IWRM and Water Planning in Langat UNESCO HELP River Basin MALAYSIA

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INTRODUCTION

- Water resources are increasingly under pressure from:
  - population growth >> increased water withdrawals
  - economic activity >> increased development
  - intensifying competition among users
- Shortcomings in the management of water
  - focus on developing new sources rather than managing existing ones better
  - top-down sector approaches to water management result in uncoordinated development and management of the resource
- Current climate variability due to climate change demand improved management of water resources to cope with more intense floods and droughts
IWRM and Water Planning in Malaysia

- **IWRM**: “A process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an adequate manner without compromising the sustainability of vital ecosystem (GWP 2000)”

- In Malaysian context:
  - IWRM accepted as an innovative approach in managing its water resources since 1990s by the water technical agencies (e.g. DID)
  - Formation of Malaysian Water Partnership (MyWP) in 1997 and Malaysian Capacity Building Network for IWRM (MyCapNet) in 2001 to promote IWRM Implementation and Capacity Building in IWRM.

- IWRM is also in line with Malaysian Government aspirations as stated in:
  - Third Outline Perspective Plan, Malaysia (OPP3) 2001-2010

>> emphasizes the need for IWRM and to build capacity for its implementation
Malaysia Water Vision

“In support of Vision 2020 (towards achieving developed nation status), Malaysia will conserve and manage its water resources to ensure adequate and safe water for all (including the environment)”
“The security and sustainability of water resources shall be made a national priority to ensure adequate and safe water for all, through sustainable use, conservation and effective management of water resources enabled by a mechanism of shared partnership involving all stakeholders.”
“Success of the national IWRM agenda over the long term requires a mind-set change among public, private and community stakeholders. Awareness-raising of water issues, challenges and integrated solutions that extends to community stakeholders and the public at large are essential ingredients to the IWRM agenda. Similarly, political leaders are best placed to play the advocacy role in promoting IWRM, facilitate participatory management and in resolving conflicts through engagement and dialogue. More importantly, personnel involved in water resource management and water utility provision from both Federal and State administrations at all hierarchical levels require more holistic training comprising a blend of a common IWRM modules prior to being streamed to undergo specialized training based on their respective sectorial management and service delivery needs”

(ASM 2016)
Langat UNESCO HELP River Basin

• The Langat River Basin in Malaysia is one of the UNESCO-IHP HELP (Hydrology for the Environment, Life and Policy) River Basins since 2004, classified as an “Evolving” HELP Basin under the framework of UNESCO-IHP HELP Network out of 91 catchments, from 67 countries in the world.

• This basin is currently the only River Basin in Malaysia that has already connected to the UNESCO HELP Programme.

• This recognition was initiated by the Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia (UKM).
Langat UNESCO HELP River Basin

- Transboundary river basin – covers 3 states
  - Selangor (78%)
  - Negeri Sembilan (19%)
  - Federal Territories of Putrajaya (3%)
- Situated approximately 27 km to the south of Kuala Lumpur (the capital city of Malaysia)
- Total basin area – 2,350 km. sq. & 200 km long
- Major water use – Potable water supply for Kuala Lumpur, Putrajaya, basin and areas adjoining it
- Minor use – Some navigation in lower reaches & groundwater extraction for industrial use
HELP River Basin Networks
Showing Langat River Basin in Malaysia
Out of 91 RB in the World & 26 RB in AP & 3 RB in SEA

Langat UNESCO HELP River Basin, Malaysia
What is HELP?

- HELP is a cross cutting and transdisciplinary initiative of the UNESCO led by the International Hydrological Programme (IHP). HELP has created a new approach to integrated catchment management through a framework for water law and policy experts, water resource managers and water scientists to work together on water-related problems (UNESCO, 2010).

- The objectives of HELP are to deliver social, economic and environmental benefits to stakeholders through sustainable and appropriate use of water by directing hydrological science towards improved integrated catchment management basins and also implementation of research through collaborations between scientists, managers and stakeholders (UNESCO, 2004).

