GlobWetland Africa: Towards Earth Observation based Wetland Monitoring in Africa

STRP-20 | 13-17 February 2017 | Gland, Switzerland

GLOBWETLAND AFRICA

esa

Ramsar

Why GlobWetland Africa?

- **African wetlands** are rich on biodiversity and an important resources for local livelihoods.
- African wetlands are **under immense pressure** from a young and growing population, widespread poverty, but strong economic growth.
- **Ramsar in Africa**
  - 370+ Ramsar sites (over 40% of the total areas of Ramsar sites)
  - 50 contracting Parties (30%)
  - Only 15 countries have achieved their wetland inventories

GlobWetland Africa in a nutshell

Objectives

- Exploit the **increasing capabilities of satellite observations and geospatial technology** for wetlands inventory, assessment and monitoring.
- Develop a "**free of charge" and "open source" software toolbox** to better assess the state and change in wetlands.
- Access **"freely and openly available" satellite observations** from the most recent and innovative EO assets (mainly Sentinels of the European Copernicus Program and NASA/USGS Landsat 8).
- Enhance the **capacity of African stakeholders** to develop national and regional wetland observatories and fulfill their Ramsar commitments.

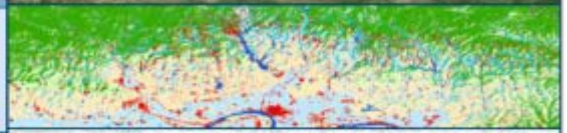
Project key facts

- 1.500.000 EUR **budget**
- **3 years** duration (starting from Nov 2015)
- More than **25 African and international partners**
- Provision of free of charge and open source EO toolbox
- **4 regional trainings** (North, East, West and Central Africa)

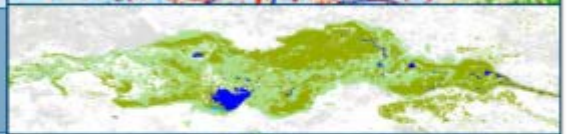
GlobWetland Africa, an open-source EO toolbox for a wide range of wetland applications

Wetland inventory
identification and delineation of wetland areas over large river catchments, in support to national wetland inventorying campaigns;

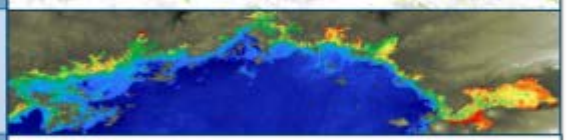
Wetland habitats maps
for the assessment of the wetland status and for long-term change and trend analysis, inside and around Ramsar/wetland areas;



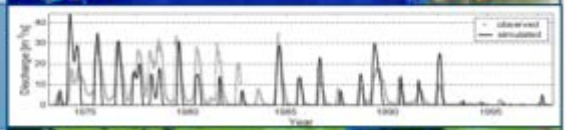
Water cycle regimes,
for the analysis of the intra- and inter-annual variations of the water tables, inside and around Ramsar/wetland areas;



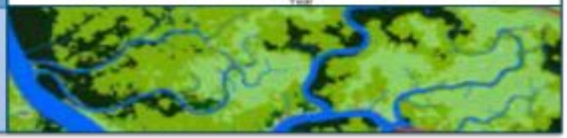
Water quality parameters
such as turbidity, suspended solids and chlorophyll concentration, for the monitoring of the aquatic contamination and physical disturbances of the wetland ecosystem;



River basin hydrology
for the modelling of the water balance and the impact of/on wetlands within river catchments;



Mangroves mapping
for the assessment of the status and trends of tropical mangroves.



