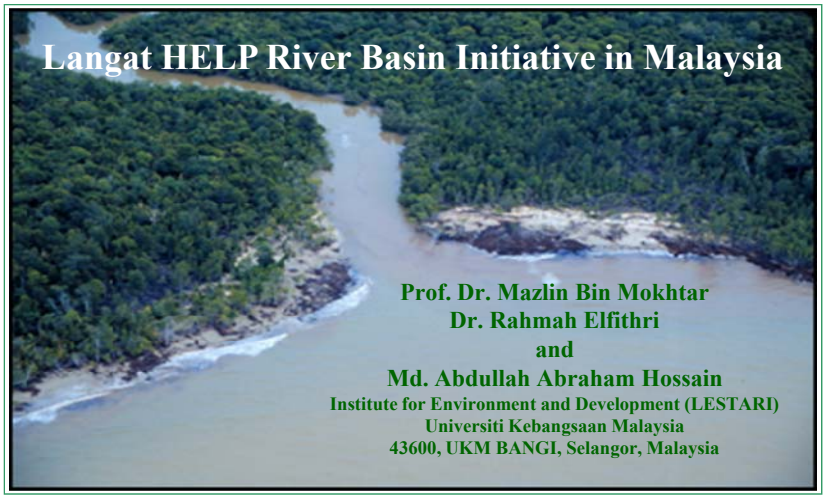

Langat HELP River Basin Initiative in Malaysia

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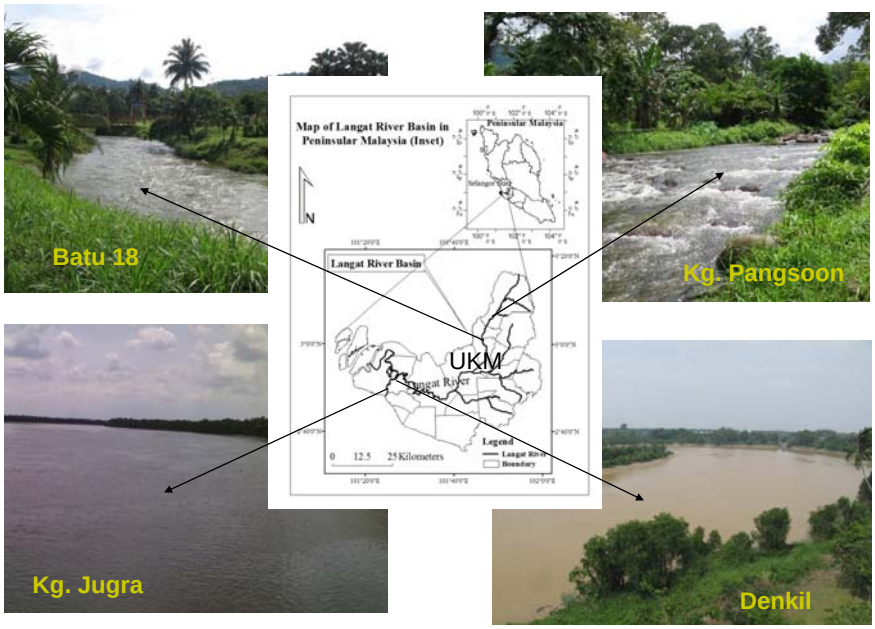
Langat River



What Makes Langat Unique?

- Langat River Basin, Malaysia is recognized as one of the HELP Basins since 2004, initiated by the LESTARI, UKM.
- Langat was classified as Evolving HELP Basin, out of 90 catchments from 56 countries in the world.
- The selection has been made based on the international programme that is a catchment based activity which is interfacing scientific research with stakeholders needs.
- Includes scientists, stakeholders, policy-makers, lawyers.
- Provides options as against imposing solutions.
- Providing/testing/implementing and improving solutions.
- Sharing experiences across a global network of basins.
- Geographical location.

Integrated Water Resources Management

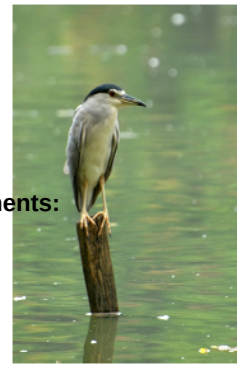
To promote a process towards the vision of The Three Es by coordinated development and management of water, land and related resources, in order to maximize the resultant Economic and social welfare in an Equitable manner without compromising the sustainability of vital Ecosystems.