Langat HELP River Basin, Malaysia
HELP CATEGORIES

• Group D: World Demonstration HELP Basin
  This is seen as demonstrating best practice in HELP and IWRM, and serves as a model or demonstration basin for other basins - with something to offer other basins.

• Group O: Operational HELP Basin
  This is an established basin which may become a World Demonstration Basin in due course. It is implementing the HELP philosophy in an integrated manner and is involved with stakeholders in basin management.

• Group E: Evolving HELP basin
  This is a basin which is not yet fully operational, but well-developed plans conforming to the HELP philosophy which are beginning to be implemented.

• Group P: Proposed HELP Basin
  Additional information is needed to re-classify this basin. Further work is required to develop plans and activities in an integrated way that supports the HELP philosophy.

Langat UNESCO HELP River Basin, Malaysia
The management focus on IWRM and IRBM implementation at catchment level

THE LANGAT RIVER BASIN

- Total Length: 200 km
- Total Basin Area: 2,350 km²

Map of the Langat River Basin showing key features and cities.
Langat River Basin – Socio-Economics

- The Langat River Basin is currently the fastest developing area in the country, where a number of large scale social-economic projects have either currently taking shape or are already completed in the Basin:
  - The new township of Putrajaya (new Federal Government Administration Center)
  - The Multimedia Super Corridor (MSC) for the information technology industry
  - Cyberjaya (the paperless electronic village and township)
  - The Malaysian BioValley project for biotechnology research/industry
  - The Kuala Lumpur International Airport (KLIA)
  - The Formula One Grand Prix Circuit at Sepang
  - Several institutions of higher learning including universities
Current Problems in Langat River Basin
Water Pollution

Water pollution has become one of the main problems in the Langat Basin and increased water deficiency has worsened the situation. (Mokhtar et al. 2012)
Langat River Basin getting nowhere

This is despite with help from a Unesco programme

BY KARMIKATI KAMARUZAN

It is sometimes difficult to determine how important resources like water are unless our conditions are not better taken care of by the locals and the authorities.

The 2,345 sq km Langat River Basin in Selangor is the main water source for those in the Klang Valley, yet parts of it are so polluted that it has led to numerous water crises in the Klang Valley.

The basin runs 300km across the Klang Valley to the Strait of Malacca, it has several tributaries, among them Sungai Senex, Sungai Lui, Sungai Bereang, and the most important river in the basin, Sungai Langat.

According to a report by the Department of Environment, only a part of Sungai Langat is still clean and categorized as Class 2. The rest are polluted and unsuitable for drinking, categorized either Class 3 or 4. The main sources of pollution can be attributed to wastewater from the industrial, agricultural and residential areas, particularly in the upper reaches of the streams that eventually affect the entire river.

The selection

Having the United Nations Educational, Scientific, and Cultural Organisation (Unesco) adopt Sungai Langat into its Hydropathy for the Environment, Life and Society (Help) programme is a significant move towards coming up with a solution for the problems at hand.

Dr Rahimah Effendi, a senior lecturer at the Institute for Water Chemistry and Development (Iswat), Universiti Kebangsaan Malaysia (UKM), is responsible for bringing Sungai Langat into the programme.

According to her, as Sungai Langat is one of the four rivers in the Klang Valley, it was felt obliged to find ways to better care and protect the river basin. Rahimah, who is also the Unesco's Help River Basin Network coordinator, said it was imperative to build a network with other countries at the early stages of participation, particularly for coming up with new ideas to upgrade river basins.

"It is wise to learn from others, as they may have used methods that we can apply here. For example, Brazil has employed a benchmark using the successful sustainability indicators," she told Bernama in an interview at her workplace.

"By using this method, the status of Sungai Langat can be measured by comparing it with several nearby river basins. A solution to improve its conditions can be derived from the findings."

Learn from others

Much can also be learned from the Dawos River Basin in the Philippines, which joined the Help programme like the Langat River Basin in 2004. In just six years under the programme, the Dawos River Basin had gone from stage three to stage two in 2008 under Help classification, a significant improvement.

"We should strive to ensure the efforts are made to uphold the status of the Langat River Basin. The Help programme is a tool to help improve the effective local management effort and the basin's stakeholders, specifically the basin's district council members," she said.