TIGER AFRICA

*Inherits the **TIGER** Water Observations Information System*

WOIS

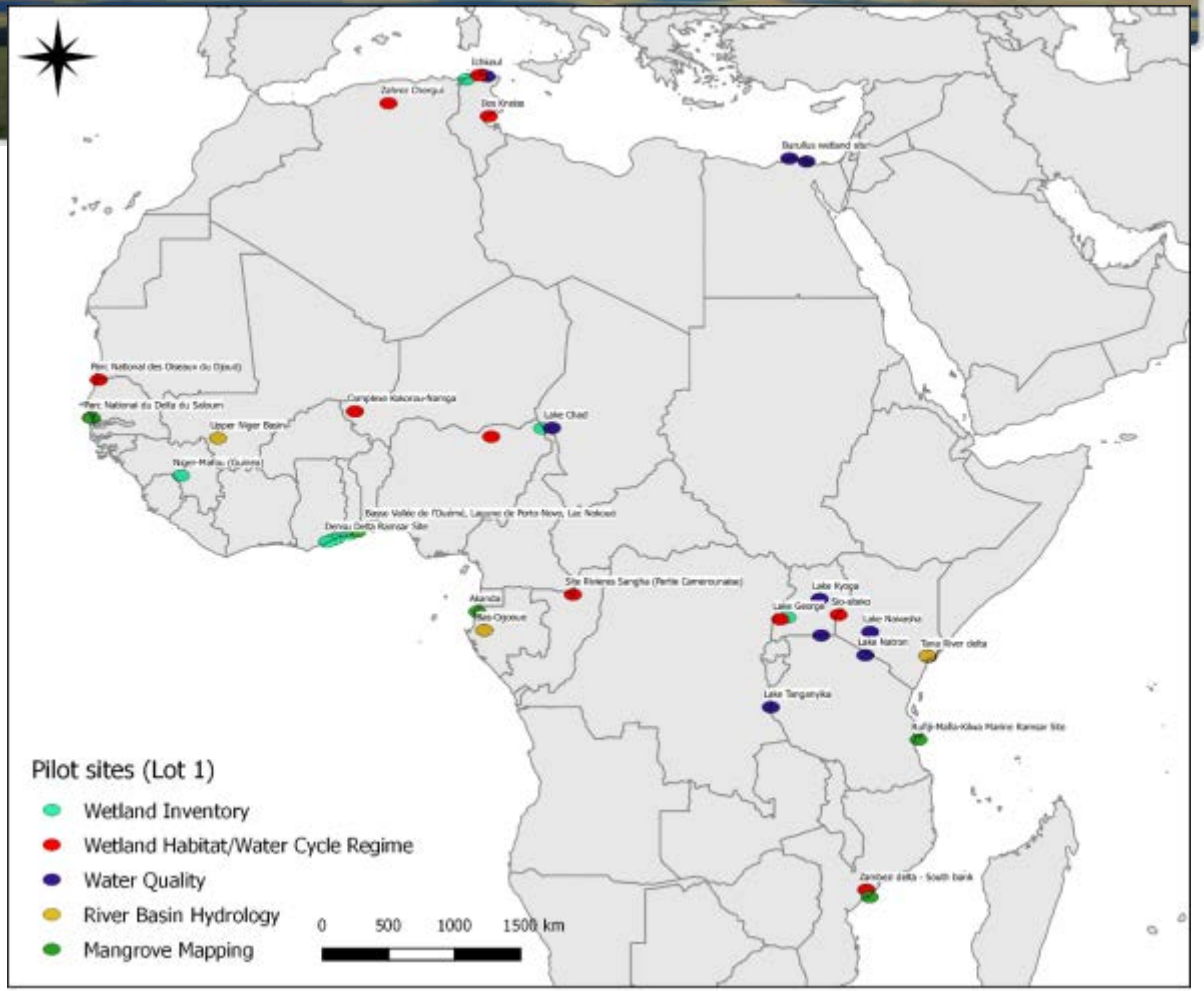
User driven development

- GW-A is a **user-driven project**, where the toolbox and products are developed and demonstrated in direct response to specific user needs.

- The **GW-A user group** encompasses major actors involved in the implementation of the Ramsar Convention in Africa.