The Four Dublin principles (1992)

1. **Fresh** water is finite and vulnerable resource
2. **Participatory** approach
3. **Women** play a central role
4. Water has **economic value**

The Tools: The Three Pillars of management components:

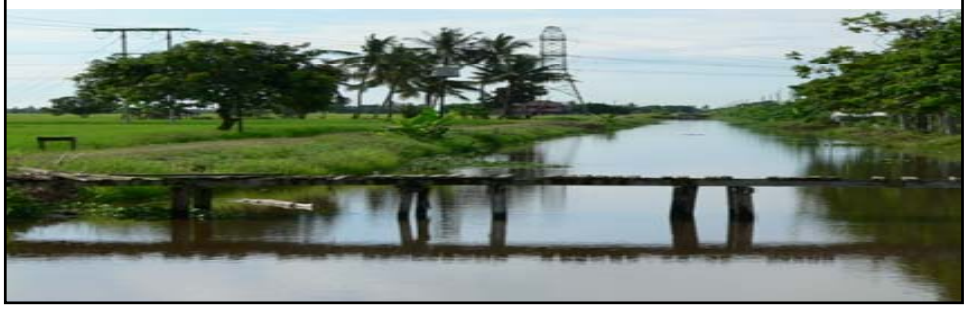
1. Enabling Environment: **Policy, Law, Finance**
2. **Institutional** framework
3. Appropriate **management instruments**



The Outcome

A cross-sectoral coordination of water agencies:

- Water for **people**: water supply and sanitation
- Water for **food**: farms and fisheries
- Water for **nature**: conservation and recreation
- Water for **other uses**: hydropower, industry, safety, transportation



What is HELP?

- **The Hydrology for the Environment, Life and Policy (**HELP) is an integral cross cutting activity and transdisciplinary initiative of the United Nations Educational Scientific Organization **(UNESCO)** led by the International Hydrological Programme (IHP) to *solve real problems in real catchments*.
- **HELP** is creating a new approach to integrated catchment management through the creation of a framework for water law and policy experts, water resource managers and water scientists to work together on water-related problems.
- The HELP network is composed by 90 basins classified under the 4 categories:
  · Group D: ***Demonstration* HELP Basin -** This is seen as demonstrating best practice in HELP and IWRM, 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.
  · Group E: ***Evolving* HELP basin -** This is a basin which is not yet fully operational.
  · Group P: ***Proposed* HELP Basin -** Additional information is needed to re-classify this basin.

Malaysian Context on IWRM

Malaysia has accepted IWRM 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 different policy documents:

- The Third Outline Perspective Plan, Malaysia (OPP3) 2001-2010
- The 8th Malaysia Plan documents (MP8) 2001-2005
- The 9th Malaysia Plan (MP9) 2006-2010

National Policy Agenda on IWRM

The issues of sustainability of water use and conservation are well documented through different policy documents of Malaysia as national agenda (GoM 2006c; UNEP 2006).

Third Outline Perspective Plan (OPP3), Chapter 1, Paragraph 1.81: Effort to manage forests sustainabily will be intensified and at the same time expanding the multiple use of forests, **steps will be taken to formulate integrated river basin management plans** to improve water quality and supply as well as managing water resources. To ensure sustainability of coastal resources integrated coastal management plans will be introduced in all states (GoM 2000b).

National Policy Agenda on IWRM

Eighth Malaysia Plan

- IWRM approach has been endorsed under sustainable environmental management.

Ninth Malaysia Plan, Chapter 22, Paragraph 22.22:

The utilization of the integrated river basin management (IRBM) approach will be intensified to improve river and ground water quality (GoM 2006c). Besides, this plan also emphasized on following issues:

- To make efforts to protect and conserve land, water, biodiversity;
- To promote sustainable natural resource management practices in relation to land, water, forest, energy and marine resources;
- To make closer cooperation with stakeholders and non-governmental organizations (NGOs) in addressing environment and natural resource concerns; and
- To enhance protection of the environment and conservation of natural resources and contribute towards improving the quality of life. (GoM 2009).

