

# SPATIAL STREAM LTD

By: Fredrick Juma, Luchu Owen & Chris Kamau  
EIA/GIS Specialists, Application Developers, Water  
Engineers/Conservationists

CONSULTANCY TO CONDUCT  
INVESTMENTS MAPPING ALONG EWASO  
NG'IRO AND TANA RIVER BASINS



# Assignment Description

**Client/Project Name:**-Wetland International, IRM-PfR Network (Mapping Water Infrastructures)

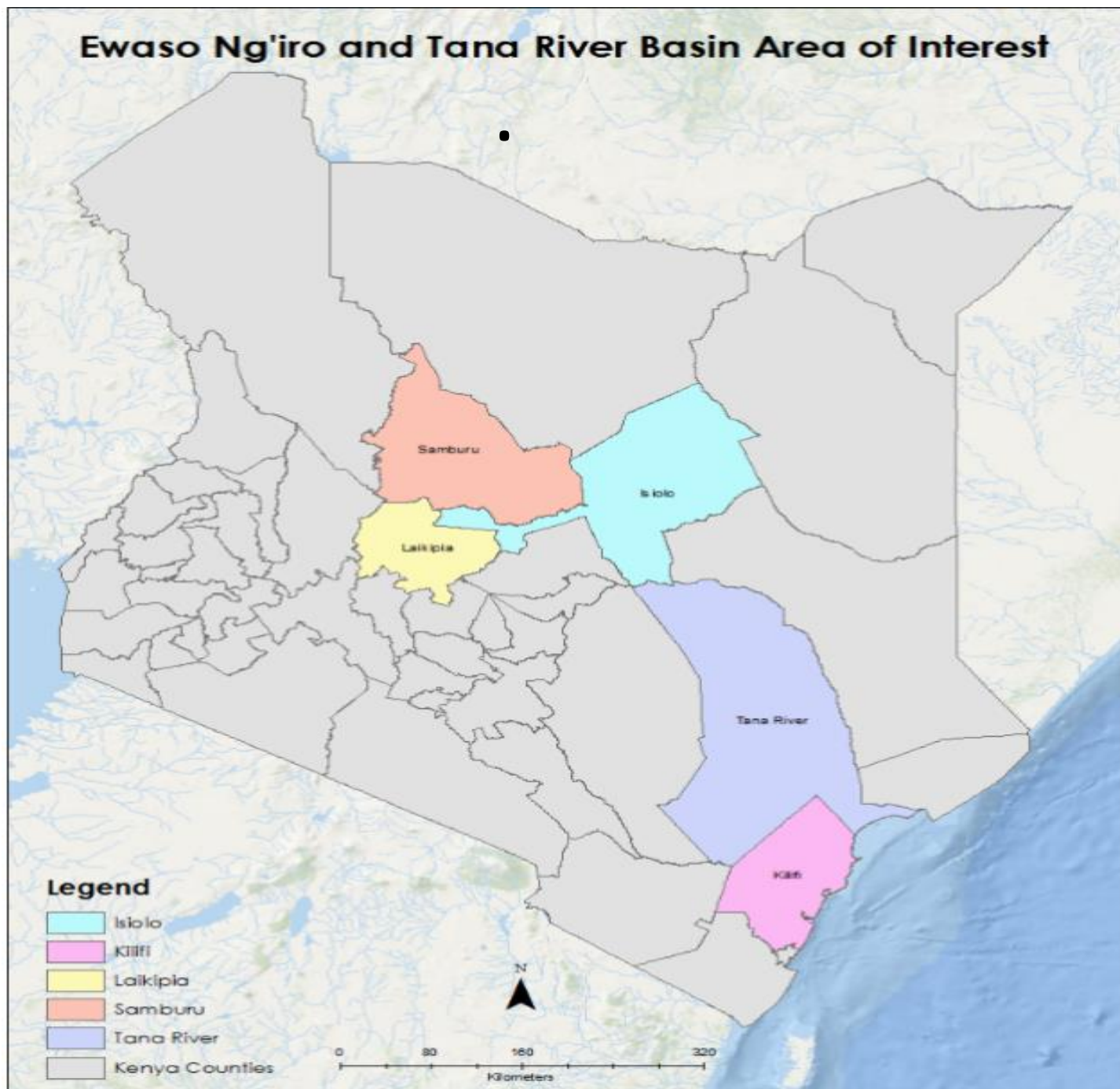
**Coverage:** Tana and Ewaso Ngiro Basins (5 Counties:- Samburu, Laikipia, Isiolo, Tana river, Kilifi)