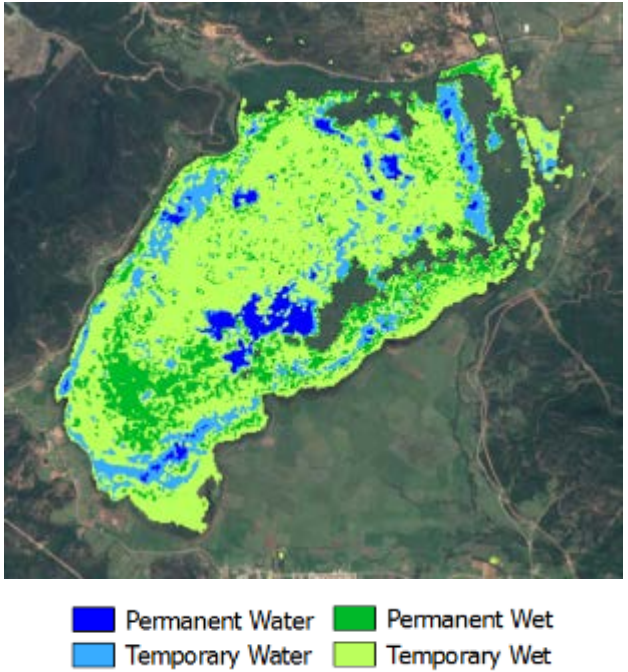
Proof-of-concept

GW-A methods, maps and indicators are tested on a number of test sites to demonstrate the **“quality”** and **“fitness for purpose”** of the GW-A tools and products.



Wetland Inventory

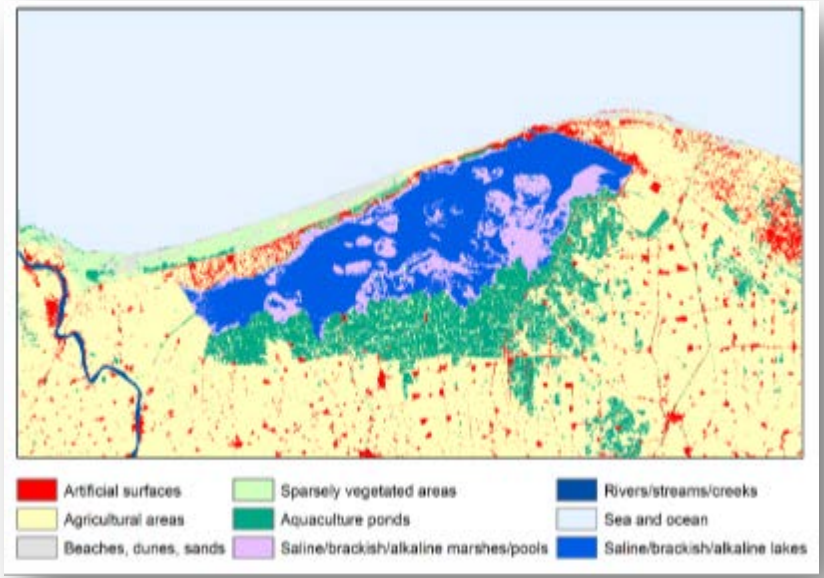
- Identification and **delineation of wetlands areas** as a support to wetland inventories.
- Serve the needs of national/sub-national agencies interested in exploring the possibilities to **reduce costs** associated to **large-scale wetland inventorying campaigns**.



Wetland Inventory, Lake Tonga, Algeria

Wetland Habitat Mapping

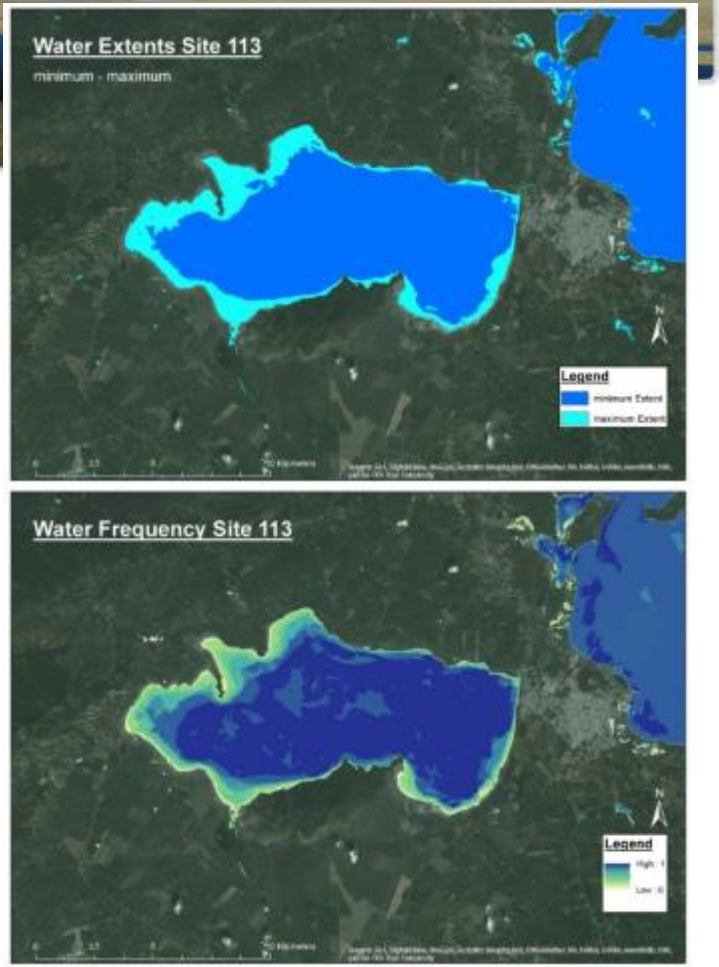
- Detailed **classification of Wetland Habitats** (through LC/LU), and of their changes
- Cover the **wetland area** but also the **surrounding** to identify threats
- Detect **changes of wetland habitats**, derive trends of wetland status, **assess threats** and **estimate impacts**
- **Standardized Land Cover / Habitat Classification scheme** incorporating the Ramsar wetlands typologies.



