# WATER SECURITY IN CAGAYAN DE ORO: INITIATIVES and CHALLENGES


6
CLEAN WATER
AND SANITATION

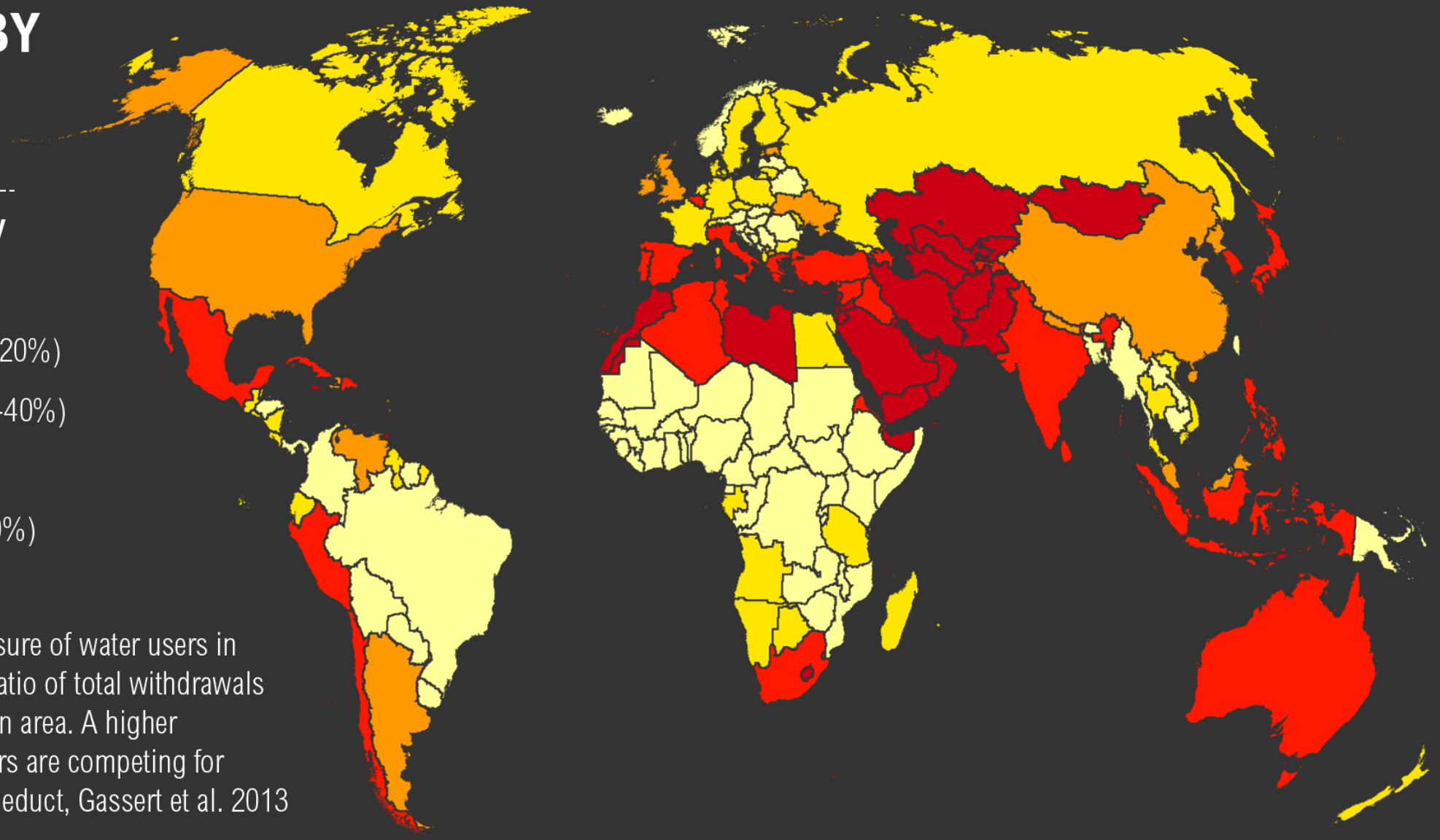

# WATER SECURITY

- harnesses water's productive power and minimizes its destructive force *(too little – too much water)*
- the reliable availability of an acceptable quantity and quality of water for human consumption and the ecosystem, in general
- Water security also means addressing environmental protection and the negative effects of poor management. *(wikipedia)*

