

**STAKEHOLDER FORUM: INCORPORATING CLIMATE RESILIENCE IN
THE NATIONAL WATER RESOURCES POLICY ACTION PLANS**

Pullman Putrajaya, 27-28 October 2014



Developing Climate Resilience

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- Introduction
- Mandates and Approaches
- Understanding Resilience
- Various Regional Initiatives
- Moving Forward



Introduction



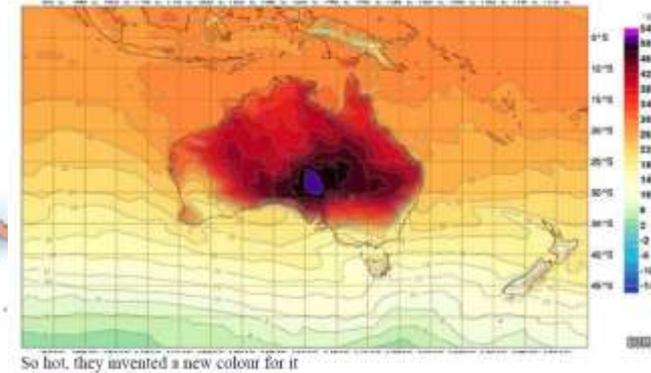
Heat Records

Heat records



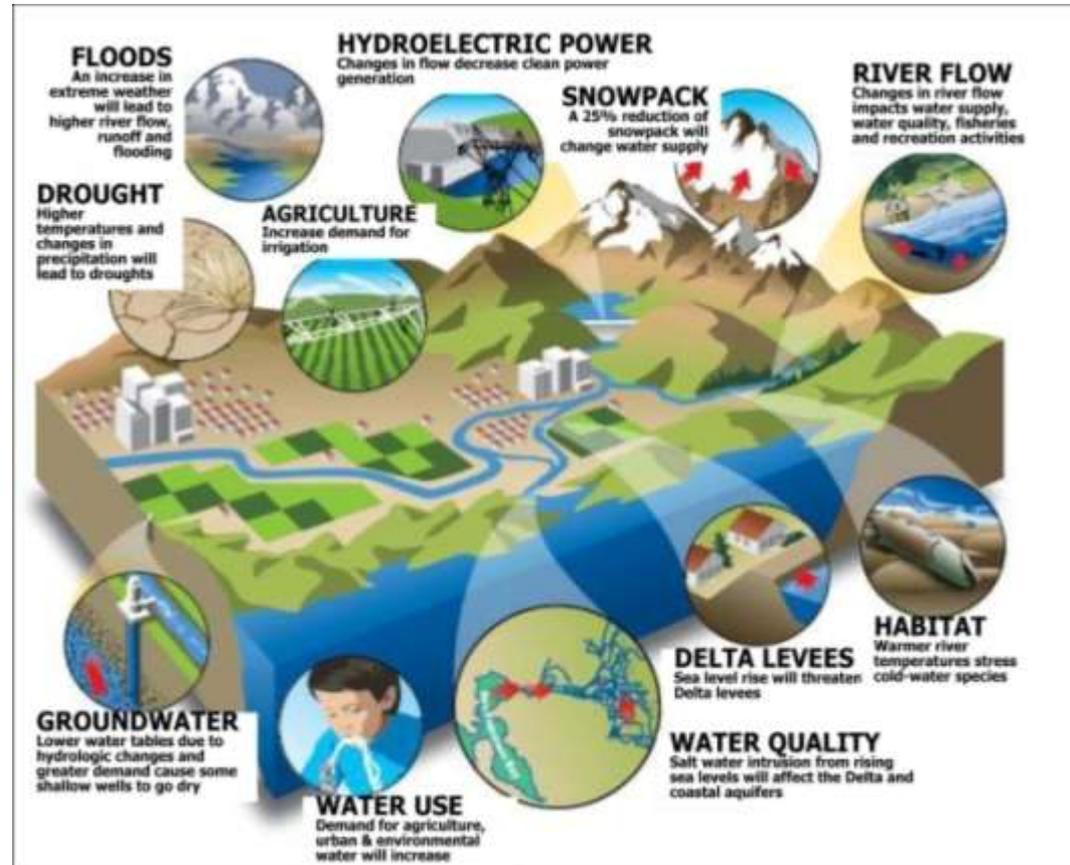
Economist.com/graphicdetail

So hot! – they invented a new colour



Impact of Climate Change – 93% Water related *water & CC - a web of interconnected uses and values*

- Climate change affects all facets of the system and their interactions
- Some uses compete with one another
- Others are complementary
- Pervasive externalities exist



Mandates and Approaches



Major Development of global policies for water

- Mar del Plata 1977
- Rio 1992, Agenda 21 - IWRM
 - WWC, WWF, GWP, etc
- 2000-2015 – MDGs
 - Millennium Development Goals
- MCED5, 2005 – Green Growth
- WEF, Davos, 2011 – Water-Food-Energy Nexus
- Rio +20, 2012 – Sustainable Development and the Green Economy
- Post 2015 – SDGs
 - Sustainable Development Goals



Mandates – Rio +20, ESCAP Resolution 69/8

- “The Future We Want”, the outcome document of the landmark Rio+20
 - Article 3: “[...] the need to further mainstream sustainable development at all levels, integrating economic, social and environmental aspects, and recognizing their inter-linkages, so as to achieve sustainable development in all its dimensions”.
 - Article 120: “[...]the commitments made in the Johannesburg Plan of Implementation and the Millennium Declaration regarding [...] the development of integrated water resources management and efficiency plans, ensuring sustainable water use” and “[...] [t]o significantly improve the implementation of integrated water resource management at all levels, as appropriate.”
- ESCAP Commission Session 69, 2013 –Res 69/8
 - Enhancing knowledge-sharing and cooperation in integrated water resources management in Asia and the Pacific



Approaches

- IWRM
- Green Growth
- Water-Food-Energy nexus
- Post 2015 - Proposed SDG 6



Re-analyzing and redefining IWRM

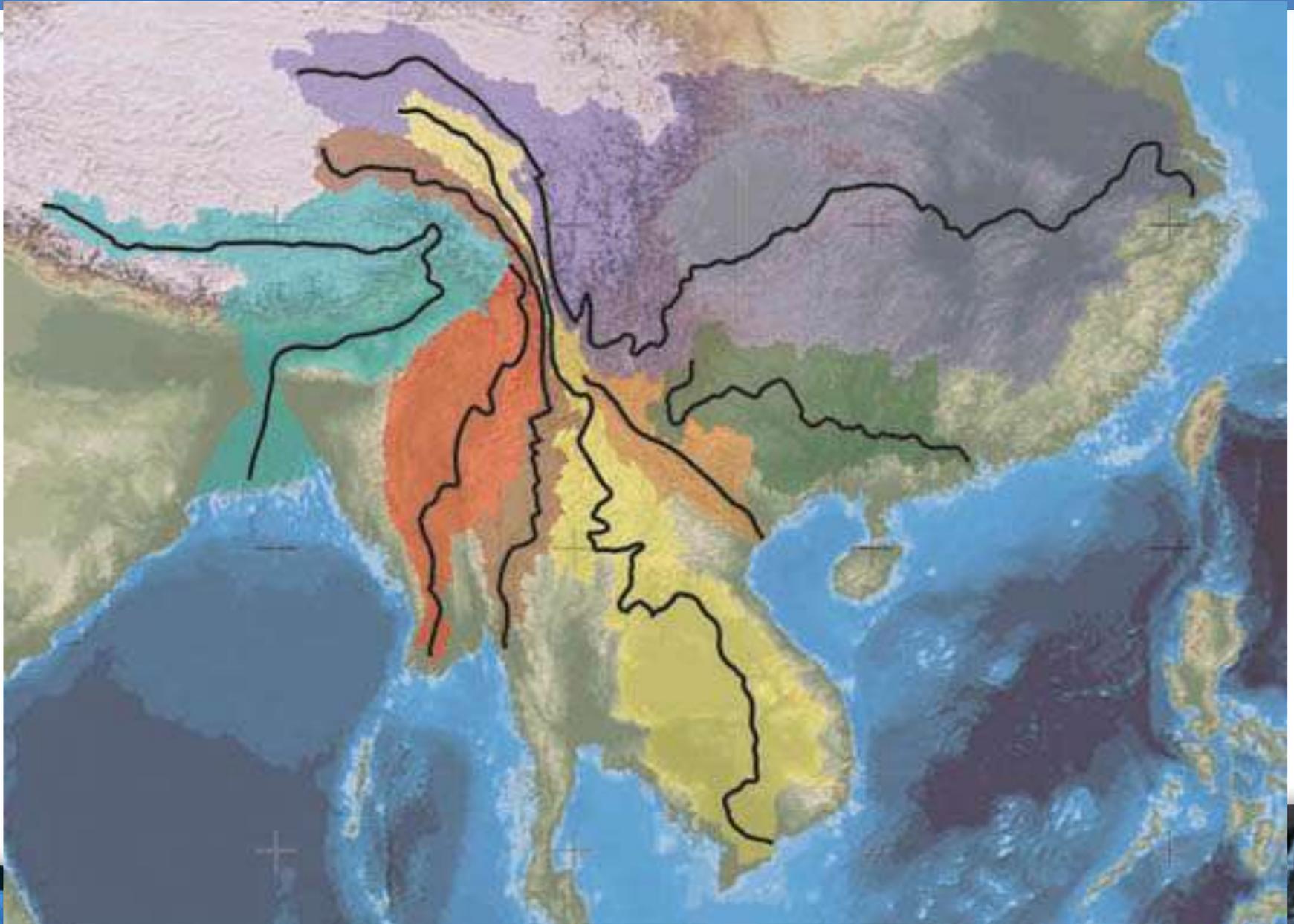
(Integrated Water Resources Management)

Implementation Unit – IRBM

(Integrated River Basin Management)



Major River Basins of Mainland East Asia



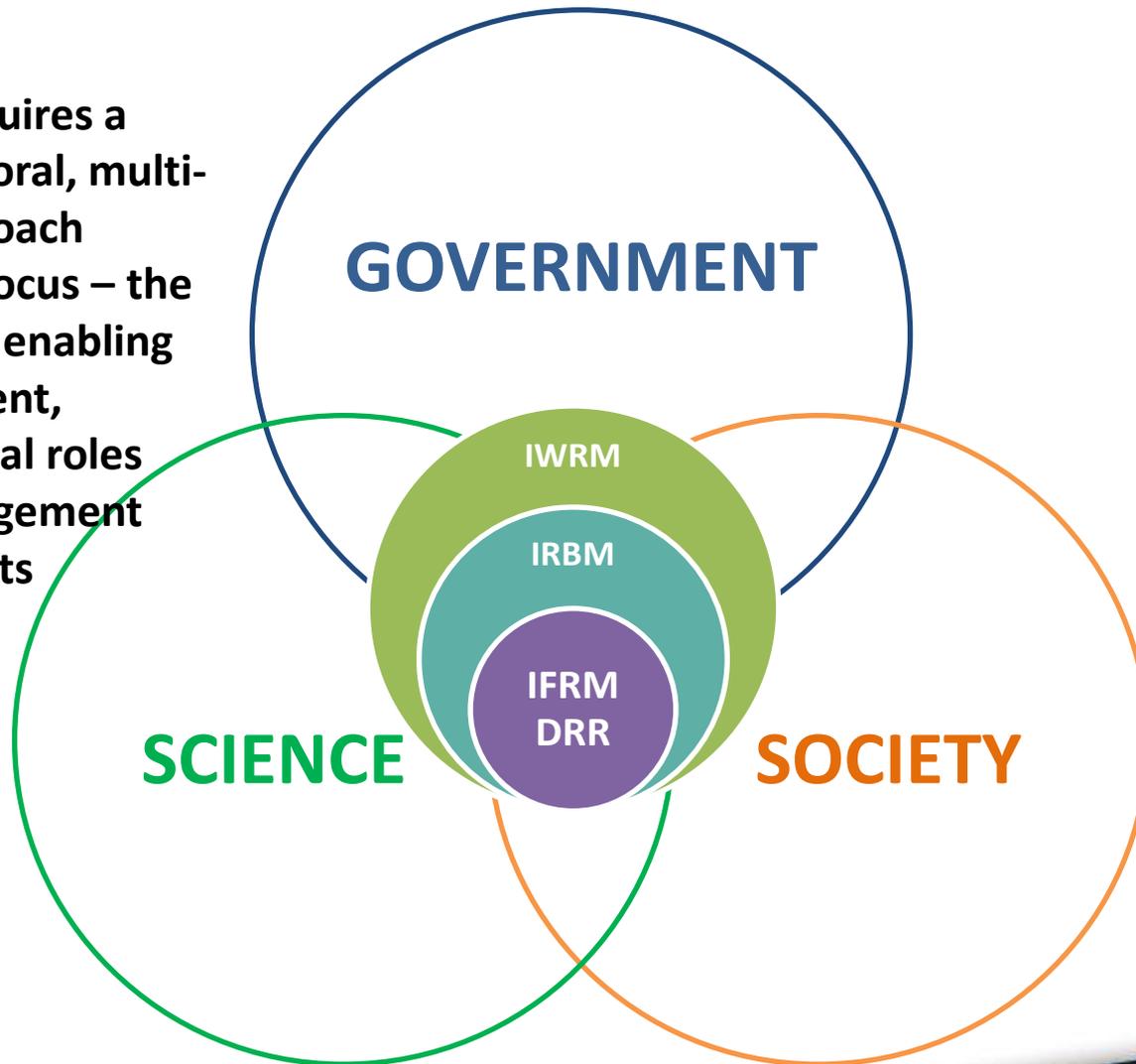
IWRM evolvment

- **Illusive IWRM success stories**
 - Mar del plata -1977, Rio 1992 & Agenda 21, Johannesburg 2002, Rio +20
 - Development of green growth and the water-food-energy Nexus
- **Prof Malin Faulkenmark SIWI Water Conference, 2013**
 - While the sciences behind IWRM is strong and robust, in many countries, the disconnect between the sciences and the implementers is yet to be bridged