**Main Objectives:** (Mapping of Water Infrastructures, Geodatabases development)

**Estimated Duration:** 30 Days ?? To be validated as per list & location of infrastructures

- Tasks:-
- **Delineation/mapping of Ewaso Ngiro & Tana River Basins**
- **Review of available list/maps of water infrastructures in 5 counties.**
- **Consultation with Wetland Intl., WARMA, NDMA, County Gvt Water, NGOs**
- **Configuration of Mobile Data collector for Mapping**
- **Field Mapping of water infrastructures-sampling from the list**
- **Develop a GIS Geodatabase schema –populate as per attribute list**
- **Develop a prototype GIS Web Map Application-sharable portal**

## Ewaso Ng'iro and Tana River Basin Area of Interest



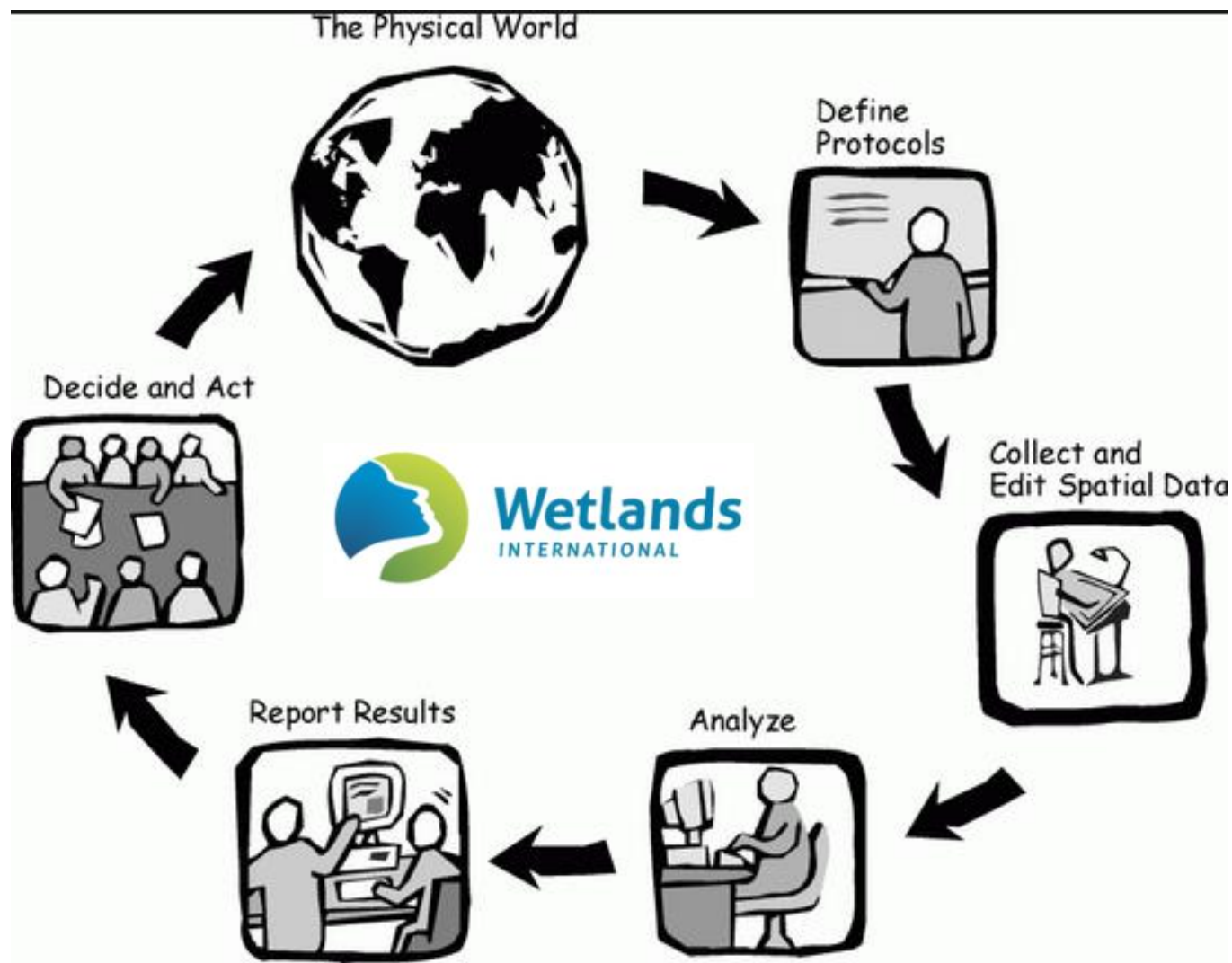
# The database pre-defined attributes from field