# WATER STRESS BY COUNTRY

**ratio of withdrawals to supply**

- Low stress (< 10%)
- Low to medium stress (10-20%)
- Medium to high stress (20-40%)
- High stress (40-80%)
- Extremely high stress (> 80%)



This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013

AQUEDUCT

WORLD RESOURCES INSTITUTE

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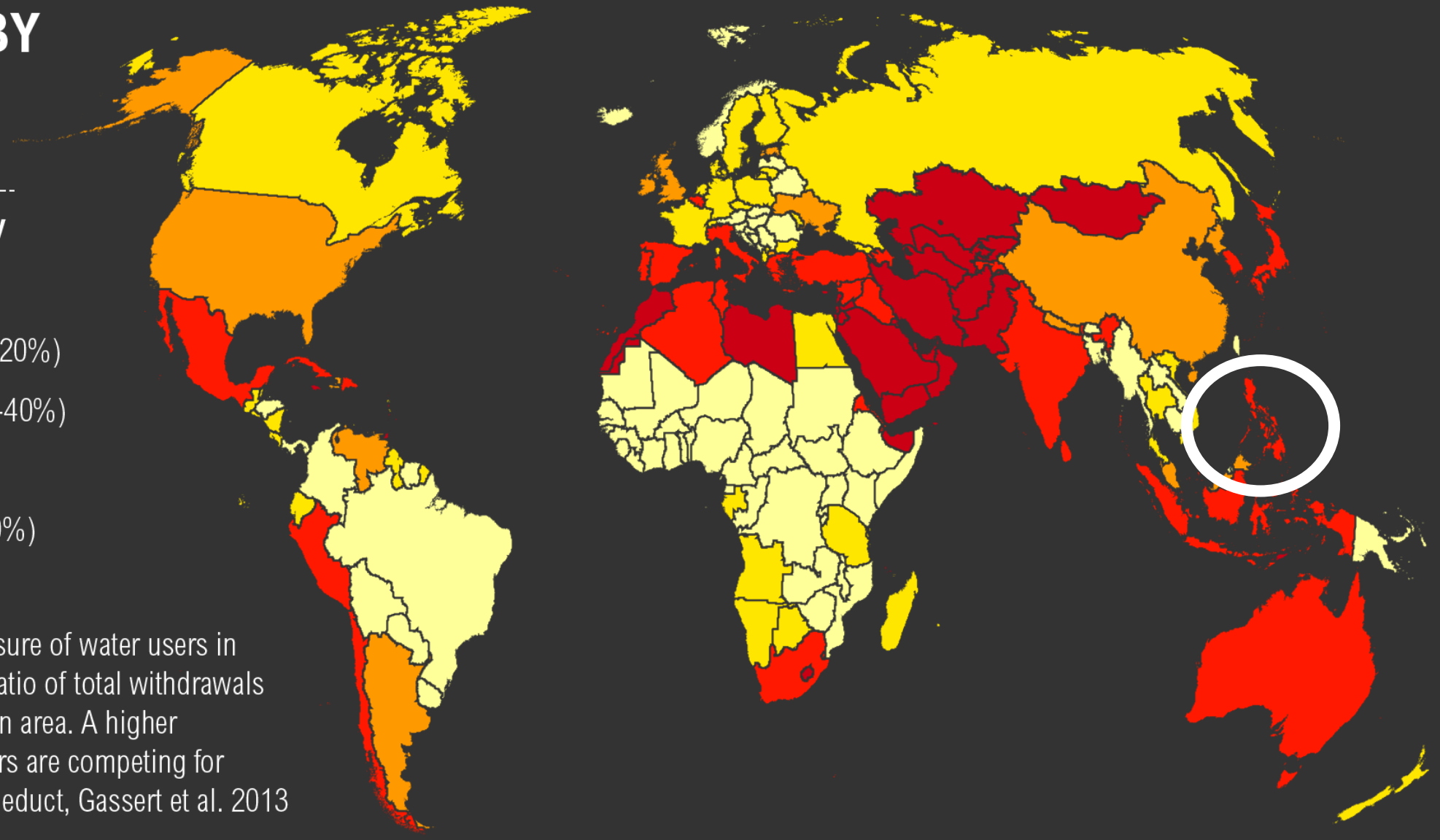

