegal or foreign fishing boats into their areas, difficulty to access the open sea due to the silted canal and inconsistency in fish prices and limited market that may lead to lower income of the fishermen. Apart from addressing the challenges, the fishermen indicated their interests (Table 2) in more training courses to build their skills and capacities in engine repair and maintenance, new fishing gear and methods and fish handling, processing and marketing. They are also keen to be involved in alternative livelihoods to diversify their socio-economic activities, i.e. tourism related business and aquaculture. It was interesting to note that there is an increase in the number for fishermen willing to stay in the fishing business professionally from 1.9% (2003) to 9.1% (2006). The sudden rise in the interest could be influenced by the improvement in fisheries catchments with the formulation of FRMP zoning areas.

TABLE 2 : Interests of KPEP Kuala Teriang members

Interests	2003 (%) N= 53	2006 (%) N= 77
i. Training course in engine repair and maintenance	18.9	10.4
ii. Training course in new fishing gear and methods	-	28.6
iii. Training course in fish handling/ processing/ marketing	9.4	-
iv. Involve in tourism related business	9.5	1.3
v. Involve in aquaculture activities	3.8	7.8
vi. Continue as a professional fisherman	1.9	9.1

Source: Adapted from Thanyalak Suasi (2008)

As for the future expectations of local fishermen (Table 3), they mostly anticipate increase in fisheries resources. They see themselves continuing being professional fishermen and at the same time being more involved in tourism business development

activities. In addition, they expressed the need for succession planning for the future generation in continuing the fishing tradition.

TABLE 3 : Future Expectations of KPEP Kuala Teriang Members

Future expectations	2003 (%) N= 53	2006 (%) N= 77
i. Fisheries resources increased/ high fish catch	7.5	29.9
ii. Fishing with new and larger vessels/ use of more FADs	22.7	-
iii. Construction of deeper canal and a jetty	9.4	7.8
iv. Continue to be professional fishermen	5.7	11.7
v. Installation of ARs and FEDs	-	19.5
vi. Involve in tourism business development	5.7	14.3
vii. Need for succession in fishing by the next generation	-	15.6

Source: Adapted from Thanyalak Suasi (2008)

CULTURE, IDENTITY AND KNOWLEDGE

Religious practices and community traditions have also been incorporated into the resource management mechanisms. For instance, there is no fishing on Friday or when there is community feast or death in the community (Sharina Abdul Halim 2009). The traditional penalty for such an offence is a fine of one or half a dozen of plates to be given to the mosque. This reinforcement of community rules is an implicit form of unifying the community and conserving the heritage of fishing tradition.

As stated earlier, local fishermen have knowledge on spawning seasons and fishing grounds. Thus, the zoning of Fisheries Resources Management Plan (FRMP) gazetted under Section 61, Fisheries Act 1985 is a formal mechanism to manage the resources and reduce the encroachment of illegal trawlers. The area covers approximately 30 nautical miles and has been a traditional fishing ground for fishermen from Kuala Teriang, Kuala Chenang, Pantai Kok, Kuala Melaka. The formulation of Fisheries Resources Management Plan (FRMP) comprise installation of Fishing Enhance Devices (FEDs) and Artificial Reefs (ARs), fish landing data collection, creation of business activities, training and capacity building and demarcation of the management zone (Abdul Rahman Abdul Wahab 2008).

PARTICIPATION IN FISHERIES RESOURCES MANAGEMENT TOWARDS HERITAGE CONSERVATION

How do managing fisheries resources in a co-operative manner link with heritage conservation process? Implicit in such an approach is a sense that local fishermen's participation in managing resources would utilise local knowledge gained from the traditions passed down from previous generations. The application of local knowledge encourages them to become aware of their fishing cultural heritage and help them to conserve the knowledge. It was found that local fishermen in KPEP Kuala Teriang have very good skills and experience on fishing gear maintenance and fishing operations (Chanrachkij 2008). Thus, further skills improvement should be given to empower local fishers to ensure sustainable fisheries resources.

In order to sustain the long-term fisheries resources, combining local knowledge and proper scientific methods, stock assessment on the resource abundance should be conducted. Although the discussion in fisheries resource management did not explicitly mention the importance of heritage conservation in their activities, it could be assumed that the intention for heritage conservation is at the heart of the initiatives. However, immediate needs supersede the intention as the establishment of KPEPs serve as platforms to develop and upgrade the livelihoods of fishing communities. Thus, fulfilment of basic needs and quality of life among local fishermen's is crucial to ensure heritage conservation activities could be carried out.

CONCLUSION

Without greater public participation, Langkawi islands' physical legacies will remain fragile and highly vulnerable, especially within the context of the economic market forces and real estate development (Ahmad Sarji Abdul Hamid 2008). In the context of managing fisheries resources towards heritage conservation, all stakeholders, should not only include conservation experts, but also academics, developers, local authorities, planners, consultants and others involved with regeneration and community development, in order to gain a wide range of views. It is crucial that development activities surrounding the areas of KPEP Kuala Teriang is compatible and complementary to the existing activities of conserving the fisheries resources to enhance the livelihoods of the local community.

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