THE BIG PICTURE

- IWRM requires a cross-sectoral, multi-level approach
- Previous focus – the sciences – enabling environment, institutional roles and management instruments



Components

IWRM – Integrated Water Resources Management
IRBM – Integrated River Basin Management
IFRM – Integrated Flood Risk Management
AWM – Agriculture Water Management
UFWM – Urban Flood Water Management
DRR – Disaster Risk Reduction
CCIA – Climate Change Impact Adaptation, Storm water management
Urban water management
etc

Green Growth

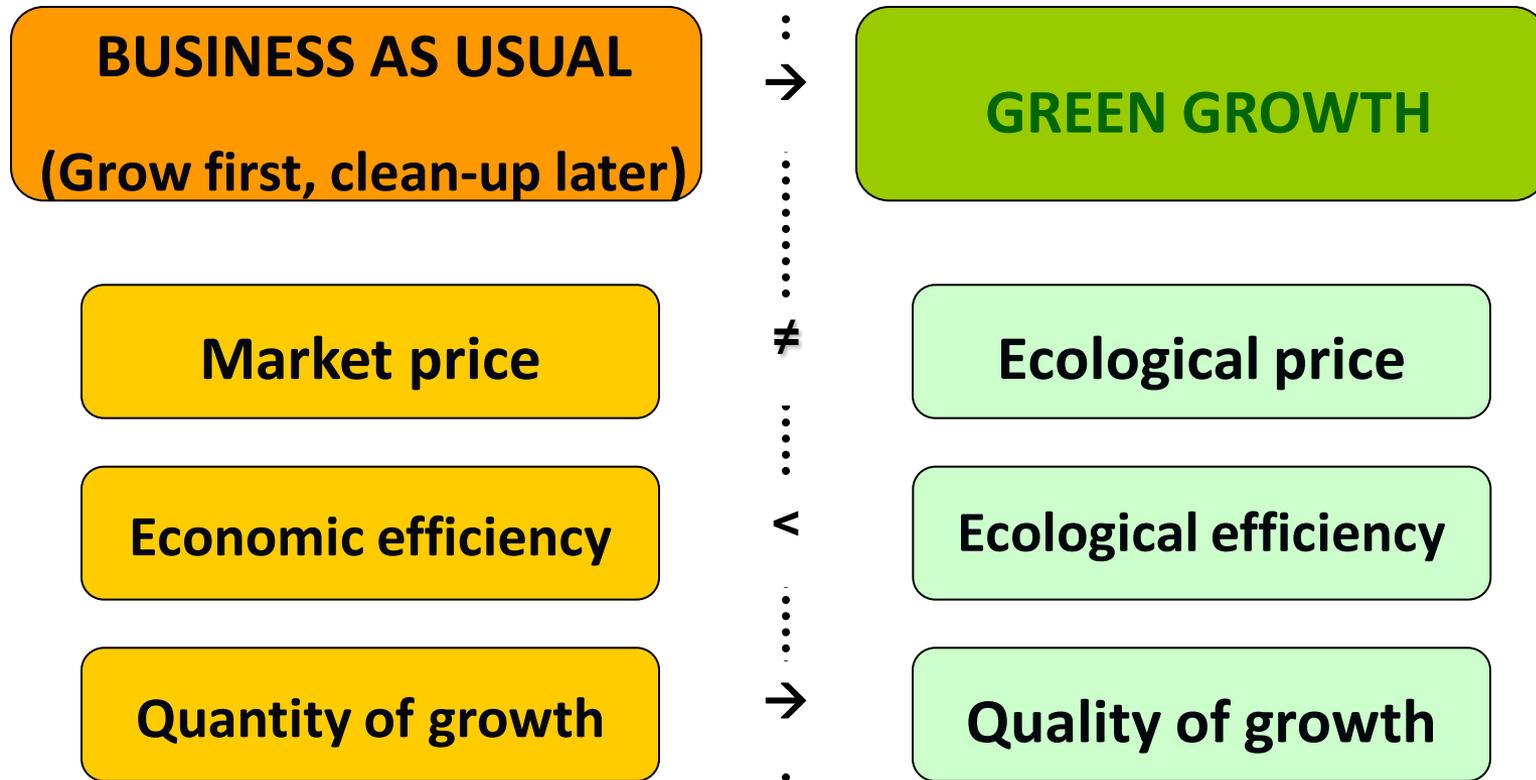


Green Growth – MCED5, 2005

- Green Growth look from the position of global environmental limitation
 - The need to migrate from current market based to ecological based economy
- Address global limited ecological carrying capacity
- Improving eco-efficient of economy as a whole is a key element for Sustainable Development
- Ensuring long term water security
 - Must concurrently focus also on System/Environmental Health ie should be ecological-based



Green Growth Principles



RK Chung: ASEAN-ISIS 24th Asia-Pacific Roundtable,
7-9 June 2010 Kuala Lumpur



Water Food Energy Nexus



World Economic Forum (WEF)

2011 Global Risks Report

- Analyze 5 areas of interconnected risks
 - Economic, geopolitical, environment, societal and technological
- Came out with 2 cross-cutting risks
 - Economic disparity and global governance
- 3 clusters of risks - 3 nexus, connected together
 - The “macroeconomic imbalances” nexus
 - The “illegal economy” nexus
 - **The “water-food-energy” nexus**

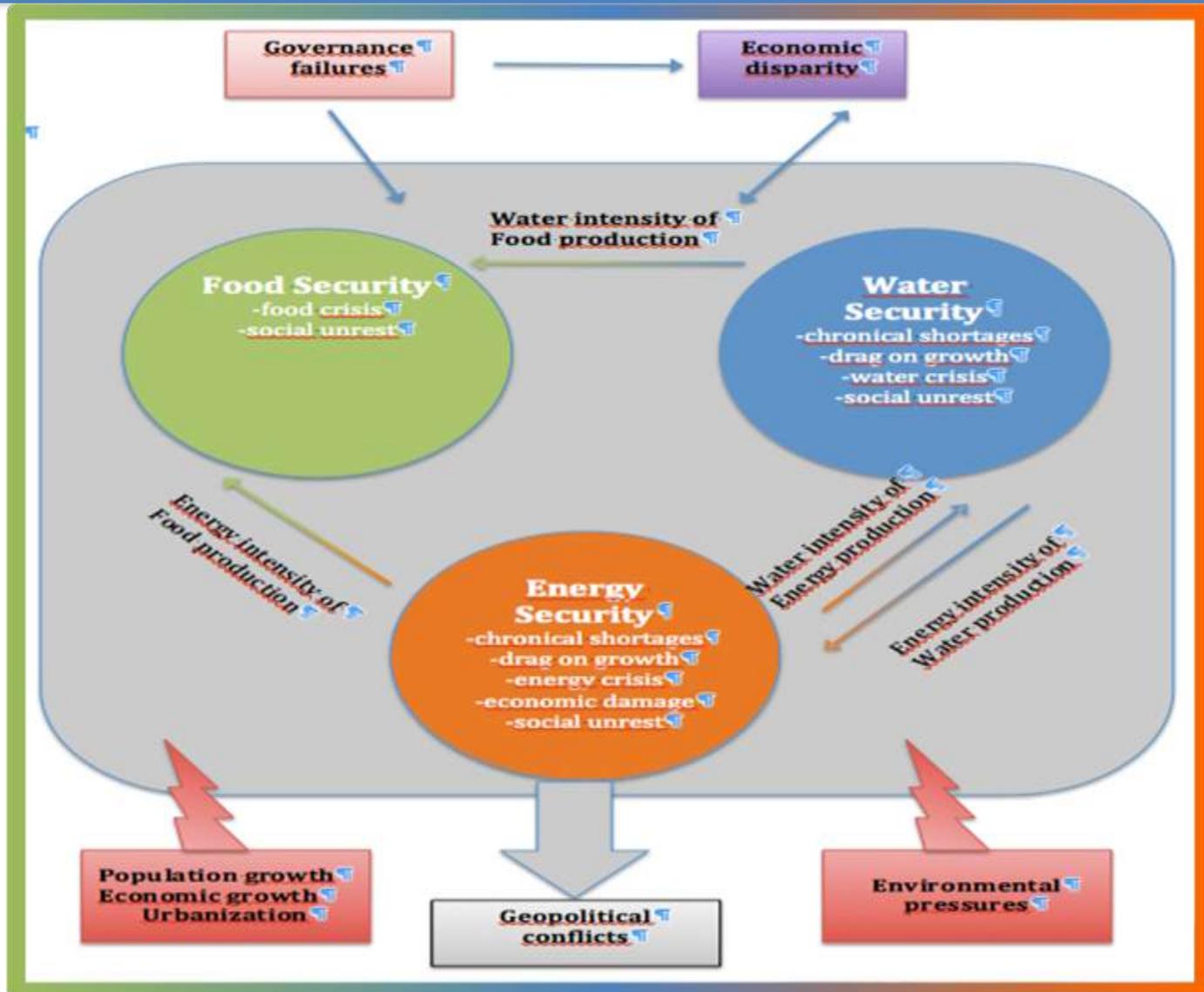


The “water-food-energy” nexus:

- Rapidly rising global population and growing prosperity are putting unsustainable pressures on resources.
 - In the next two decades; demand for water, food and energy is expected to rise by 30-50%
 - Economic disparities incentivize **short-term responses** in production and consumption - **undermine long-term sustainability.**
 - Shortages could cause social and political instability, geopolitical conflict and irreparable environmental damage.
- Any **strategy that focuses on one part** of the water-food-energy nexus without considering its interconnections risks **serious unintended consequences.**



Linkages between Water-Food-Energy



Post 2015- 17 Proposed SDGs

SDG 6 – on Water

**“Ensure availability and sustainable management
of water and sanitation for all”**



Proposed SDG 6 on water

6 + 2 Targets

- 6.1 by 2030, achieve universal and equitable access to safe and affordable **drinking water for all**
- 6.2 by 2030, achieve access to adequate and equitable **sanitation and hygiene for all**, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- 6.3 by 2030, **improve water quality** by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally
- 6.4 by 2030, substantially **increase water-use efficiency** across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity



Proposed SDG 6 on water

6 + 2 Targets

- 6.5 by 2030 implement **integrated water resources management at all levels, including through transboundary cooperation as appropriate***
- 6.6 by 2020 **protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes***
- 6.a by 2030, **expand international cooperation and capacity-building support to developing countries in water and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies***
- 6.b **support and strengthen the participation of local communities for improving water and sanitation management***



