

## Pengenalan: Geopark dan Pembangunan Lestari Wilayah

### Introduction: Geopark and Regional Sustainable Development

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Pada peringkat antarabangsa, gagasan ilmu geologi pemuliharaan dan geopark telah dipelopori oleh kumpulan penyelidik Warisan Geologi Malaysia (WGM) di Universiti Kebangsaan Malaysia (UKM). Walaupun usaha untuk memulihara sejumlah warisan geologi unggul telah bermula lebih 100 tahun yang lampau, khususnya pemuliharaan landskap berpandangan indah, kajian saintifik mengenai pendekatan pencirian, pengkelasan, penilaian dan pemuliharaan sumber warisan geologi hanya bermula pada awal tahun-tahun 1990-an. Mulai tahun 1996, penyelidik WGM telah menggunakan Langkawi sebagai makmal untuk mengenalpasti, mencari dan menilai lebih 90 tapak geologi yang bernilai warisan tinggi. Idea geopark tercetus apabila sebahagian daripada geotapak ini perlu dibangunkan dan digunakan untuk produk pelancongan.

Konsep Langkawi Geopark mula diperkenalkan pada tahun 2000, iaitu seiring dengan pembangunan gagasan geopark di Eropah. Bagaimanapun, oleh kerana idea ini terlalu asing untuk kebanyakan pihak berkepentingan di Malaysia, usaha mempromosi dan meningkatkan kesedaran masyarakat dilakukan secara berterusan, dan akhirnya pada tahun 2006, Kerajaan Negeri Kedah bersetuju menjadikan kepulauan Langkawi sebagai geopark kebangsaan pertama di Malaysia. Hasil usaha gigih Lembaga Pembangunan Langkawi (LADA) dan UKM, pada 2007, Langkawi Geopark berjaya diterima sebagai ahli Global Geoparks Network (GGN) anjuran UNESCO. Ini menjadikan kepulauan Langkawi sebagai Global Geopark pertama di Malaysia dan Asia Tenggara.

Geopark pada mula diperkenalkan bertujuan membangunkan suatu wilayah yang masih mundur, berada jauh dari arus pembangunan, tetapi memiliki warisan geologi dan landskap yang istimewa. Warisan tabii bertaraf kebangsaan atau antarabangsa, yang lazimnya berada di kawasan pedalaman, dan yang mempunyai keadaan landskap gunung-ganang tidak sesuai untuk dibangunkan selain kebiasaannya dihuni oleh golongan peribumi yang masih berkeadaan mundur. Pembangunan sumber warisan melalui aktiviti geopelancongan dalam gagasan geopark memberi harapan dan peluang kepada sesuatu wilayah yang masih belum mengecapi kemajuan untuk berbuat demikian. Geopark pada prinsipnya menerajui penerokaan mendekati pembangunan wilayah secara lestari.

Akademika keluaran khas ini merupakan himpunan makalah hasil penyelidikan sekumpulan ahli akademik

dari beberapa Fakulti dan Institut di UKM yang telah menyelidik secara berpasukan di bawah naungan Projek Arus Perdana berjudul 'Geopark Peraga Pembangunan Lestari Wilayah.' Walaupun penyelidikan masih berterusan, mereka merasakan bahawa beberapa hasil yang ditemui setakat ini perlu dikongsi dengan rakan kesepakaran memandangkan idea dan konsep geopark merupakan 'cetusan pemikiran Bangi' serta mempunyai potensi memperkenalkan keutuhan UKM sebagai universiti penyelidikan terunggul di rantau ini.

Makalah pembuka oleh Ibrahim Komoo memperkenalkan idea dan konsep geopark serta menghuraikan sejarah perkembangannya. Konsep Geopark yang diperkenalkan pada tahun 2000 telah melalui beberapa fasa pengukuhan, bermula daripada keperluan untuk memulihara tapak geowarisan sambil memperkenalkan produk baru pelancongan, iaitu geopelancongan, kini dilihat sebagai 'pendekatan pembangunan' yang memberikan tumpuan kepada mengimbangi tuntutan pemuliharaan warisan secara bersepadu, pembangunan sosioekonomi komuniti setempat melalui aktiviti pelancongan, dan meningkatkan pendidikan awam pihak berkepentingan ke arah pembangunan lestari. Idea geopark sebagai peraga pembangunan lestari wilayah diketengahkan dengan memberikan contoh pembangunan Langkawi Global Geopark.