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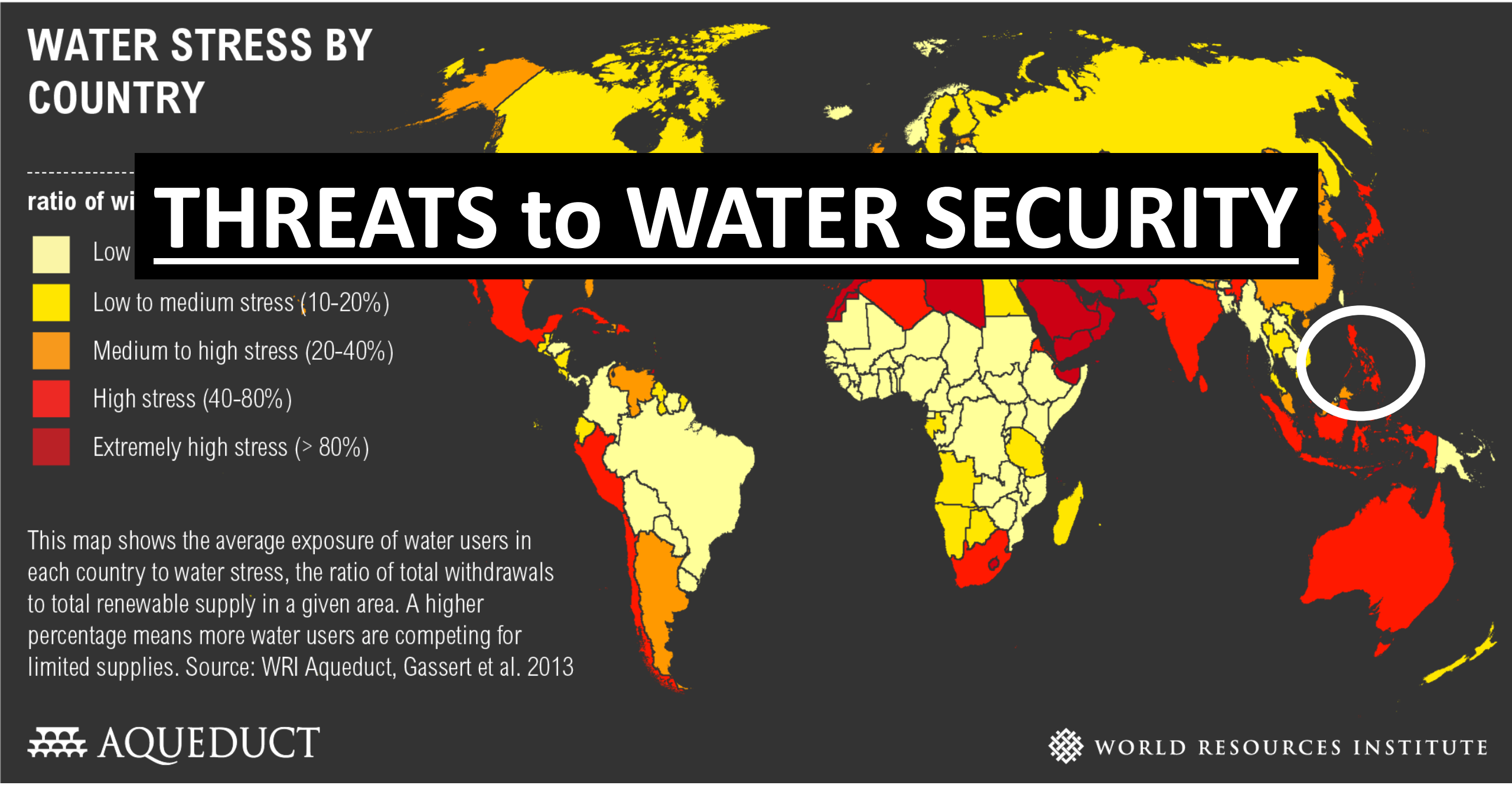


