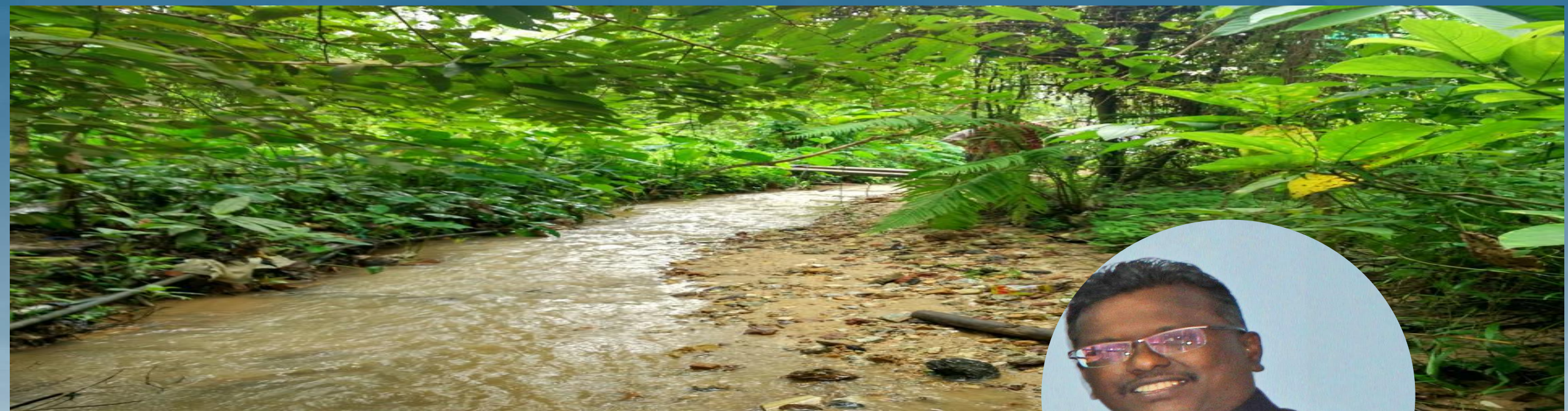


UNESCO Chairs Webinar World Water Day



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GEC RIVER Care Programs' experiences in Malaysia through Nature-Based Solutions (NbS)



Dr. Kalithasan Kailasam
Global Environment Centre
Malaysia

Water for prosperity and peace

PRESENTATION OUTLINE

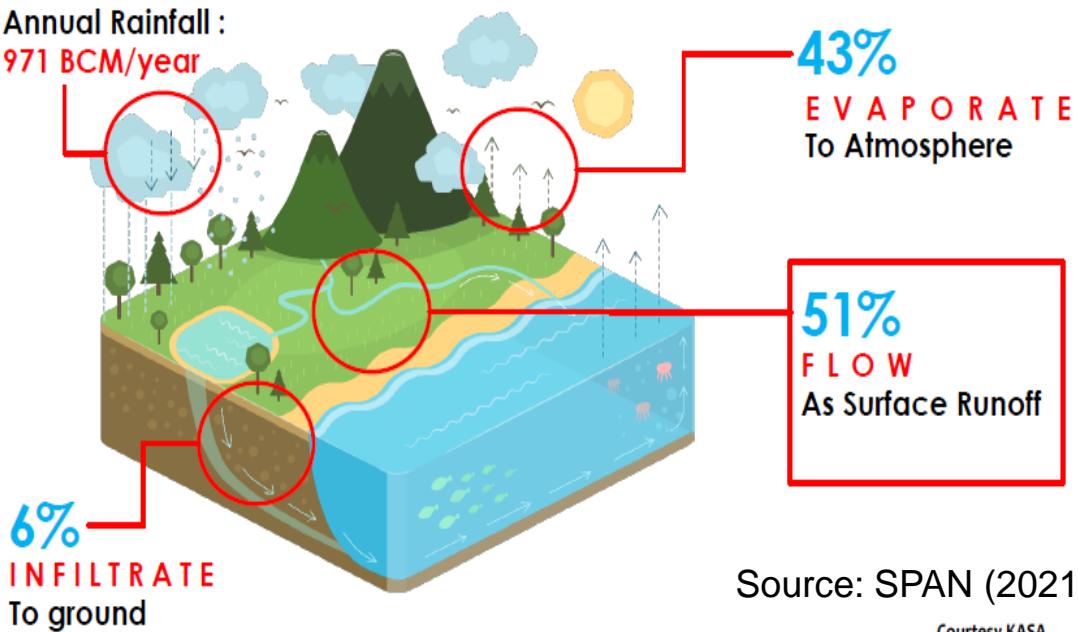


- * Water Resources in Malaysia
- * Natural River Characteristics
- * River Care Initiative through Nature Based Solution
- * Selected Case Studies
- * Conclusion