Makalah oleh Mohd Shafeea Leman meringkaskan dapatan hasil penyelidikan oleh kumpulan Warisan Geologi Malaysia mengenai pemuliharaan geowarisan sejak lebih 10 tahun lepas. Komuniti geologi telah mengenali keistimewaan kepulauan Langkawi daripada perspektif sejarah perkembangan bumi Malaysia dan menonjolkan kepentingan geowarisan melalui sejumlah geotapak yang mewakili batuan dan fosil tertua di Malaysia, susun-lapis batuan berusia Paleozoik paling lengkap, dan landskap kas kepulauan tropika paling indah di rantau Asia Tenggara. Kebanyakan khazanah geologi ini telah disyorkan untuk dipulihara berasaskan pendekatan tapak terpelihara, monumen geologi dan taman georimba. Pendekatan pemuliharaan berasaskan taman georimba atau *geoforest park* adalah yang paling berjaya, dan telah dijadikan tarikan pelancongan paling berkesan untuk memperkenalkan Langkawi Geopark. Bagaimanapun, beberapa isu pemuliharaan geowarisan dan keupayaan tampungan geotapak sebagai produk pelancongan masih perlu ditangani.

Makalah Abdul Latiff Mohamad dan Norhayati Ahmad pula membincangkan kelimpahan sumber kepelbagaian biologi, isu pemuliharaannya dan pembangunan ekopelancongan. Kajian mengenai kepelbagaian flora masih terbatas dan hanya tertumpu di kawasan Gunung Machinchang, Gunung Raya dan hutan paya bakau. Paya bakau di Langkawi sangat istimewa kerana memiliki kepelbagaian spesies tumbuhan bakau antara yang terkaya di Malaysia. Kajian mengenai flora di Langkawi meliputi vegetasi hutan kerangas (renek) di Machinchang dan flora paku pakis di beberapa kawasan hutan simpanan kekal. Kajian mengenai kepelbagaian fauna juga masih terbatas. Antara kajian yang telah diterbitkan ialah mamalia, khususnya spesies kelawar; dan kajian herpetofauna, avifauna dan serangga. Daripada kajian yang terbatas ini, kepulauan Langkawi menunjukkan jumlah spesies endemik yang tinggi. Sebahagian besar kepelbagaian biologi terpelihara melalui pewartaan 16 hutan simpanan kekal dan tujuh buah hutan rekreasi. Pada masa ini, hanya sebahagian kecil daripada sumber kepelbagaian biologi ini dimanfaatkan untuk industri ekopelancongan.

Memandangkan geopark merupakan konsep baru untuk mengurus sumber warisan wilayah, isu governans untuk geopark masih memerlukan pendekatan yang berkesan. Makalah Halimatun Saadiah Hashim dan rakan-rakan menghuraikan cadangan sistem governans yang sesuai diguna pakai untuk Langkawi Geopark. Governans yang berkesan perlu mempunyai cirian pemuliharaan warisan (geologi, biologi dan budaya), pembangunan infrastruktur pelancongan yang lestari, dan pembangunan sosioekonomi komuniti tempatan secara syumul. Untuk membolehkan pendekatan pengurusan dibangunkan dengan berjaya, semua pihak berkepentingan perlu memahami dan menghayati konsep geopark, warisan dan pemuliharaan warisan, pembangunan secara lestari, dan pengurusan transisi. Sebelum sistem governans untuk geopark disyorkan, usaha meningkatkan kesedaran melalui pendidikan awam dan perundingan pelbagai pihak berkepentingan diperlukan.

Makalah Ong Puay Liu dan rakan-rakan pula memperkenalkan konsep 'semangat kawi.' Salah satu kelainan dalam konsep geopark ialah pengiktirafan adanya pertalian erat antara sumber geowarisan dengan komuniti tempatan. Komuniti perlu mempunyai pengetahuan mengenai warisan tabii dan hubungan eratnyanya dengan warisan budaya; perlu boleh menghayati kepentingan melindungi warisan ini; dan perlu mengamalkan budaya kelestarian. Berdasarkan konsep pengetahuan, penghayatan dan amalan, pihak berkepentingan di Langkawi Geopark perlu mempunyai 'semangat kawi,' iaitu keinginan untuk melindungi dan memulihara warisan tabii dan budaya tempatan. Semangat ini dibayangkan mampu mendasari perubahan yang diperlukan untuk mengurus Langkawi sebagai geopark secara lestari.

