



# Water Quality and Ecosystem Services

**Workshop on  
Capacity Development in Advancing Water and Sustainable  
Development  
24-25<sup>th</sup> February, 2015**

Seleshi B. Awulachew  
Interregional Advisor, DSD

# Outline

- Introduction: Water Quality Importance
- Ecosystem
- Relevance to SDG
- Water Quality and Ecosystems
- Conclusion

# Introduction: WQ Importance

- Ambient water quality is key
  - Defining suitability for consumption
  - Health of water ecosystems
- Water quality:
  - the neglected dimension ‘To date, these aspects of water management have received less attention than they need, consequently in many places the action will start from a very low base’ (UN Water 2014)

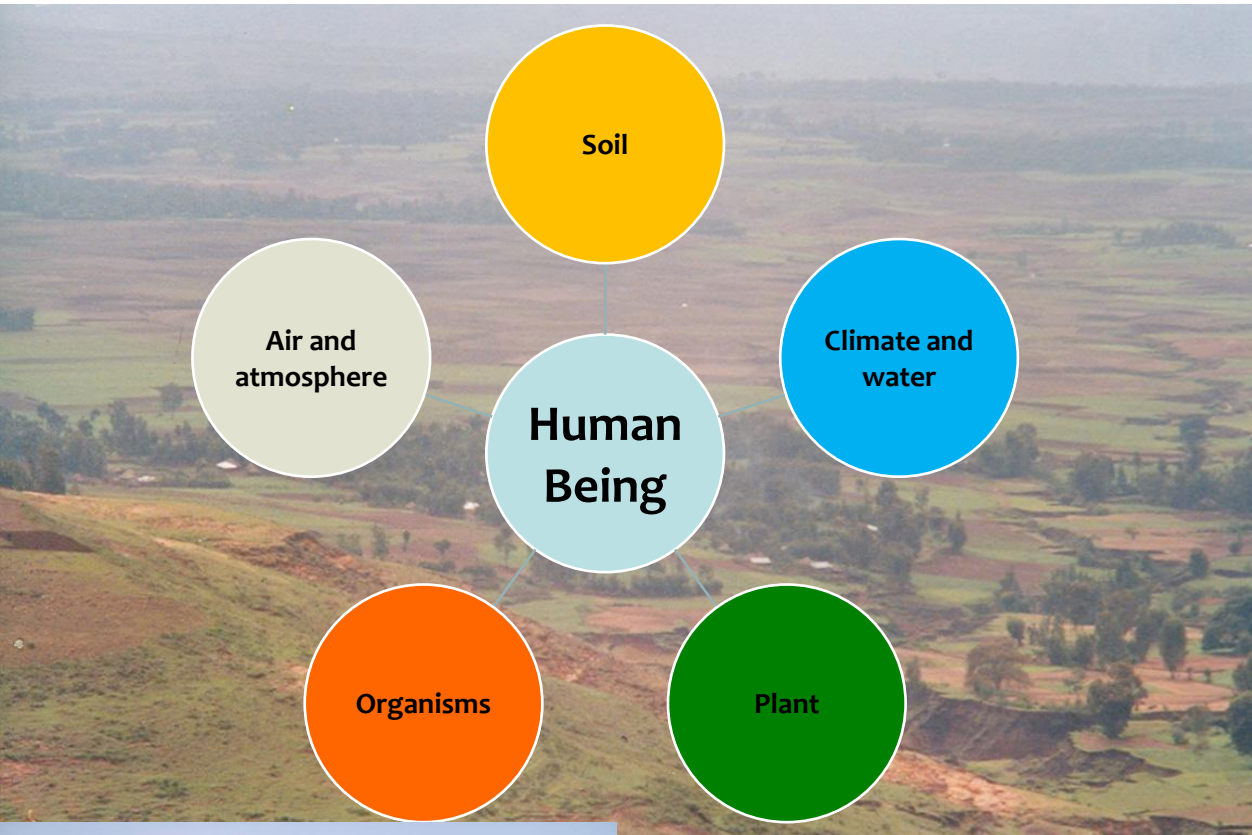
# Water Quality Importance

- *Quality* is as important as *Quantity*
- Polluted water
  - Unusable, dangerous, expensive
- Sources of pollution
  - Natural – e.g. saline water intrusion, algal bloom, etc.
  - Point source – e.g. traceable industrial effluent
  - Non-point source – e.g. unknown effluent
  - Diffuse source – e.g. agricultural pollution

# Water Quality Importance

- Water bodies can be naturally eutrophic or oligotrophic, but can also be human-caused
- Point source → pollution comes from single, fixed, often large identifiable sources
  - discharge drains, tanker spills
- Non-point source = pollution comes from dispersed sources
  - agricultural runoff, street runoff

# Ecosystem



# Relevance to SDG

## ■ As defined in Rio+20:

### □ Par. 124

- adopt measures to **significantly reduce** water pollution and increase water quality, significantly improve wastewater treatment and water efficiency and reduce water losses.
- We stress the need for international assistance and cooperation.

