Ethiopia Investment Benefits from the Nile Basin Cooperation

Current and Future Investment Benefits in Numbers - Highlights

510km
Ethiopia and Sudan Power grids interconnected through 510km transmission line from Ethiopia to Sudan (Gedaref). System complementarity secured.

300 MW
USD 10-15 million electricity exported to Sudan yielding revenue annually.

7,500 HA
of 20,000 jointly agreed upon (among Egypt, Ethiopia and the Sudan) Irrigation project, benefiting 57,000 persons.

1,400,000 households
Additional in Ethiopia and Sudan got access to electricity through the Ethiopia-Sudan Power Transmission Interconnector.

Over 240,000 persons
benefiting from Integrated Watershed Management implemented on 85,000 ha.

680 safe water points
(springs) constructed.


JUNE 2022
ENTRO was established in 1999 and comprises Egypt, Ethiopia, South Sudan and Sudan. ENTRO supports the countries in preparing cooperative water resources investment programs and projects, capacitating and strengthening institutions and providing secretariat support to its governance. The goal of ENTRO is sustainable socio-economic development through the equitable utilization of, and benefit from the common Eastern Nile Water resources. Since its establishment, ENTRO has played significant role in advancing and enhancing cooperation among the Eastern Nile Countries on water resource development and management.

Eastern Nile though linked to and form one hydrologic unit of the entire Nile Basin, bears unique features, making a compelling case for the four countries to form ENSAP. These features include:

**Hydrology:** This sub-basin supplies over 86% of the Nile flow over a 3–4-month period, characterized by seasonal and inter-annual variability.

**Topography:** The cool, high, and rugged Ethiopian highlands offer huge hydropower generation and water saving potential.

**Environment:** Land degradation and environmental problems has resulted in huge sediment load in the Nile.

**Culture:** The four countries share common religions and intricate historical and cultural linkages.

**Demography:** The four countries make nearly two-thirds of the entire Nile Basin population.

**Geography:** The four countries are geographically interlinked making infrastructure interconnection—power, road, rail possible.

**Economy:** Owing to scale, the four countries could make foundation for a viable regional integration possibility.

The Eastern Nile Subsidiary Action Program (EN SAP) headquartered in Addis Ababa, Ethiopia, known as Eastern Nile Technical Regional Office (ENTRO) and the Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP) headquartered in Kigali, Rwanda are the two investment programs of the Nile Basin Initiative (NBI).

Ethiopia is a Member of Both NELSAP and ENTRO.

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NELSAP-CU was established in December 1999 by the Council of Ministers of Water Affairs in the Nile River Basin, with a mission to “contribute to the eradication of poverty, promote economic growth, and reverse environmental degradation in the Nile Equatorial Lakes (NEL) region, within the overall NBI’s shared Vision of sustainable socioeconomic development and the equitable use of and benefit from Nile Basin water resources”.

NELSAP-CU is governed and reports to the Council of Water Ministers from 10 Nile Basin membership states of Burundi, DR Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda.

NELSAP-CU within its mandate facilitates jointly agreed transformative in-country projects with regional impact/significance and trans-boundary cooperative investment projects related to the common use of the Nile Basin water resources. NELSAP also builds regional capacity of countries and provides a platform for implementation and coordination of trans–boundary investment projects. NELSAP-CU also renders support to national initiatives and focuses on two investment areas of: (i) power development and trade; and (ii) water resources management and development.