Understanding Resilience



Climate Change Impacts – focus on Water Issues

- Vulnerabilities
 - Water supply
 - Basic needs
 - Food production
 - Security from excessive water – floods, land slides, etc
- Building resiliencies from
 - Changing weather patterns
 - Intensities, occurrences
 - Rapid development
 - Flash floods, water pollution



Related recent water/weather events

Water Supply 2014



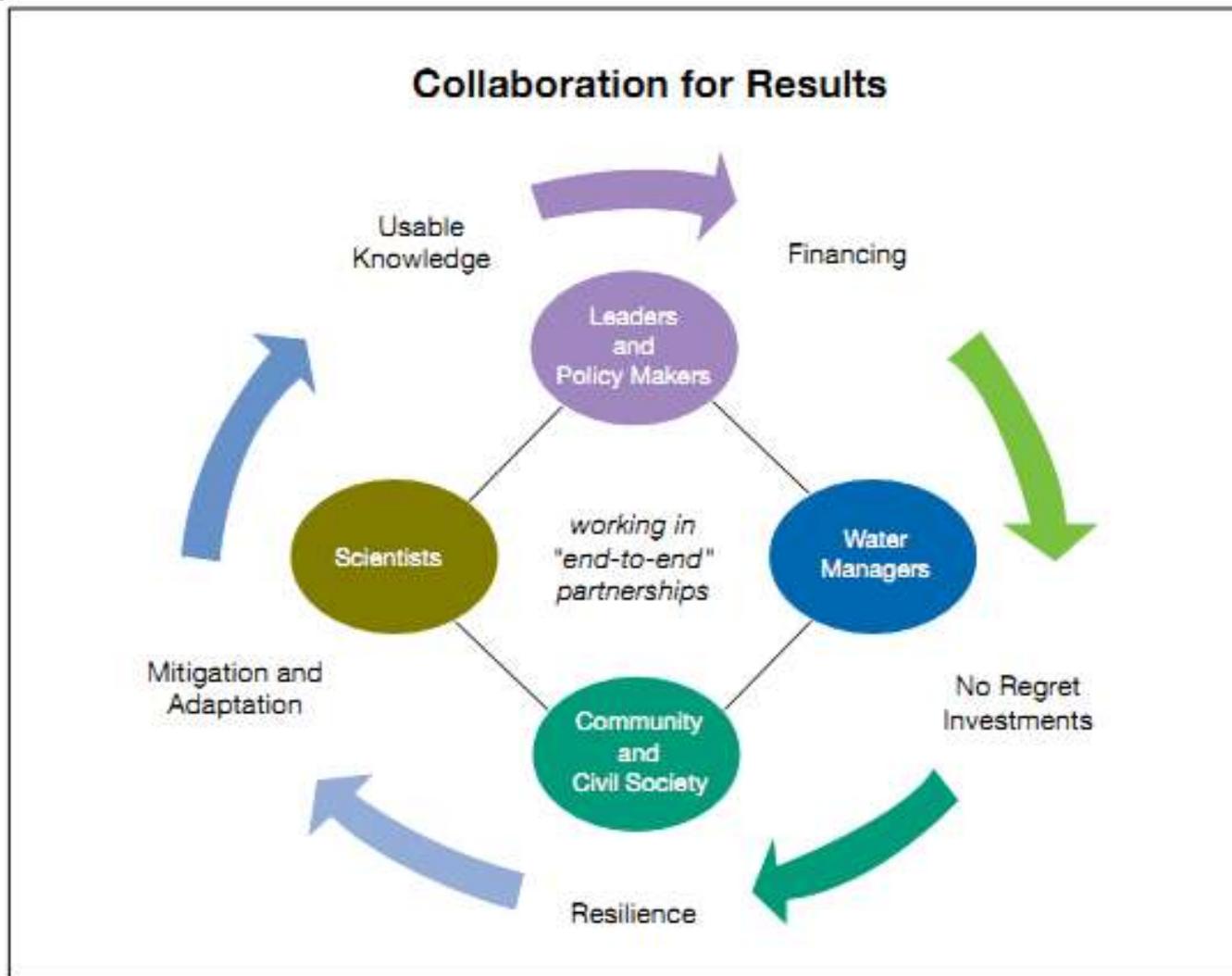
Land Slide 8 Jan 14



Floods 2 Oct 2014



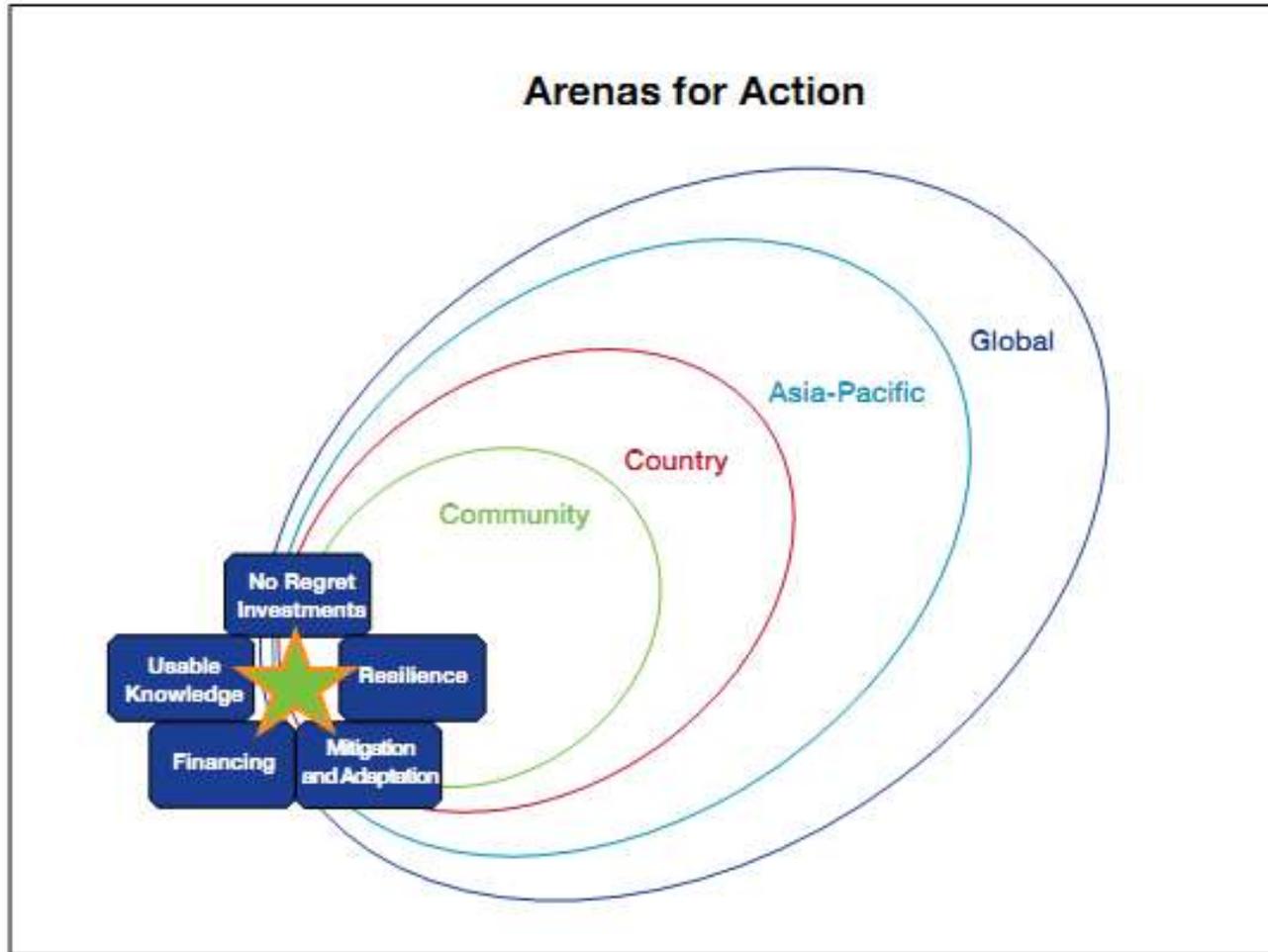
5 end-to-end principles



- <http://www.apwf.org/doc/Framework.pdf>



Apply the 5 principles simultaneously



- <http://www.apwf.org/doc/Framework.pdf>

Principle 3 Resilience

- “We must built societies’ capacity to develop communities resilience in the face of changing climate, which is a global phenomena
- Resilience
 - like vulnerability, is local
 - needs to be built locally
 - Must consider regional geographical and economic diversities

- <http://www.apwf.org/doc/Framework.pdf>

Framework Document on Water and
Climate Change Adaptation

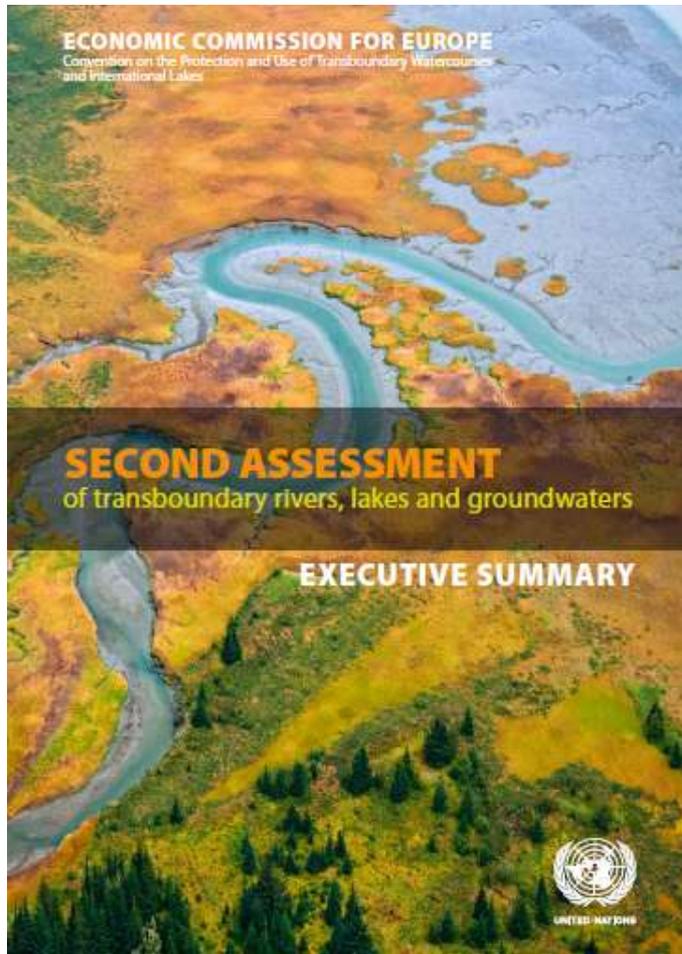
For Leaders and Policy-makers in the Asia-Pacific Region



Various Regional Initiatives



Water Convention – UN ECE



2nd Assessment

- Most Comprehensive and up-to-date of European & Asian transboundary waters
- For 7th Ministerial Conference in Astana, Sept 2011
- Leadership of Finland



Water Convention – UN ECE

- Strengthen measures at local, national and transboundary levels to
 - Protect and ensure quantity, quality and sustainable use of transboundary water resources
 - Both surface and groundwater
 - Holistic approach, commitment to IWRM
 - water resources, an integral part of ecosystems, human societies and economies
 - Include
 - Drainage Basins of the Sea of Okhotsk and Sea of Japan
 - Drainage Basins of the Aral Sea and other Transboundary Waters in Central Asia
 - Drainage Basins of the Caspian Sea