Hasil kajian awalan mengenai governans untuk Langkawi Geopark telah dihuraikan oleh Geraldine Chan dan rakan-rakan. Kupasan mereka mengenai pengurusan Langkawi sebagai geopark memperlihatkan unsur-unsur governans seperti hubungan kerja, struktur pengurusan, fungsi, peranan pihak berkepentingan dan pelbagai aktiviti pembangunan geopark. Dalam konteks ini, pentadbiran dan pengurusan Langkawi Geopark lebih sesuai dibangunkan sebagai satu sistem governans yang mampu meningkatkan status entiti geopark, yang berusaha memperjuangkan dasar pemajuan wilayah daripada perspektif pembangunan lestari dan pemuliharaan warisan.

Apapun yang ingin dilakukan untuk Langkawi Geopark, salah satu keperluan asas ialah 'pendidikan awam'. Makalah Norzaini Azman dan rakan-rakan membincangkan dapatan kajian mengenai pendidikan awam untuk pemuliharaan warisan. Dua perkara pokok yang perlu diberikan perhatian dalam usaha merancang, menyediakan peralatan dan mekanisme pendidikan awam ialah siapa pihak berkepentingan yang disasarkan, dan apakah matlamat asas aktiviti pendidikan tersebut. Penulis menghuraikan lima kelompok pihak berkepentingan, iaitu agensi pelaksana, pengusaha hotel dan resort, operator pelancongan dan para pelancong, komuniti tempatan, dan sekolah (guru dan pelajar) yang merupakan aktor yang perlu dididik mengenai pemuliharaan warisan. Sementara pendekatan dan mekanisma pendidikan untuk setiap pihak berkepentingan itu perlu kelainan tersendiri berasaskan matlamat pendidikan bagi mengukuhkan lima komponen teras, iaitu pengetahuan dan pemahaman, nilai bersama, peranan dan tanggungjawab, faedah dan peluang, serta pemeraksanaan atau tanggungjawab sosial korporat.

Ruslin Amir dan rakan-rakan menghuraikan dapatan kajian mengenai kesedaran, kefahaman dan nilai sepunya para pelajar dan guru di Langkawi Geopark. Kajian ini bertujuan mendapatkan maklum balas sekolah sebagai agen mengubah minda anggota komuniti tempatan mengenai kepentingan menghargai dan memulihara warisan. Ternyata guru dan pelajar telah mempunyai pengetahuan dan kesedaran yang baik terhadap geopark dan matlamat pewujudan Langkawi Geopark. Bagaimanapun, mereka masih merasakan pelbagai program dan aktiviti di peringkat sekolah perlu dilaksanakan bagi membolehkan sekolah memainkan peranan yang proaktif untuk sama-sama memajukan pembangunan Langkawi Geopark.

Isu kualiti alam sekitar dan kesejahteraan komuniti di Langkawi dihuraikan melalui makalah oleh Mazlin Mokhtar dan rakan-rakan mengenai pendekatan bersepadu untuk melindungi alam sekitar, dan nota penyelidikan Talib Latiff dan rakan-rakan mengenai status kualiti udara. Pendekatan untuk melindungi alam sekitar telah disyorkan berasaskan tiga pendekatan, iaitu pengurusan sumber air bersepadu (IWRM), pengurusan sisa pepejal bersepadu (ISWM), dan pengurusan bahan

kimia bersepadu (ICM). Tumpuan kepada tiga komponen pengurusan alam sekitar ini akan meningkatkan keupayaan membangunkan Langkawi Geopark daripada perspektif pembangunan lestari. Kajian mengenai kualiti udara dilakukan berdasarkan data yang terkumpul oleh Alam Sekitar Malaysia Sdn. Bhd. (ASMA), yang mempunyai stesen pemantauan di Pulau Langkawi. Pada umumnya kualiti udara di Langkawi masih berada pada tahap baik dan hanya dipengaruhi oleh fenomena tabii. Bagaimanapun, kepekatan  $PM_{10}$  terus meningkat bersesuaian dengan peningkatan jumlah kenderaan bermotor di pulau tersebut.

Sumbangan sembilan makalah dan satu nota penyelidikan dalam keluaran khas *Akademika* ini merupakan sumbangan perintis penyelidik UKM dalam arena pembangunan ilmu di peringkat global berkaitan geopark, dengan tumpuan khusus diberikan kepada Langkawi Geopark sebagai satu contoh pembangunan lestari. Penyelidik di UKM telah menerajui gagasan ilmu

pembangunan wilayah secara lestari dan mempelopori korpus ilmu mengenai geopark dan kaitannya dengan pemuliharaan warisan (tabii dan budaya) secara terkamir. Lebih penting lagi, sumbangan untuk keluaran khas ini melibatkan penyelidik dari pelbagai disiplin ilmu (sains dan sains sosial) yang telah berjaya bekerja sebagai sebuah pasukan.