WATER RESOURCES in MALAYSIA



Annual Rainfall :
971 BCM/year



Source: SPAN (2021)
Courtesy KASA

Everything is connected (SOURCE to SEA)
Water Connection

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Almost 97% of potable water comes from rivers in Malaysia



Rivers in Malaysia



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- ❖ Played a major & important role in shaping & influencing the development of the nation & the cultures of its people.
- ❖ Almost all major towns in Malaysia are located beside a river.

| Area | No. | Main River Basin (>80km ²) |
|------------|-------|--|
| Peninsular | 1,235 | 74 |
| Sabah | 1,468 | 75 |
| Sarawak | 283 | 40 |
| Total | 2,986 | 189 (cover 95% of land area) |



Rivers are important as they support :

- Economic development; Social and Cultural needs; Religious beliefs; Natural environment

Rivers provide water for:

- Drinking, Domestic use, Agriculture, Industry
- Other services - breeding areas; transport; recreational areas & hydropower

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Natural River (Care)

- Human need to reconnect to nature and must learn to coexist with others
- How to balance the Human ethic with River ethic
 - Water Connection.
 - Understand the Basin Principle.
 - River as Heritage @ Living Entity
 - River Address

a. RIVER AS LIVING ENTITIES

River is an entire living entity

- ✓ Meanders
- ✓ Riffles and Pools
- ✓ Flora & Fauna especially aquatic life
- ✓ Others
 - Voice of the stream
 - Cleansing power

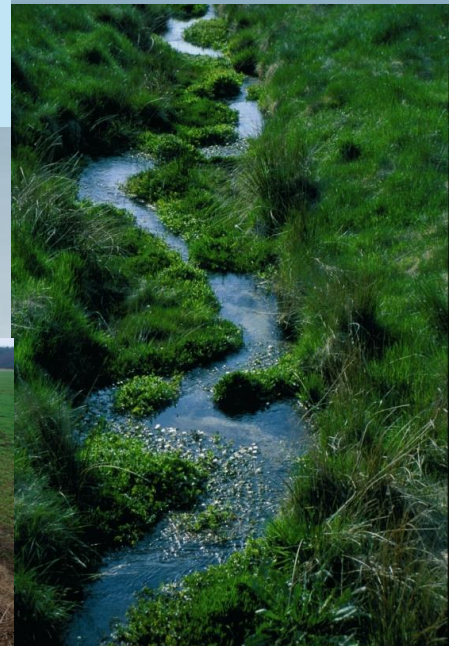
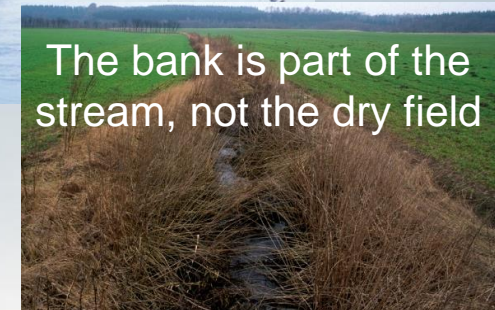
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b. The River & Its Valley

We must in fact never divorce the river from its valley ~ (Noel Hynes)



The bank is part of the stream, not the dry field



c. Natural River- Bio-engineers

Work with, not against the forces of stream

- Rivers are capable of self caring and self-purification which vital for self sustaining (*Royal Commission report, 1913*).
- Nature cannot be ordered about, except by obeying her (*Francis Bacon*)

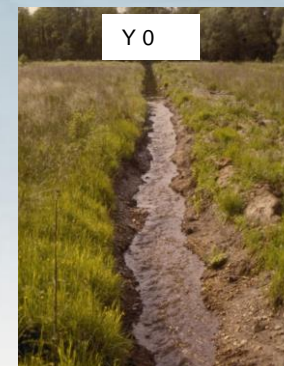


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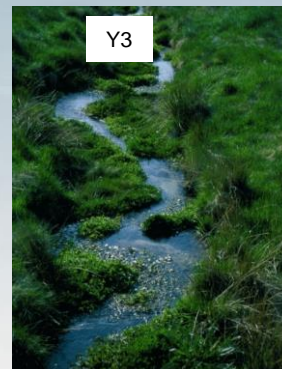


d. RIVERS' NATURAL PURIFICATION CAPACITY

- The self-recovery capabilities of each stream are not the same and depend on the characteristics of each river (Effendi, 2016),
 - Flow velocity, water discharge volume, dilution and initial waste content in the river water.
 - Agents : wetlands plants, pebbles, organisms
 - River get polluted when pollutant load > natural waste assimilation capacity
- General ecological rule:
LET THE CURRENT DO THE WORK
 - Rejuvenates/revitalization the stream