For Rahimah, the management and water quality of the Langat River Basin would have to be improved through joint efforts and the implementation of Help's philosophy. This would eventually help upgrade the river to an operational stage two or non-operational (stage three) under Help, she said.

The Dawos River has used Unesco's Integrated River Basin Management guidelines to the management of its basin and adapted it to local needs. This could also be emulated for Langat River in the management of its basin.

Management challenges

Many are unaware that the Langat River was adopted into the Unesco programme just as how Langat was similarly adopted into Unesco's Global Geoparks Network since 2002.

Rahimah added it is poor publicity on Sungai Langat, and the lack of involvement of stakeholders in uplifting the river's status that also contributed to its poor state.

"Researchers cannot do this alone. Everyone, be it the government, private bodies or individuals, needs to participate in preserving, conserving and improving the Langat River Basin," she said.

Public awareness of the matter remains low. Many in the river basin live only as a source of water, without understanding its vital role in the aspects of hydrology, water-economy, environment, community and policy.

It was a different story when the conservation efforts of the Geopark in Langkat. That effort saw active involvement of the Langat Development Authority, UKM researchers, local government agencies, non-governmental organizations, and private bodies.

The aforementioned joint efforts helped it retain Unesco Geopark status. In addition, increasing its value as an ecotourism destination.

This translated into social, economic and environmental benefits to the local community. This also encouraged the community to partake in the sustainable development of the Langat Geopark.

"We have yet to find a group that can actively join us in preserving Sungai Langat as one of the world's river basin sites. The researchers, UKM is open to conducting research and working with [the] relevant authorities to run programmes that can help us get there," she said.

Using the example of the Dawos River, which it had since visited, said local government leaders often went down to the ground to promote the importance of the river. They would also introduce the Dawos River Basin as a valuable asset of the community that needed to be preserved by the local community and authorities.

Management body needed

The rivers in South Africa and Australia have the best examples in river basin management with two of the river rivers matching Class 1 status.

These rivers translated the best practices in Unesco and integrated water resource management, making them models to other rivers in the world.

Although it may take some time for Sungai Langat to reach such levels, Rahimah is optimistic that it could be achieved with the collective effort of all parties. She proposed for a special authoritative body to manage river basins as practiced by countries such as Australia through its Murray-Darling Basin Authority.

In Selangor, each effort is spearheaded by Lembaga Air Selangor (Lasa).

"It would help improve the status of Sungai Langat and eventually make it world renowned," said Rahimah.

She believes the success of the Help programme in Sungai Langat could provide a winning model that could be applied to other rivers in the country. — Bernama
Soil Erosion along the riverbank
Improper Rubbish dumping
Pollution from livestock farming (Cattle and Buffalo)
Pollution from Industries
Sand Mining/River Dredging
Flash Flood
Emerging Issues

• The rapid urbanisation in the Basin has led to a large influx of people into the region.
• Conflict between federal and state governments
• Water resource administration is fragmented
• Lack of coordinated approach to planning, development and management
• Protection and conservation of water aspect
• Land-use control and watershed management aspect.
• A certain degree activities pertaining to realization of goals of an IWRM approach. The problem of integrated management lies in developing cooperation and collaboration among the agencies to ensure the well being of the basin itself.
• This includes issues of conflict resolution, information management and transboundary organization.
• Many solutions and activities have been carried out to arrest the deterioration of the Langat River water quality but few have achieved success. The root to the problem is the absent of a truly integrated management system of water resources in the Basin.

>> There is a need for IWRM practices and implementation at all levels.
Initiatives at Langat HELP River Basin

• Ecosystem Health of the Langat Basin by Institute for Environment and Development (LESTARI UKM) 1997-2004
• River Basin Authority Establishment through Selangor Waters Management Authority (LUAS) 1999
• Integrated Catchment Development and Management Plan (CDMP) for Putrajaya Lake Catchment (Sub Catchment of Langat) (PPj) 2000
• Pollution Prevention and Water Quality Improvement Programme of Langat River by Department of Environment (DOE) 2003
• Acknowledgement of Langat as UNESCO HELP River Basin (LESTARI UKM & UNESCO) 2004
• Langat Integrated River Basin Management (IRBM) Study by Department of Irrigation and Drainage (DID) 2005
• Integrated Water Resources Management (IWRM) Research Group Establishment by the National University of Malaysia (UKM) 2007
Initiatives at Langat HELP River Basin