Wetland Habitat Map, Lake Burullus, Egypt

Inundation Regime

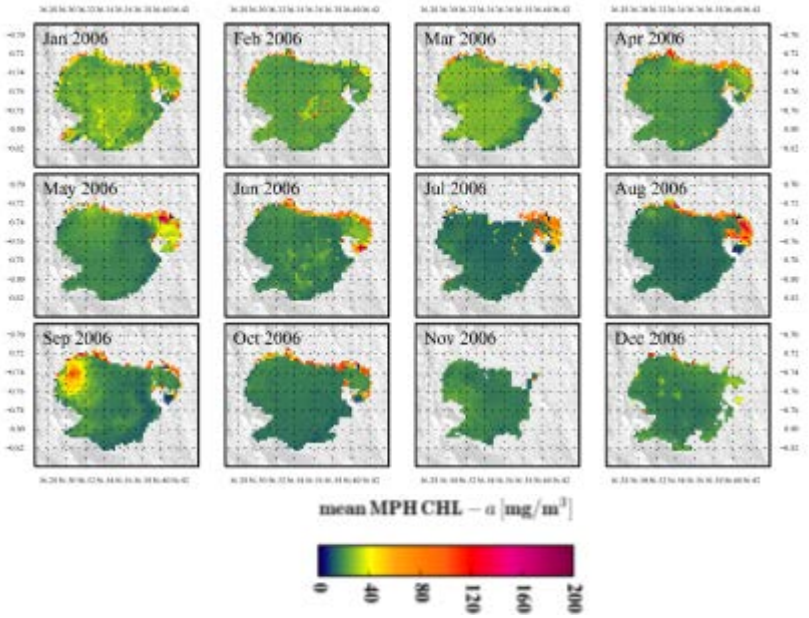
- Capture the **annual and seasonal variations** of the water table.
- Shows **minimum and maximum surface water extent** during hydrological year.
- Variations in **open water bodies** and **inundated vegetation**.
- To be generated yearly to characterise intra- and inter- variations of water regimes and identify **changes that affect the ecological character** of the wetlands.



Water Extent, Water Frequency, Lake Ichkeul, Tunisia

Water Quality

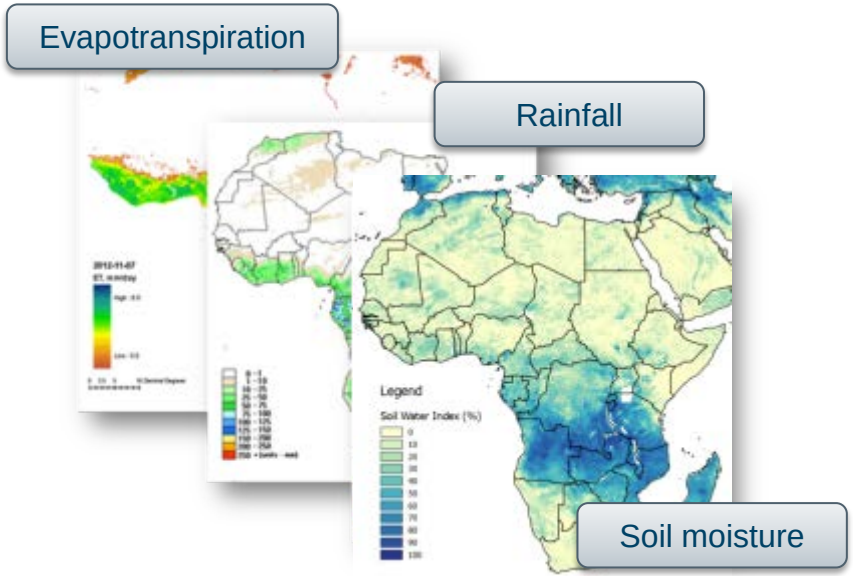
- **Spatial and temporal assessment** of Water Quality
- Retrievals of **total suspended sediments** (TSM), **dissolved organic matters**, **chlorophyll concentration**, **cyanobacteria blooms** in absolute or relative terms
- Allow to monitor **wetland ecosystem contamination** (water body eutrophication due to excessive nutrients) from nearby agricultural activities and from urban / industrial waste discharge, and to estimate physical disturbances