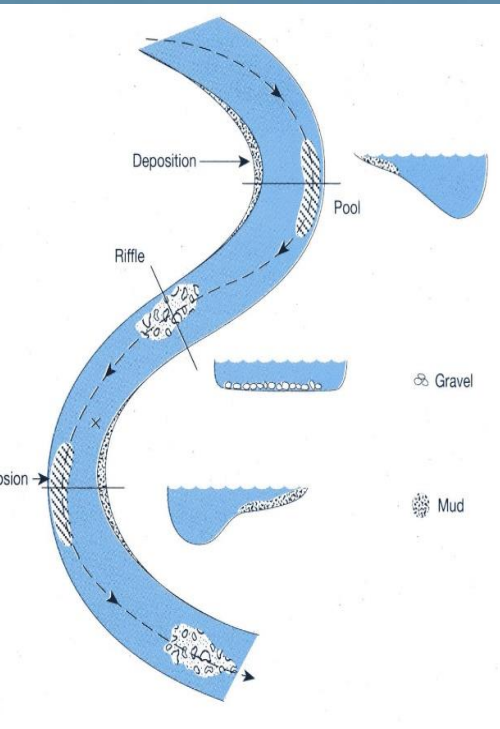
Self-restoration



e. All streams are not equal

Meandering

- Their own flow & shape
- Specific & individual functions & benefits



Riffle

Low, swift, noisy, many insects
Shelter for small fish
The "lung of the stream"



Pool

Deep, slow, Mud, Shelter for big fish

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f. River & Ecology

The first step towards good ecological status in streams

Components:

- Main river body
- Lake/pond
- Drainage
- Water, Flora & Fauna
- River bank
- Water Current
- Natural process; flood

Good Ecological River

i. Good water
quality

ii. Sufficient
discharge

LIVING
River

iii. Varied physical shape

g. River Address

Each river has its own address

For community reference, it can be divided into 3 aspects to determine your ecological 'river' address:

DO YOU KNOW WHERE IS YOUR RIVER BASIN?

STEP 1: Locate your house in the map given. Find the drain located within your housing area.

STEP 2: Can you identify the nearest river? **List down the name.**

STEP 3: Does the river leads into a 2nd river? **List down the name.**

STEP 4: Follow the river flow until it reaches the sea. **List down any connecting rivers on the way.**

DO YOU KNOW WHERE YOUR DRINKING / TAP WATER COMES FROM?

Find the nearest water treatment plant. **List down the location / name.**

FIND OUT WHERE YOUR WASTEWATER GOES TO

Find the nearest wastewater treatment plant. **List down the location / name.**

3 aspects to determine your ecological 'river' address

Discover Your Ecological Address

1. Which river basin is your home/ office building located in?
2. Where do you get your clean water source?
3. What happens to your wastewater?

h. Nature Based Approaches

Nature-based approaches/solutions (NBS) are inspired and supported by nature and use, or mimic, natural processes to contribute to the improved management of water (UN Water, 2018).

| Water management issue | Grey infrastructure | Green Infrastructure |
|------------------------------------|--|--|
| Water supply (quantity) regulation | <ul style="list-style-type: none"> Dams Ground water pumping Water distribution systems WTP Barrage | <ul style="list-style-type: none"> Water catchment protection Reforestation Wetlands preservation/restoration Reconnecting rivers to floodplains Rainwater harvesting |
| Water Quality regulation | <ul style="list-style-type: none"> WTP SWTP RWTP WWTP Concrete slopes | <ul style="list-style-type: none"> Constructed wetlands Rain gardens Bio-retention and infiltration Vegetated swales Cleansing biotopes Natural vegetation on eroded banks (e.g. bamboo) |

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GEC's River Care Initiative through Nature Based Approach



25
YEARS
BUILDING
PARTNERSHIPS
FOR THE
ENVIRONMENT



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Global Environment Centre (GEC)



GEC's 25 Years of Building Partnerships for the Environment and Vision for the Future

- Established in 1998.
- Malaysian Non-profit Organisation (Reg. no. 473058-T).
- Supports information exchange & capacity building as well as undertaking strategic projects particularly in developing countries.