- Name of the project
- Brief description
- Specific products
- Project details (duration, geographic and demographic coverage – including coordinates)
- Type of population
- Potential affected population
- Affected population
- Type of water related? ecosystem goods and services
- >Volume of Water abstraction
  - Executing agency (Company names or state enterprises)
    - Company risk management / safeguard policy
  - Funding agency and Funding
    - Funding agency risk management / safeguard policy
  - Relevant government actors
  - Other actors
  - Potential ecosystem impacts
  - Existing ecosystem impacts
  - Potential socio-economic impacts
  - Existing socio-economic impacts
  - Project status
  - Development of alternatives
  - Do you consider this as a success? Why? Explain briefly.
  - Policy and legal framework
- Contacts
  - Project website/links

N/B: Attributes with blue areas were very much accessible in most sites while dark attributes were partially filled. (see attached database files segmented by type)

# Uses of Water Infrastructure-IMR-PfR Network

Dynamic GIS Database-for Resilience Building of Ecosystems and Community



# List of Stakeholders-Fieldwork & Desk

## Target Counties visited Water Infrastructures (23rd-31<sup>st</sup> July)

- |               |  |
|---------------|--|
| 1. Samburu    | <b><u>List of stakeholder interacted with during fieldwork (ref.field notes)</u></b> |
| 2. Laikipia   | Mr.Joseph Olendira-Impact Nanyuki  |
| 3. Isiolo     | Mr.Ibrahim-Mid Program   |
| 4. Tana River | Mr.Felix-of WARMA:Water Abstraction(Mid &Upper Ewaso Ngiro)                          |
| 5. Kilifi     | Mr.Njuguna-GIS section of CETRAD Nanyuki   |
|               | Mr.James Mwangi,Starnle Kiremi of Laikipia Wildlife Forum                            |
|               | Mr.Tom of Rural Focus-Nanyuki office   |

Mrs. Sarah Mwaura-NEMA Nayuki office

Mr.David Mumo and Madam Rehab of Lower Ewaso WARMA Rumuruti

Mr.Mbogoni Mureithi-WARMA Isiolo office

Mr.Mututo NEMA CDE & Vincent Mahiva (NEMA Officer) –Isiolo

Mr.John Mwaninki-Technical Manager ENNDA-Isiolo HQ

Mr. Gichuhi, Technical manager- Garissa Water & Sanitation Co.

Madam Nasra Hanshi MD of Tana Water & sanitation Company

Mr. Jacob Hamisi of Hola Irrigation Scheme

Mr. Mwamuzi of KFS, Kilifi Ecosystem..effects of Magarini Salt Co.