# THREATS to WATER SECURITY

# 1. Water wastage

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# 2. Pollution

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# 3. Climate Change

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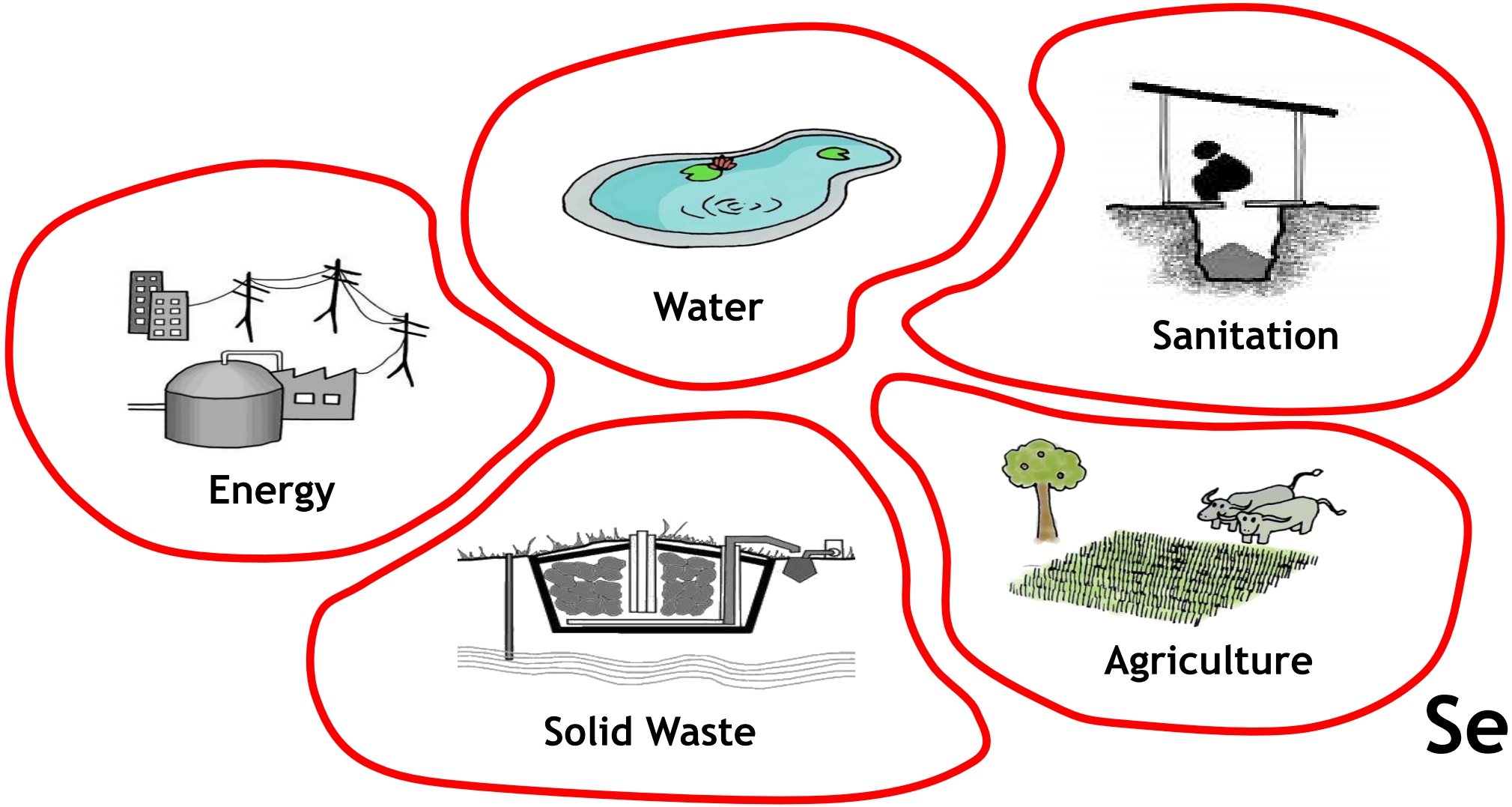
3. Climate Change