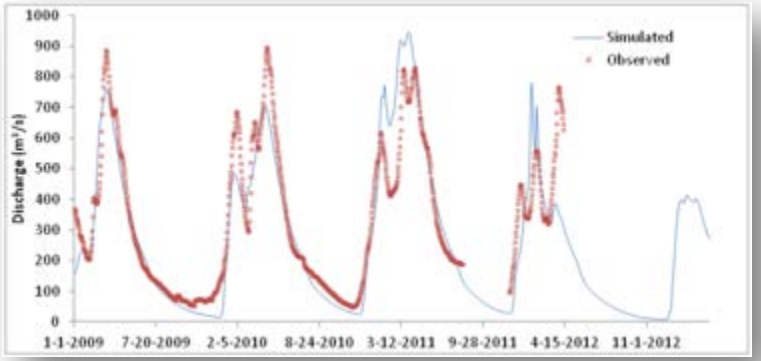
Chlorophyll concentration, Lake Naivasha, Kenya

River Basin Hydrology

- **Hydrological characterization** to assess the water conditions at a river basin level

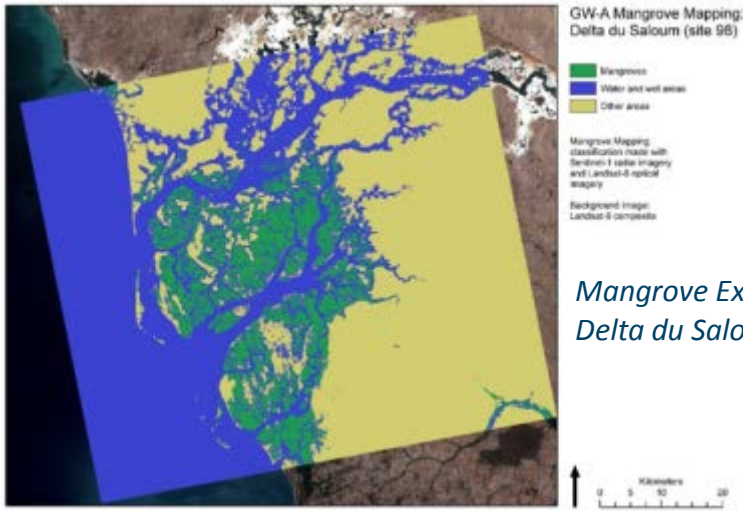


- **Hydrological modeling** to assess **impact of human activity** and **adverse effects of climate changes** on wetlands



Mangroves mapping

Mangrove Inventory



Mangrove Extent
Delta du Saloum, Senegal

Delineation of mangrove forests to support inventory, monitoring and assessment of mangroves

