

WATER RESOURCES FUNCTIONS AT THE RIVER BASIN LEVEL

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CAPACITY DEVELOPMENT IN IWRM EDUCATION & TRAINING (CDIET) PROJECT
STRATEGIC PLANNING FOR RIVER BASIN ORGANIZATION
SWIS BELL-INN HOTEL, MALANG – 3 APRIL 2017

LEARNING OBJECTIVES

- Learn the basic functions of water resources management at a river basin scale;
- Discuss the institutional arrangements and introduce process-thinking to conduct the water resources management functions;
- Appreciate that it takes time to fully perform water resources management functions and that goals have to be set in relation to what can realistically be met.

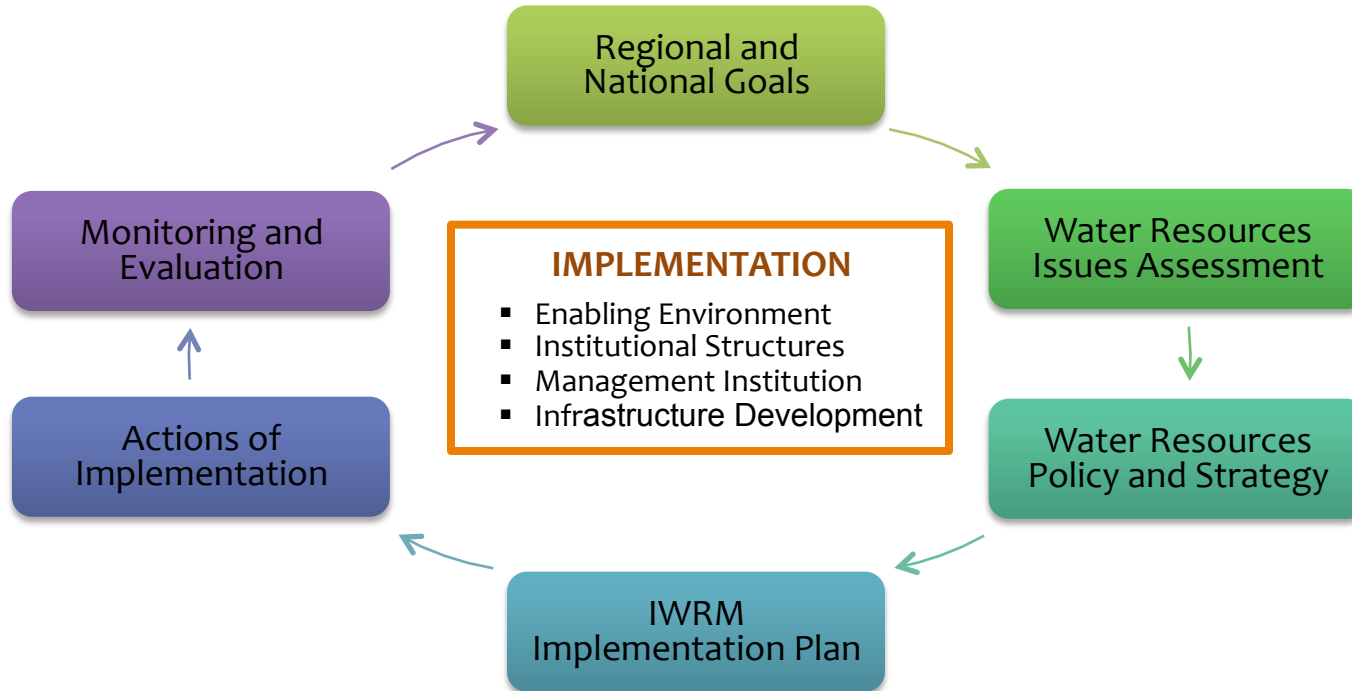
RIVER BASIN MANAGEMENT

The boundaries for a river basin, the catchment area that is divided by topography, provides a **natural unit** for water resources management;

Water resources management is aimed at **providing** water for **human** and **environmental** requirements and **preventing** fluvial related disasters.