MOVING TOWARDS 2050, GEC HOPES TO SEE ...

... HUMANKIND LIVING IN HARMONY WITH THE PLANET

RIVER CARE PROGRAMME

VISION:

To have clean, healthy, living and vibrant rivers for people and the environment

MISSION:

Promote and support integrated management of river basins and water resources with particular focus on stakeholder engagement, community participation, waste management, biodiversity and wetland conservation and /or through nature based solutions as well citizen science approaches



GEC's PROGRAMME



**RIVER
Care**



**Forest &
Coastal**



Peatland



**Outreach &
Partnership**



2002



2004



2007



2014



2015



2016



2019

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GEC'S 25 YEARS EXPERIENCE



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1. OWNERSHIP

Reconnect To Nature, Stakeholders, River Address, Gazetting

2. CONSERVATION

Protection, Restoration, Biodiversity Conservation

3. REHABILITATION

Water quality improvement, Habitat creation/enhancement,
River flow/hydrology

4. WASTE/POLLUTION REDUCTION

Pollution Prevention. Zero Waste

5. RIVER HEALTH: MONITORING

River Condition, Pollution Management

6. EDUCATE & RECONNECT PEOPLE TO NATURE

Ethics, Civic Science Approach

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KEY FOCUS AREA

1. River Conservation
2. River Rehabilitation
3. Water Resource Management
4. Pressure Management
5. Demand Management
6. Pollution Management
7. Disaster Risk Management
8. Potable Water Supply
9. Rain Water Harvesting
10. Nature Based Solution
11. Research and Study
12. National River Care Fund
13. Environmental Education
14. SMART Partnership
15. Stakeholder Engagement
16. Environmental Education Programmes
17. Volunteering & Outreach



Our APPROACH THAT LEAD TO INITIATIVES



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Balance HARD vs SOFT vs HEART APPROACHES

Put the CIVIC back
into CIVIL
ENGINEERING

To instill Sense of
Ownership

CIVIC SCIENCE APPROACH



To Enable Local
Action

Reconnect to
NATURE

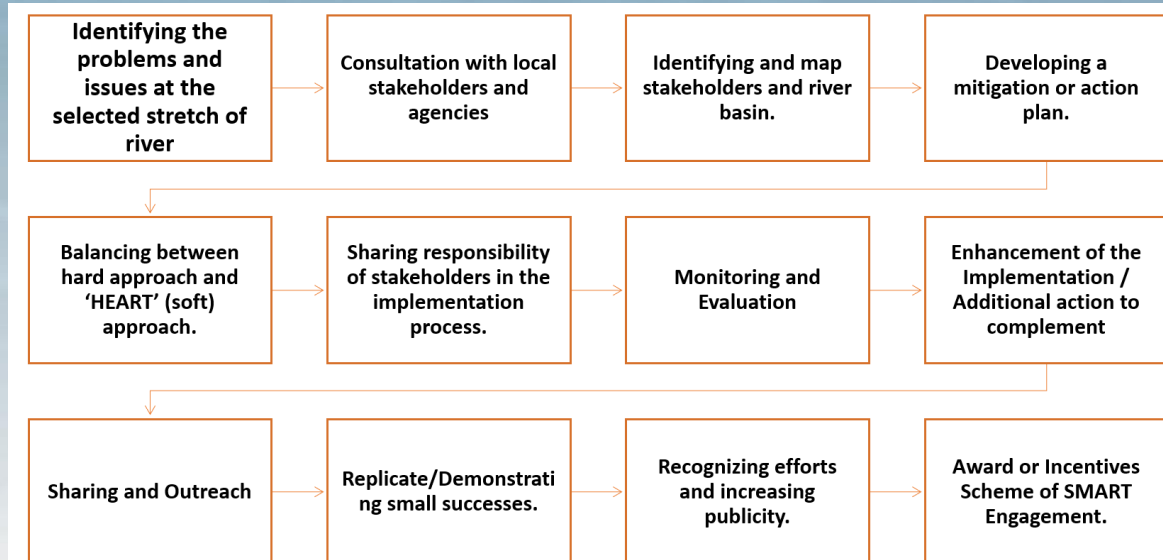
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Reconnect to Nature