3. Natural Hazard

# THREATS to WATER SECURITY:

1. Water wastage
2. Pollution
3. Climate change
4. Natural hazards
5. Terrorism
6. Nuclear accident

# *WHY IS THIS SO? What's Going Wrong?*

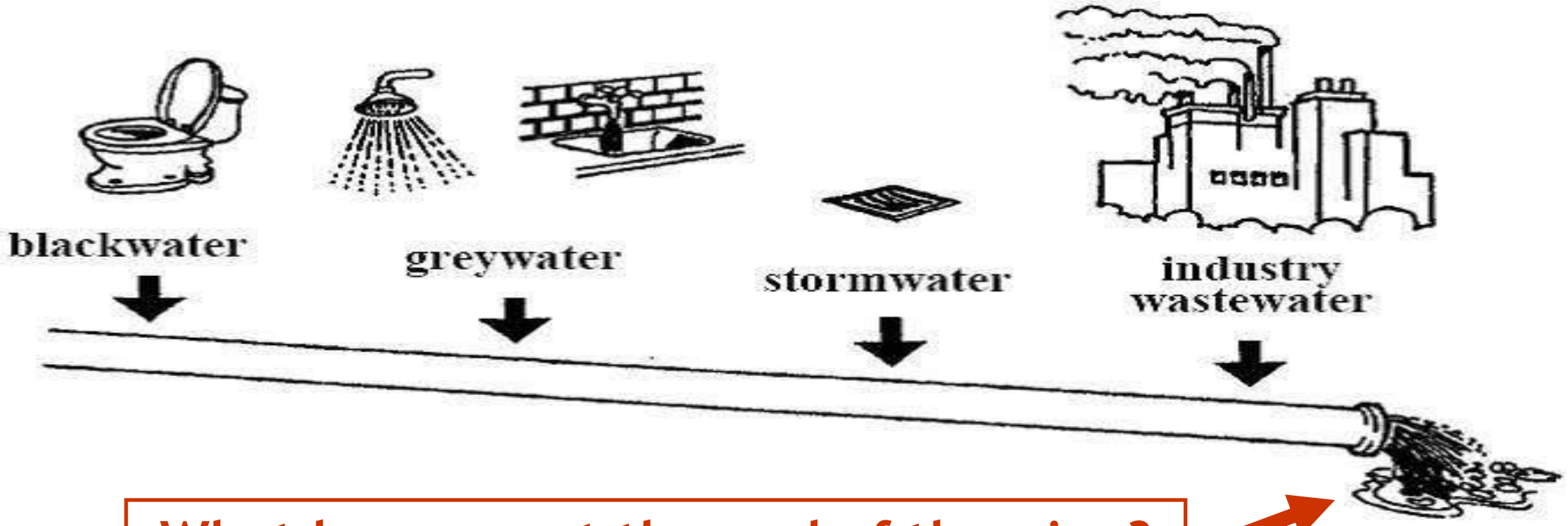



**Sectoral Thinking**

*Source: SSWM Training of Trainers, 2013*


*Source: http://www.wsp.org/userfiles/image/2009_JUL.jpg [Accessed: 23.03.2010]*