Madam. Arafa Baya of Mida Creek Conservation Community

Engineer Felix Shiundu of Bura Irrigation Scheme

Mr. Maulidi Diwayu of TDIP by TARDA

Mr. Abdi Omar of WRMA lower Tana basin

## Other References

- NORTHERN WATER SERVICES BOARD
- NIB
- VISION 2030
- MIN.of ENV.NRM

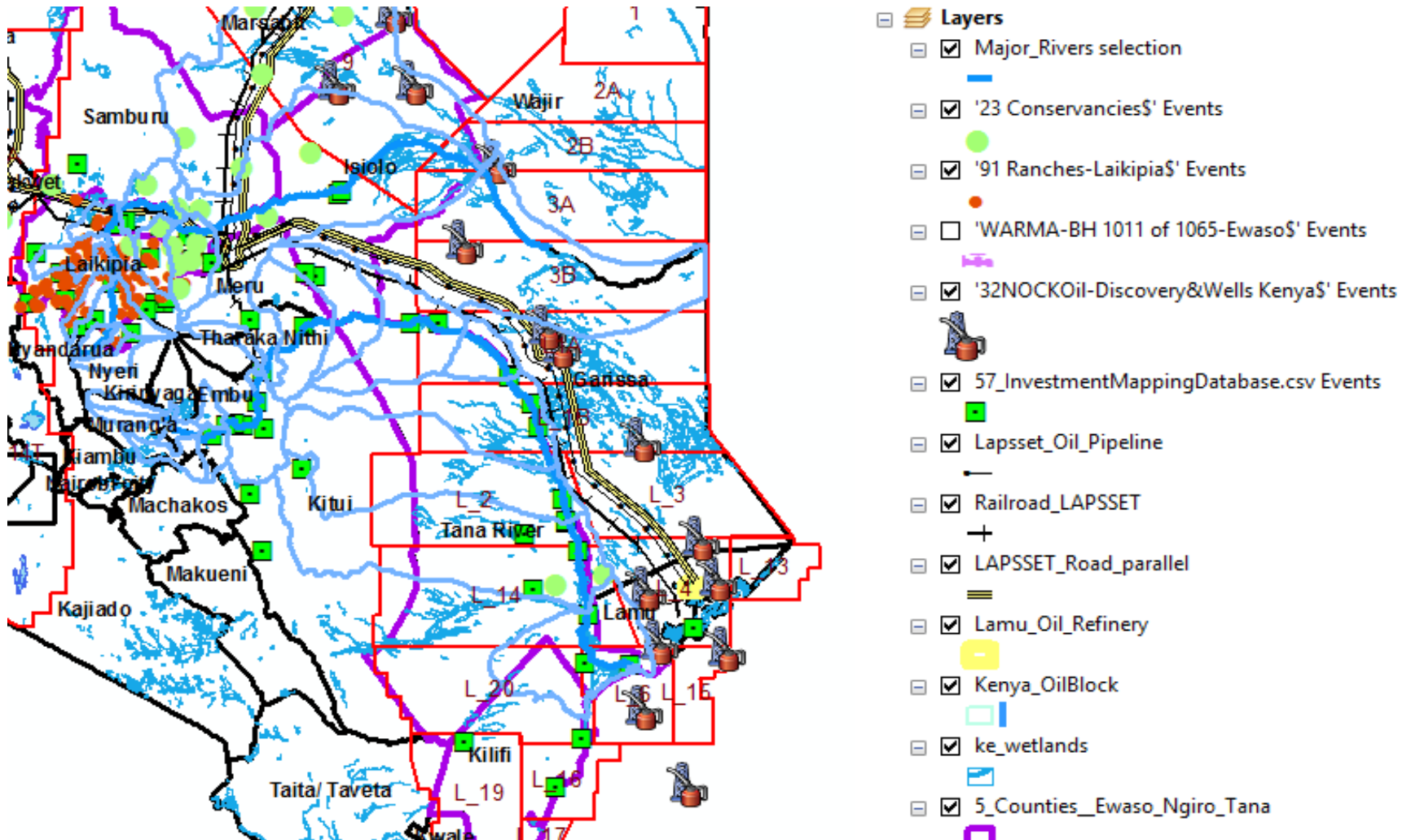
# Summary of Data Collected

	Ewaso Ngiro and Tana River Basins		
Type of infrastructures	Investment Category	No.of facilities	Products/Threats
Oil refineries	Energy Production		2 Oil, Gases,By-products
Oil & Gas Exploration block	Energy Production		16 Oil,Gases,By-products
Oil & Gas Discovery Wells	Energy Production		32 Oil,Gases,By-products
Biofuel & Oil Seed farms	Irrigation Agriculture		2 Crops,energy,water use
Irrigation schemes	Irrigation Agriculture		22 Crops, water use
Water and Sanitation facilities	Water and Sanitation Company		11 Water,Sewage
Hydro Electric Dams	Energy Production		10 HEP,Water
Flower Irrigation farms in Laikipia	Irrigation Agriculture		3-49 Chemicals,flowers
Urban Cities Expansion	Urban Infrastructure		4 Urbanization
Lapsset Transport infrastructures	Urban Infrastructure		3 road,rail,pipeline
Others			
Boreholes drilled in Ewaso basin	Water facilities		1011 Ground water
Wetlands & Swamps	Conservation sites		Many Wildlife
Ranches	Conservation sites		91 Wildlife
Community & Private Conservancy	Conservation sites		23 Wildlife