- Harmonising Environmental Considerations with Sustainable Development Potential of River Basins (LESTARI UKM & UNESCO) 2010
- Acknowledgement of Putrajaya Lake and Wetlands as UNESCO Ecohydrology Demonstration Site (LESTARI UKM, PPj & UNESCO) 2010
- Development of Decision Support System for Langat River Basin (UKM) 2010-2014
- Upscaling of MSMA-SME (Stormwater Management Ecohydrology) at Catchment Level (Langat River) (LESTARI UKM & HTCKL) 2012-2015
- Langat River Basin Management Plan by Selangor Waters Management Authority (LUAS) 2015
- Establishment of Sustainability Science Demonstration Pilot Project on Restoring and Managing Langat River, Malaysia for Future (LESTARI UKM & UNESCO) 2015-2016
- Langat River Conservation Programmes (FoLR, KeTTHA & LESTARI UKM) 2017
The UKM’s IWRM Research Group was formed in December 2007 under the Framework of Regional Sustainable Development Research Niche of UKM. The group consists of lecturers and researchers from various faculties and institutes in UKM who are engaged in IWRM research and activities.

The research are mainly focused on four research fields, namely, governance, science and technology, economy and health.

Some activities related to IWRM have already been conducted and carried out at various levels involving multi disciplines and multi stakeholders as initiatives to move forward towards the implementation of IWRM in Malaysia.
Harmonising Environmental Considerations with Sustainable Development Potential of River Basins

UNESCO-IHP HELP SYMPOSIUM ON Harmonising Environmental Considerations with Sustainable Development Potential of River Basins, 24-26 March 2010, Kuala Lumpur, Malaysia
Training Course on Developing the Capacity of NGOs for the Practical Implementation of IWRM in Malaysia
Training Course on Developing Capacity of Academia for the Practical Implementation of IWRM in Malaysia
Training Course on Developing the Capacity of Government Officers for the Practical Implementation of IWRM in Malaysia

2nd & 3rd November 2010
Puri Pujangga, UKM, Bangi, Selangor

1 & 2 December 2010
Grand Dorsett Labuan Hotel, Labuan, Malaysia

Organized by:
Workshop on Developing the Capacity of Media for the Practical Implementation of IWRM in Malaysia
Developing the Capacity of Young Leaders for the Practical Implementation of IWRM in Malaysia

Water Watch Programme for Young Leaders
Water Information Access Carnival
19-20 April 2014
Dewan Komuniti Seksyen 7, Bandar Baru Bangi
UPSCALING OF MSMA ECOHYDROLOGY AT CATCHMENT LEVEL (SC. LANGAT)

This project aims to provide a more appropriate stormwater management strategies and best practices and mitigation measures to counter negative effects of urbanization with the development of detailed design of various MSMA Stormwater Management Eco-hydrology (MSMA SME) components. The effort has gone beyond stormwater management to include efforts at local ecological governance and public involvement in the creation of an urban riverfront park that will contribute to the livability of the immediate residential surroundings as well as the surrounding city of Bandar Baru Bangi.

Component 1: Porous Pavement
Porous and permeable surface water that can be used as a sidewalk or parking.

Component 2: Bioretention
Bioretention is a stormwater treatment structure designed to filter stormwater runoff with additional pleasing aesthetic look that cannot be provided by typical stormwater treatment structures.

Component 3: Wetland
Constructed wetlands are extensively vegetated water bodies that remove nutrients and pollutants from stormwater through a series of processes of sedimentation, filtration, and biological uptake.

Component 4: Slope Protection
a) The geosynthetics use to increase the general slope stability of soils and rocks. It is noted that the geosynthetics use, especially the geotextiles, geogrids types and some geocomposites ones, make a increasing in the earth slope stability.

b) The geosynthetics use to increase the general slope stability of soils and rocks. It is noted that the geosynthetics use, especially the geotextiles, geogrids types and some geocomposites ones, make a increasing in the earth slope stability.