# Mixing Different Types of Wastewaters …




**What happens at the end of the pipe?**

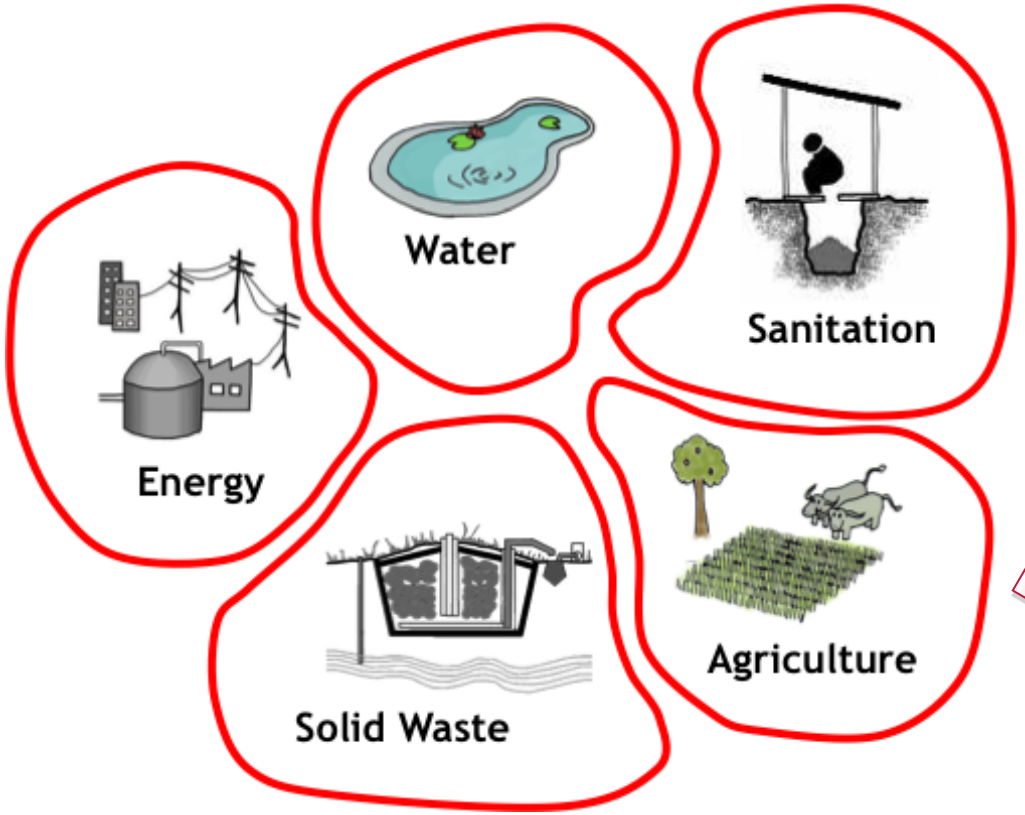


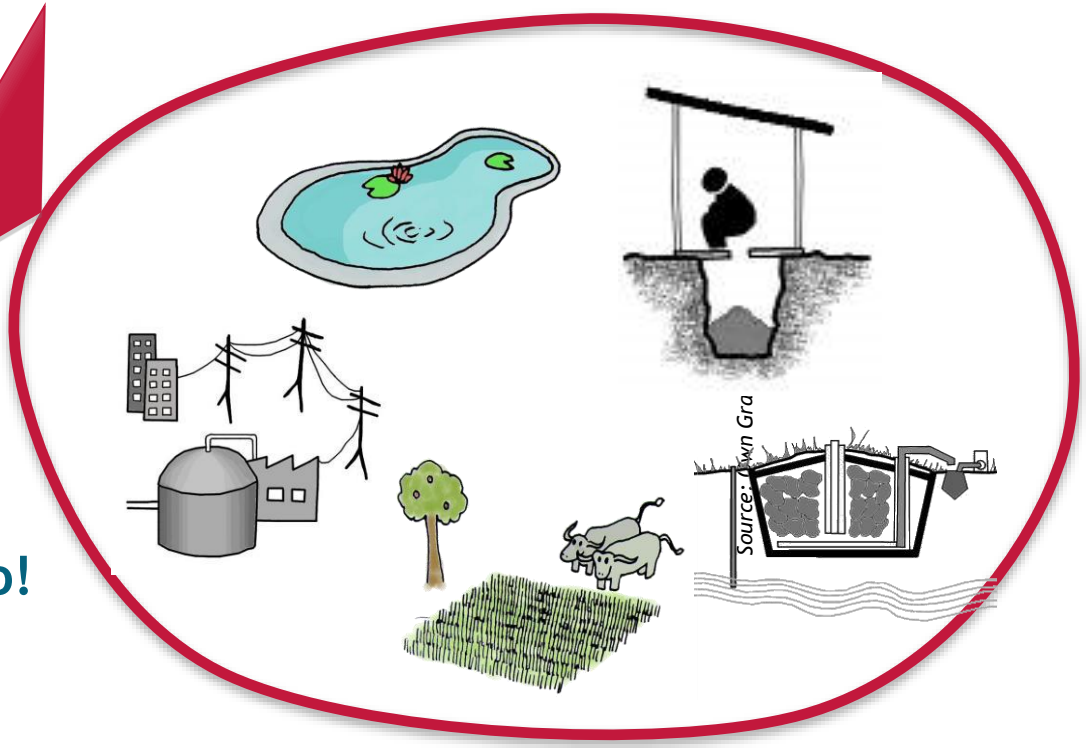
*Source: SSWM Training of Trainers, 2013*

# Uncontrolled Discharge of Wastewaters

*Source: SSWM Training of Trainers, 2013*

# So, Let's Link the Water Cycle, the Nutrient Cycle and Sanitation …



… and solve those big problems in one go!