Science



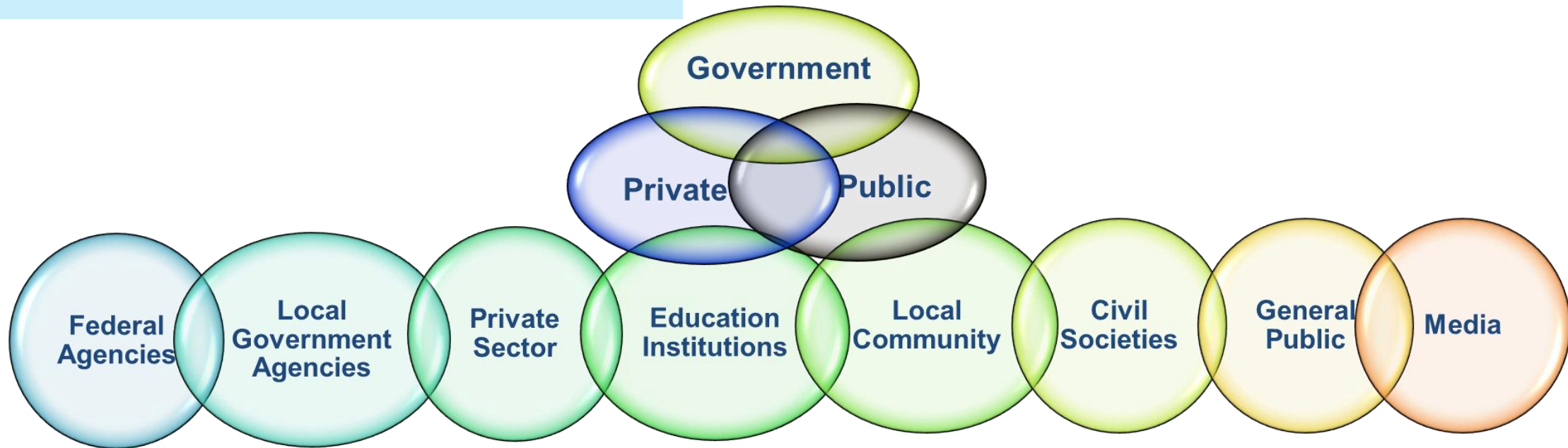
Community Engagement Steps



SMART PARTNERSHIP OWNERSHIP, BENEFICIARY & STAKEHOLDERS



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CASE STUDIES : NBS



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a) Restoration



Sg. Bras, Klang Basin

a) Restoration



- At the upstream of Klang River, ✓ (near to the Klang Gate Dam and Kampung Warisan)
- Natural wetland plants & reintroduce
- Benefit : natural filtration; Source of food; Habitat

a) Restoration – Clay dyke

- **Clay dyke** is a new innovative method, where more than one hundred meters of peat was dug and replaced with clay which will serve as a retaining wall and water storage in that particular area. The clay dyke functions in preventing surface and subsurface seepage to adjacent areas. Clay dykes are usually constructed in the forest edges to maintain high water levels in the forest edges.
- Currently, 300meter claydyke is being constructed in Raja Musa Forest Reserve to support water storage for Selangor River Basin



b) Water Quality Improvement

Pilot Constructed Wetland Cell in Sg. Pencala Restoration – Clay dyke



- Pilot project in selected stretch in Sg Pencala
- Covering length of 400m
- Aimed to improve water quality and biodiversity especially aquatic fauna

Construction of wetland cell to treat sewage effluent, upstream of Sungai Pencala



Construction of wetland cell to treat sewage effluent

HABITAT CREATION



Improved access to the stream channel for habitat

c) RIVER REHABILITATION

Sg. Way, Klang Basin

BEFORE



AFTER



1. River Within River' Concept
2. Improved WQ :Class IV-V to Class III
3. River beautification
4. Improved aquatic biodiversity



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CASE STUDIES : NBS



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d) Reducing Pressure on Water Catchment

