How EO data is critical in SDGs decision making

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Improving world water quality is essential to achieve the SDGs

SDG 6 – Water

Target 6.1 & 6.2
... access to safe water and sanitation

Target 6.3
... improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials...

SDG 3 - Health

Target 3.3 ... combat water-borne diseases...

Target 3.9 ... reduce deaths and illnesses from hazardous chemicals ... and air, water and soil pollution

SDG 12 – Production & Consumption

Target 12.4
... significantly reduce release of chemicals to air, water and soil in order to minimize their adverse impacts on human health and environment
Water quality monitoring for the SDGs implementation and progress evaluation

- Lack of global water quality data and information
- Lack of human and technical capacity for water quality monitoring

Need to evaluate and monitor progress towards SDGs achievement

An urgent need to enhance global water quality data and information, supported by capacity building on water quality monitoring
GEMS/Water quality monitoring stations: Inadequate worldwide coverage

Lack of water quality monitoring stations and data in Africa, Asia, Small Island States, Latin America (except for Brazil)

Source: Water Quality Outlook, 2007 (UNEP/GEMS Water Programme)
GEMStat - The global water quality database
Scarce global water quality data

River water quality monitoring stations:
Mean annual dissolved oxygen (%), 1965-2018

Can Earth Observation fill the global water quality data gap for the SDGs monitoring?
UNESCO International Initiative on Water Quality (IIWQ)
Activities on water quality monitoring
Focus on scientific, technological and policy innovations for improved water quality monitoring in the SDGs framework

A Special Session on Water Quality Monitoring using GIS and Remote Sensing co-convened with JAXA

- The use of GIS and remote sensing technologies in water quality monitoring
- The potential use of satellite and remote sensing data in:
  - monitoring and assessing inland water quality, especially in inaccessible areas
  - collecting water quality data and information on systematic spatial and temporal scales.
- The role of Earth Observation in monitoring SDG targets related to water quality
UNESCO IIWQ Regional Consultation on Water Quality in Europe (Koblenz, Germany – 2015)

Focus on addressing water quality challenges and sharing and promoting best technical and policy practices

A Technical Session on Water Quality Data and Monitoring

- Water quality assessment, data and monitoring at national and regional scales.
  - Scarce water quality data in some sub-regions (Eastern European countries)
- Applications, capabilities and limitations of various water quality monitoring approaches
- Earth Observation tools for the interpretation and analysis of the quality of surface water resources
  - A decision was made to develop the UNESCO IIWQ World Water Quality Information and Capacity Building Portal
A demonstration project on water quality monitoring, using Earth Observation under the International Initiative on Water Quality (IIWQ) of UNESCO-IHP

Aims at improving global water quality information, focusing on inland freshwater resources

- A valuable tool to obtain water quality data and information, especially in remote areas and developing countries (Africa, Asia, Latin America, and SIDS) where water quality monitoring networks and laboratory capacity are lacking

Promotes the use using innovative scientific approaches and technologies for better water management

- Demonstrates the capabilities and use of Earth Observation (satellite-based data) for monitoring water quality in inland freshwaters

Supports the implementation and monitoring of the SDGS at the global, regional, national and local levels.
Water quality parameters

- Turbidity (sedimentation)
- Chlorophyll-α
- HAB indicator
- Total absorption
- Surface temperature

- **Global layer** (90-meter/mixed resolution)
- **Regional layers/demonstration basins** (30-meter resolution):
  - Lake Sevan in the Caucasus highlands - Armenia, Azerbaijan
  - Itaipu and Parana River Basins - Argentina, Brazil, Paraguay
  - The Mecklenburg Lake Plateau - Germany
  - River Nile and Aswan Reservoir - Egypt, Sudan
  - The Mekong Delta - Vietnam
  - Florida Lakes - USA
  - Zambezi River - Zambia, Zimbabwe
UNESCO-IHP International Initiative on Water Quality

UNESCO World Water Quality Portal

www.worldwaterquality.org
WATER QUALITY REPORT

Generated at: 2018-01-21 Time 17:41:40
Parameter: Chlorophyll-a
Unit: µg/l
Product: eoWater (satellite based)

Region: AM/AZ - Caucasus highlands, timeseries - [30m]
Station lat/lon: 40.41433 / 45.26688
Year: 2016
Median: 2.24
Mean: 3.97
Minimum value: 0.62
Bottom quintile: 1.38
Top quintile: 6.46
Maximum value: 15.09

Trophic State Index (according to Carlson 1977): Oligotrophic
Oligotrophic: 54.17%
Mesotrophic: 33.33%
Eutrophic: 12.50%
UNESCO-IHP International Initiative on Water Quality

UNESCO World Water Quality Portal

www.worldwaterquality.org

• A useful tool to assess the interlinkages between the human and natural (ecological) systems.

• Provides information on impacts and pressure on water quality from other sectors:
  • urban areas,
  • agriculture
  • energy sectors (dams and reservoir management)
  • climate change
Turbidity / sedimentation distribution
An indicator of dam and reservoir management

Turbidity distribution, River Nile and Aswan Reservoir, on 17 January and 20 August 2016.
IIWQ World Water Quality Portal, UNESCO / EOMAP
Chlorophyll-a
- An indicator of eutrophication in lakes
- Impact of nutrient loadings from agriculture and wastewater disposal
Harmful Algae Bloom (HABs)

- An indicator of anthropogenic nutrient enrichment / Eutrophication in surface waters
- Impact of agricultural activities and wastewater discharges on water quality

Florida Lakes (USA)
Dissolved organic substances

- Permafrost melting
- Impact of climate change on water quality

The Sakha Region (Russia)
Capacity building and training on monitoring water quality using Earth Observation
### Targets

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<th><strong>Indicators</strong></th>
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<td><strong>6.3:</strong> Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally</td>
<td>6.3.2: Proportion of bodies of water with good ambient water quality</td>
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| **6.6:** Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes | 6.6.1: Change in the extent of water-related ecosystems over time  
- spatial extent  
- quantity of water  
- state if ecosystem health (water quality) |
| **14.1:** Prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution | 14.1.1: Index of coastal eutrophication and floating plastic debris density |
UNESCO-IHP International Initiative on Water Quality

UNESCO World Water Quality Portal:
Supporting science-based decision-making

- Promotes science-based, informed decision-making and policy development on water quality, leading to sustainable water resources management.
  - A decision-support tool, helping countries identify the most pressing water quality problems such as pollution hotpots and consequently the action needed.

- Supports national efforts for the implementation of water quality related SDG targets as well as for monitoring progress towards their realization.
For more information

UNESCO World Water Quality Portal
www.worldwaterquality.org

UNESCO International Initiative on Water Quality
http://en.unesco.org/waterquality-IIWQ
International Initiative on Water Quality (IIWQ)

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UNESCO
Division of Water Sciences
International Hydrological Programme (IHP)

Thank you!