# Closing and Linking-up the Loops

# IWRM & SuSan

# MAJOR THREATS to WATER SECURITY in CAGAYAN DE ORO

- 17 December 2011 Typhoon Sendong: about **43%** of **total water supply capacity** was lost affecting about **56%** of the population for at least **18 days**; cost of rehabilitation about **Php155M**

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- 17 December 2011 Typhoon Sendong: about **43%** of **total water supply capacity** was lost affecting about **56%** of the population for at least **18 days**; cost of rehabilitation about **Php155M**

- 22 December 2017 Typhoon Vinta: about **44%** of **total water supply** was lost affecting about **51%** of the **population** for **8 days**; cost of **rehabilitation** about **Php52M**

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- Residential houses and relocations built-up around and close COWD's existing sources
- **High system loss (NRW)**

# MAJOR LIFELINES (WATER SUPPLY FACILITIES) AFFECTED & DAMAGED

**SENDONG:** **100% RESTORED AFTER 25 DAYS**

***AFFECTED:*** **6 Wells Affected**

***DAMAGED:*** **All 6 wells filled with mud, pumps, controllers, gensets broken; only the tripod survived**

# MAJOR LIFELINES (WATER SUPPLY FACILITIES) AFFECTED & DAMAGED

## SENDONG:

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## VINTA: 100% RESTORED AFTER 8 DAYS

***AFFECTED:*** **7 Wells Affected**

***DAMAGED:*** **PRACTICALLY, NONE of the 7 wells were damaged since all 7 used submersible pumps, only 2 controllers, only 1 of 7 gensets**

# MAJOR LIFELINES (WATER SUPPLY FACILITIES) AFFECTED & DAMAGED

## SENDONG:

***AFFECTED:*** **2 Booster Stations in one site**

***DAMAGED:*** **all 11 booster pumps, all controllers, 3 gensets, 3 chambers of collector wells filled with mud, transformers**

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## SENDONG:

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## VINTA:

***AFFECTED:*** **2 Booster Stations in one site**

***DAMAGED:*** **6 of 11 booster pumps, 1 set controllers, 3 gensets, 3 chambers of collector wells filled with mud**

# MAJOR LIFELINES (WATER SUPPLY FACILITIES) AFFECTED & DAMAGED

## SENDONG:

***AFFECTED:*** **Office and entire Laboratory facility**

***DAMAGED:*** **all equipment, supplies, materials & furniture; entire laboratory facility**

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## VINTA:

***AFFECTED:*** **2 Booster Stations in one site**

***DAMAGED:*** **steel cabinets, furniture & some supplies & materials; 1 laboratory equipment**

# WHAT HAS BEEN DONE SO FAR to ENSURE WATER SECURITY (2012 to 2018)

# 1. CLIMATE RESILIENCY

- Vulnerability Assessment (2016 onwards)

- Adaptation measures (2012 to 2022)