#### PENGHARGAAN

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## Introduction: Geopark and Regional Sustainable Development

### Pengenalan: Geopark dan Pembangunan Lestari Wilayah

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At the international level, advancing the corpus of knowledge that now serve as a basis for conservation geology and geopark characterisation has been the main thrust of the Geological Heritage Group (GHG) based at Universiti Kebangsaan Malaysia (UKM). Though much of the work to conserve outstanding geological heritage can be traced back 100 years, the focus on conserving landscapes based on its aesthetics value, the approach to be adopted in the characterisation, classification, evaluation and practices related to conservation took root in the 1990s. In 1996, The GHG researchers decided to use Langkawi as a 'lab' where 90 geological sites were identified, characterised and evaluated as sites with high heritage value. It is from this exercise that gave the idea of establishing a geopark whereby the geosites could be developed and used as tourism products while promoting geoheritage conservation.

The Langkawi Geopark concept was introduced in 2000, parallel to an initiative of the establishment of geoparks in Europe. Nonetheless, the idea mooted in 2000 remained foreign to many key stakeholders in Malaysia. However, efforts to promote and raise awareness continued until 2006, when the State Government of Kedah agreed to promote Langkawi as Malaysia's first geopark. Through the hard work put in by the Langkawi Development Authority (LADA) and

UKM, in 2007 Langkawi was accepted as a member of the Global Geoparks Network (GGN), a network supported by UNESCO, and awarded a geopark status. Langkawi became the first Global Geopark in Malaysia and Southeast Asia.

When the Geopark concept was first introduced, it was to develop an area that is still underdeveloped and located far from the mainstream development, but possessing unique geological heritage and landscape. Natural heritage of national or international stature that are generally found in the interior with mountainous landscape and inhabited by the aborigines are not suitable to be developed. The development of heritage sources through geotourism activities within the Geopark provide hope and opportunities of development to an area that has not been developed. In principle Geopark brings a step closer to achieving sustainable regional development.

This special issue of *Akademika* on 'Geopark and Regional Sustainable Development' presents a collection of research articles from a group of researchers from Faculties and Institutes at UKM working as a team under a Mainstream Research Project entitled 'Geoparks as Models for Sustainable Regional Development.' Although the research is still ongoing, the researchers are of the opinion that some findings needed to be shared with others in the field. This is because the ideas and

concept of Geopark, can be said to be homegrown, contributing to the 'Bangli School of Thought.' The geopark concept has the potential to highlight UKM as a forefront Research University in the region.

The opening article by Ibrahim Komoo sets out the idea and concept of a geopark as well as the history of its development. The concept introduced in 2000 has gone through phases that has strengthened it, beginning with the prerequisites to conserve geoheritage sites, in addition to introducing a new product 'geotourism,' which can be looked at as a means to balance the need to conserve heritage in an integrated manner, local socio-economic development through tourism and the raising awareness as well as education of stakeholders to ensure Langkawi is sustainably developed. The idea of using the geopark concept as a model for sustainable development is put forward using Langkawi Global Geopark as an example.

The article by Mohd Shafeea Leman provides a summary of the research conducted and the findings of the GHG on geoheritage conservation in the last decade. The geological community already understood the uniqueness of the islands of Langkawi, as its geological evolutionary history. They had highlighted the importance of geoheritage conservation, as illustrated through the identification of the oldest known geological formation and fossils in Malaysia, the most complete Paleozoic rocks and karstic landscape located in one of the most beautiful cluster of tropical islands in Southeast Asia. Most of these geoheritage identified have been recommended for conservation based on approaches that are pegged on approaches related to protected areas, geological monument and geoforest park. The geoforest park approach has been the most successful as it has become an effective tool to attract tourists thus serving as a 'gateway to Langkawi Geopark.' However, there are still issues pertaining to geoheritage conservation and carrying capacity in relation to geosites being tourism products that will have to be addressed.

Abdul Latiff Mohamad and Norhayati Ahmad in their article discussed the biological diversity to be found in Langkawi, issues relating to conservation and the prerequisites to strengthen ecotourism. The study relating to flora and fauna is still ongoing and at present, it is focused in areas within Gunung Machinchang, Gunung Raya and wetland areas in Langkawi. These wetland areas are important, as they possess among the richest diversity of mangrove plant species in Malaysia. The findings presented in their article include forest vegetation in Machinchang and fern species in several permanent reserve forest areas. Researches on fauna species too is ongoing and among those highlighted include identified mammalian species, such as bats, herpetofauna, avifauna and insects. The initial findings indicate that there is high endemism, of which is being conserved in the 16 gazetted permanent forests reserves and seven recreational forests. Presently, only a small

part of the biological diversity is being benefited by the ecotourism industry.