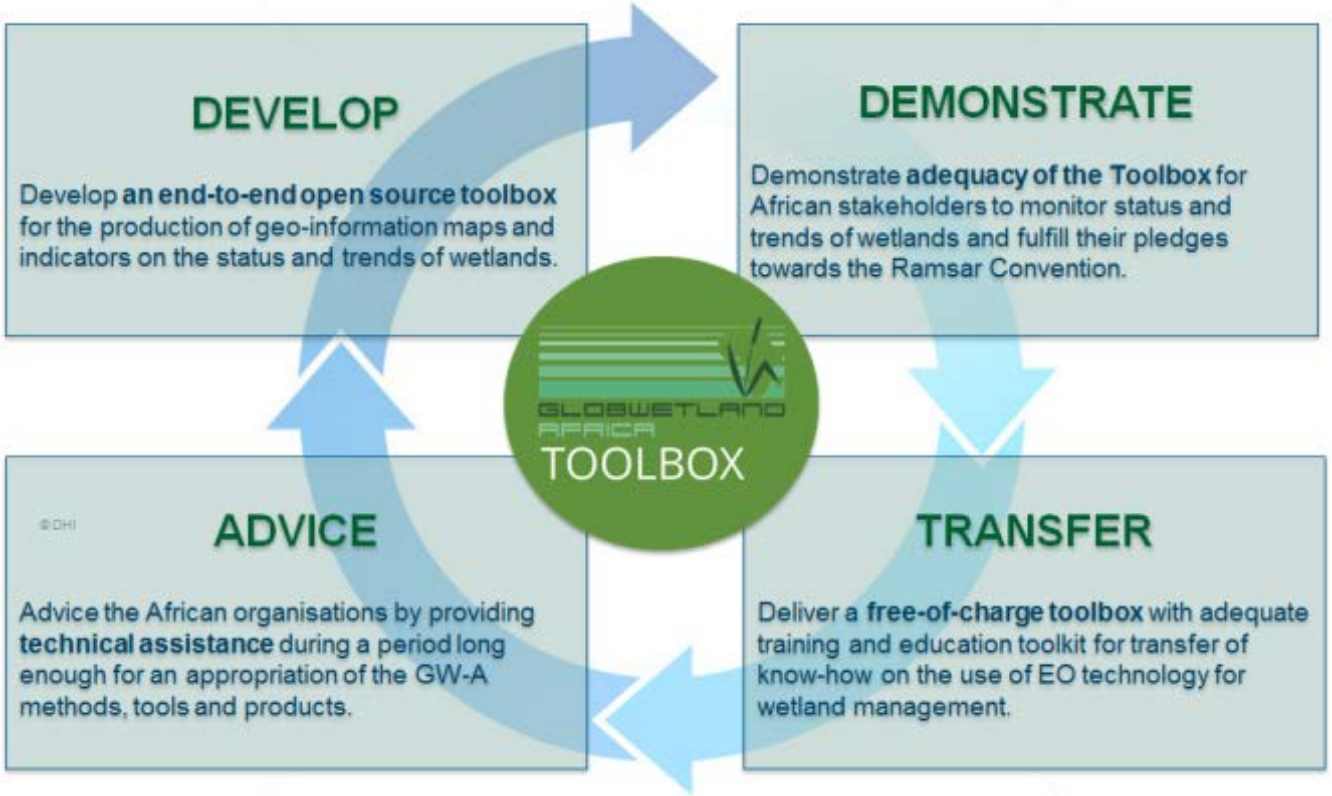
Mangrove Characterization

Characterization of mangroves into **communities** (species composition) and/or **structures** (high and low biomass)

GW-A toolbox key features

- **Free and open source** → *cost and license free*
- **User Friendliness** → *wizard based processing*
- **Easy to operate** → *Easy to use for non-experts*
  but comprehensive enough to satisfy advanced users
- **Free to transfer and modify**
  Adaptable to evolving user requirements
  Can be integrated into IT infrastructures (cloud-computing platforms)
- **Open and Inclusive** → *stimulate development community*