National Water Vision 2020

National Water Vision 2020 endorsed that 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 key objectives of the vision are:

- Water for people
- Water for food and rural development
- Water for economic development
- Water for environment

Gotoroyong-event at Batu 18

Existing Institutional Arrangements for IRBM in LRB

- **National Policies**
- **Laws and rules**
- **Organizations (formed inter-organizational network)**

Relevant National Policies

- National Forestry Policy 1992;
- National Policy on Biological Diversity (1998);
- National Policy on the Environment (2002);
- National Wetlands Policy (2004);
- National Physical Plan (2005);
- National Urbanisation Policy (2006);
- National Agriculture Policy (2006); and
- National Biotechnology Policy (2006)

Laws and Rules

Important Federal level laws

- Environmental Quality Act, 1974;
- Land Conservation Act, 1960;
- Irrigation Areas Act, 1953;
- Fisheries Act, 1985;
- Town and Country Planning Act, 1976;
- National Forestry Act, 1984;
- Mineral Development Act, 1994;
- Water Services Industry Act, 2006;and
- National Park Act, 1980;

Mangroves in LRB

Laws and Rules

Important State level laws/rules

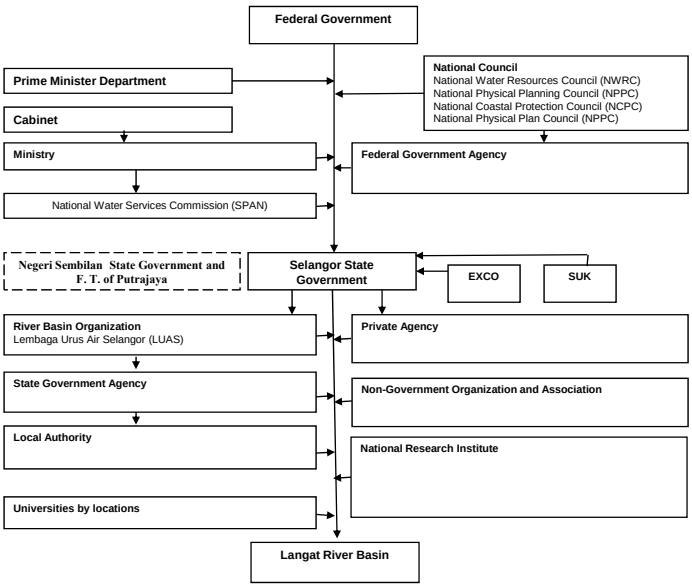
- The Drainage Works Act, 1954;
- Irrigation Areas Act, 1953 (Revised in 1989);
- The National Land Code, 1965;
- Land Conservation Act, 1960;
- Waters Act 1920 (Revised in 1989);
- The Forest Act, 1984;
- Water Supply Enactments, 1955;
- Perbadanan Urus Air Selangor;Selangor Waters Management Authority Enactment, 1999;
- Protection of Wildlife Act, 1972;
- National Parks Act, 1980;
- Town and Country Planning Act, 1976;
- The Fisheries Act, 1985;
- Fisheries Maritime Regulations, 1967 (Amended in1987);

Laws and Rules

Important State level laws/rules

- Merchant Shipping (Exemption) Order, 1961;
- Poisons Act 1952;
- Prevention and Control of Infectious Diseases Act,1988;
- Environmental Quality Act, 1974;
- Local Government Act, 1976;
- Street, Drainage and Building Act, 1974
- Mining Enactment, 1929;
- Geological Survey Act, 1974;
- Pesticides Act, 1974;
- Pesticides (resgistration) Rules, 2005;
- Pesticides (Exemption) Order, 2004;
- Pig Framing Enactment;
- Sewerage Services Act, 1993;

Inter-organizational Network for IRBM in LRB



Organizational Setup that is Legitimately Responsible for Water Related Policy Matters in LRB.