As the geopark concept is still in its fledgling stage, therefore to effect the management of resources at a regional scale, issues pertaining to instituting a fully-fledged approach for geopark governance are necessary. The article contributed by Halimaton Saadiah Hashim and co authors puts forth for consideration a system of governance that can be adopted for Langkawi Geopark governance. What is clear is that effective governance arguably will have to encompass characteristics that take into account heritage (geological, biological and cultural), infrastructure development for sustainable tourism and a holistic approach for the socio-economic development of local communities. To ensure its success will require greater stakeholders' understanding and appreciation of the geopark concept, heritage and heritage conservation, sustainable development and transitional management. Before the governance system can be put forward, efforts will have to be made to raise the level of awareness through public education and stakeholder consultation.

The concept of 'kawi spirit' is what is purported by Ong Puay Liu and co authors, and which serves as a thread that binds geoheritage resources and the local communities. It is the knowledge about the natural heritage and its close link to cultural heritage that should be inculcated in local communities, so as to ensure the appreciation to protect these heritage as well as adoption of a sustainable culture. It is this 'kawi spirit' that will serve to underlie knowledge, concept, appreciation and practice that will guide community protection and conservation of natural and cultural heritage. The article argues that it is this very spirit that can spur the change that will help manage Langkawi as a geopark which in turn will aid the sustainable development of the island.

Geraldine Chan and co authors puts forward the need to establish a geopark governance framework so as to ensure that Langkawi Geopark is developed sustainably. The article discusses briefly the prerequisites for governance, focusing on networks, such as work relationships, management structures, stakeholder functions as well as roles, in addition to geopark development activities. The key thread that helps bind existing governance processes and systems for Langkawi Geopark would be the commonalities that form the networks that in turn affects the way Langkawi is administered and managed, in short, governed as a geopark.

Whatever it is that Langkawi Geopark aspires, a fundamental need would be public education. Norzaini Azman and co writers put forward a brief discussion on findings related to public education for heritage conservation. Two key aspects were focused to facilitate planning, putting together mechanism and tools for public education that is the targeted stakeholder group and the

purpose of the activities. Five stakeholder groups were identified, as groups that could benefit i.e. implementing government agencies; hotel and resort operators; tourism operators and tourists; local communities; and schools (teachers and students). Further, the approach and mechanism for public education to be adopted need to be explored for each targeted group, structured in accordance with purpose that will strengthen the five core areas i.e. knowledge and understanding; shared value; role and responsibility; benefits and opportunities; as well as empowerment or corporate social responsibility.

Ruslin Amir and co authors in their article present findings related to the awareness, understanding and shared value of teachers and students in Langkawi Geopark. The study conducted was to determine whether schools can operate as agents of change to help shift local community mindsets toward adopting a mindset that prioritises the appreciation and conservation of heritage. The results indicate that both teachers and students have an understanding as to what a geopark is as well as the purpose of creating Langkawi Geopark. However, there is a need to structure programmes and activities to enable schools to play a proactive role in the development of Langkawi Geopark.

Environmental issues and community wellbeing set the scene for two other articles, one by Mazlin Mokhtar and co authors who sets out arguments advocating the adoption of integrated approaches for environmental protection such as Integrated Water Resources Management (IWRM), Integrated Solid Waste Management (ISWM) and Integrated Chemicals Management (ICM). The second article by Talib Latiff and fellow authors put forth an argument to better manage pollution emission, as evidenced by findings though localised, indicating poor air quality. Recommendations from both articles pertaining to the adoption of integrated approaches as well as review of measures to control air pollution will help improve community well-being in addition to protecting the environment and natural resources in Langkawi, which will inherently contribute to the sustainable development of Langkawi.

The compilation of these nine articles and one research note are representative of the pioneering work

undertaken at UKM that can transcend national and international application. The research that are helping generate and strengthen the corpus of knowledge relating to heritage conservation (natural and cultural) and geoparks as a whole have brought together academics and the application of knowledge that is multidisciplinary in nature in a collective manner. This issue draws its strengths from the contributors, whose efforts are much appreciated. The reviewers who provided insights and inputs had added dimensions which helped strengthen the contributions herein.

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