• Potable Water For Orang Asli



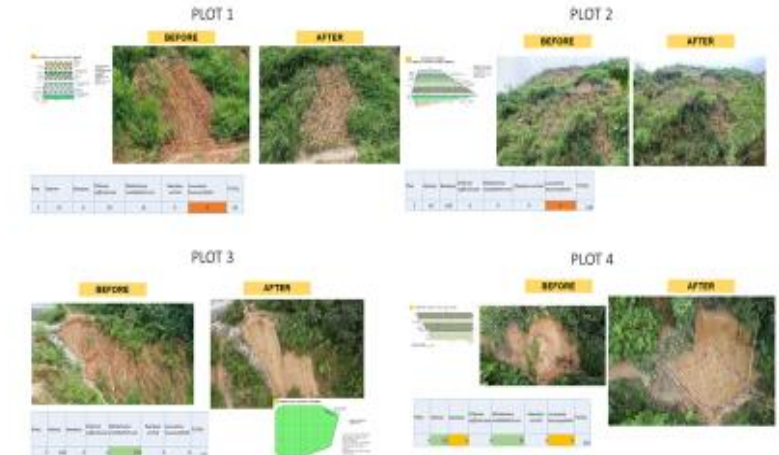
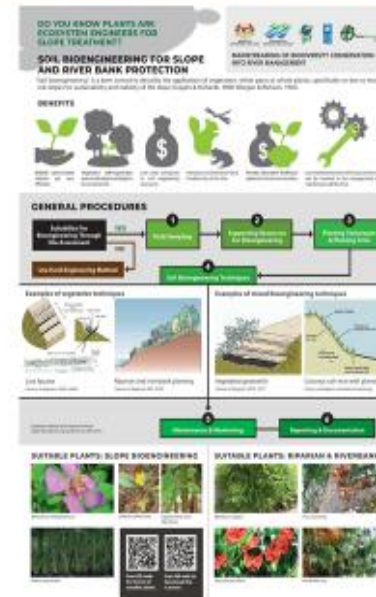
Water Demand
Management

• Non Potable Water For Urban communities



- ❑ Mainly used for garden and non-potable usage
- ❑ Cut down usage of treated water for non-potable usage

e) Soil Bioengineering



Slope Erosion Mitigation

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CASE STUDIES : NBS



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A. Physical parameters

- Physical component

B. Chemical parameters

- DOE's WQI + Other selected parameters

C. Biological parameters

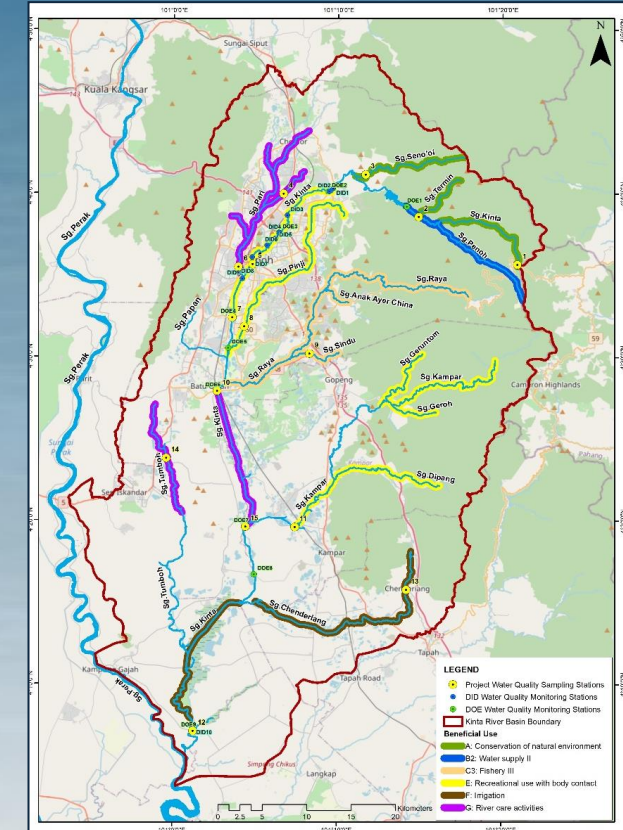
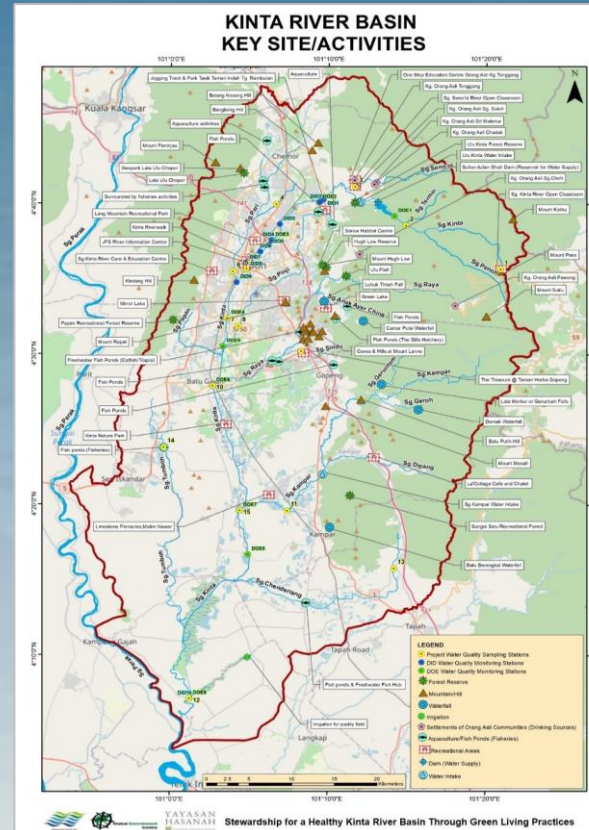
- Benthic Macroinvertebrate