IWRM CYCLE

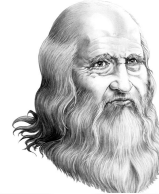
Development Objectives



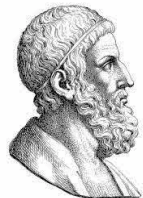
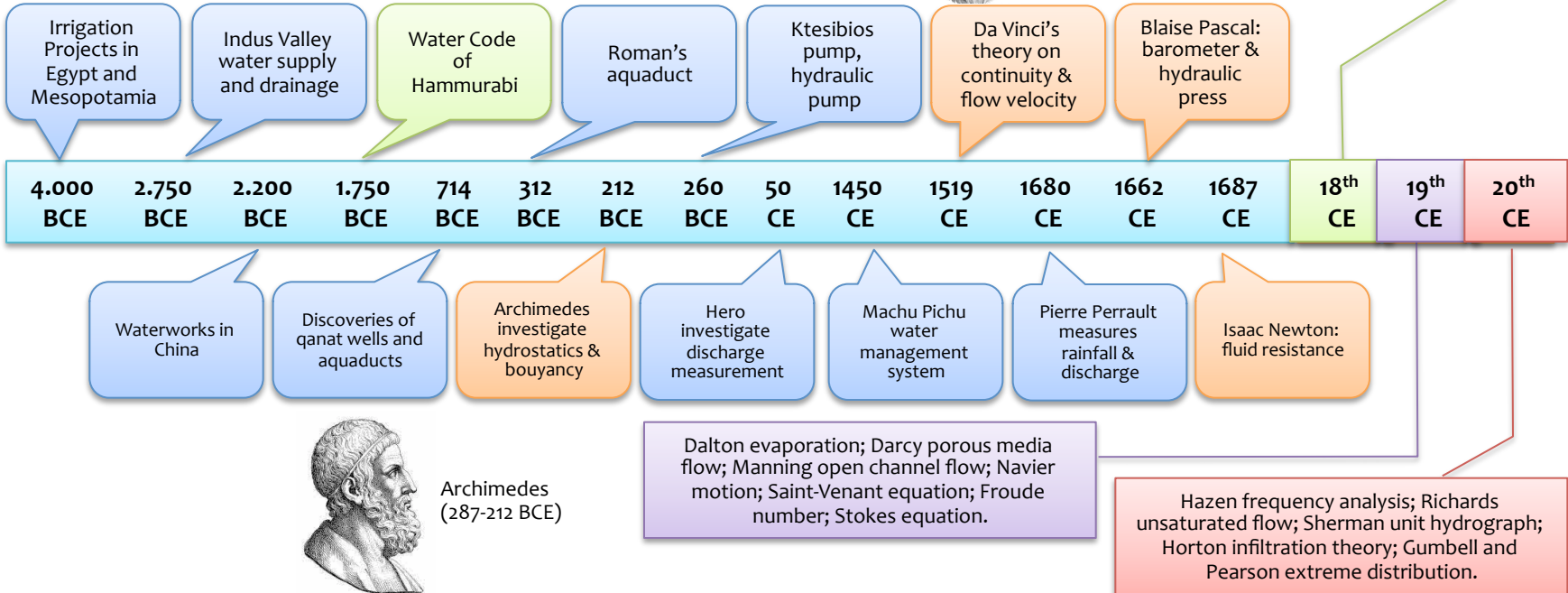
IWRM INSTRUMENTALS



Hammurabi
(died 1.750 BCE)



Leonardo da Vinci
(1452-1519)



Archimedes
(287-212 BCE)