Drainage Basins of Sea of Okhotsk and Sea of Japan



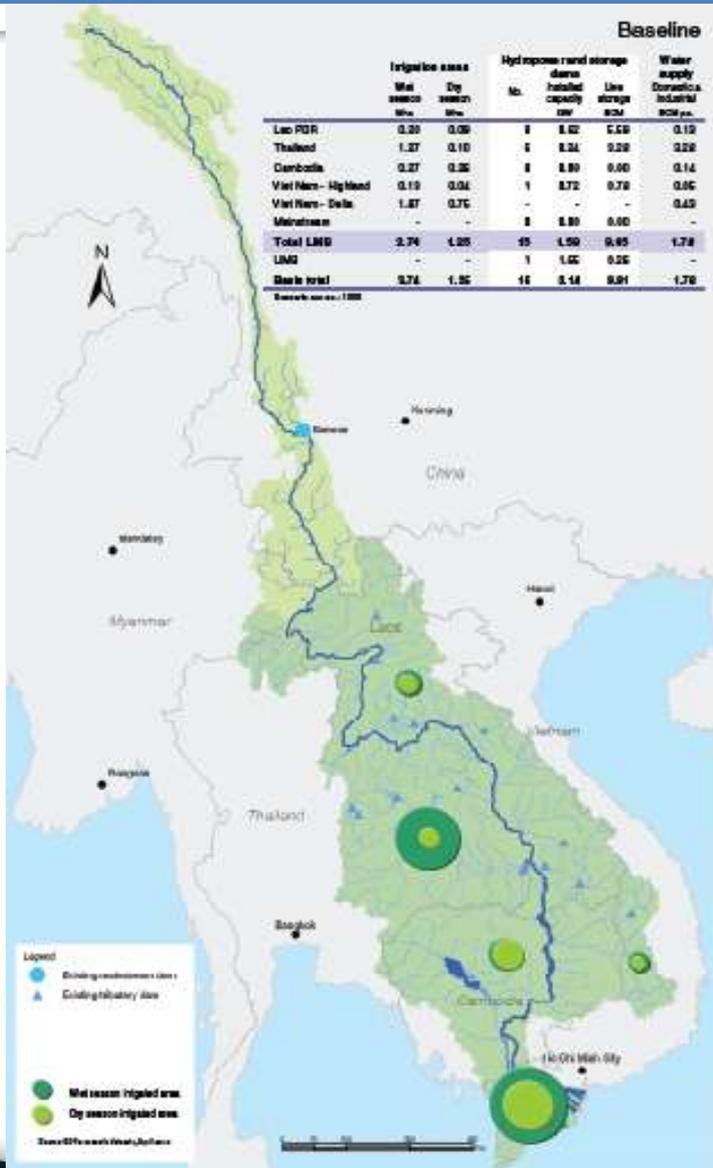
Drainage Basins of the Aral Sea and other Transboundary Waters in Central Asia



Astana Water Action



Mekong River Basin

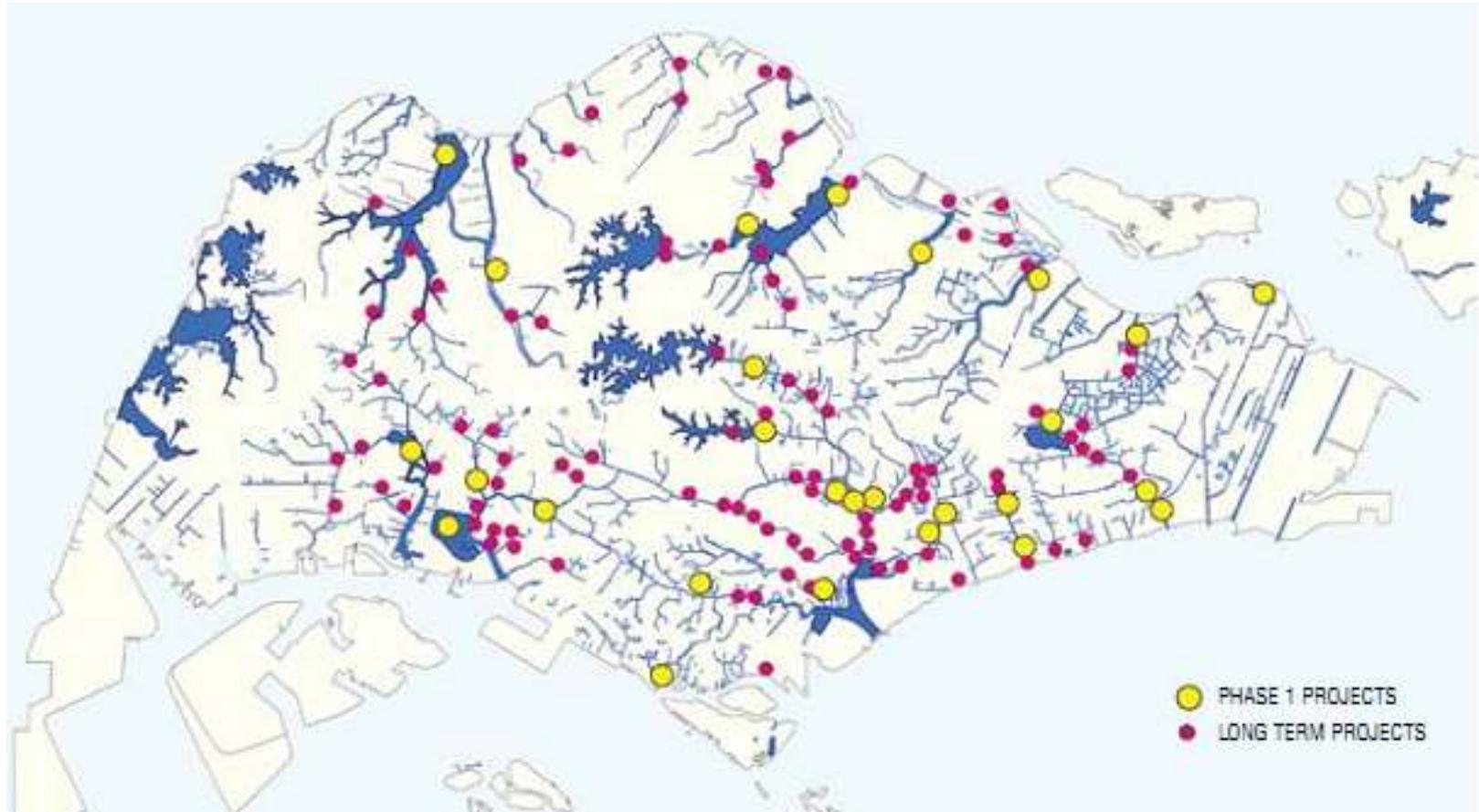


- A number of studies carried out
 - Assessment of Basin-wide Development Scenarios
 - Basin Development Strategy
 - Basin Action Plan
 - Regional Plan
 - 4 National Indicative Plans



Singapore's ABC – City of Gardens and Water

- Location of ABC Waters Projects -



ABC's Water Program



- Encourages to keep water ways and water bodies clean
- Natural systems which retain and treat stormwater on site before allowing the water to naturally flow into reservoirs
- Water features – ecological habitat, conducive for social and recreational activities



Moving Forward



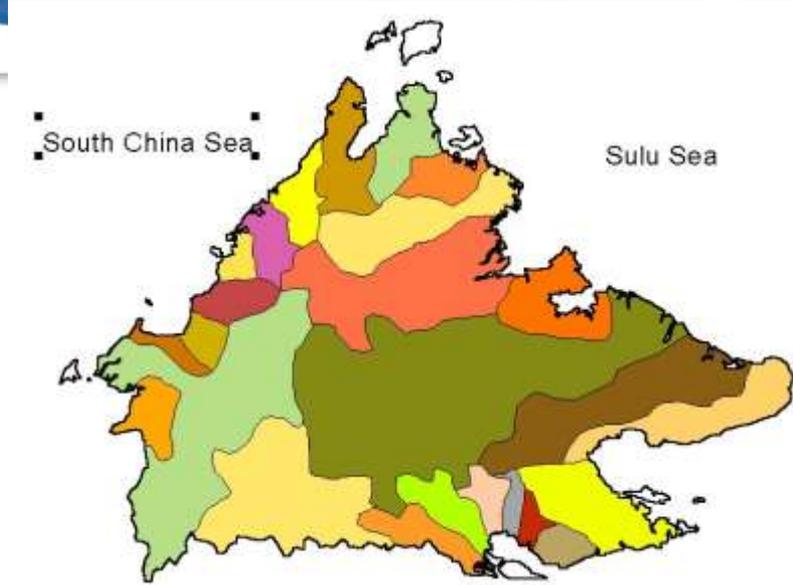
Moving Forward for Malaysia

- Water Resources Resilience
 - Analyze and implement IWRM/IRBM
 - Analyze changes in hydrological patterns and adapt system management, including retrofitting
 - Eco-efficient water infrastructure – mostly for new projects
- Local Level Resilience
- Synergizing with other policies
 - Capitalizing on each other's strength
 - National Physical Plan
 - Green Technology



Water Resources Resilience





SARAWAK - RIVER BASINS
 For development planning purposes, the state of Sarawak is divided into 21 major river basins.



Malaysia - 330,000 km²
 Average Annual Rainfall 1500mm to 4500 mm

189 River Basins Management Units (RBMU) in Malaysia

SOUTH CHINA SEA



River Basins in Labuan

LEGEND :

-  Project Boundary
-  Sub-Basin Boundary
-  SB01-Sg Bt Manikar
-  SB02-Sg Lada
-  SB03-Sg Belukut
-  SB04-Sg Buton
-  SB05-Sg Kina Benuwa
-  SB06-Sg Keling
-  SB07-Kg Rancha Rancha
-  SB08-Sg Bt Arang
-  SB09-Sg Gersik
-  SB10-New Victoria
-  SB11-Sg Nagalang
-  SB12-Sg Tg Aru
-  SB13-Sg Ganggarak
-  SB14-Kubong Bluff
-  Satellite Islands

Source: IES in Labuan (Draft Report, 2009)

River Basin Master Plans

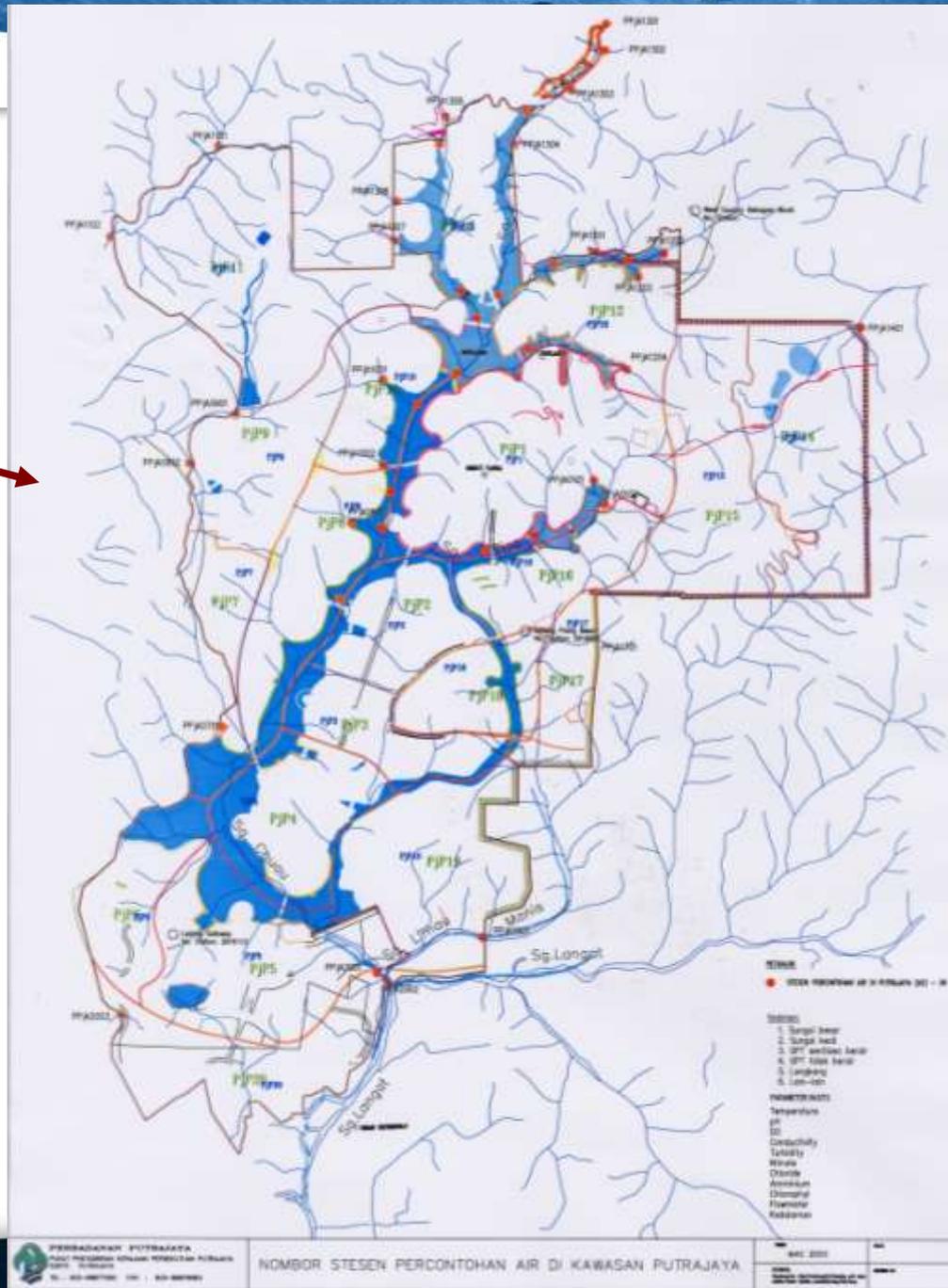
- A specific Basin Master Plan for each River Basin
 - Specific to the physical, social and economic needs of each basin
 - Cities and infrastructure planned and influenced by the physical limitations of each basin, and by the topography
 - National Physical Plan should look at river basin as constraints in their regional, structural and local plans
 - And National Economic Development Plan be influenced by the National Physical Plan





