**Terms of Reference**

**Intern – Eastern Nile Land Use and Land Cover Change (LULCC) and Hydrological Assessment**

**11th NCCR Internship Batch (28th ENTRO Internship Batch)**

## Background

The Nile Basin Initiative (NBI) is an intergovernmental partnership of the ten Nile Basin states sharing the Nile. The NBI established to develop the river cooperatively; reduce poverty and environmental degradation; share substantial socio-economic benefits and promote regional peace and security. The NBI guided by a Shared Vision, which envisages achieving “sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”.

The Eastern Nile Technical Regional Office (ENTRO) is one of the three Centers of the Nile Basin Initiative, (NBI). Guided by the mandate in the 1999 Strategic Action Program Guidelines, NELSAP – CU and ENTRO operate at a sub-basin level, and are charged with facilitating water resources development, including investment projects in agriculture, environmental, energy and river basin management, as well as gathering data and conducting analysis on issues unique to the sub-basins such as flood and drought.

The NILE COOPERATION FOR CLIMATE RESILIENCE (NCCR) is one of the NBI main projects that aim to improve mechanisms for cooperation on water resources management and development in the Nile Basin.

**ENTRO Internship and Young Professionals Program:** ENTRO has taken the initiative to establish the Internship and YPs program as part of its core activities and successfully implemented in the last 13 years. This program has proven immensely popular in fostering cooperation and allowing ENTRO to expand its professional network. The Internship Program has proven more effective in terms of building regional capacity in the Eastern Nile Basin and bringing a diversity of expertise and outreach opportunities to ENTRO and academia. Up to now 27 different batches of internship have been implemented through the program.

## Eastern Nile LULCC and Hydrological Assessment

Land use and Land Cover Change (LULCC) also known as Land Change is a general term for the human modification of Earth’s terrestrial surface. It is driving unprecedented changes in ecosystems and environmental processes at local, regional, and global scales. These changes encompass the greatest environmental concerns of human populations today, including climate change, biodiversity loss and the pollution of water, soil and air (Ellis, 2007). Changes in LULC continue to impact local-to global-scale weather and climate by altering the flow of energy, water, and greenhouse gases between the land and atmosphere. Moreover, LULCC is influenced by a variety of biophysical and societal factors operating on several spatial and temporal levels and acting in complex webs of place-and time-specific relationships. Local climate and weather, topography, soil type, surface water, and groundwater are some of the relevant biophysical factors that could be affected as a change in the LULCC intensify.

Eastern Nile Basin is one of the areas which has evolved through the significant LULC change through human activities in the historical time since human civilization along the Nile Valley. In recent decades, due to intensive economic and social development activities in the sub-basin, significant changes have been recorded in the terrestrial environment. The timeseries analysis of this LULCC and identification of the driving forces responsible for these changes are needed to the sustainable management of natural resources particularly the limited water resources and also for projecting future trajectories of resource availability and changes in the basin.

**Theme-I:** **Eastern Nile Land Use and Land Cover Change (LULCC) Assessment**

Available data on Land Use and Land Cover (LULC) changes can provide critical input to decision-making of environmental management and planning which imply also the management of water resources in a sustainable manner. Under this theme, interns will engage in desk review on the LULCC pattern in the Eastern Nile Basin and obtain long years of available remote sensing data and track the changes in the LULC both in space and time using advanced modeling tools.

**Theme-II: Eastern Nile Hydrological Assessment**

Determining the effects of LULCC on the hydrology of the Eastern Nile depends on an understanding of past land use practices, current land use and land cover patterns and projection of future scenario on the LULC that affected by human distribution, economic development and other factors. Under this theme, Interns are expected to conduct desk reviews on changes of hydrology as a result of LULCC, collect historical long years of hydrological data at least for the last 20-30 years in the Eastern Nile Basin. Moreover, they will engage in conducting hydrological assessments using advanced hydrological modeling tools to detect changes in the hydrology of the EN basin.

## About the position

ENTRO intends to engage highly motivated candidates from EN countries with tertiary level education, to work collaboratively in several activities to facilitate outreach efforts in regional cooperation. The Interns are expected to help bring fresh perspectives to ENTRO work and significantly learn from this experience to help with their professional career development.

ENTRO internship opportunity is expected to be beneficial to the interns by providing them an exposure to working as team in a regional organization, develop a regional perspective for their work, learn new skills, tools, techniques, and methodologies, interact with other regional and international staff/consultants/interns, and contribute to the work of ENTRO in fostering and improve cooperation on water resources development and management within the Eastern Nile Basin including work on information/analysis.

## Objective

The main objective of the assessment is to quantify and monitor trends of Land Use and Land Cover Change (LULCC) and its spatial and temporal distribution in the Eastern Nile (EN) Basin as well as conduct hydrological assessments.