Organization	Responsibility	Description
Federal Government (Ministry of Energy, Green Technology and Water)	Policy matters	Development of a holistic water policy for the country by setting policy directions.
National Water Resource Council (NWRC)	Water resource matters –Cross boundaries/ inter-State/ issue of national interest	Ensures coordination with the various State Government in the management of the water basins.
State Government	Raw water matters	Regulate raw water abstraction and catchment management
National Water Services Commission (SPAN)	Regulatory matters	Regulate the water services industry (water and sewerage services)

Important Interventions in Langat River Basin

Preparation of Integrated River Basin Management Plan

Sl. #	Management perspectives	Issues under consideration
1.	Catchment management and monitoring	Land use; Forests and biodiversity; Soil erosion; and sedimentation;
2.	River corridor development and management	Reclamation; Rehabilitation; Restoration; Remediation; Preservation; and Conservation;
3.	Water resources development and management	Surface water and ground water management; Water treatment plants; Pollution threats for surface water and ground water; Development of new water supply source; River water quality improvement; Reduction of non-revenue water loss; Rainwater harvesting; and Industrial waste water recycling;
4.	Flood mitigation	Structural measures for flood mitigation (for Sg. Langat; Sg. Semenyih; Sg. Beranang; and Sg. Labu); Non-structural measures; and Flood forecasting;
5.	Environmental management	Pollution control (from point source, non-point source); Solid waste management including schedule waste; and Water quality monitoring;

Source: DID. 2003. *Integrated river basin management plan for Langat River Basin, Volume 3.* Department of Irrigation and Drainage, Kuala Lumpur: Department of Irrigation and Drainage (DID)

Important Interventions Applicable in Langat River Basin

- Formation of Lembaga Urus Air Selangor or its acronym, LUAS (or SWMA in English) under the Selangor Waters Management Authority Enactment 1999 pursuant to the approval of the Selangor State Legislative Assembly on 9 April 1999.
- Formation of National Water Services Commission (SPAN) to provide central regulatory service
- Increased in coordination among implementing agencies through LUAS
- Water quality has been improved through water quality monitoring
- Different research studies carried out on Langat River Basin

Research Initiatives By UKM

Mission

Promote integrated and sustainable water resources management and development towards good water governance in Malaysia.

Objectives

a. Conduct various innovative research on water resources management and governance
b. Explore various concepts and guidelines to establish the good water governance.
c. Facilitate networking between various

Research Initiatives on the Basis of Scalar Components of River System Within LRB

Natural system		Social system	
Scalar components	**Example**	**Scalar components**	**Example**
Micro habitat	Water quality, Chemical governance	Individual	Capacity building, awareness
Hydraulic unit	Flow-sediment interaction	Household	Motivation, campaign
Geomorphic unit	River structure-process	Neighbourhood &village	Social learning
Reach	Pattern of channel landform, flood plain	River basin	IRBM
Landscape	Topographic feature	State	Love our river
Catchment	Drainage, geology	Country	Sustainable development/ IWRM
Ecoregion	Lithologic and climatic control	Region & global	HELP initiative

Research Opportunities Through Different Types of Projects

- Collaborative research project
- Fundamental research project
- Contract research project
- Research University Operational Funds' project
- Research University Grants project
- Science Fund project

Paya Indah Wetland

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
2008			
Collaborative research project	Climate change policy	Ministry of Natural Resources and Environment	Country
Collaborative research project	Planning for developing environmentally sensitive areas for hills and highlands in Selangor	Department of Town and Rural Planning, Selangor (JPBD)	State
Fundamental	Situation and gap analysis for chemicals management	Ministry of Higher Learning	State
Fundamental	Chemicals governance in Malaysia: development of chemical management systems	Ministry of Higher Learning	Country

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
Contract	Strategic plan for forest management in Peninsular Malaysia	Forestry Department of Peninsular Malaysia (JPSM)	Country
Contract	Baseline information on Malaysian environmental health	Ministry of Health, Malaysia	Country
Contract	1st Malaysian national environmental health action plan (NEHAP)	Ministry of Health, Malaysia	Country
Research University Operational Funds' project	Ecosystem services and public policy: the case of wildlife conservation in Malaysia	Research University Operational Fund	Country

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
Research University Operational Funds' project	Sustainable campus	Research University Operational Fund	Reach
Research University Grant	Managing contaminated land for Langat Basin ecosystem health sustainability	Research University Grant	River basin
Research University Grant	Landscape fragmentation and heterogeneity of mangrove forest in Peninsular Malaysia	Research University Grant	Country/ regional
Research University Grant	Connecting ecosystem science with policy processes for a national scale ecosystem approach in Malaysia	Research University Grant	Country