HOW WATER HAS DEFINED CULTURE

| | SUMERIAN | EGYPT | INDUS VALLEY | CHINA |
|------------------------|---|---|--|--|
| ENVIRONMENT | <ul style="list-style-type: none"> Tigris and Euphrates flooding unpredictable No natural barriers Limited natural resources | <ul style="list-style-type: none"> Nile flooding predictable Natural barriers: deserts Nile as an easy transportation link | <ul style="list-style-type: none"> Indus flooding unpredictable Natural barriers: mountains and deserts Monsoon | <ul style="list-style-type: none"> Huang He flooding predictable Natural barriers: mountains and deserts Isolated |
| POWER AND AUTHORITY | <ul style="list-style-type: none"> Independent city-states governed by monarchs City-states united into empires | <ul style="list-style-type: none"> Pharaohs rule kingdoms as “gods” Monumental structures | <ul style="list-style-type: none"> Centralized kingdoms Planned cities | <ul style="list-style-type: none"> Community and family strong basis Sharp social divisions Heaven mandate |
| SCIENCE AND TECHNOLOGY | <ul style="list-style-type: none"> Cuneiform Irrigation Bronze Wheel, saw and plow | <ul style="list-style-type: none"> Hieroglyphs Pyramids Mathematics and geometry Medicine | <ul style="list-style-type: none"> Writings (un-deciphered) Cities Plumbing and sewerage systems | <ul style="list-style-type: none"> Writing Silk Money Cast iron |




 水 *shui* (water)

THREE DIMENSION OF IWRM

| Enabling Environment | Institution | Management Approach |
|--|--|---|
| <p>Laws and Policies</p> <ul style="list-style-type: none">▪ Frame water resources within a country or between countries <p>Water Users Dialogue</p> <ul style="list-style-type: none">▪ Cross sectorial and upstream-downstream dialogue <p>Budget</p> <ul style="list-style-type: none">▪ Financing organizations and investments <p>Co-operation</p> <ul style="list-style-type: none">▪ Within administrative boundaries | <p>Roles and Responsibilities</p> <ul style="list-style-type: none">▪ Basin and other water sector organizations at different levels in the government▪ Effective co-ordination mechanism▪ Planning process▪ Financing | <p>Structures to ...</p> <ul style="list-style-type: none">▪ Assess water resources (availability and demand)▪ Set-up communication and information systems▪ Resolve conflicts in allocation of water resources▪ Establish regulation▪ Establish financial arrangements▪ Research and development▪ Undertake development works▪ Ensure accountability▪ Develop organizational capacity▪ Co-ordinate |