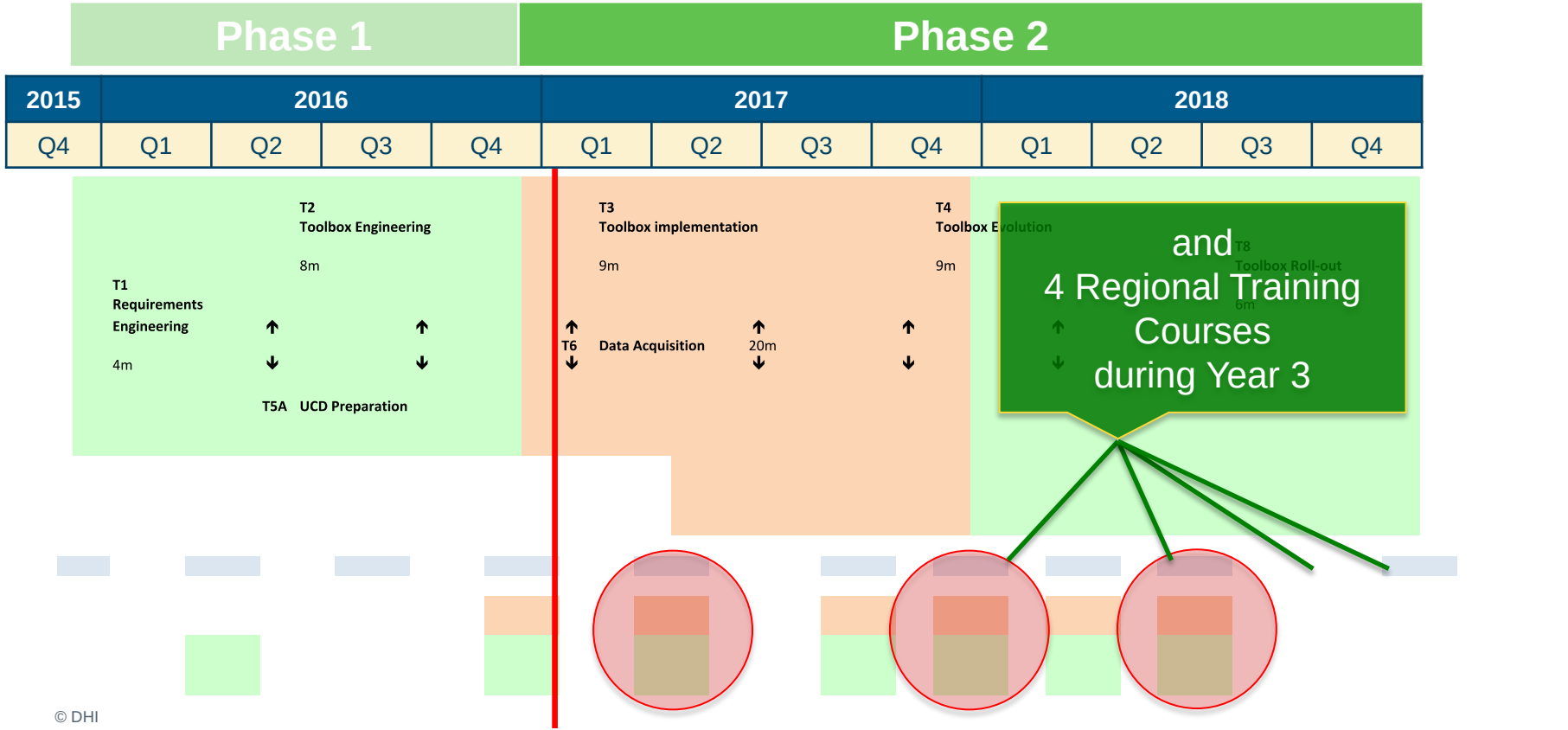
Implementation approach



GW-A products vs Ramsar strategic objectives and UN SDG targets

GW-A main products	Contribution to Ramsar Strategic Plans & CBD Biodiversity Targets 3rd SP Key Result Areas – 2020 Aichi Targets	Ramsar 4th SP 2024 targets	UN SDGs Targets & Indicators
Wetland Inventory	**Wetland distribution** and status data and information available.	SP Targets **8**, 9, 12, 14, 15	SDG Target 6.6
Wetland Habitat Mapping	Wetland observing system(s) reporting on **changes in wetland status**.	SP Targets **5**, **7**, 11, 12, 13, 14, 15	SDG Target 6.6 SDG Target 15.1
Water Cycle Regime	Managing wetlands as natural water infrastructure integral to **water resource managemen**t at the scale of river basins.	SP Targets **2**, 5, 9, 11, 12, 13, 14, 15	SDG Target 6.6 SDG Target 12.2
Water Quality	By 2020, **pollution, including excess nutrients**, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	SP Targets 2, **4,** 5, 14, 15	SDG Target 6.3 SDG Target 12.4
River Basin Hydrology	Effectiveness of **cooperative management** in place **for shared wetland systems** (for example, in shared river basins and coastal zones).	SP Targets 2, **9**, 14, 14, 15	SDG Target 6.5
Mangrove Mapping	National Wetland Policy and instruments fully in place alongside and integrated with … **coastal and marine resource management** plans.	SP Targets 7, 8, 12, 14, 15	SDG Target 6.6 SDG Target 14.2 SDG Target 15.1

GlobWetland Schedule



www.globwetland-africa.org