NELSAP-CU has mobilized finances for pre-investment and investment projects cumulatively totaling to USD 1,050 billion (pre-investment USD 557.107 million and for investment projects USD 493.018 million). Its key institutional strength lies in project pre-investment feasibility studies, regional projects coordination support, regional strategic analysis, environmental aspects, social economic development and stakeholders’ engagement. NELSAP-CU, in delivering on its mandate, is supported bilaterally and multilaterally by different development partners.
INTRODUCTION TO NBI INVESTMENTS IN ETHIOPIA

Ethiopia is the source of the Blue Nile (Abbay), which is by far the largest Nile River tributary, contributing 57% of the total flow of the river Nile. Flowing from Ethiopia’s Lake Tana, the Blue Nile together with its tributaries, the Baro-Akobo Sobat and the Tekeze-Seitit tributaries join the White Nile at Khartoum in Sudan. Since Biblical times, the life of Ethiopia has been attached to the Nile; culturally, politically, and economically. Of the country’s 1,144,035 Km² land area, some 32% lie in the Nile Basin and about 40% of the population lives there. 11.5% of the total Nile Basin area is in Ethiopia. Approximately 86% of the flow of the river Nile is generated from the Ethiopian highlands.

Ethiopia has been part of the Nile Cooperation since 1999 when the country became a member of Nile Basin Initiative (NBI). The country signed the Cooperative Framework Agreement (CFA) on 14th May 2010 and ratified it on 13th June 2013. Previously, Ethiopia was as an observer under the Hydromet, one of the early regional projects towards Nile Basin cooperation that was established in 1967 to conduct joint hydrometeorological surveys on the Nile in the wake of flooding disasters. The country was also an observer under Undugu (meaning ‘brotherhood’ in Kiswahili), which was established in 1983 to consider regional economic development.

NILE BASIN INVESTMENT PROJECTS IN ETHIOPIA

<table>
<thead>
<tr>
<th>INVESTMENT PROJECT BENEFITS</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDEN Projects</td>
<td></td>
</tr>
<tr>
<td>Eastern Nile Irrigation and Drainage Studies (ENIOs)</td>
<td>Feasibility study completed for Ethiopia and Sudan</td>
</tr>
<tr>
<td>Eastern Nile Watershed Management Project (ENWM)</td>
<td>Study completed and operational</td>
</tr>
<tr>
<td>Eastern Nile Power Trade Project (ENPTJ)</td>
<td>Study completed</td>
</tr>
<tr>
<td>Ethio-Sudan Interconnection</td>
<td>Operational</td>
</tr>
<tr>
<td>Baro Akobo Sol&gt;at Multipurpose water Resource Development Study (BASMWROS)</td>
<td>Study completed (3 short-term projects prepared; 9 medium- and long term projects identified for preparation)</td>
</tr>
<tr>
<td>Post-IDEN Investment Projects</td>
<td></td>
</tr>
<tr>
<td>Chemoga-Yeda Integrated watershed Management</td>
<td>Project preparation completed</td>
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<tr>
<td>fincha Integrated Watershed Management</td>
<td>Project preparation completed</td>
</tr>
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**515 KM ETHIOPIA-SUDAN POWER INTERCONNECTION**

**Gedaref- Bahr Dar - Gondar-Shehedi Metema Transmission Line**

ENTRO played a significant role in the fully commissioned 515km Ethiopia-Sudan Power Transmission Interconnector that comprises the 194km Gondar-Bahr Dar Transmission Line and the 321km Ethiopia (Gondar-Shehedi-Metema) – Sudan (Gedaref). The Transmission Line, commissioned at the end of 2013, has enabled 300 MW of power trade between the two countries. Ethiopia obtains USD 10-15 million in electricity sales revenue annually. Nearly 1.4 million households (in both Ethiopia and Sudan) can access affordable and reliable electricity. The predominantly hydro system in Ethiopia has also reaped benefits by being part of a larger power system with Sudan which has significant thermal generation, and this provides security of supply in periods of low hydropower production.

The role of ENTRO in the above project was among others, updating Environmental and Social Impact assessment Studies (ESIA) and Resettlement Action Plan (RAP). ENTRO facilitated resource mobilization for this construction as well as negotiation for Power Purchase Agreement, Construction Agreement and Operation and Maintenance Agreement. ENTRO was also Involved in the monitoring of implementation of the ESIA and RAP studies during the construction period. Other key benefits for Ethiopia are the ability to better integrate reserve capacities, and in the process improve reliability of supply on the interconnected system while saving capital and operating costs. In addition, more reliable and secure supplies have secondary benefits through lighting of schools and homes, better access to social services, and greater opportunities for business development. Small and medium-sized industries particularly flour mills, rural water supply installations, tanneries, and coffee processing plants are then better able to create employment and contribute to poverty alleviation.