D. Citizen participation parameters

- Citizen participation

f) River Health Monitoring (RHI)

(In progress)



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MALAYSIA'S BIG & SIGNIFICANT PROJECT BY MALAYSIAN GOVERNMENT



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Putrajaya Lake



Putrajaya Wetland

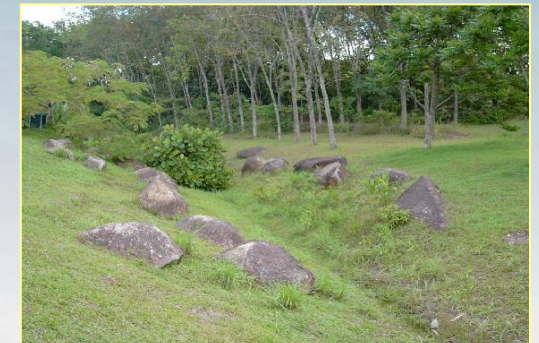
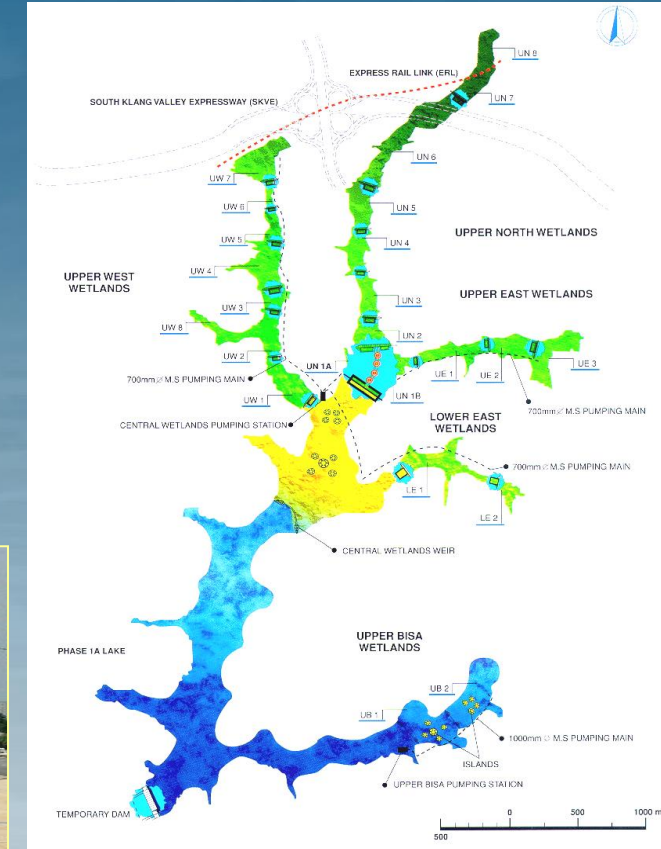


Artificial wetland system to
cleanse catchment (river) runoff



Underground Drainage in
Build Up Area

Unlined Open Drain to provide
a soft and natural surfaces



Lake

- 400 ha. (Designed for aesthetic values and activities such as recreation, fishing, water sports, water transport etc.)