Putrajaya Catchment, Sg Chuau Catchment, is a tributary of Langat River System

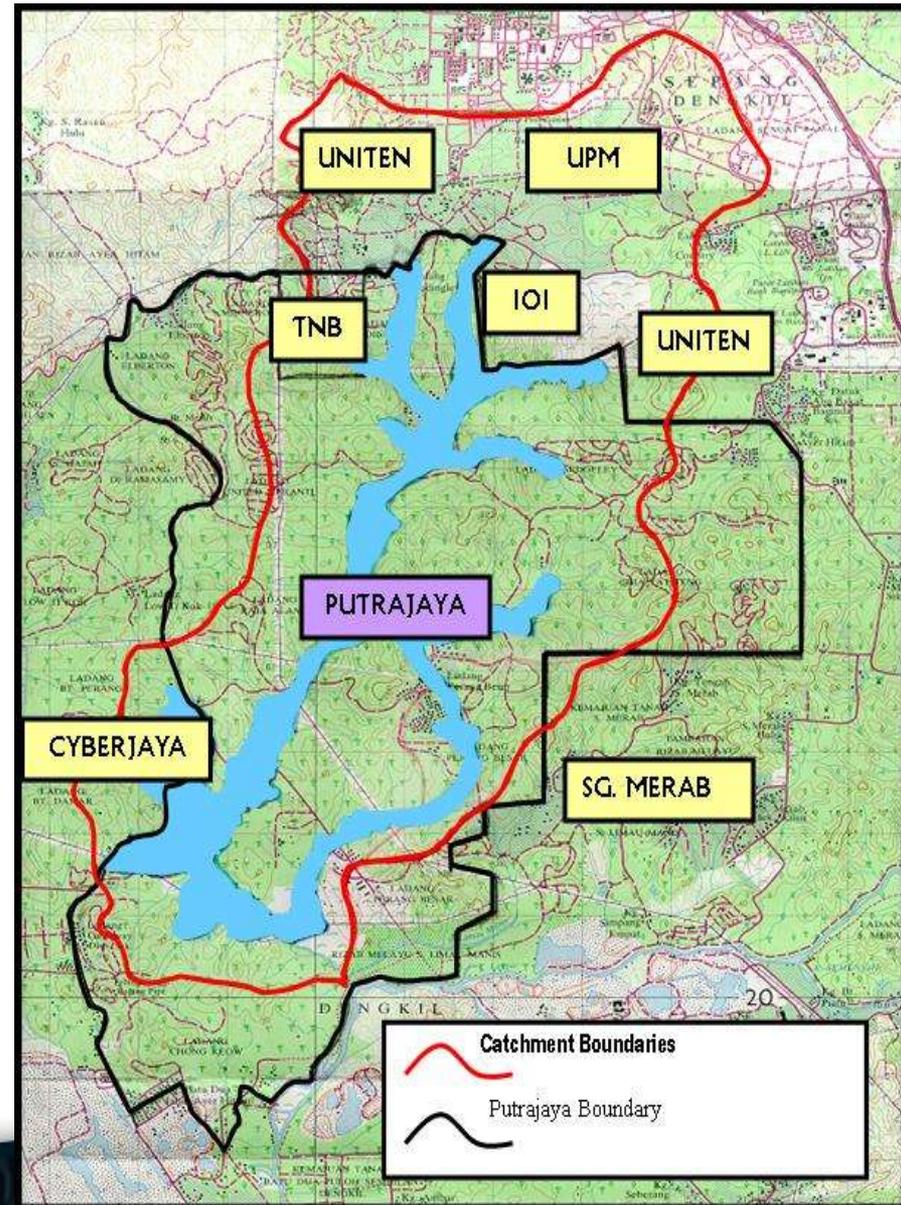
From: Perbadanan Putrajaya



PUTRAJAYA LAKE AND WETLAND

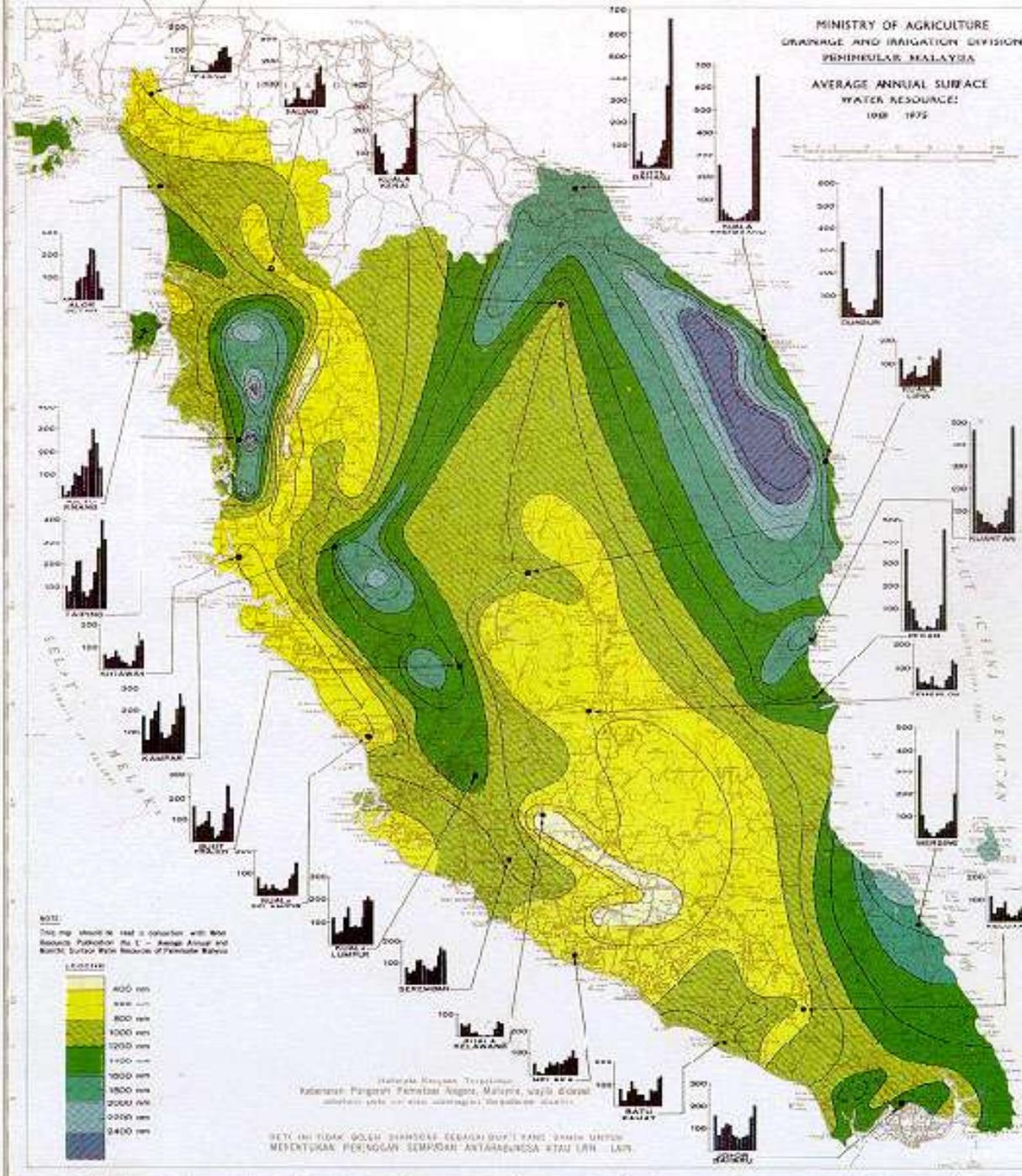
- 70% of the catchment is within the Putrajaya area
- 30% located outside Putrajaya area shared by other stakeholders i.e. UPM, MARDI, IOI, UNITEN, Sg. Merab Malay Reserve and Cyberjaya
- Catchment lies within the jurisdiction of Majlis Perbandaran Sepang (MPSp), Majlis Perbandaran Subang Jaya (MPSJ) and Perbadanan Putrajaya (PPj)
- Supported by the Akta Perbadanan Putrajaya 1995
 - Peraturan-Peraturan WP PJ (Perlesenan dan Pendaftaran Aktiviti di Tasik – 2004)

From: Perbadanan Putrajaya

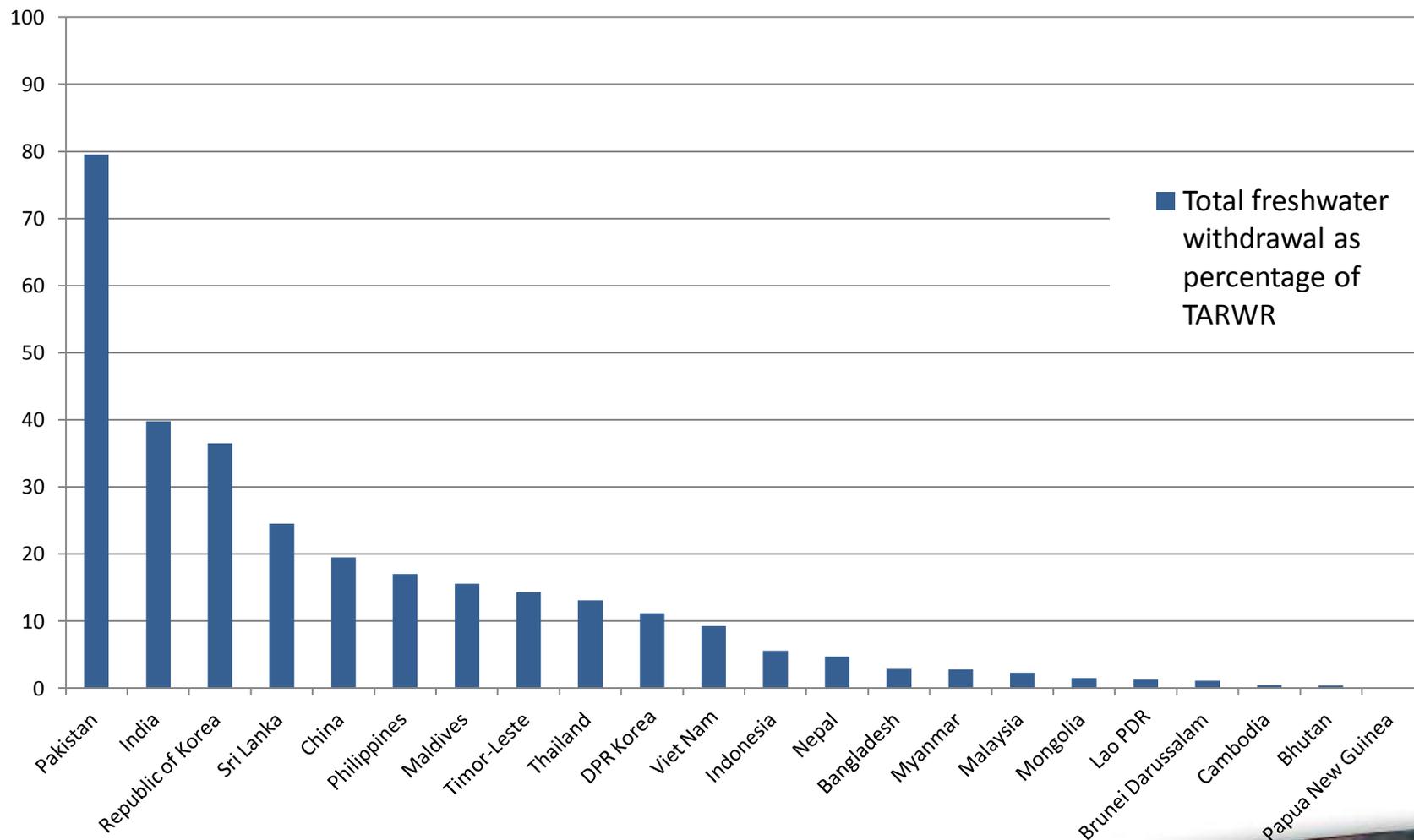


Changing Rainfall Patterns





TOTAL FRESHWATER WITHDRAWAL AS PERCENTAGE OF TARWR



Local level Resilience



Water Projects and public ownership

Public Ownership of local Water Ways and infrastructure



Principle 3 Resilience – Detail 1

- National level institutions
 - Control resources, allocates and prioritize them
 - Requires improved governance
 - Increased capacity
 - Necessary policy reforms for local stakeholders to
 - develop and increase resilience
 - managed their resources
 - balance decision making systems to engender
 - An infrastructure approach with natural and human systems, which include environmental, societal, political and economic aspects