## Duties and Responsibilities

* Collect observation (point and remote sensing) data for climate, hydrological, and LULC for change detection and hydrological assessment from national, regional and global sources,
* Conduct desk review of knowledge products on LULCC and Hydrological alternations specific to the EN river basin,
* Assess the LULCC and its impact on the hydrological flow for the last 20-30 years
* Update ENTRO database specific to the EN River basin
* Apply new techniques (e.g., data analysis, development of new knowledge products/maps, assisting in model development and application, preparation of reports and documents, etc.).
* Organize and compile the assessment to present the results for policy/decision makers, stakeholders, and for knowledge base at ENTRO and EN countries.
* Participates in capacity building training, field visits and workshops.
* Performs other duties as assigned or required.

## Qualification Requirements

* **Minimum B.Sc.** in Hydrology, Natural Resources Management, Remote Sensing and GIS, Water Resources Engineering and Management, Hydraulic Engineering, Irrigation Engineering, River Basin Management, or related fields
* Minimum of five (5) years of Experience after B.Sc. degree in the above fields of area.
* Having MSc. Degree or above in the above fields is an advantage.
* Knowledge of applying and using Hydrological and Remote Sensing models and tools is an advantage.
* Knowledge of programming language (preferably R) and/or using water resources data analysis tools, GIS and any other spatial analysis and statistical tools is an asset.
* Fluency in written and oral communication in English, capability of clear report writings with excellent illustrative and graphical presentation skills,
* Capability of working in multi-disciplinary and multi‐cultural teams, and under tight deadlines.
* You must be under thirty-five **(35)** years of age at the time of application.
* Only Citizen of one of the Eastern Nile basin countries (Egypt, Ethiopia, South Sudan, and Sudan) **can apply.**
* Female candidates are **highly encouraged** to apply.
* Previous ENTRO interns **are not allowed to apply!**

## Deliverables:

At the end of the internship the following deliverables are expected:

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| **Deliverables/Outputs** | **Theme** | **Planned Date of report submission** |
| Desk Review | I and II | After 2-weeks of the Internship Started |
| Data Sourcing and compilation for LULCC and Hydrological Assessment | I and II | After 1 month of the Internship started |
| LULCC Analysis and Hydrological Assessment specific to the EN River Basin | I and II | After 2 months of the internship started |
| Draft Report compilation and submission | I and II | After 2 and ½ months of internship started |
| Final Report and Presentation (Consolidated) | I and II | At the End of the Internship |

## Selection:

ENTRO will evaluate the applications inclusively and contact the finalist. During the Selection process, ENTRO will ensure country representations equally among the EN basin Countries (Egypt, Ethiopia, Sudan, and South Sudan).

## Implementation Arrangements:

* The deadline for application is **31-January 2025, time: 24:00hr** (mid-night Addis Ababa time)
* This assignment is a 3-month assignment, extending from **01-March 2025 to 31-May 2025**
* The Intern will be stationed at ENTRO office, Addis Ababa, Ethiopia.
* ENTRO will cover the cost of the travel expenses (ticket, visa, etc) as well as giving a monthly stipend to cater accommodation and living expenses.
* ENTRO assigns an internship supervisor who will be responsible for overseeing the work and to whom each intern shall report.
* ENTRO shall also provide:
  + Adequate support to the interns by facilitating gathering of data, access to relevant information and authorities.
  + Providing adequate office space and support facilities (such as internet)
  + Capacity building programs and training will be organized in collaboration with other partners, and it will be defined later.
* Any studies, reports, or other material, or otherwise, prepared by the Intern during the internship period shall belong to and remain the property of the ENTRO. The Intern may retain a copy of such documents.

## Application:

Interns must submit their CVs together with the cover letter, copy of passport and the following application form **Via email** to the following email address: [entrointernship@nilebasin.org](mailto:entrointernship@nilebasin.org) and copy it to [gabdi@nilebasin.org](mailto:gabdi@nilebasin.org)

**11th NCCR Internship Batch (28th ENTRO Internship Batch) Application Form**

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| --- | --- |
| **Full Name of the applicant (***as indicated in the passport***)** |  |
| **Date of Birth (***as indicated in the passport***) (***DD/MM/YYYY***)** |  |
| **Place of Birth (***as indicated in the passport***)** |  |
| **Nationality (***as indicated in the passport***)** |  |
| **Current Residential address (***Country, City, street/home address***)** |  |
| **Educational Level (***BSC, MSC, PHD***)** |  |
| **Field of Specialization** |  |
| **Date of first degree (BSC) graduation (***DD/MM/YYYY***)** |  |
| **Current Home institution (***organizational affiliation***)** |  |
| **Have you previously participated in the Internship program of one of the NBI Centers (***ENTRO, NELSAP, Nile-SEC)? (Yes/No***)** |  |
| **Which Thematic area are you applying for this internship? (***Theme-I: EN LULCC Assessment, or Theme-II: EN Hydrological Assessment***)** |  |