Wetland

- 200 ha.
- Largest constructed freshwater wetland in the tropics
- Functions as a flood control system and a natural filter system for the Putrajaya Lake
- Filter pollutants before entering the lake
- Provides an extensive area for recreation and education
- Forms an essential part of the eco-system

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OVERALL



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- **Nature-based solutions (NBS)** can be vital to the sustainable river management (care) and use of nature for tackling socio-environmental challenges.
- Includes river health, water security, food security, disaster risk management, biodiversity protection /enhancement, well human health as well conserve connectivity between HUMA, FLORA, Fauna Environment (**Healthy Planet**).
- These solutions are inspired and supported by nature with **traditional knowledge**, which are cost-effective, simultaneously provide **environmental, social, economic and spiritual benefits**.
- Hard approach must be complimented with heart approach (soft approach) to optimize the impact of community on environment
- **Community** can be main **driver** for this approach (Water Sector Transformation, WST 2040)
- Community engagement is a creative skill and need right models & tools
 - RIVER Ranger **module** and River Care **tools**

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RIVER CARE TOOLS

- ❖ **Reconnect to nature**
 - ❖ **River Address**
- ❖ **River monitoring**
 - ❖ River Report card, Lake report card, water testing kits, river auditing tools, pollution mapping, YSI meter (probe)
- ❖ **Water conservation**
 - ❖ DrH2O Kit (Water Saving kits, Checklist, water Audit), Water Conservation Module
- ❖ **River Education**
 - ❖ Interactive board (ROLPOP5)
 - ❖ Mobile River Care Unit (MRCU)
 - ❖ Interactive River Games
- ❖ **River monitoring & sharing**
 - ❖ RIVER Ranger Website, WhatsApp's, Facebook, CITIZEN's EYE



RIVER Ranger Kit



RIVER RANGER @2.0



ENVIRONMENTAL EDUCATION

Module

- RIVER Ranger Module
- SMART Ranger Module
- Dr H2O
- FLOOD Ranger Module
- RIVER Guide Action Book

Tools

- River Report Card
- Lake Report Card
- DrH2O Water Auditing Calculator & Toolbox
- Grab Bag & 72H Kit



Materials

- **Reconnect to Nature**
 - River Address
- **River Monitoring**
 - River Report card, Lake report card, water testing kits, river auditing tools, pollution mapping, YSI meter (probe)
- **Water Conservation**
 - DrH2O Kit (Water Saving kits, Checklist, water Audit), Water Conservation Module
- River Education**
 - Interactive board (ROLPOP5)
 - Mobile River Care Unit (MRCU)
 - Interactive River Games
- River Monitoring & Sharing**
 - RIVER Ranger Website, WhatsApp's, Facebook, twitter, Citizen's Eyes App

CONCLUSION



- ❑ Water is Life; Water for Life
- ❑ River is our treasure; Living heritage
- ❑ **Connectivity** at all level and all the time (source to sea)
- ❑ **Reconnection of human with nature** is vital to get buy-in as well as to instill ownership
- ❑ **River Care through Nature based Solution** (approach) is best yet cheapest (cost-effective) sustainable a way forward approach
- ❑ **SMART Partnership** & Commitment/cooperation from all stakeholders are the key to success & sustainability
 - Government, private sector, Media, Public ; River Care tools
- ❑ Action (**citizen science**)
 - To try, One does not have to be a scientist, or even have a high school diploma, in order to experiment
 - All it takes is common sense ; Perhaps backed up by a little intuition

and most importantly



JUST DO IT
Walk the Talk
(No Talk Action Only)

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THANK YOU & ACKNOWLEDGEMENT



GEC will to thanks all parties that supported US:

1. Government agencies especially DID Malaysia (as well HTCKL)
2. Private sectors
3. International funders
4. Community partners (IPLCs)



The following projects* that help GEC to implement River Care initiatives through NbS

- W.A.T.E.R Project : Sg Pencala River programme – water stewardship
- Mainstreaming Biodiversity Conservation into River Management in Malaysia
- National River Care Fund (NRCF)
- Stewardship for a healthy Kinta River Basin through green living practices
- Restoration of lake with community/public participation to enhance lake biodiversity and ecosystem
- Empowering Community Livelihood in Upper Kinta Basin as part of Post COVID-19 MCO Strategy
- Alternative water supply for Rural Communities



FOR DETAILS, PLEASE REFER TO THE LINK:

(*but not limited to)

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<https://www.gec.org.my/index.cfm?&menuid=333>

<http://www.riverranger.my/RiverineBioD/index.cfm>

<http://www.riverranger.my/riverranger/index.cfm>



**25
YEARS**
BUILDING
PARTNERSHIPS
FOR THE
ENVIRONMENT



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healthier environment; better economy; more cohesive society
together we achieve more – Work with Nature
Thank you!

Follow us on Instagram & Facebook & hashtag away!
@rivercareprogramme @globalenvironmentcentre



#rivercarewecare
#globalenvironmentcentre
#riverranger; #smartranger; #drh2o



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