See below Excel Sheets: Tabs of investments



# Sample of infrastructures mapped

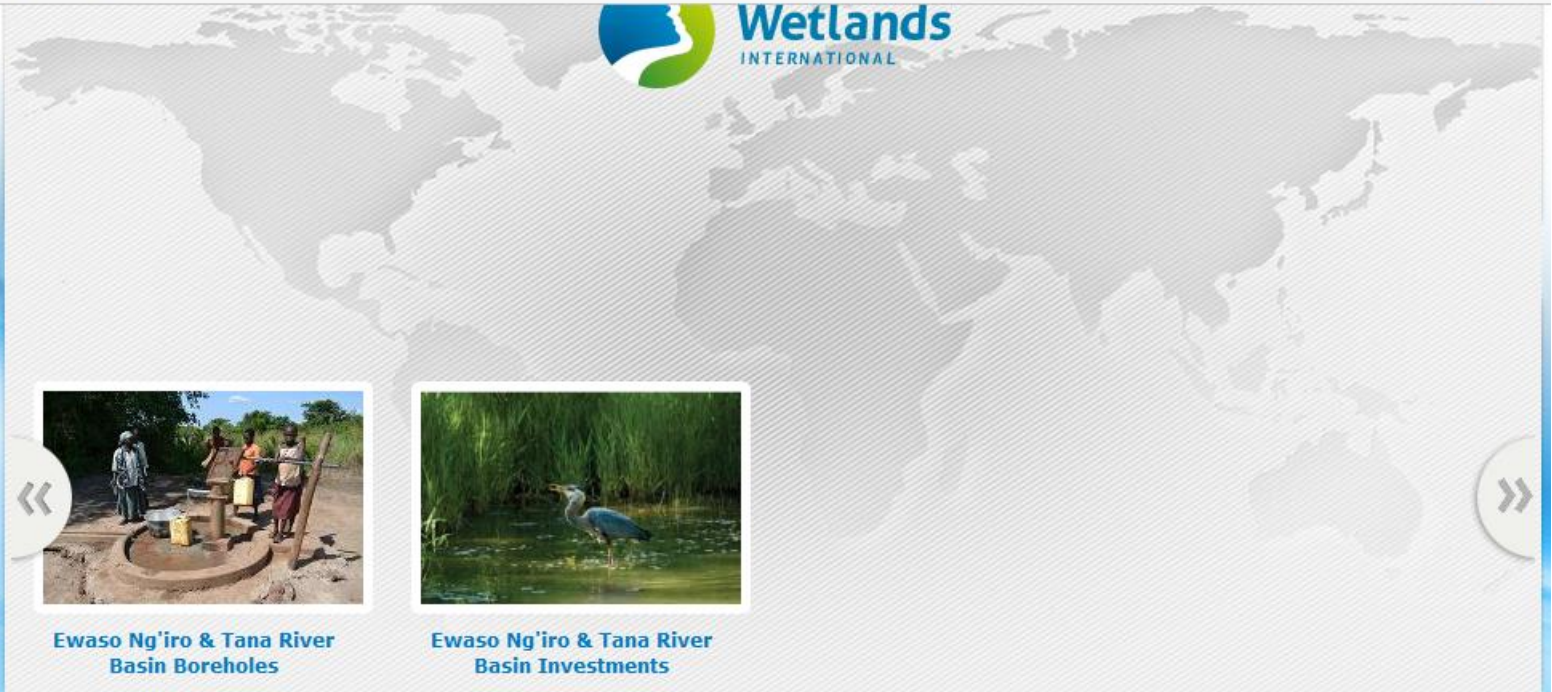




# Prototype of Online Application

wetlandsint.maps.arcgis.com/home/index.html

Search



**Ewaso Ng'iro & Tana River  
Basin Boreholes**



**Ewaso Ng'iro & Tana River  
Basin Investments**

Wetlands International is the only global not-for-profit organisation dedicated to the conservation and restoration of wetlands. We are deeply concerned about the loss and deterioration of wetlands such as lakes, marshes and rivers. Our vision is a world where wetlands are treasured and nurtured for their beauty, the life they support and the resources they provide. Wetlands International is dedicated to maintaining and restoring wetlands— for their environmental values as well as for the services they provide to people. We work through our network of offices, our partners and experts to achieve our goals. Most of our work is financed on a project basis by governments and private donors. We are also supported by government and NGO membership.