- <http://www.apwf.org/doc/Framework.pdf>



Principle 3 Resilience –Detail 2 - Next Steps

- 3.1 – Strengthen the adaptation capacities of water managers, communities, and of society as a whole
- 3.2 – Improve community-based water risk management capacities



Step 3.1 - Strengthen the adaptation capacities

- Identify Gaps in governance structure and adaptive capacity, and fill in the gaps
- Strengthen capacity development programs
 - Localized climate projections and impact assessment
 - Local governance structure, with financing from national levels
 - Identify, utilize and adapt local methods, solutions and material, suited to local conditions
 - Built network between local communities and experts to facilitate sharing of information



Step 3.2 - Improve community management capacities

- Comprehensive, land and water management planning risk management strategy
 - Participatory development and implementation with all stakeholders, at all levels
 - Provide capacities and skills as given under institutional structures
 - Strengthen capacity of academia, government institutions, communities and all stakeholders
 - Share knowledge, experience and success stories
 - Develop risk management approaches for agriculture
 - Agricultural production is particularly sensitive to changes in hydro-climatic conditions of temperature, water balance and extreme events



National Physical Plan



Policies under the 5yr National Development Plan

- 3 main Policies
 - National Water Resources Policy
 - National Policy on Climate Change
 - National Physical Plan, shall be reviewed every 5 years
 - NPP1 - approved by NPPC, 26 April 2005
 - NPP2 – endorsed by NPCC, 13, August 2010
 - NPP3 – in preparation, launched 2015?



National Water Resources Policy

- The security and sustainability of water resources
 - A national priority, to ensure adequate and safe water for all
 - Through sustainable use
 - Conservation
 - Effective management
 - of water resources
 - Enabled a mechanism of shared partnership involving all stakeholders



National Policy on Climate Change

- Ensure climate resilient development to fulfil national aspirations for sustainability
 - Mainstreaming change through
 - Wise management of resources and enhanced environmental conservation resulting in strengthened economic competitiveness and improved quality of life
 - Integrated of responses into national policies plans and programmes
 - To strengthen the resilience of development from arising and potential impacts of climate change
 - Strengthening of institution and implementation capacity
 - To better harness opportunities to reduce negative impacts



The background of the slide is a photograph of lush green ferns, with their fronds filling most of the frame. The lighting is bright, creating a natural and vibrant atmosphere. The ferns are in various stages of growth, with some fronds appearing more developed than others. The overall color palette is dominated by various shades of green, from light lime to deep forest green.

NATIONAL **Physical Plan**

Framework for an integrated and
Sustainable Landuse Planning

manage

Environmental Sensitive Areas

safeguard

Water Resources

conserve

Prime Agricultural Areas

The Netherlands

Prof Pavel Kabat



Studied climate change for almost 20 years
Started in early 1990s

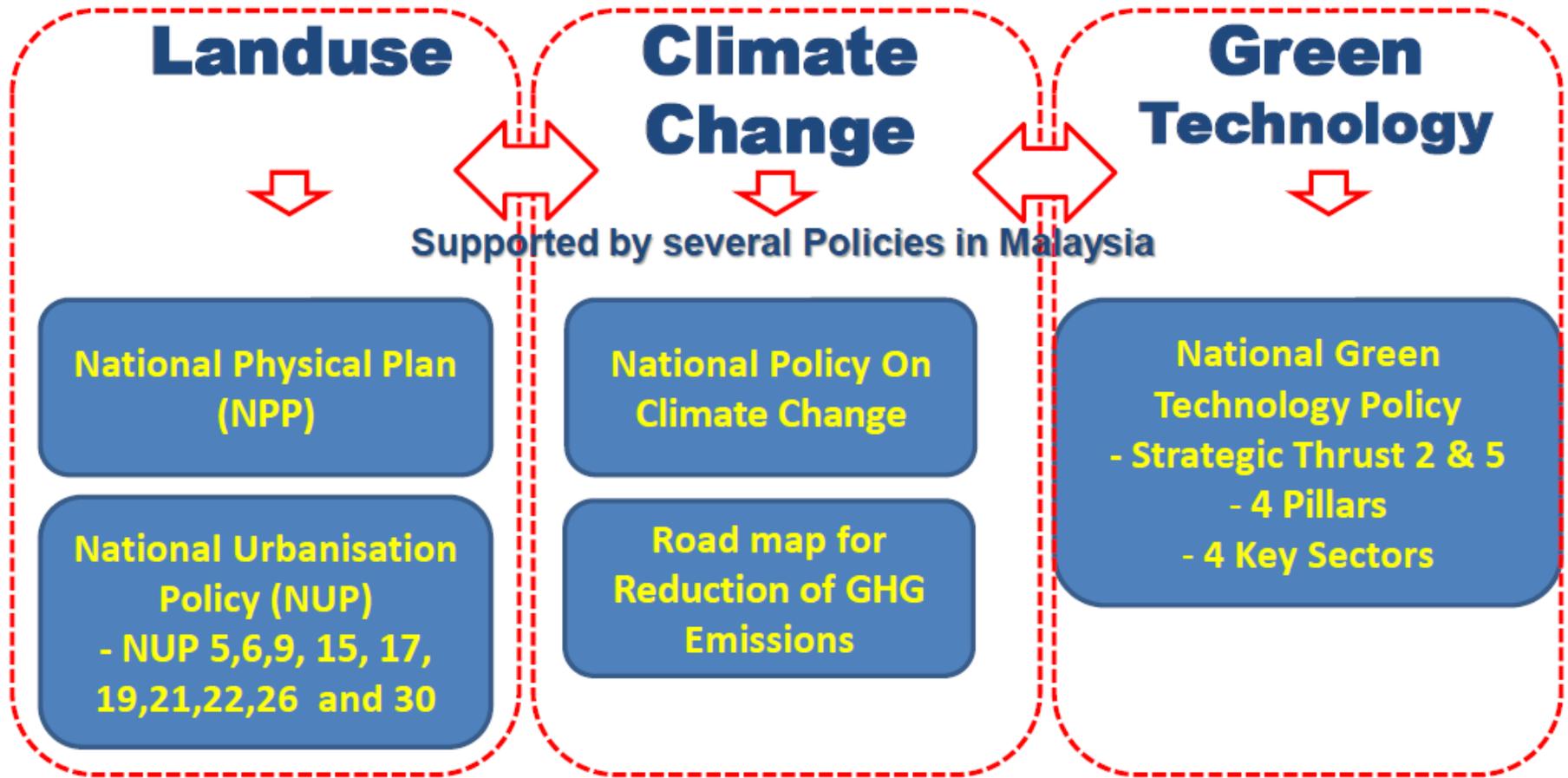
To understand the climate system you have to look at the land too

- Initially climate change, focus on weather, atmosphere and the oceans
- Kabat and team conduct research both on basic aspects of the climate system – how the atmosphere functions and the interaction between land and land use – and on technologies to adapt to climate change
- Land and land use are essential to understanding how the climate system works.
- “...carbon is to a large extent captured on land; tropical forests, for example, play an important role in this.
- carbon emissions are also mostly produced on land.



Malaysia: Towards Sustainability

POLICIES

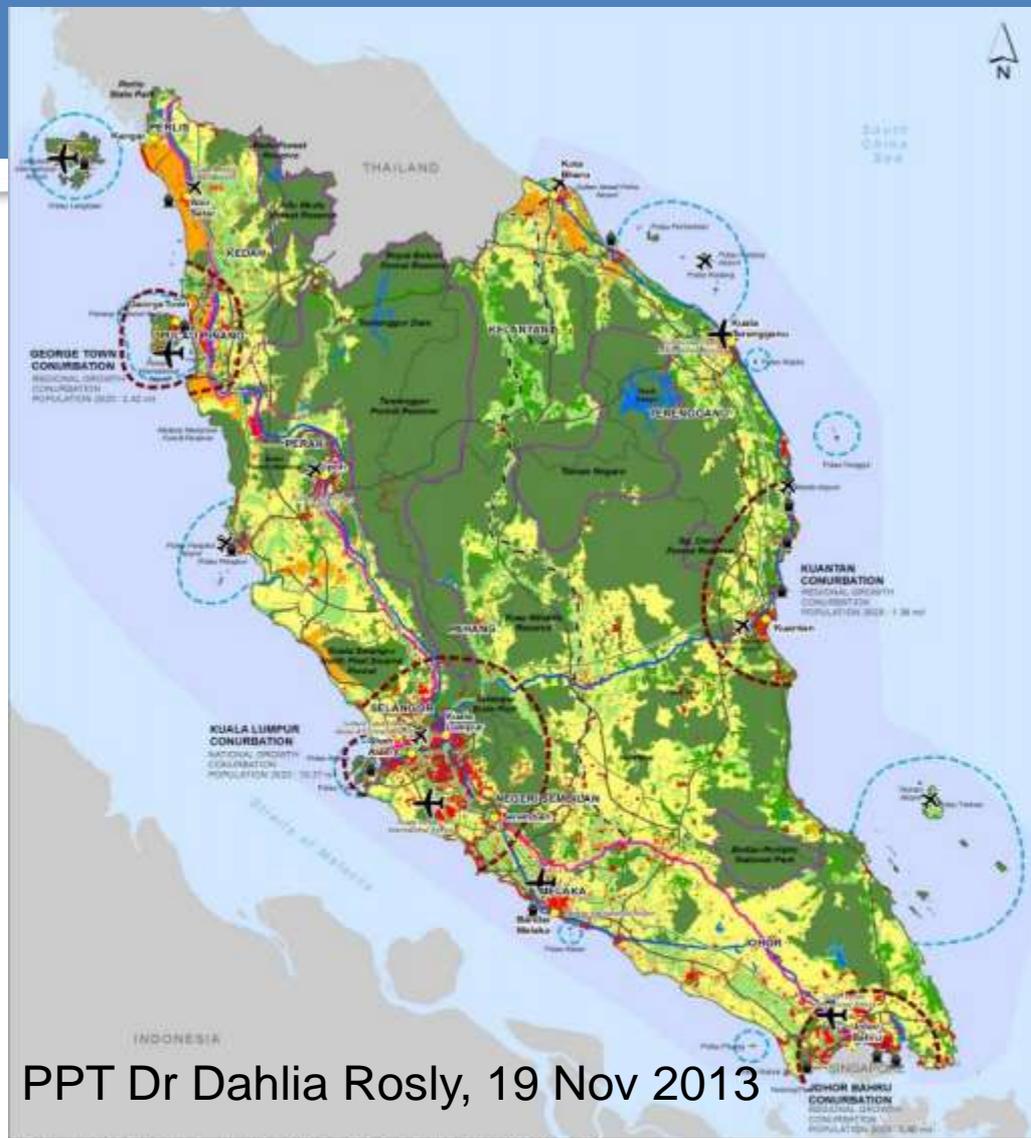


PPT Dr Dahlia Rosly, 8 Sept 2011

SUSTAINABLE DEVELOPMENT AND GREEN GROWTH

NPP2 NATIONAL SPATIAL FRAMEWORK 2020

- Achieve an integrated and sustainable land use planning, coordinated with other sectoral policies/plans.
- Provides the general directions of physical development in the nation.
- Forms the basis for detailed development plans at regional, state and local.
- Ensure resources are optimally used, avoid duplication in infrastructure investments and strive for sustainable development.