### □ Par. 109

- knowledge and appropriate and affordable technologies, including for efficient irrigation, **reuse of treated wastewater ...**

### □ Par. 141

- reducing, inter alia, air, **water** and chemical **pollution** leads to positive effects on health.

## Target goal 6: Ensure availability and sustainable management of W&S 4 ALL

- |     |                                                                                                                                                                                                                                                                                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.1 | by 2030, achieve universal and equitable access to safe and affordable <b>drinking water</b> for all                                                                                                                                                                                 |
| 6.2 | by 2030, achieve access to adequate and equitable <b>sanitation and hygiene</b> 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, <b>improve water quality</b> 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 <b>increase water-use efficiency</b> 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                                    |
| 6.5 | by 2030 implement <b>integrated water resources management</b> at all levels, including through <b>transboundary cooperation</b> as appropriate                                                                                                                                      |
| 6.6 | by 2020 protect and <b>restore water-related ecosystems</b> , including mountains, forests, wetlands, rivers, aquifers and lakes                                                                                                                                                     |
| 6.a | by 2030, expand <b>international cooperation and capacity-building support to developing countries</b> 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 <b>participation</b> of local communities for improving water and sanitation management                                                                                                                                                                   |



# Relevance to SDG

- The key outcomes of the water quality target are listed as (OWG 2014):
  - public health protection;
  - protection of the environment;
  - promote the reuse of wastewater and sludge; and
  - support the multiple opportunities of water, nutrient and energy recovery.

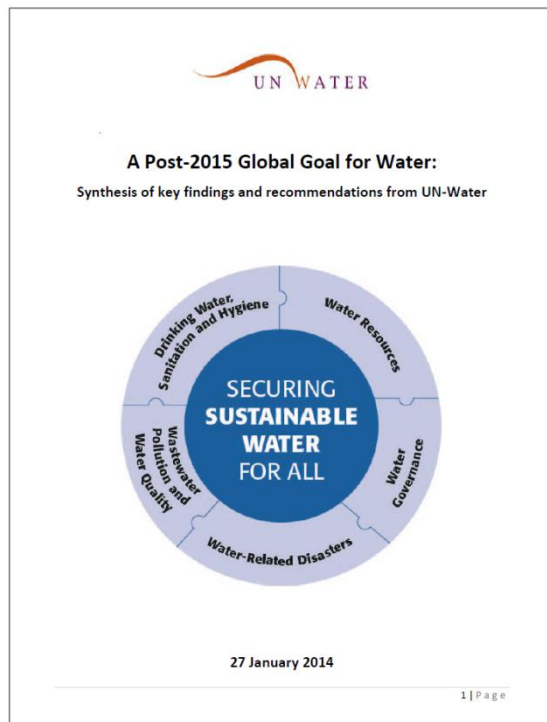
# WQ-Ecosystem

## Synergism Ecosystem Services and Water Quality (Maintaining Environmental Capital)

- Significant health benefits from water quality
  - Eutrophication reduction (reduced algal toxins)
  - Drinking water quality improvement (pathogen reduction)
  - Recreational water improvement (pathogen reduction)
- Significant water quality and ecosystem benefits from ecosystem maintenance
  - Natural cleansing through natural and constructed wetlands removes, N+P, pathogens, turbidity and BOD
  - Wetlands enhance biodiversity

## Water quality: the neglected dimension

*‘To date, these aspects of water management have received less attention than they need, consequently in many places the action will start from a very low base.*



# Tools and UN Agency Initiatives

## GEMStat

Actual water quality data but with patchy coverage

Progress on water quality index development

## AquaStat

Mainly ancillary variables some predictors of WQ

Excellent global coverage

## WWQA

Measured WQ (GEMStat data) and

Modelling (AquaStat data) to infill data gaps

Complementary

## WQ & protection of ecosystems- Major Challenges

- the need for improved financing of soft and hard infrastructures
- development of institutional capacity for development of standards and regulations and their monitoring and enforcement,
- limited information and experience on accounting for water quality and ecosystem protection (scale, data, ground-truthing and relevance, coverage and representativeness, added value for decision making, monetary valuation), and
- disconnection between water and land use regulations.

## WQ & protection of ecosystems- Major Challenges, Data

- Actual water quality data but with patchy coverage
- Progress on water quality index development  
Mainly ancillary variables some predictors of WQ
- Excellent global coverage Measured WQ (GEMStat data) and Modelling (AquaStat data) to infill data gaps
- Tools and UN Agency Initiatives Complementary GEMStat AquaStat WWQA
- Encouraging development of water quality indicators– GEMStat–  
Brazil/Colombia/EU/Canada

# WQ & Ecosystems- Implementation Tools

- A **global framework** for monitoring progress on water quality, wastewater and water resources management
- Increased and improved **financing**
- use of economic instruments, such as immediate, targeted and sustained investments reflecting the full life cycle of the facility or monitoring and investing in environmental assets and reducing pollution
  - payment for ecosystem service schemes
  - direct public and private payments
  - cap-and-trade schemes,
  - eco-certification programmes
  - Green taxation
- Appropriate **technologies**:
  - smart wastewater management socially and culturally appropriate, economically and environmentally viable into the future;