BASIC FUNCTIONS AT A RIVER BASIN

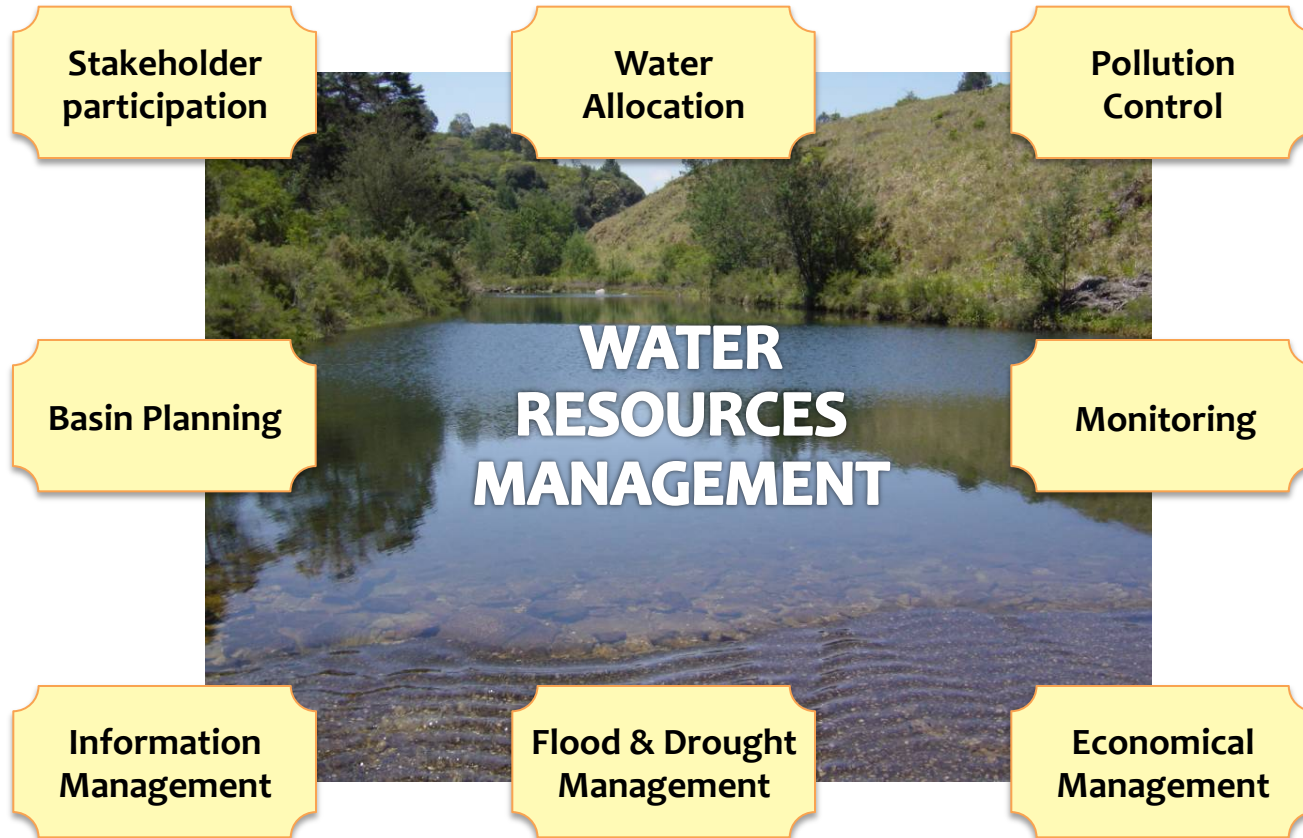
RIVER BASIN
SCALE

INTEGRATED
WATER
RESOURCES
MANAGEMENT

FOCUSES ON

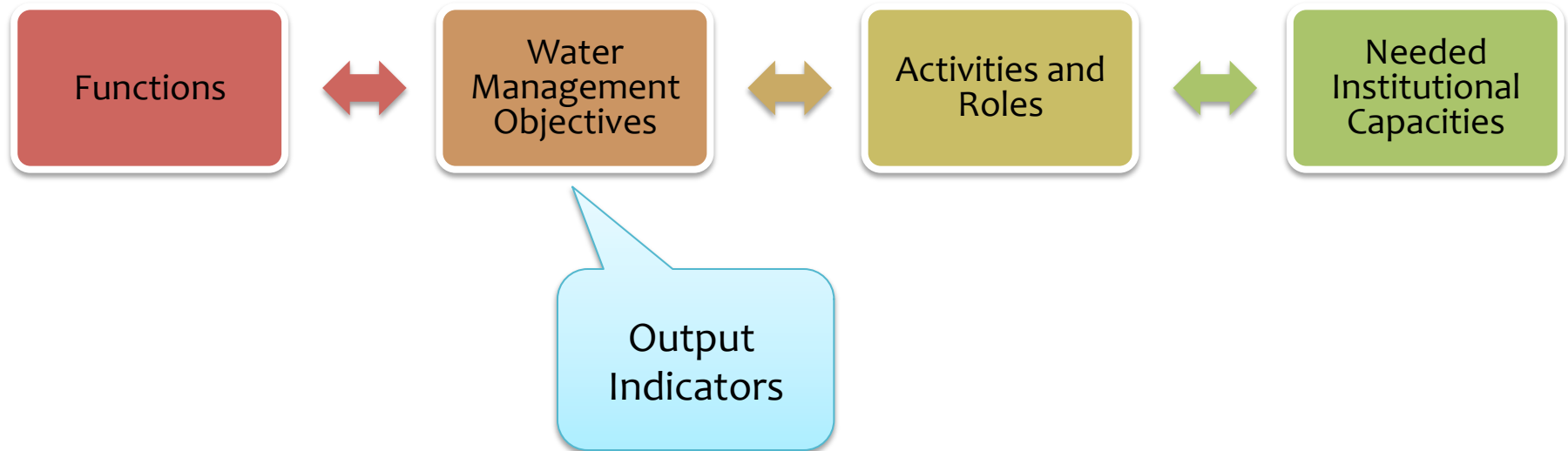
BASIC SETS OF
WATER
RESOURCES
FUNCTIONS

IWRM FUNCTIONS AT A RIVER BASIN



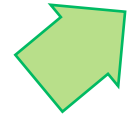
IWRM FUNCTIONS AT A RIVER BASIN

Process for conducting integrated water resources management (IWRM) functions:



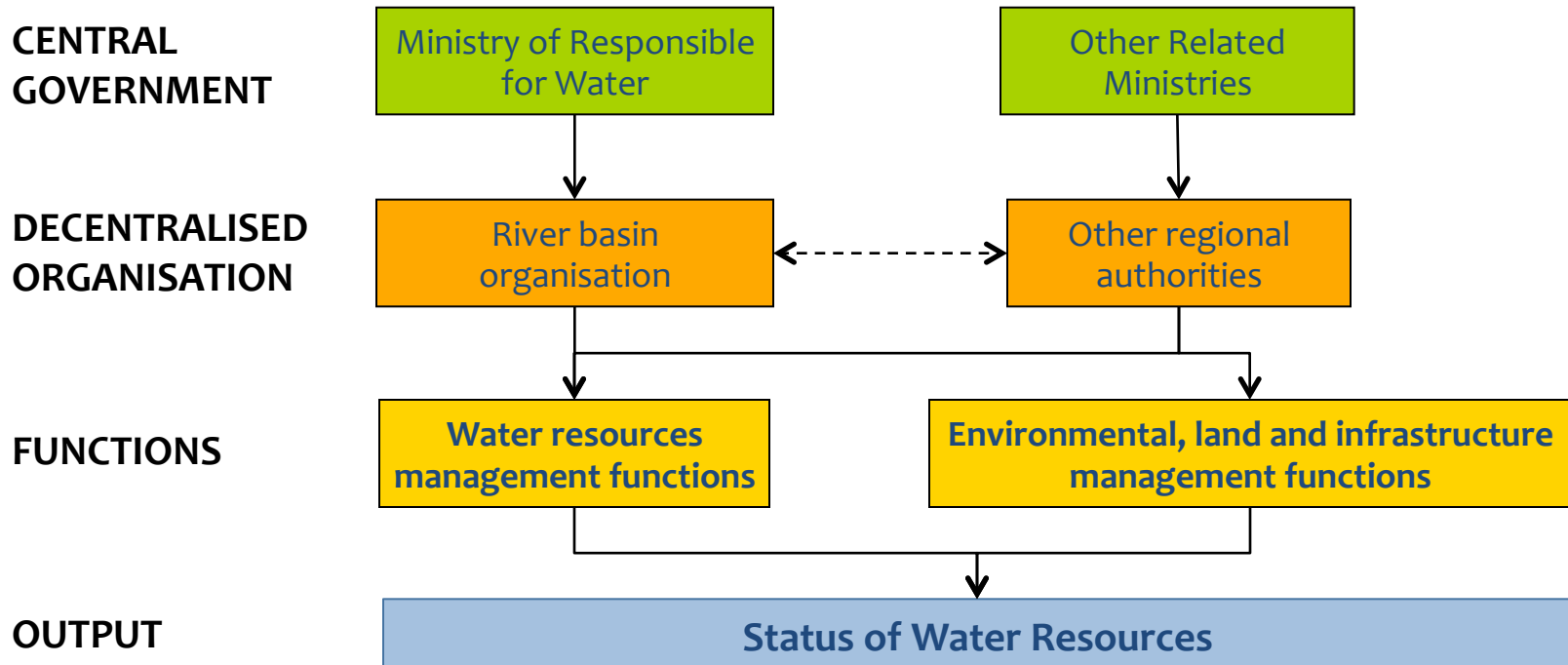
IWRM FUNCTIONS AT A RIVER BASIN

| FUNCTIONS | WATER MANAGEMENT OBJECTIVE | ACTIVITIES |
|---|--|--|
| <p>Implementing effective monitoring systems that provide essential management information and identify and respond to infringement of laws, regulations and permits.</p> | <ul style="list-style-type: none">▪ General knowledge of water resources availability▪ Knowledge of major water users | <ul style="list-style-type: none">▪ Daily measurements at key run off stations▪ Rainfall measurements▪ Hydrological modelling▪ Registration of major water users▪ Self monitoring applied by users |