**7,500 HA DINGER BEREHA IRRIGATION DEVELOPMENT PROJECT**

ENTRO developed the first ever jointly, agreed upon Eastern Nile irrigation project, that was approved by Egypt, Ethiopia, and Sudan. Out of this project, 7,500 Ha have already been developed and are operational and benefitting 57,000 people. Ethiopia will develop a further 20,000 ha of irrigated land from this first-ever jointly agreed upon Easter Nile irrigation development project. When fully implemented, another 92,000 people will eventually benefit from this Dinger Bereha irrigation scheme identified through ENTRO under the Eastern Nile Irrigation and Drainage Project.

**85,00 HA EASTERN NILE WATERSHED MANAGEMENT PROJECT**

ENTRO prepared the 85,000Ha Eastern Nile Watershed Management Project which benefitted 240,000 people. This was also the first jointly agreed upon Integrated Watershed Management Project in the Eastern Nile and was located in the upper catchments of Lake Tana. Prepared from both bio-physical and livelihood improvement perspectives, and implemented on 85,000 ha, the project has resulted in improvements in soil and water conservation, agricultural practices, access to extension services and increases in land productivity. The project established 35 farmer training centres with about 700 farmers trained in improved cereal cropping, fruit tree cultivation as well as vegetable gardening and marketing. The project also established 13 animal health posts, supplied 735 modern beehives as well as 163 pieces of bee-keeping equipment. With the introduction of area closure and end of free livestock grazing, degraded watersheds have been enabled to rehabilitate. Introduction of improved fodder has resulted in significant increase of livestock productivity. A total of 205,000 people in Chemoga and another 160,000 in Fincha are set to benefit from the 600,000 ha watershed management projects prepared under the project.
Through this project, 680 safe water points have been constructed that are providing access to potable water for at least 75,000 people. The Tana-Beles Integrated Water Resources Development Project in the Upper Blue Nile carried out several physical and biological soil and water conservation measures on 46,276 ha of cultivated land by employing a combination of technologies. In piloted areas, reduction in rainwater run-off has led to increases in groundwater recharge, river/stream bed-flow rates, as well as water flows and volumes over time in the system. This project begun in 2009 and since then, 163 community watershed development plans have been implemented through a range of activities, namely: treatment of 821 ha of gully; rehabilitation of 16,000 ha of degraded hillside; and development of 4,000 ha of community woodlot forestry. In addition, 680 safe water points have been constructed that provide access to potable water for at least 75,000 people. This integrated approach to watershed management has reduced the loss of topsoil. These advances are expected to bring about more benefits further downstream, such as better water quality and less silting of the Nile waters in Sudan and Egypt.

The Eastern Nile Power Trade Studies proposed the Eastern Nile Regional Transmission Line, connecting the grids across Ethiopia, Sudan and Egypt and has the potential to enable the country to generate up to USD 600 million per year from electricity exports. Under this study the Rabak-Nage Hamadi Transmission Line was identified. After the identification, the Feasibility study for the Ethiopia-Sudan (Rabak) – Egypt (Nage Hamadi) power interconnection has been completed. The study covered Ethiopia-Sudan 1,200 MW or 9,200 MWh/yr and Ethiopia-Egypt 2,000 MW or 7,700 MWh/yr interconnections that will facilitate import and export of power between the three countries.

In 2006 it was decided to phase the implementation of FPEW with two phases, with the first phase – FPEW I – focused on building the institutional capacity and developing critical baseline information to enhance the readiness of EN countries to implement subsequent FPEW phases. While second phase – FPEW II – focuses on the structural measures and up-scaling of the pilot interventions.