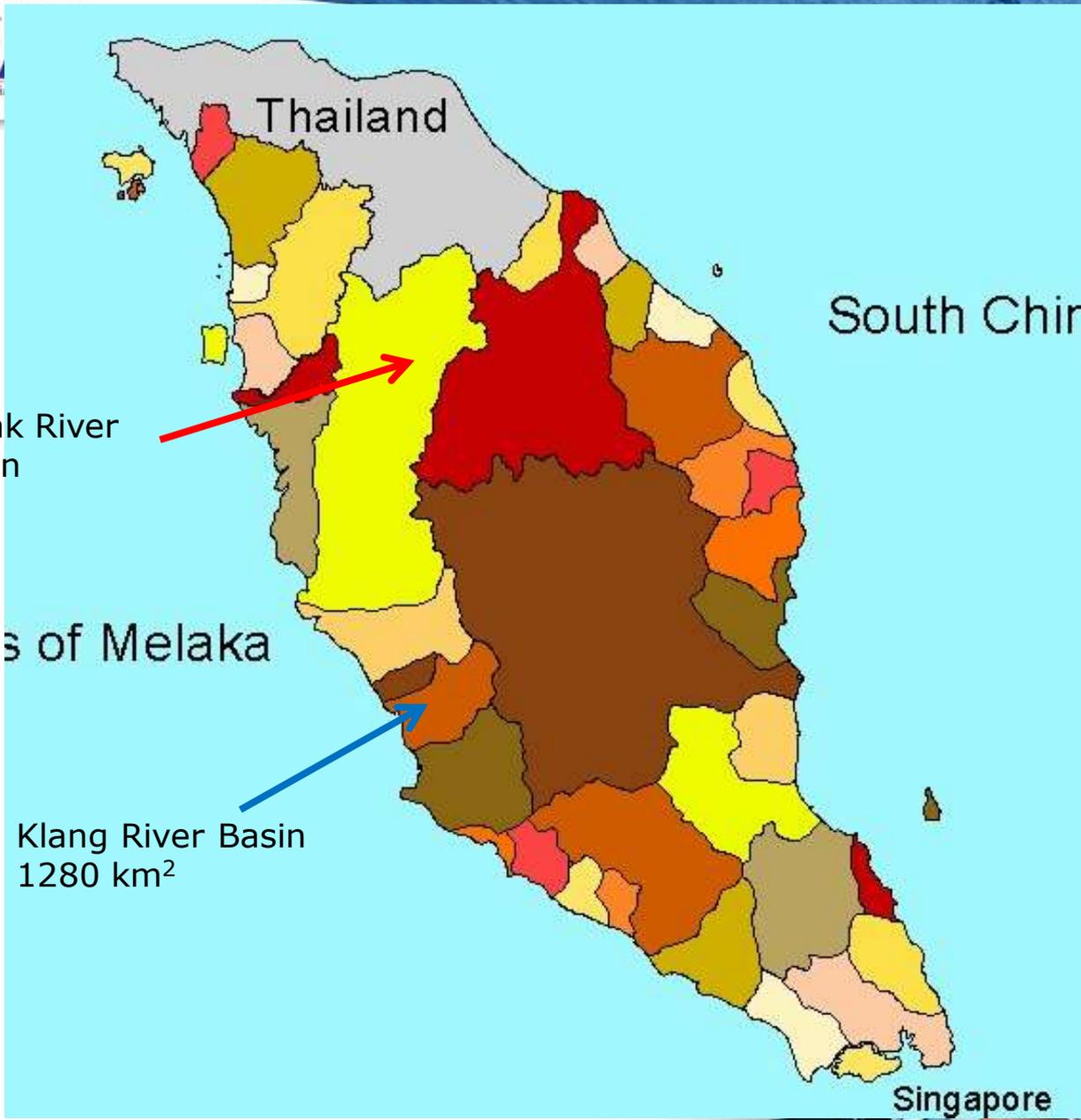
PPT Dr Dahlia Rosly, 19 Nov 2013

FIG 1: NATIONAL SPATIAL FRAMEWORK 2020



Federal Department Of Town And Country Planning Malaysia





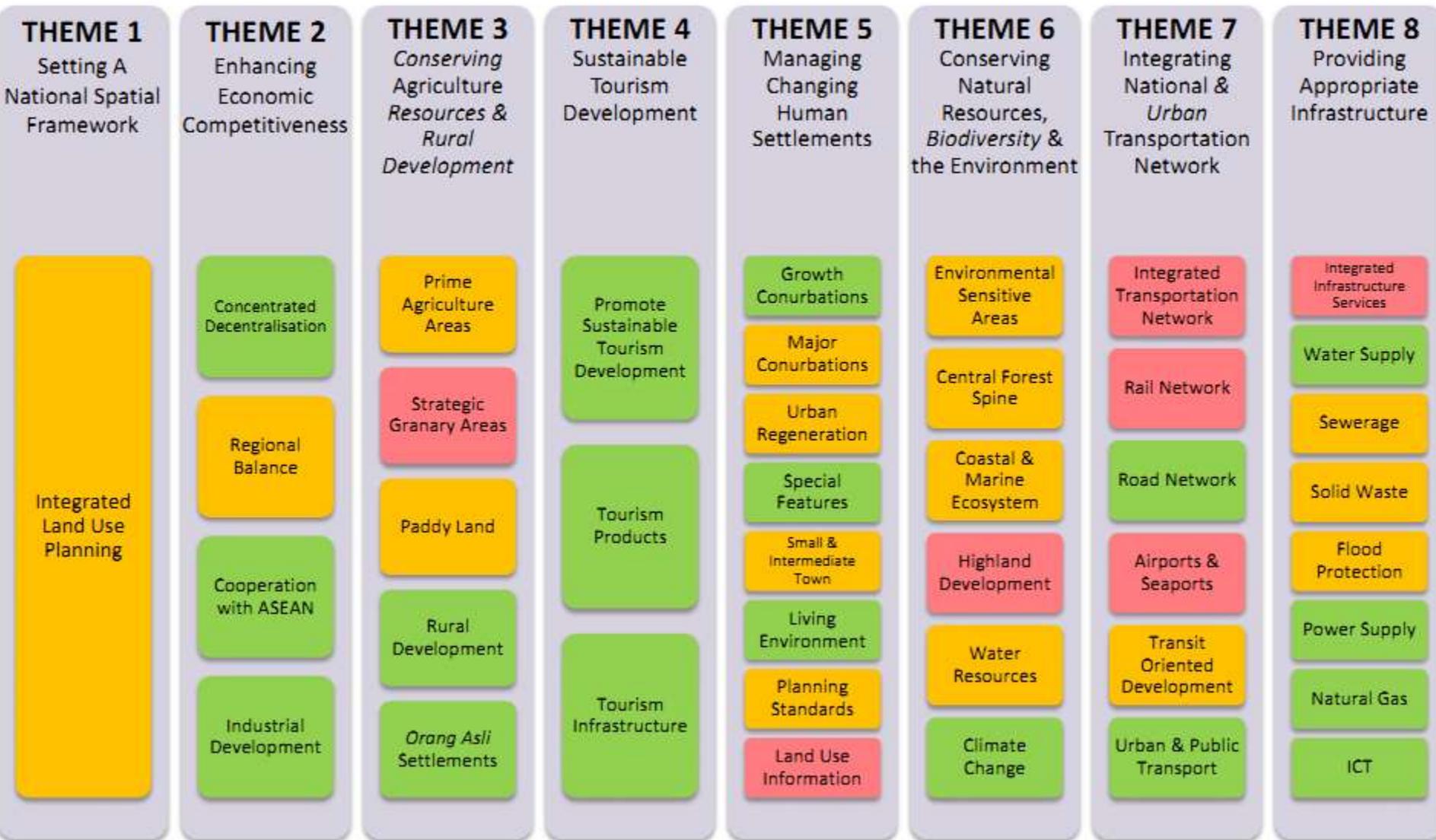
Perak River Basin

Strait of Melaka

Klang River Basin
1280 km²

Singapore

Status of Implementation 2010-2011



 Implemented (18 Policies)

 In the Process of Implementation (16 Policies)

 Early Stage of Implementation (7 policies)

Green Economy/Technology



Areas for water in Green Technology

- **Resources management**
 - Water and green growth
 - Policies, R & D etc
- **Water Services**
 - Water Supply
 - Domestic and Industries
 - Agriculture
 - Recreation
 - Transport
 - Hydropower
 - Disaster Risk Management, eyc



Innovations in Water Sectors

- Technologies
- Financing
- Management, Policies and Governance



Innovation -defined

OECD (2005) "The OECD Strategy: Getting a head start on tomorrow" Organization for Economic Cooperation and Development

- Implementation of
 - a new or significantly improved new product (good or Service) or *process*, a new marketing method or *a new organizational method in business practices, work place organization or external relations*
- New and unique application of old technologies.
 - Using design to develop new products and services
 - New processes and structures to improve performance in diverse areas, organizational creativity
 - Public sector initiatives to enhance delivery of services
- Creating sustainable and cost effective solutions
- Strategy for inclusive growth in developing economies
- Increasingly beyond the confines of formal research and development



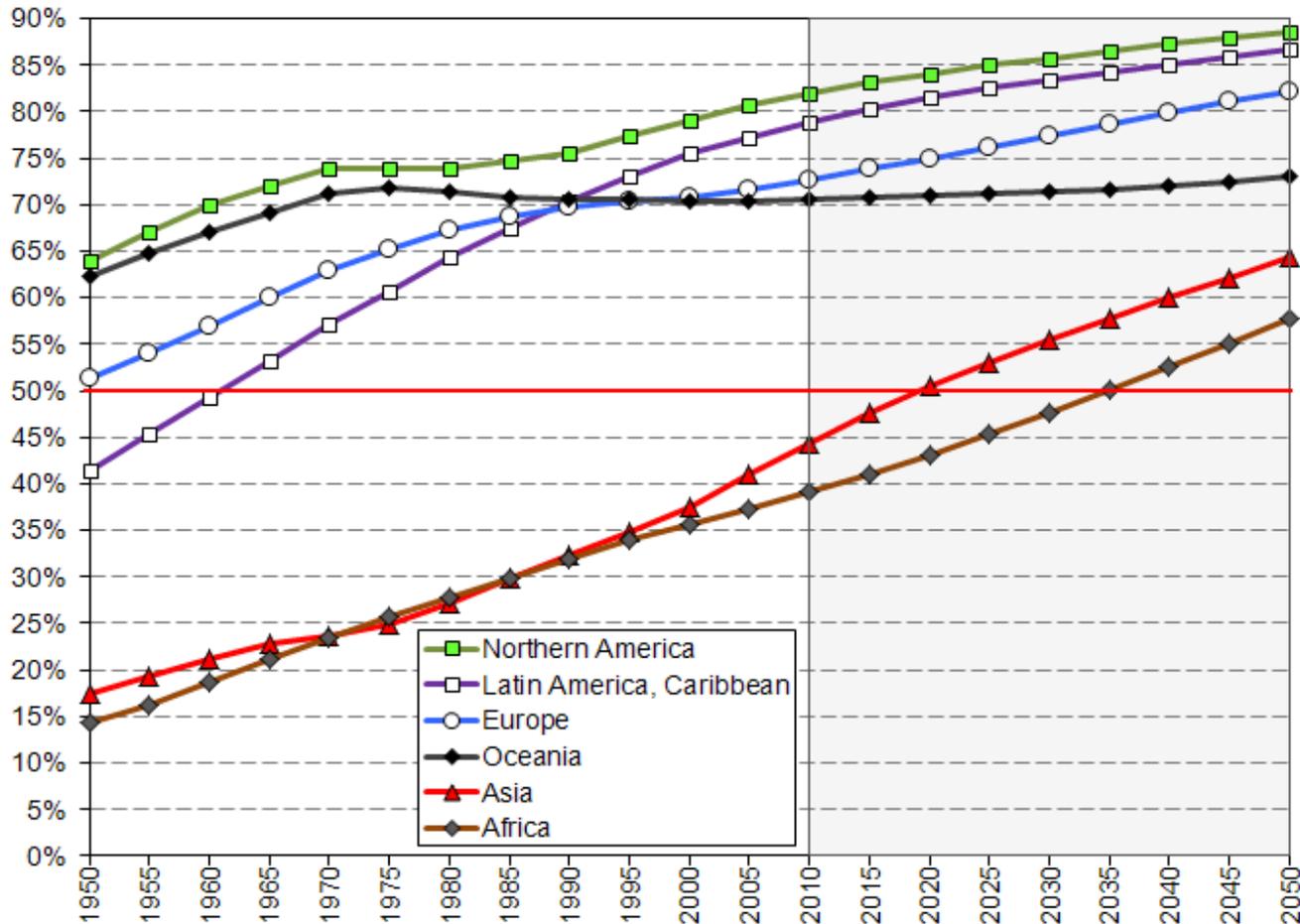
Innovative Technologies

- Structures
 - Design for eco-efficient water infrastructure for water supply, pollution and urban drainage to meet needs of its functions
- Product Development, Instrumentations and materials
 - pumps, modular structure, meters, insulators, filters, etc
- Treatments
 - Industrial Waste Management
 - Treatment depend on sources of industrial waste: iron and steel, chemicals, etc
 - Sewage
 - Various level of processes, from primary, odour control, sludge treatment, etc
 - Open defecation is still wide spread in South Asia
 - Wastewater treatment
 - Numerous methods from aerobic/anaerobic/, chemical, vacuum; including that for sewage and water supply