PROPOSED PROJECT LOCATION
The project area situated at a 2 km stretch along Sungai Langat nearby the Universiti Kebangsaan Malaysia (UKM) and Taman Tasik Bangi 3.
The proposed Langat Riverfront Community Park is a part of Upscaling of MSMA Ecohydrology at the Catchment Level (Sg. Langat) project. The structures and components of proposed park will serve the community for recreational purpose and fulfilling public recreation demand. Recreation provides service opportunities for management, supervision, coordination, and implementation of local ecological governance. This includes organized space for physical fitness, utilizing recreation centers, open space, children playground, and other facilities. Recreation also provides for the leisure services for all walks of life.

Langat River Information Center aims to provide scientific, educational, and leisure exhibits and programs designed to increase awareness of the importance to preserve the Langat River.

For further info, kindly contact:
Institute for Environment and Development (LESTARI)
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Tel: +603 89277641
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Website: http://www.ukm.my/lestari/

WE NEED YOUR HELP TO MAKE THIS A REALITY
Stakeholder Consultation Workshop with Bangi Community Section 3 Bandar Baru Bangi on Proposed Langat Riverfront Community Park
15 Jun 2014
Restoran Warisan Bangi
Putrajaya UNESCO Ecohydrology Demonstration Site

- Putrajaya Lake and Wetland catchment are located in **Putrajaya Federal Territory** within the **Langat River Basin** area of Malaysia.

- It is one of the **Ecohydrology Demonstration Site** of UNESCO-IHP Ecohydrology Programme (EHP) since 2010 & classified as an **Operational Demo Site** which are implementing Ecohydrology principles and involved with stakeholders in project management.

- This achievement is initiated by the Institute for Environment and Development (LESTARI) of the National University of Malaysia (UKM), in collaboration with the Lake and Wetland Unit of Putrajaya Corporation for the project called “**Integrated Catchment Management of Putrajaya Lake and Wetland**”.
What is Ecohydrology?

- UNESCO’s IHP Ecohydrology Programme is focused on an **integrated understanding of biological and hydrological processes at a catchment scale** in order to create a scientific basis for a socially acceptable, cost-effective and systemic approach to the sustainable management of freshwater resources.
- The Ecohydrology Programme (EHP) has been formulated as a key theme of the Seventh Phase (2008-2013) of the International Hydrological Programme’s (IHP) action oriented and policy relevant knowledge generation, sharing and technical capacity building. This theme is contributing to a better understanding of water as both an abiotic resource and as a service delivered by ecosystems.

Ecohydrology Demonstration Projects Network
Showing Putrajaya Lake & Wetland in Malaysia
Out of 32 Demo Projects in the World & 16 Projects in AP & 5 Projects in SEA

Putrajaya Lake and Wetland, Malaysia
Operational Projects

A floating mat of Eichhornia crassipes (water hyacinth), one of the many alien species which has reduced the services from the Naivasha ecosystem.

Flowers displayed in European supermarkets—like the largest ecosystem service from Naivasha, KENYA.

Lake Naivasha’s waters (together with those flowing in and out by rivers and groundwater) are not “fit for purpose”. The entire basin has too many users, taking too much water, with the result: the lake is shrinking. It is shallower, warmer, full of sediment and low in oxygen. The industry that is most visible, horticulture on the lake shores, receives the most blame for the lake’s state. However, that industry is only partly to blame—a succession of alien introductions and arrivals have wreaked havoc with the ecosystem.

The favoured customers—supermarkets—of the horticultural industry are highly susceptible to criticism regarding the sustainability of their suppliers. Part, but only part, of this criticism has been addressed by growers seeking “Fair Trade” status with partner supermarkets promoting it.

An initiative to move the Naivasha Basin towards sustainable use: Payment for Ecosystem Services from the European supermarket buyers of flowers from Lake Naivasha, KENYA.