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
Research University Grant	Developing management system and sustainable resource planning towards sustainable ecosystem in UKM campus	Research University Grant	Reach
2007			
Collaborative Research	Hydrology of the Langat Basin: surface water and ground water interaction	Ministry of Science, Technology and Innovation through IRPA research funding	Basin
Collaborative Research	Ecological footprint in landuse planning	Town and Country Planning Department, Peninsular Malaysia	Country

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
Collaborative Research	Ground water ecosystem: the impact of ground water abstraction to land stability in Langat Basin	Ministry of Science, Technology and Innovation	River Basin
Collaborative Research	Landscape ecological assessment of protected areas in Peninsular Malaysia for sustainable management planning	Ministry of Science, Technology and Innovation	Country
Fundamental Research	Sustainability science and governance: development of an integrated framework	Ministry of Higher Education	Country
Fundamental Research	Developing capacity of academia for the practical implementation of IWRM in Malaysia	Ministry of Higher Education	Country/State

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
Collaborative Research	Bandar lestari: environment award	Department of Environment, Ministry of Natural Resources and Environment	Country
Collaborative Research	Sekhola lestari: environment award	Department of Environment, Ministry of Natural Resources and Environment	Country
Collaborative Research	Feasibility study on toxic and hazardous waste recovery potential in Malaysia	GEF-KANSI	Country
Collaborative Research	Implementing integrated water resources management (IWRM) in Malaysia: multistakeholder and multidisciplinary approach	Ministry of Science, Technology and Innovation	Regional (Pahang River Basin and Langat River Basin)

How are we utilizing research fund?

Type of Funding	Research Project	Partner	Impact on Scalar Component
Fundamental Research	Science and governance for sustainable development	Ministry of Higher Education	Country
Fundamental Research	MyIWRM, What can I do? Developing capacity for the practical implementation of IWRM in Malaysia	International Capacity Building Network for IWRM (CapNet)	Country

Focus on Ecosystem Health of the Langat River Basin.

The objectives of the study were:

i. To understand **inter and multi-disciplinary approaches** to monitoring and assessing the health of the Langat Basin ecosystem and suggest framework for integration

ii. To **identify strategies and tools** that allow integration of conservation and development

iii. To **gather scientists and technical experts** to monitor, analyze, evaluate and make recommendations on the sustainable management of ecosystem health at the national level based on the Langat Basin a case study

iv. To suggest **a list of environmental health indicators** which will assist planners, policy and decision makers in planning and environmental management

v. To **develop information directory** related to Langat Basin Ecosystems to facilitate sharing of information and references

vi. To **develop a decision support system** inclusive of data bases, good management systems, modeling and friendly user interface.

Ecosystem Approach

- **Ecosystem Approach in IWRM** should be taken into consideration:
  - The integration of the roles played by various agencies (both government and private sectors, and NGOs and the citizens),
  - Land use development activities and
  - Protection of vital ecosystems.

- **Strong coordinated national actions** are required to integrate legislation and all relevant stakeholders that are related to water resources management, including NGOs.

- The integration will take into account **the coordination in decision making** among **different levels** of government and among **various sectoral** departments and agencies within government, private sectors, NGOs, communities and also universities or research institutes.

- Needs **commitment from all stakeholders, especially NGOs,** where currently no involvement from any NGOs in Malaysia in WRM of Langat Basin. At least to add numbers of NGOs to be involved and participated fully in IWRM processes in Langat river Basin.