## WQ & Ecosystems- Implementation Tools

- **Capacity development**

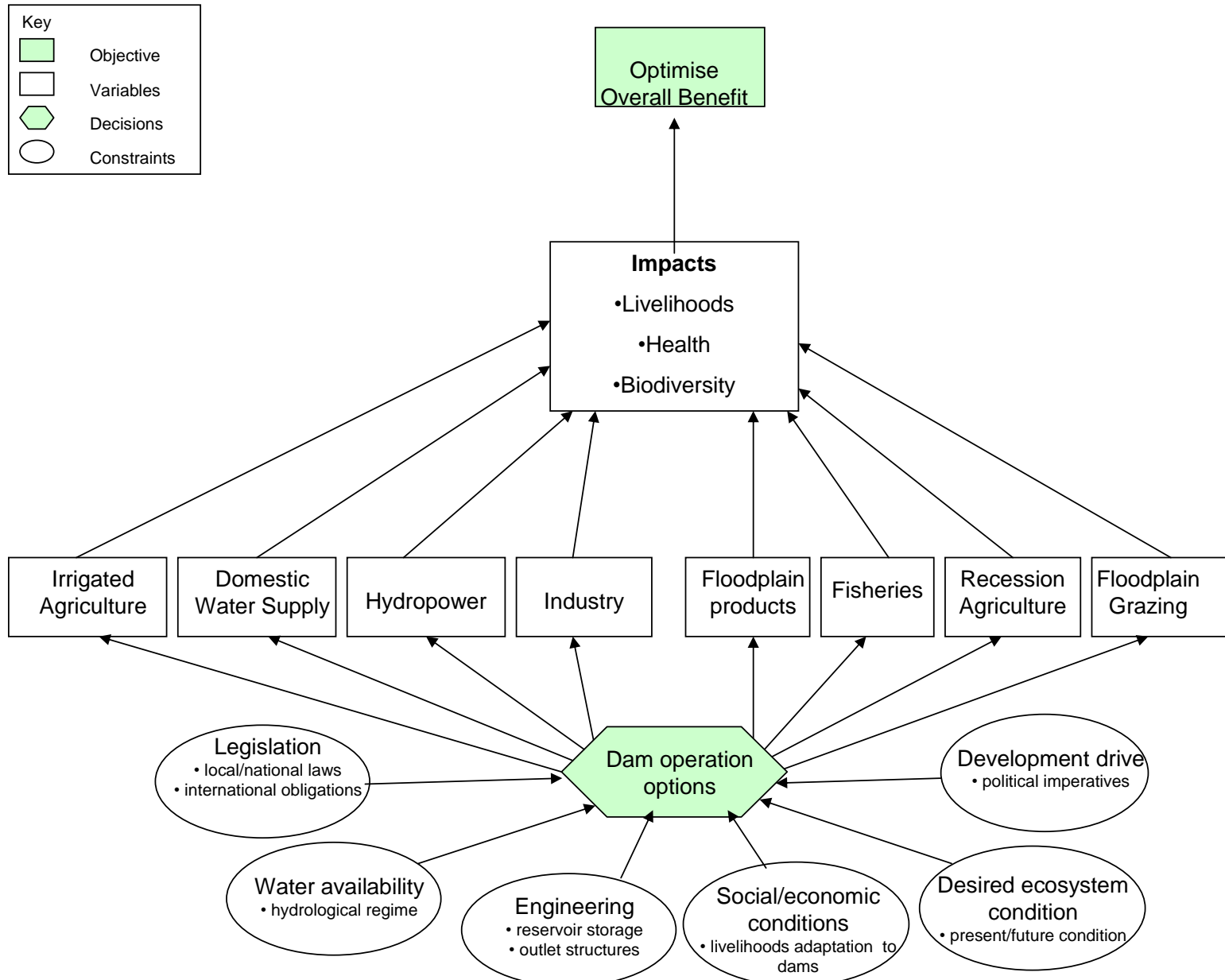
- communication, education and awareness at multiple levels;

- **Water governance**

- integrated water and wastewater planning and management at national and municipal levels are needed.
- wastewater management and ecosystem approaches become an integral part of river basin and urban planning.
- Countries may need to adopt a multi-sectoral approach to wastewater management, incorporating principles of ecosystem-based management from the watersheds into the sea, connecting sectors that will reap benefits from better water quality management.



# Conclusions: Constraints and Tradeoffs



# Conclusions

- Ensure that both targets survive
- Overcome the challenge of Abundance, Quality, and Efficiency of Resources
  - Financial
  - Technical
  - Human
- Future Needs: Develop Indicators and Programs that are...
  - Innovative
  - Adaptive
  - Collaborative



**Thank You**