Now, two European supermarkets, from Germany and Switzerland, have provided support for wetland ecosystem restoration, community capacity building, sustainable water use and the development of intervention methods to achieve “water friendly farming.” The next two years will see the original ecohydrological restoration proposals developed under the ETH programme in 2004 implemented and tested.

Key contact: Dr David M. Harper
Email: david Harper@u.ac.uk

Sustainable water resources management plans in the Tiber river basin for environment protection, minimum in-stream flows regulation and the Trasimeno Lake ecosystem preservation, ITALY

The analysis of the Tiber river basin pointed out how, during the last 20 years, there has been indiscriminate and irrational use of the water resources at the basin scale. What in the past was just a feeling, was brought up by severe droughts. This situation is also worsened if the issue of water quality is taken into consideration especially in ecosystems like the Trasimeno lake.

This project is strictly linked to the principles and goals of ecohydrology in fact it foresees to affect the Tiber basin ecosystem starting from the evaluation and regulation of the in-stream flows. This project integrates the communicative and diluvial aspects that can boost the final outcomes. More over, the support of the University can guarantee a distinctive outcome for all stakeholders.

Key contact: Prof. Stefano Casadei
Email: casadei@ing.unijs.it

Upper Tiber River in July 1996, Italy. A cooperation of Civil and Environmental Engineering University of Roma

Integrated Catchment Management of Putrajaya Lake and Wetland, MALAYSIA

Putrajaya lake and wetland catchment are located in Putrajaya Federal Territory within the Langat River Basin area of Malaysia. The management, planning, approval, monitoring and enforcement jurisdiction over all land development and human activities in this catchment area is authorized by the Putrajaya Corporation. The lake is an urban lake, created right in the middle of Putrajaya, the newly developed Government Administrative Center of Malaysia, which was planned to be developed into a “City in a Garden” with the 500 hectares Putrajaya Lake and Wetland as its focal point. It is a largest constructed wetland in the tropics and one of the constructed wetlands and lake of national importance in Malaysia. It is an integrated lake and wetland catchments management system and needs a serious and systematic management approach and control in order to sustain the catchment area of Putrajaya.

Key contact: Dr Ruhmah Elkhilbi
Email: elkhilbi@yahoo.com

Putrajaya Lake and Wetland, Malaysia
EHP DEMONSTRATION PROJECT CRITERIA

**Global Reference Projects:**
Show best practice in EH principles (dual regulation, integration) and serve as a model for other projects. **Total 3:** Poland (2), Portugal

**Operational Projects:**
Are implementing EH principles and involved with stakeholders in project management. **Total 7:** Argentina, China (2), Germany, Italy, Kenya, Malaysia

**Evolving Projects:**
Well-developed plans conforming to the EH principles that are beginning to be implemented. **Total 13:** Australia (3), China (3), Costa Rica, El Salvador/Guatemala/Honduras, Greece, Indonesia, Micronesia, Philippines, Sweden

**Emerging Projects:**
Further work is required to develop plans and activities in an integrated way to support EH principles. **Total 9:** Bangladesh, Bahamas, Ethiopia, Ghana, Indonesia, China, Philippines, Spain, Croatia

Putrajaya Lake and Wetland, Malaysia
Development of UNESCO Ecohydrology Demosite Card on Integrated Catchment Management of Putrajaya Lake and Wetland, Malaysia

- The development of this card were taking into account the current status of Putrajaya Lake and Wetlands Ecohydrology management by using relevant data and information needed which collected from various sources virtually or directly in collaboration with local stakeholders in Putrajaya.
- All data gathered were compiled and arranged into specific Demosite Card template developed by UNESCO.
Putrajaya UNESCO Ecohydrology Demosite Card

INTEGRATED CATCHMENT MANAGEMENT OF PUTRAJAYA LAKE AND WETLAND (MALAYSIA)

Demosite description

- Lithology / Geochemistry
  - Calcite-cemented karst, ganister, carbonaceous schist and quartz-mica schist.
  - Thinly-bedded meta-siltstone and meta-sandstone.

Main description:
- Putrajaya Lake and wetland catchment (fig. 1) are located in Putrajaya Federal Territory within the Langat River Basin area in Malaysia. The lake is at the southern part of the wetland.
- Putrajaya Lake (fig. 2) is an urban lake in which its foreshores are the most popular resource for informal recreation as a waterfront city.