FPEW Phase I has successfully completed in 2010. The first Phase of the FPEW project; FPEW I delivered a platform for institutional settings and data/information collections/sharing at community and national levels, together with enhancing regional coordination and cooperation with the recommendation for the follow-on the subsequent phases (FPEW phase II). The proposal of FPEW II has evolved from national and regional consultations to focuses on the structural measures and up-scaling of the pilot interventions. The project proposal, prepared by an international consulting firm, was finalized in 2007 and distributed to different stakeholders and donors to secure funding. Though funding was not secured to work on FPEW II, after the completion of FPEW I project ENTRO initiated with Eastern Nile countries and created a regional Flood Forecast and Early Warning (FFEW) system under the Eastern Nile Planning Model project (ENPM) and the FFEW activity continued under the current Nile Cooperation for Result project (NCORE). The FFEW, has been an important part of ENTRO’s activity that continuously been conducted since 2010 for every flood season (June-September). The FFEW has helped the Eastern Nile countries in reducing the loss of life and money by preparing flood forecast.
Ongoing Projects and Initiatives with Direct Benefit to Ethiopia

Ethiopia Irrigation and Drainage Projects: Dinger Bereha Irrigation and Tana Beles Integrated Project

A total of 56,700 farmers will benefit from 20,000 ha irrigation under the ongoing construction of Ethiopia Irrigation and Drainage Project. Another 92,000 people will benefit from the 7,500 ha Dinger Bereha Irrigation scheme under the Eastern Nile Irrigation and Drainage projects. More than 2,800 households benefitted from 14 newly developed small scale irrigation schemes under the Tana Beles Integrated Water Resources Development Project in the Upper Blue Nile. Improvements in soil and water conservation, agricultural practices, and access to extension service have led to increase in land productivity in different parts of the country. The project established 35 farmer training centres with about 700 farmers trained in improved cereal cropping, fruit tree cultivation as well as vegetable gardening and marketing. The project also established 13 animal health posts, supplied 735 modern beehives as well as 163 pieces of bee keeping equipment. With the end of free animal grazing, fodder and livestock productivity improved significantly.

Baro-Akobo-Sobat Multipurpose Study Project

Small scale farmers and pastoralists in the Baro-Akobo-Sobat sub basin and Ethiopia in general will also benefit from the completed Baro-Akobo-Sobat Multipurpose Study Project which identified short-, medium- and long-term projects e.g. Akobo-Gambella, Kinyeti, Majang projects. These projects have been identified based on a Strategic Social and Environmental Assessment, which will balance conservation of the relatively pristine environment of the sub-basin with the effort to address poverty and deprivation. Other projects include hydropower generation for implementation in South Sudan and Ethiopia.
The Nile Equatorial Lakes Subsidiary Action Program (NELSAP) has consolidated the advances made in independently prepared investment projects from the Nile Basin Member Countries into a single, feasible Nile Equatorial Lakes Investment Program (NEL-IP). The NEL-IP provides a framework for shared water and other resources, and more importantly, a suite of well-structured, designed, purposeful, integrated and bankable projects for development partners and investors to consider. Out of the total list of 17 projects, Ethiopia got three projects, these are:

1. Ethiopia – South Sudan (Dedesa-Tepi-Juba) Power Transmission Line Project
2. Dindar Transboundary watershed, a Transboundary Wetland Management Project between Ethiopia and Sudan.

The Ethiopia - South Sudan (Dedesa-Tepi-Juba) power Transmission Line will benefit 350,000 people. The project has an overall Internal Rate of Return (IRR) of 12% and Net Present Value (NPV) of 56.8 million USD (m USD). Its Estimated Net Direct Benefit will be USD 1,400 million.

The Dedesa-Tepi-Juba project is a 700km 400KV/500HVDC transmission line from Ethiopia to South Sudan. It is anticipated that with a connection between Ethiopia, South Sudan, and on to Uganda, ultimately five or more countries could be supplied with electricity from Ethiopia. This project is at identification stage, and NELSAP proposes to conduct studies on the same. The project is a high national priority for South Sudan. The project has been identified by the countries in their development plans as well as NELSAP through the Hydropower Expansion Plan and Regional Integration Plan of South Sudan into Regional Grid (2015).