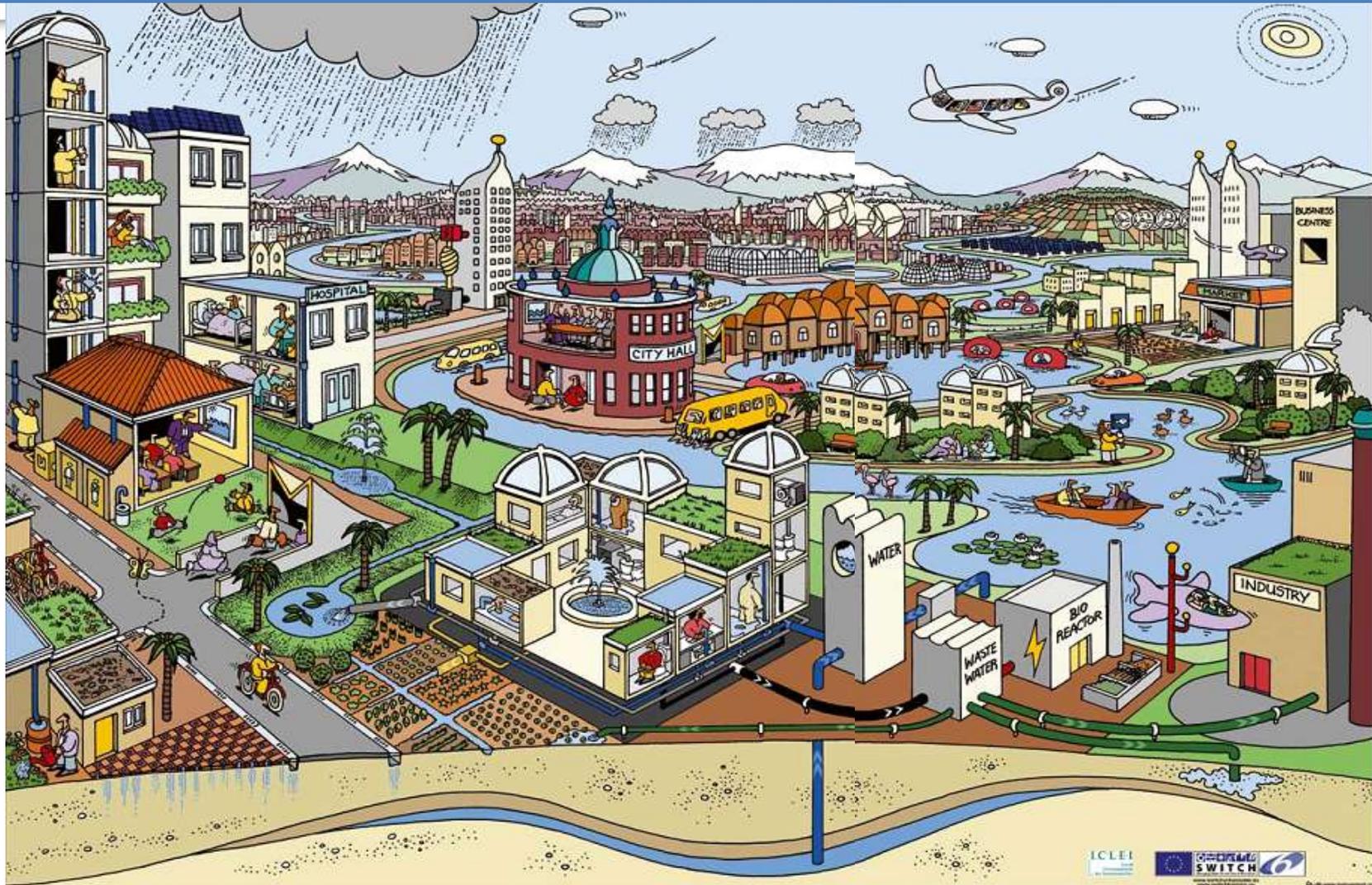


Urban population by major geographical area

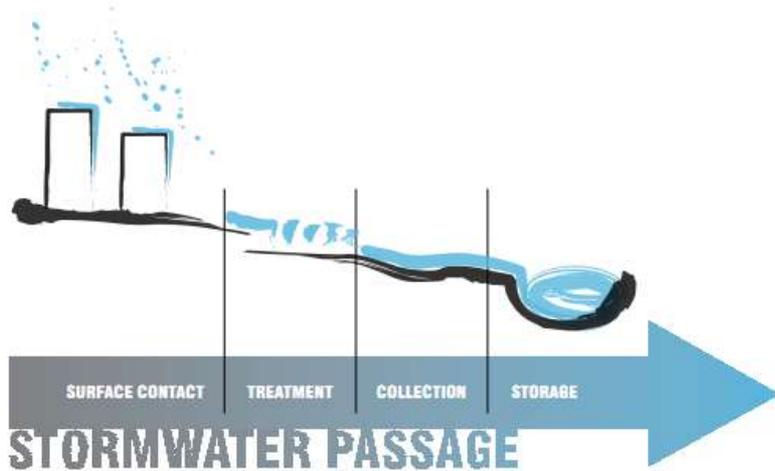
(in per cent of total population)



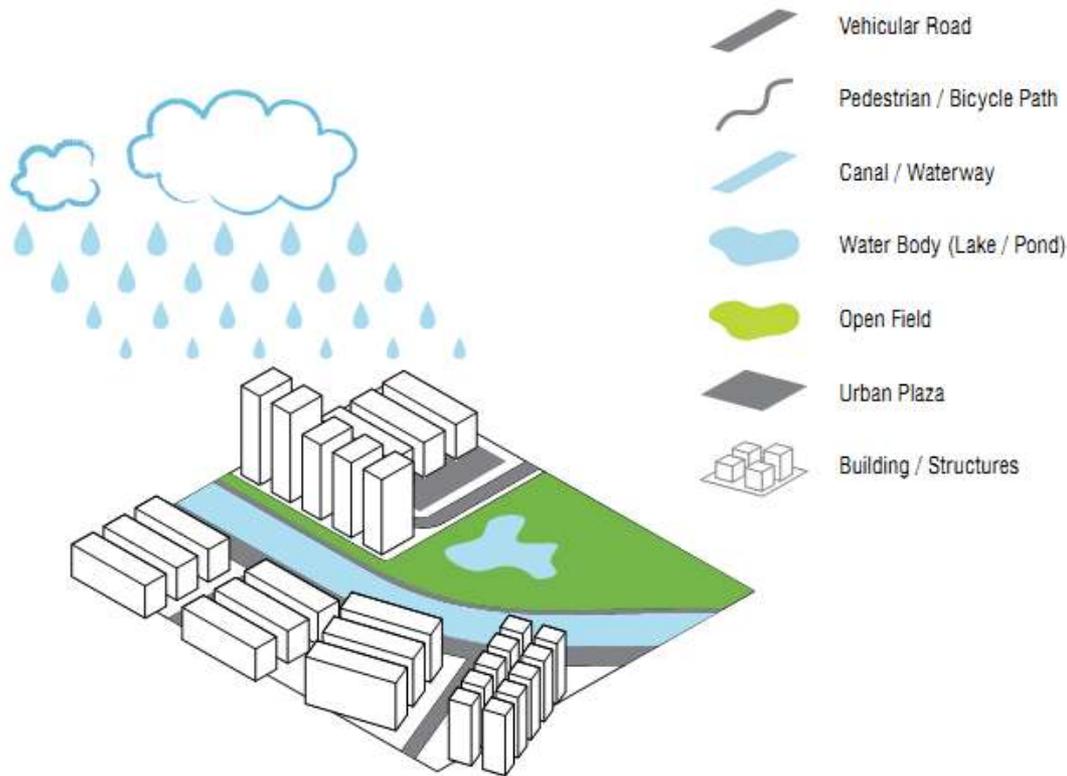
Integrated Urban Waters Management



Stormwater Passage



Rain Water Harvesting

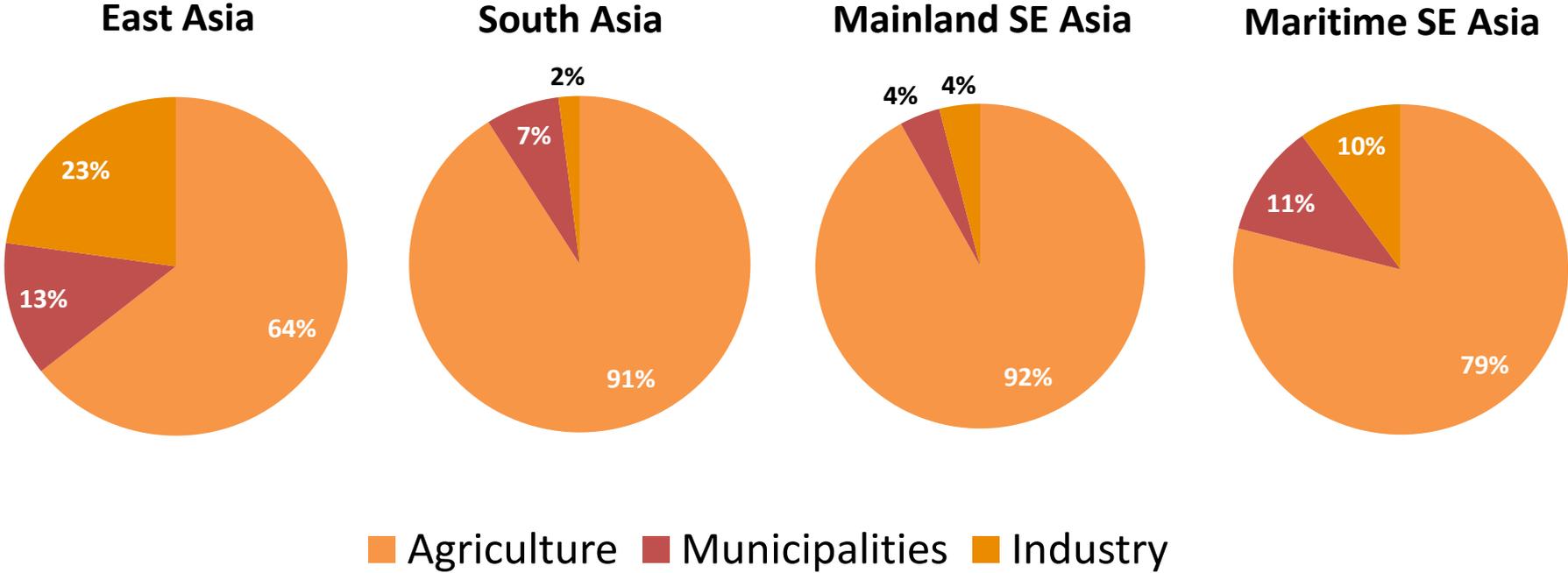


- Rainwater, relatively clean, gets contaminated when it comes into contact with surfaces
- Surfaces: roads, paths and walkways; building structures, fields and parks, waterways and waterbodies



Competition for water

Water withdrawal ratios by sector



Data Source: FAO Irrigation in Southern and Eastern Asia in figures, AQUASTAT Survey – 2011

Thank you.