Putrajaya Eco-Hydrology Management won the Excellent Award in the Green City Award Category of the Malaysia Landscape Architecture Awards (MLAA) 2012 and a Gold Award of The International Awards for Liveable Communities 2012.

Ecohydrology Principles and Solutions

- Conserve Ecohydrological processes in natural ecosystems
  - NO
- Enhance Ecohydrological processes in novel ecosystems
  - YES
- Apply complementary Ecohydrological processes in high impacted systems
  - YES

EH IMPLEMENTATION PRINCIPLES

* Ecological engineering

EH SOLUTIONS

- Plantation of a variety of aquatic plants in this wetland (more than 70 species, totaling 12 million number of plants)
- The Putrajaya constructed wetland system (implemented since 1998) comprises five arms with 24 cells.

Major Issues

- Elevated level of pollutants from upstream inflow to the lake

Social-Ecohydrological System

- EH Methodology
  - The ecohydrological approach is implemented by the use of constructed wetland as a natural treatment system to treat primary upstream inflow to the lake.

Objectives

- To increase stakeholder engagement and community participation in Putrajaya
- To raise awareness among communities
- To educate people to be more responsible in taking care of the environment

Lifelines

- Life Zone: Tropical Moist Forest
  - PPT (mm/yr): 2307
  - T (°C): 27
  - RH: 98%
  - Humidity: Humid

ACTIVITIES

* Transforming Putrajaya from a Garden City to a Green City (Putrajaya Structure Plan – Sustainable Putrajaya 2025)
* Local Agenda 21 – a Community Programme for Sustainable Development
* Preparatory team, the site coordinator and the team coordinator
* Monitoring, Surveillance, and Maintenance Works of Lake and Wetlands
* Environment & Ecosystem Educational Programmes
* Healthy Community Healthy Ecosystem (HCHE)
* Series of Putrajaya Lake and Wetland Management Workshop/Seminar/Forum/Dialogue/Colloquium
* Series of Putrajaya Lake and Wetlands Explorers
* Series of Workshop & Photography Contest on Biodiversity Appreciation
* Series of Catch and Release Fishing Competition
* Series of Bird Watching and Identification Programme

Results

MAIN EXPECTED OUTCOME

- Improvement of the water quality of the surface runoffs flowing into the lake from the upstream areas

LATEST RESULTS

The ecohydrological approach that combined need of the ecosystem into the overall planning, approval, monitoring and enforcement jurisdiction of the city development and the human activities in the catchment area, significantly having a direct impact to the Putrajaya Lake. A number of monitoring and surveillance conducted in this area has shown very positive signs of interesting habitat development and ecosystem enhancement. Water quality is remained in good water quality for allowing water-related activities conducted in the lake.

http://ecohydrology-ihp.org/demosites/resources/arquivos/1ef2de9951b414610be0d31c0af90b8911_DEMOCARD_PUTRAJAYA.pdf
Putrajaya Lake
Langat UNESCO Sustainability Science Demonstration Site

• The Project on "Establishment of Sustainability Science Demonstration Pilot Project on Restoring and Managing Langat River, Malaysia for Future" is carried under the UNESCO framework of "Sustainability Transformation Across the Region (STAR)", funded by Japanese Fund-in-Trust (JFIT).

• Implemented in 2015-2016 by LESTARI, UKM
What is Sustainability Science?

‘Sustainability science is an emerging field of problem-driven, interdisciplinary scholarship that seeks to facilitate interventions that foster shared prosperity and reduced poverty while protecting the environment. The field is defined by the problems it addresses rather than the disciplines it employs. It draws from multiple disciplines of the natural, social, medical and engineering sciences, from the professions, and from practical field experience in business, government and civil society’

- Harvard University 2012 -

‘Sustainability Science is a vital part of the solutions to the sustainability challenges we face. It promotes as such cross-disciplinary coordination, and requires global cooperative effort to advance understanding of the dynamics of human-environment system.’