For this phase of NEL-IP, NELSAP is mobilizing resources to conduct Feasibility Studies (USD 3m) to determine and confirm its feasibility / viability. Depending on outcome of this feasibility, detailed design, Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) studies (ESIA & RAP), tender documents and construction could potentially follow in future phases if the project is feasible.

Importance: The project will bring much needed power to unserved areas and communities in and around Juba and Malakal in South Sudan.

Current status: The project has been identified by the countries in their development plans as well as NELSAP through the Hydropower Expansion Plan and Regional Integration Plan of South Sudan into Regional Grid (2015).

Countries: Ethiopia and Southern Sudan

Anticipated beneficiaries: 350,000 people in Tepi, Juba and surrounding areas will benefit from 88 MW.

Time frame: 2 years for studies

Regional Importance: With power connection between Ethiopia and South Sudan, and South Sudan and Uganda, electricity could reach more than five NEL countries.

Pre investment costs: USD 3m over 2 years for feasibility studies, detailed design, independent ESIA and RAP studies.

Estimated implementation costs: USD 420m (2016 preliminary estimate to be refined in feasibility studies).
The project will benefit – 5.6 million people and has an overall Internal Rate of Return (IRR) of 7% with Net Present Value (NPV) of 15.5 million USD. Its estimated Net Direct Benefit is USD 22,400 (million USD). This project is one of the three projects in Ethiopia that is being fronted by the Nile Equatorial Lakes Investment Program (NEL-IP) program of NELSAP. The project will be implemented through ENTRO.

The Ethiopia (GERD) – Sudan (Khartoum) Transmission Line project comprises a 580km new 500kV power transmission interconnector between Ethiopia and Sudan, of which approximately 16km will be in Ethiopia, starting at the Grand Ethiopia Renaissance Dam (GERD), and approximately 564km will be in Sudan, terminating in Khartoum. This interconnector project will facilitate trading in electricity and promote power systems stability between Ethiopia and Sudan as well as other countries in the Eastern Africa Power Pool (EAPP). The interconnector will have a transmission capacity of 4,000 MW.

The Project also includes two new 500kV capacitated substations at Rabak and Jebel Aulia (both in Sudan), and power line bay extensions at the following existing substations: Grand Renaissance (500kV Ethiopia) substation, Rabak (220kV substation in Sudan) and Jebel Aulia (220kV substation also in Sudan). It is estimated that the project will benefit at least 5,600,000 people and now requires USD 515m (30m for Ethiopia, and 485m for Sudan) for project finalization, tendering and implementation. The objectives of the Ethiopia (GERD) – South Sudan (Khartoum) Transmission Line project include provision of transmission capacity to cater for grid interconnection from Ethiopia to Sudan and eventually between Egypt and Sudan, provision of transmission infrastructure to cater for future grid interconnections to other countries, promotion of regional cooperation through sharing of power generation resources and facilitation of rural electrification and improve the standard of living for the population in project areas. The Project will enable Sudan to make use of Ethiopia’s cleaner energy resources, most notably, Africa’s soon to be largest hydro-electric scheme, the Grand Ethiopia Renaissance Dam project, which will have a generation capacity of 6,000MW and to which this Project will have a direct connection.

**Project Summary**

- **Problem Definition:** Ethiopia and Sudan have low levels of electricity generation per capita. For example, in Ethiopia and Sudan only 27% and 45% of the population have access to electricity, respectively. There is thus need for a regional electricity market that can play a key role in ensuring that the hydropower resources of the Nile Basin are developed and managed in an integrated and sustainable manner.

- **Previous studies.** A full Preliminary Design was completed as part of the Feasibility Study and Preliminary ESIA, project structuring phase complete.

- **The next step:** Project finalization, tendering and implementation.

- **Countries:** Ethiopia and Sudan

- **Anticipated beneficiaries:** 5,600,000 (high level estimate)

- **Time frame:** 3 years