IWRM FUNCTIONS AT A RIVER BASIN

Institutional Arrangements



IWRM FUNCTIONS AT A RIVER BASIN

Institutional Arrangements

**The RBO shall
act as:**

a regulatory body for
the functions they
have been given
responsibility for

a strong stakeholder
for the other
functions

LESSONS LEARNT

- **Lack of ...**
 - Clear role for the RBOs;
 - Autonomy for the RBOs;
 - Recognition of the RBO among stakeholders;
 - Human and financial resources of the RBOs;
 - Adaptive management in the RBOs;
 - Cross-sectoral coordination.

LESSONS LEARNT

- The development of an institutional arrangement for conducting all water resources management functions is a **long and on-going process**.

We will address the **PERFORMANCE INDICATORS** of IWRM implementation later.

INDONESIAN WATER RESOURCES

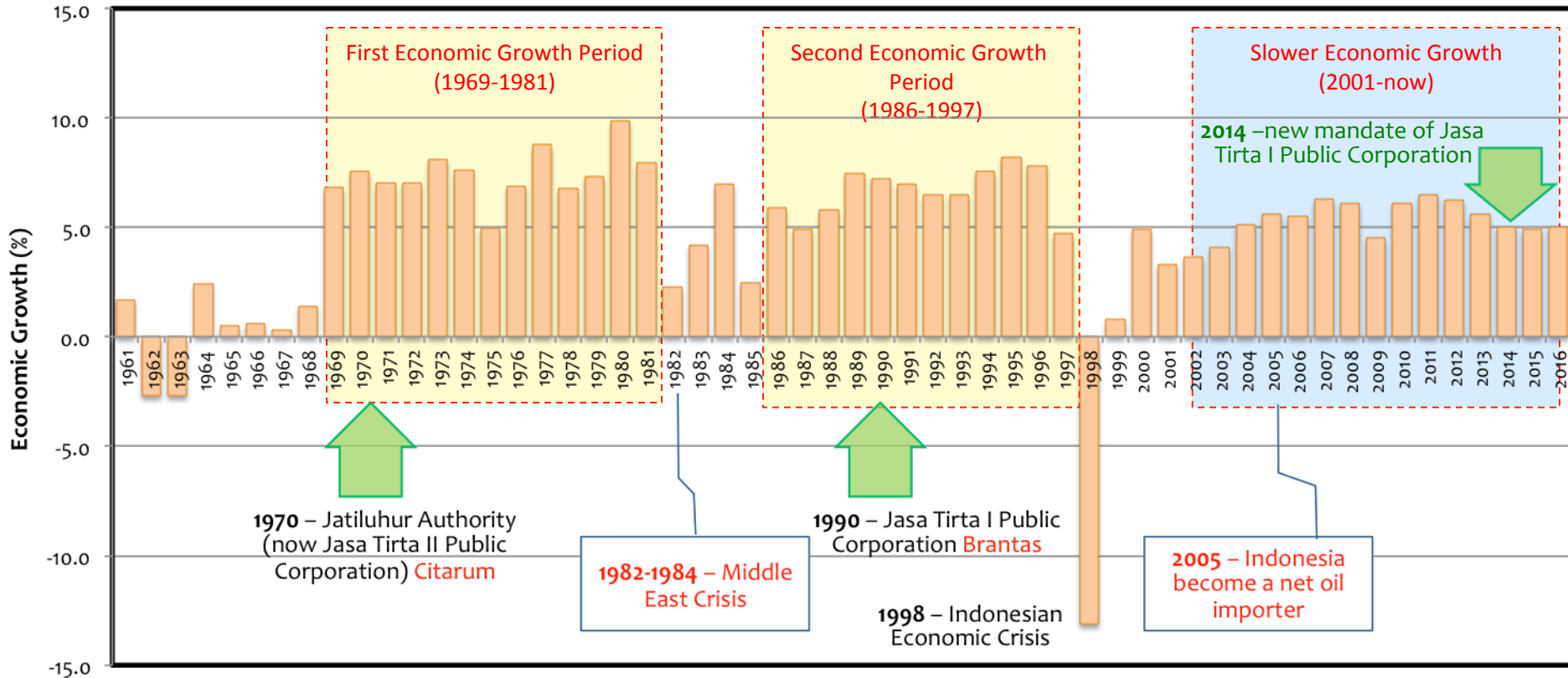


In favor of the monsoon and dipole mode, Indonesia is blessed with abundant water; however as an archipelago the water is **unequally distributed.**