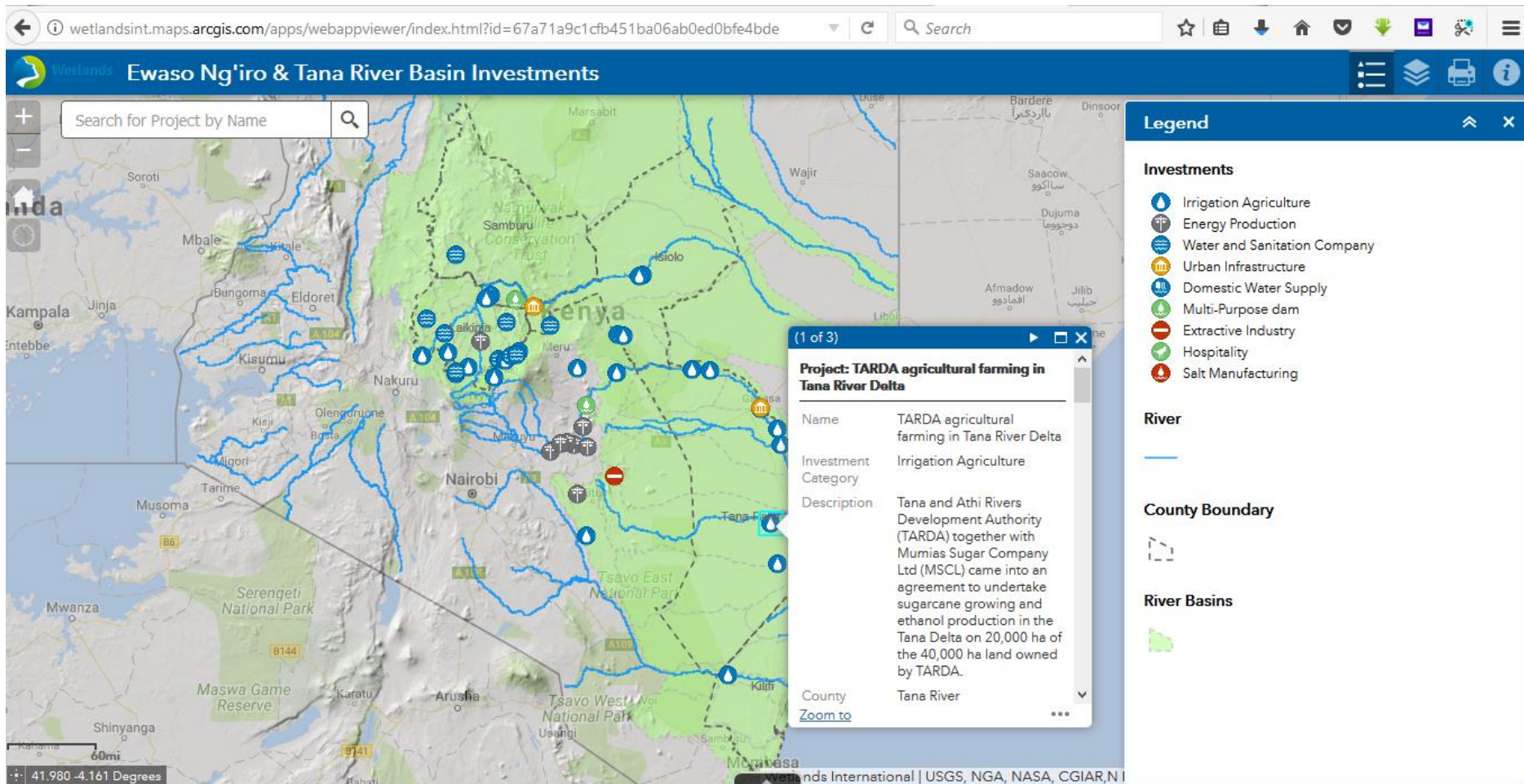
# Wetlands Intl. Web Maps Portal

To access the web portal, here are the credentials;

URL: <http://wetlandsint.maps.arcgis.com/home/index.html>

Username: wetlandsinternational

Password: wetlands2017





# Sample Photographs

## Chinese firm to build Kenya's largest water reservoir

Posted on May 11, 2014 by Jane Mwangasha



*Dam construction. High Grand Falls Dam will hold 5.6 billion cubic metres of water. PHOTO/COURTESY*

# Challenges encountered against Contract Timelines

1. Delayed disbursement of funds for mobilization-chaque delay in notification came a little late within contract period (20<sup>th</sup> July 2017)
2. Logistic challenges, bad roads and rain season before August 8<sup>th</sup>
3. Staff on leave due to Election of campaign before 8<sup>th</sup> August 2017
4. Suspicion and delay or negative feedback on information to complete database
5. Government staff decline to give information unless from higher office especially on high profile project planned under vision 2030 eg.LAPSSET
6. Prolonged political temperatures in the country-low moral to focus on work
7. Scarcity of information on websites and published literature online to complete database eg Flower firms and Water Companies
8. Poor GPS Coordinates from WARMA data
9. Level of details required for the secondary information beyond mapping
10. Limited time in field-6days

# Recommendations:

- **Scarcity of infrastructure data:** Give the scarcity of the infrastructure information, its recommended that the GIS consultant should be given a long term contract to continuously compile and fill the database with any new information encountered that is relevant to the assignment. This will ensure completeness of the database.
- **Small scale irrigation farmers:** Its important to continuously work with partners eg.WARMA especially in important catchments such as Mt.Kenya around Nanyuki and along river Tana to map and identify small scale farmers who abstract water for irrigation activities, the intensity of some of the illegal small scale abstractions result in significant siltation and water diversions Upstream. GIS consultant can provide technical training where necessary to partners.
- **Mapping of Boreholes and wetlands:** GIS consultant can work with WRUAs across key basins to map and update existing wetlands database and use remote sensing to undertake change detection. For prioritization of interventions for the areas that are heavily affected. Boreholes data from WARMA needs to be verified by trained WRUAs since accuracy of their positions and intensity of borehole location can be used to inform groundwater abstraction challenges.