- UNESCO 2013 -
UNESCO Sustainability Science Demonstration Sites
(8 Demo Sites, 4 Countries)

Langat UNESCO HELP River Basin, Malaysia

- Siem Reap, Cambodia
  Establishment of Sustainability Science Demonstration Site on Restoring and Enhancing Angkor World Heritage Site and Siem Reap City Water System

- Langkawi Geopark, Malaysia
  Establishment of Sustainability Science Demonstration Site on Water and Environmental Sustainability Education Linked with Ecotourism in Langkawi Geopark

- Langat River Basin, Malaysia
  Establishment of Sustainability Science Demonstration Site on Restoring and Managing Langat River, Malaysia for Future

- Ifugao, the Philippines
  Establishment of Sustainability Science Demonstration Site on Rice Terraces of the Philippines Cultural Heritage

- Davao, the Philippines
  Establishment of Sustainability Science Demonstration Site on Enhancing Resilience to Disasters of Urban Water System of Mindanao

- District of Solok, West Sumatra Province, Indonesia
  Establishment of Sustainability Science Demonstration Site on Enhancing and Managing Green Livelihood, Green Education Project

- District of West Lombok, West Nusa Tenggara Province, Indonesia
  Establishment of Sustainability Science Demonstration Site on Enhancing and Managing Forest Rehabilitation and Conservation

- District of Bantul, Special Province of Yogyakarta, Indonesia
  Establishment of Sustainability Science Demonstration Site on Enhancing Resilience to Climate Change and the Challenges of Irregular Weather Patterns for the Farmers in Jogja
LANGAT RIVER CONSERVATION PROGRAMMES

- UKM
- KeTTHA
- LUAS
- DID/NRE
- MPKj
- MWA

1st Site Visit & Identification of Area for LANGAT RIVER CONSERVATION, 29 March 2017, Persiaran Universiti (in Front of UKM Main Gate)
LANGAT RIVER CONSERVATION PROGRAMMES
Phase 1: UKM Trails @ Langat >> Another 9 Langat Tributaries to be adopted!
CONCLUSION & RECOMMENDATIONS

• Some works in progress especially on local sustainability efforts have been carried out as local actions from a global initiative at improving the environment and river basin.

• The efforts are part of an initiative towards improving the current level of Langat UNESCO HELP River Basin from an "Evolving" to an "Operational" River Basin in the future.

• A sustainable and integrated water resources management and water planning in this basin will help Langat to move forward to achieve this agenda.

• This will also need to be supported by an IWRM Awareness-raising, Advocacy and Capacity Building (AACB) programmes to improve the current water management system and practices, and ensure local participation and governance of Langat to be achieved and mobilised.
The Need for IWRM AWARENESS RAISING, ADVOCACY AND CAPACITY BUILDING (AACB)
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- Selangor Waters Management Authority (LUAS)
- International Capacity Building Network for IWRM (Cap-Net)
- Japanese Fund in Trust (JFIT)
- Institute for Environment and Development (LESTARI)
- Integrated Water Resources Management (IWRM) Research Group
- Sustainable Ecosystem Management Research Group
- Universiti Kebangsaan Malaysia (UKM)
Related Links

- Integrated Water Resources Management (IWRM) Research Group of UKM
  http://www.ukm.my/myiwrm/index3.htm

  http://www.ukm.my/myiwrm/

- Development of Decision Support System (DSS) For Langat River Basin Management in Malaysia
  http://www.ukm.my/dsslangat/index2.php

- Facebook Page of Langat UNESCO HELP River Basin
  https://www.facebook.com/helplangat/

- Facebook Page of Putrajaya UNESCO Ecohydrology Demonstration Site
  https://www.facebook.com/putrajayaecohydrology/

- Facebook Page of Integrated Water Resources Management (IWRM) Research Group of UKM
  https://www.facebook.com/iwrmukm/

- Facebook Group of IWRM Research Group
  https://www.facebook.com/groups/iwrmresearchgroup/

- Putrajaya Lake & Wetland Demosite UNESCO @Ecohydrology web platform
  http://ecohydrology-ihp.org/demosites/view/124
Thank You
Terima Kasih

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