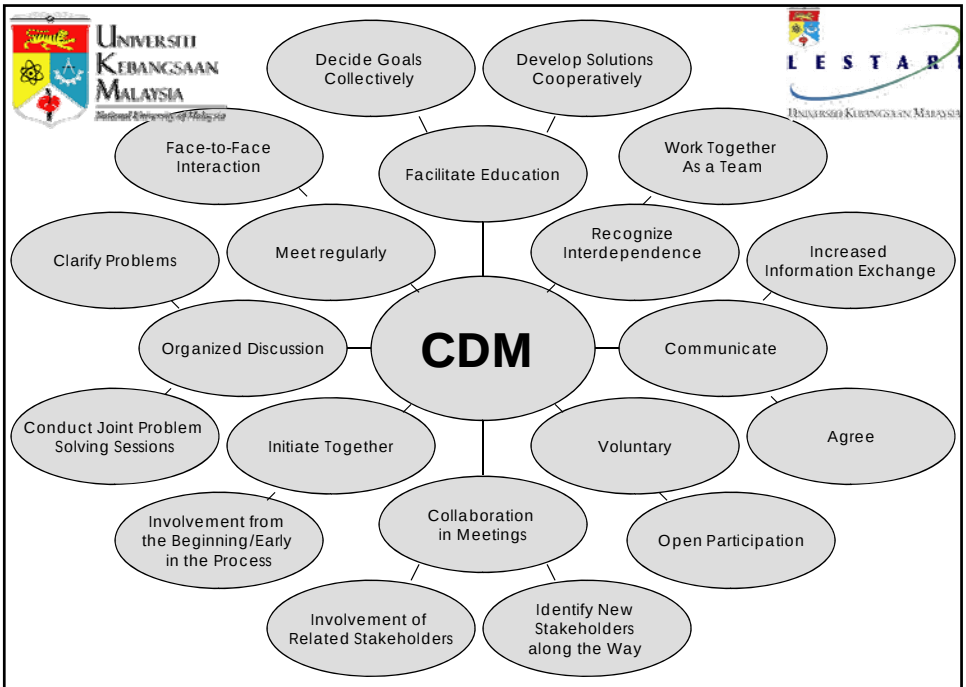
Focus on Participatory Management for IWRM Through Collaborative Decision Making

- CDM is an approach where individuals and organizations recognize their interdependence, communicate and agree to document requirements prior to submitting reports, and present and resolve regulatory requirements early in the administrative process.

- Individuals and organizations meet regularly to clarify problems, organize their discussions, conduct joint problem-solving, and work to make complex tasks easier through improved communication and coordination.

- Collaborative decision-making provides individuals and organizations:
  - To better listen
  - To develop a more honest approach
  - To demonstrate follow-through or modify commitments

- Working together as a team with an approach of CDM will attain a common goal: timely, cost-efficient, environmental cleanup and compliance.



How CDM?

Case Study on Promoting CDM in the Langat Basin

- The Langat River Basin administratively involves two states viz. Selangor State and Negeri Sembilan State and also the Putrajaya Federal Territory.
- This basin has become the focus of major development:
  - The New Federal Government Administrative Centre of Putrajaya
  - The Multimedia Super Corridor (MSC)
  - Cyberjaya
  - The Malaysian BioValley project
  - The Kuala Lumpur International Airport (KLIA)
  - The Formula One Grand Prix Circuit at Sepang
  - Several institutions of higher learning including universities
- The rivers play a significant role in the ecology of the basin, provide potable water to residents within the basin as well as in the adjacent Klang Valley, industries and agricultural areas.

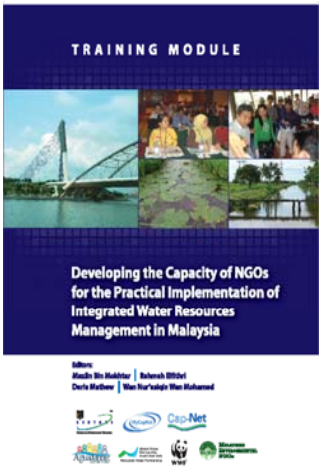
Focus on NGOs and Academia

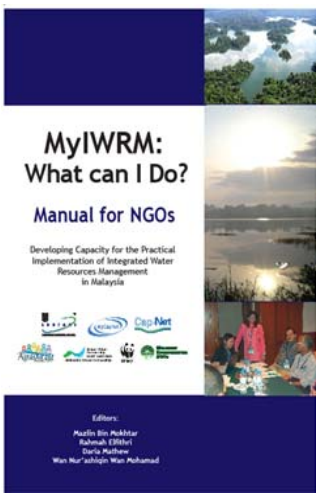
- NGOs, **universities**, private sector and governments have **different roles to play** but should compliment each other.
- Necessary for NGOs and Academia **to develop capacity for participation and implementation** of IWRM in Malaysia.
- NGOs play an **important facilitating and catalysing role** in stimulating and implementing IWRM processes, especially in involving local communities and the general public.
- Until now however, **limited attention has been given to NGOs** to develop the capacity of NGOs to act as facilitators or catalysts in the IWRM processes.
- **Academia** plays an important role in educating the future leaders achieving better water resources management in the country.