From the total potential of 3.906 km³ water in Indonesia, only ± 15 km³ or 63,5 m³ per-capita amount of water can be managed through reservoirs.

INDONESIAN RBO'S TIME LINE

RBO EVOLUTION REQUIRES TIME AND (ECONOMIC) EXTERNALITIES



INDONESIAN RBO'S TIME LINE

**THE INDONESIAN
CONSTITUTION OF 1945**

**INDONESIAN LAW
NO. 11 OF 1974
ON
WATER RESOURCES**

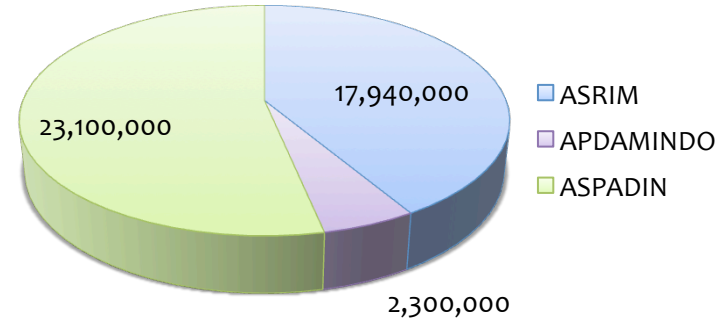
**INDONESIAN LAW
NO. 7 OF 2004
ON
WATER RESOURCES**

ONE OF THE
CONSIDERED
ISSUE

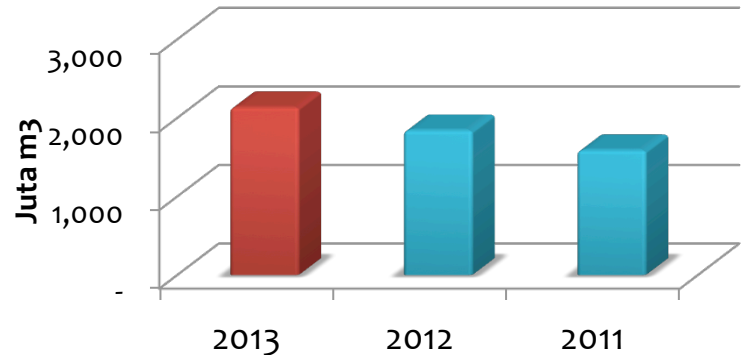
Algemeene
Waterregelen (AWR)
1936 Dutch Indies

Annuled by the
Constitutional High
Court (2015)

Bottled Water Sales (in m3) as 2013



PDAM Supply (in Mm3) as 2013



TEMPORARY CONCLUSION

- Focus on water resources management functions
- Different actors may have the responsibility for performing the WRM functions
- The RBO must work as a regulatory body for functions it has been given responsibility for, but also act as an active stakeholder to promote actions in the areas outside of its jurisdiction

IWRM FUNCTIONS (EXERCIZE)

- **Purpose:** To demonstrate how water resources management functions are managed in a basin.
- **Activity:** Work in river basin groups (1 hour)
- **Task:**
 1. Choose one of the key water resources management functions in your river basin. Who has the responsibility for this and which other governmental organizations need to coordinate with the responsible institution?

IWRM FUNCTIONS (EXERCIZE)

- **Task (continued) ...**
 - Formulate the most prominent water management objectives relevant for implementing the above function in your river basin!
 - Choose an output indicator for each of the water management objectives!
- **Report back.**
- Summarize the outcome of the discussion (30 minutes).

*Thank
you*



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