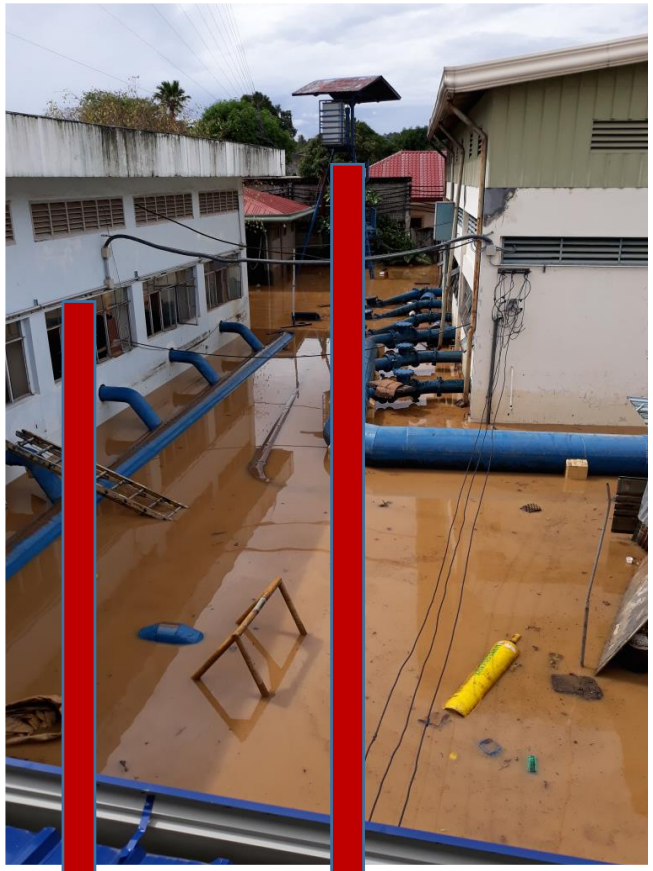
  - elevating critical facilities (controllers, laboratory, etc)
  - replacement of turbine with submersible pumps
  - isolation of critical facilities (2012 – 2022)

- Emergency Response Planning (2017 onwards)

**ELEVATION of TRANSFORMERS during Vinta**


Elevation of transformers during Sendong

**ELEVATION of CONTROLLERS**



New Elevation of controllers at BPS

Typical New Elevation of controllers at wells

**ELEVATION of LABORATORY FACILITY during VINTA**

Location of Laboratory facility during SENDONG

**5 SUBMERSIBLE BOOSTER PUMPS during VINTA**

**6 MORE TURBINE BOOSTER PUMPS FOR REPLACEMENT WITH SUBMERSIBLE PUMPS**

# 2. NRW REDUCTION (2015 – 2022)

- Latest NRW volume is enough to serve the projected population increase in 2030
- recovered volume can defer extraction of more water for at least 10 to 15 years

# 3. SEPTAGE MANAGEMENT (2018 – 2019)

- preserve and protect groundwater and surface water sources from contamination
- FS conducted in 2017
- Completed TOR late 2017
- Schedule to tender the Project 2018
- hopefully, construction to complete in 2019
- hopefully, operation to start in 2020

*** City Government of CDO already passed Septage Management Ordinance 13022 – 2015 and the corresponding IRR under EO No. 027, S-2018

Partnership for Sustainable Water Supply in the Cagayan de Oro River Basin

# Ridge to Coast, Rain to Tap

## Project facts

Locations : CdO city & CdO river basin

Period : Jan 2018 – Dec 2022 (5 years)

Budget : 6.1 million EUR = 363 million PHP

Grant (49%) : 3.0 million EUR = 179 million PHP

Funding : Sustainable Water Fund (FDW), Netherlands Ministry of Foreign Affairs

Topics: Sustainable access to clean drinking water & sanitation

Improved river basin management and safe deltas

# Partners

NL Agency
*Ministry of Foreign Affairs*

VEi

CAGAYAN DE ORO CITY WATER DISTRICT 1973

Wetlands INTERNATIONAL

hinelebanfoundation
reviving ecosystems, enhancing values, transforming communities

CAGAYAN DE ORO RIVERBASIN MANAGEMENT COUNCIL

unifrutti


The Netherlands Red Cross

PHILIPPINE RED CROSS

## OTHER REFERENCES:


- WWAP (2012): The United Nations World Water Development Report 4. Managing Water under Uncertainty and Risk. URL: http://unesdoc.unesco.org/images/0021/002156/215644e.pdf#page=406 [Accessed: 18.02.2013]

- GNEHM, F. (2012): Der Wasser-Fussabdruck der Schweiz. Ein Gesamtbild der Wasserabhängigkeit der Schweiz. URL: http://www.deza.admin.ch/ressources/resource_de_209662.pdf [Accessed: 10.07.2012].

# THANK YOU
# for YOUR
# KIND ATTENTION!