Focus on NGOs and Academia

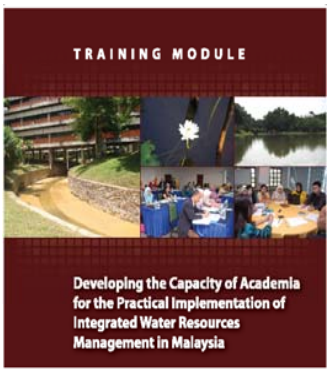
- This programme, as a first step, focus on the **development of the capacity of NGOs and Academia** in their role as facilitators and catalysts for IWRM involving communities.
- The **training courses on IWRM for NGOs and Academia** to specifically strengthen their role in the IWRM processes in Malaysia. These trainings include subjects such as:
  - Basic principles of IWRM
  - Stakeholder participation
  - Empowering society
  - Awareness raising among private sector and schools
  - Tools that could be used

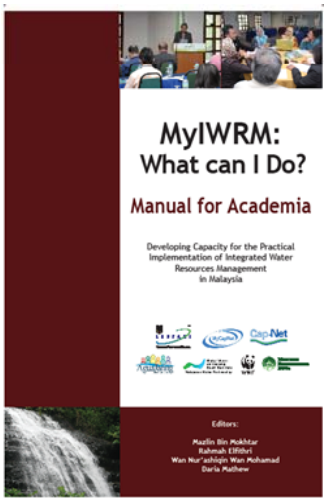
Training Module and Manual for NGOs





Training Module and Manual for Academia





Focus on Regional River Basin Issues

Project: **Implementing Integrated Water Resources Management (IWRM) in Malaysia: Multistakeholder and Multidisciplinary Approach.**

Research Areas: Langat River Basin & Pahang River Basin

Output: 1 (one) PhD research & 1 (one) Masters degree research.

Deliverables:

(a) Indicator system for Pahang River Basin.
(b) IWRM strategy for Pahang River Basin.
(c) Identification of institutional challenges and scope of social learning in LRB
(d) Several dialogues with government agencies to build consensus on strategy
(e) Highlighted issues on Cameron Highlands, Chini Lake and Kuala Pahang
(f) Adopted IWRM in the neighbouring river basin which is future sources of raw water for LRB

Focus on Social Learning

Social learning is a process of learning by doing together and balancing top-down and bottom-up approaches of decision making by gradually improving stakeholder participation beyond informative or consultative participation which might end up with them co-designing and co-deciding mechanism.

It is a iterative learning process and evolving in nature.

Social learning will promote stability of expectations (ex-ante) and consistency in actions (ex-post) by developing institution at all levels

Social Learning & Capacity Building

Social learning	Capacity building
Continuous and iterative process	Discrete and ad hoc programme
Indigenous knowledge and procreations	Exotic knowledge and utilization
Evolve from governance process	Imposed in governance process
Shared problem perception	Individual problem perception
Motivation and action	Motivation but action opportunistic
Learner changes the environment and changed environment affects learner	Environmental change not guaranteed
Proceed with uncertainty and complexity	Proceed with certain goal and simplicity
Ability to cope with dynamic nature of ecosystem	Unable to cope with dynamic nature of ecosystem
Balance between top-down and bottom up approaches for decision making	Top down approach for decision making
Resilient and adaptive	Dependent and fixed
Subjective in origin and operation and objective in manifestation and impact	Subjective in origin without operation and objective in manifestation but without impact
Deals with policy formulation and implementation	Deals with programme formulation and implementation

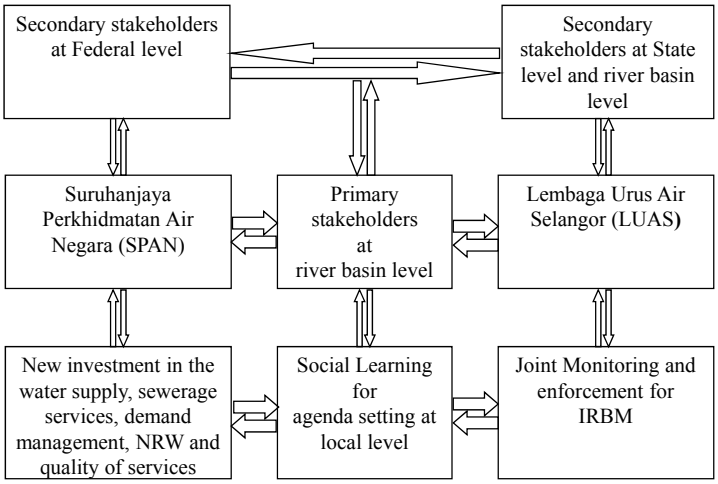
Opinion Survey Result on Social Learning

TABLE: Binary logit model summary

Variables	Coefficient(β)	Z-Stat	P- value	Odd- Ratio ($e^{\wedge \beta}$)
α	0.44	0.28	0.78	1.56
X_1	-0.06	-0.08	0.94	0.94
X_2	-0.61	-0.89	0.37	0.54
X_3	-0.09	-0.13	0.90	0.92
X_4	-0.92	-1.18	0.24	0.40
X_5	-1.23	-1.53	0.13	0.29
X_6	-0.29	-0.32	0.75	0.75
X_7	0.20	0.26	0.80	1.23
X_8	1.36^	2.22	0.03	3.89^
X_9	1.43^	2.11	0.04	4.17^
X_{10} (Social learning)	2.84*	3.69	0.00	17.11*
X_{11}	0.36	0.49	0.62	1.43
X_{12}	-1.55	-1.37	0.17	0.21
X_{13}	0.09	0.13	0.89	1.10
X_{14}	-0.87	-1.16	0.25	0.42
X_{15}	0.68	1.10	0.27	1.98

*, ^, ~ indicates significant level at 1%, 5% and 10% significance level.

Proposed Framework for social learning at Langat River Basin



Note: (a) Primary stakeholder (who enjoy products and services from the river basin but not formally engaged/employed with agency (ies) responsible for managing product and services of river and associated resources) and (b) Secondary stakeholder (who may or may not getting product and services but formally engaged/employed with agency (ies) responsible for managing product and services of rive basin and associated resources).

What We Have Achieved on LRB

- LRB is recognized as HELP Evolving RB under UNESCO HELP Programme.
- IRBM process has been introduced in LRB since 1999
- Research network has been developed
- Inter-organizational network has been functional through LUAS
- River Basin Enactment has been enacted since 1999
- HELP principles have been followed for river basin management
- LRB has its own IRBM plan
- IRBM Plan is under implementation by concerned agencies
- Water supply service and sanitation services have been improved
- Self financing ability is improving within LUAS
- Certain level of stakeholders are involved in decision making
- Different agencies are reporting their activities in the respective annual reports
- Higher level research like Masters and PhD level research work have been carried out on Langat River Basin.
- Stakeholder participation issues are brought under formal higher level research.
- Already experiencing IRBM implementation by following IRBM plan.

Way Forward

We need collaboration and cooperation from UNESCO HELP Programme to upgrade the present status of Evolving HELP Basin to Operational HELP Basin for Langat River Basin.

Possible Cooperation and Collaboration between LESTARI and UNESCO HELP Programme

- May cooperate to organize short training course for higher level officials and water mangers of LRB from within Malaysia and members of HELP programme of other neighbouring countries.
- May arrange some scholarship funds for students who are interested to carry out PhD research on IWRM and water through LESTARI, UKM
- May provide support to organize seminar and workshop for policy makers in Malaysia to disseminate HELP policy matters.
- May provide support to organize field visit for the LRB stakeholders to other HELP river basins in the region.
- May join LESTARI, UKM for collaborative research on LRB to ensure operational river basin soon.
- May collaborate to carry out study on how to strategize institutional change and stakeholder participation for IRBM implementation in LRB.
- All these contributions from UNESCO would be useful to the improvement of R & D work on Langat River Basin.

LESTARI Research Network

IWRM Networks

- Southeast Asia Capacity Building Network for IWRM (AguaJaring)
- International Capacity Building Network for IWRM (CapNet)
- Department of Irrigation and Drainage (DID)
- Global Water Partnership (GWP)
- Humid Tropics Centre Kuala Lumpur (HTCKL)
- Institute for Environment & Development (LESTARI) Universiti Kebangsaan Malaysia
- Malaysian Environmental Non Governmental Organisations (MENGOs)
- Malaysian Water Partnership (MyWP)
- National Hydraulic Research Institute of Malaysia (NAHRIM)
- Wetlands International (WI) Malaysia
- World Wide Fund for Nature (WWF) Malaysia