

**ETHIOPIAN ELECTRIC POWER CORPORATION**

***Gibe III Hydroelectric Project***



**Environment & Social Issues Related to Gibe III  
Hydroelectric Project**

August 2010  
Gibe III HEP Office  
[Addis Ababa](#)

## 1. Introduction

Ethiopia has a huge potential for hydropower development. Its a generation capacity is estimated at 45,000 MW. However, so far, the utilization of this potential is limited to 2,000 MW which is less than 4.5 % of the existing potential. Despite the availability of such huge hydropower potential, currently access to electricity in Ethiopia is only about 35% and only 5,189 towns and villages out of 7,000 are electrified. Most of the populations in the country live in poverty and energy insecurity. Use of traditional fuels such as fire wood still continues aggravating the soil erosion and forest destruction.

In Ethiopia the average per-capita energy consumption is about 36 kWh while the average minimum level of consumption per- capita for reasonable quality of life is about 500 kWh. Per-capita consumption of 500kWh corresponds to an annual electricity consumption of 46,344 GWh based on current population.

As effective development and management of hydropower is central to the quest for sustainable development and meaningful economic growth to the country's industrial and agricultural development and to improve the above mentioned situations, the Government of Ethiopia has given due attention and commitment to the power sector and has committed itself to develop the electric power generating capacity of the country through harnessing the huge water resources potential available in the country.

Accordingly, the Ethiopian Electric Power Corporation (EEPCo) has embarked in energy production through construction of huge hydropower plants. One of these plants is the Gibe III hydroelectric power plant with an installed capacity of 1870 MW and an annual energy production of 6,500 GWh. This additional energy ensures the satisfaction of the ever increasing domestic demand with reliable supply as well as supporting the country's Universal Electrification Access Program. By exporting power through regional interconnection system, the country will significantly benefit from foreign currency earning through sales of electricity to the neighboring countries as well as contributing to the regional economic integration.

Moreover, the government has launched a Universal Electricity Access Program (UEAP) that is being implemented by EEPCo with the view of enhancing the electricity access to 50% within 5 years. This Electricity Access Program has to be supported by generation projects such as the Gibe III hydroelectric project.

In light of the present world energy crisis, interconnection of the regional electric energy networks is the best alternative to displace expensive thermal generation in the regional as well as the international power markets.

The project will have economical, social, and environmental advantage for the country in particular and for Eastern Africa in general. It contributes a lot in meeting the country's demand for electrical energy which is an essential part for economic development. This allows the country not only to reduce expenses (in foreign currency) for fuels but also has environmental benefits.

For this reason, Ethiopia has devised a strategy for accelerating cross-border electricity trading with the neighbouring countries to spur regional economic growth through developments of the untapped, environmentally friendly; hydro resources for electricity. The Gibe III Hydroelectric Project is one of the strategic projects aimed at achieving these benefits.

However, some environmentalists and lobbyist groups argue against the project in the name of environment. They continuously champion the idea of impeding the project as they presuppose it will cause food insecurity, chronic hunger, poor health food aid dependence, severe conflicts among the indigenous tribes throughout the downstream of the project.

Nevertheless, the arguments against the project are not supported by substantial facts. EEPCo has conducted series of Environmental and Social Impact Assessments (ESIA) prior to embarking to the implementation of the project by recruiting international independent experts. The comprehensive assessments, appreciated by all financiers and stakeholders, indicate that the possible negative impacts are very minimal and insignificant when compared to the massive and actual benefits of the project.

In addition, the World Bank, and the African Development Bank (AfDB) experts said in an exclusive interview with the Gibe III HEP Website (<http://www.gibe3.com.et>) that the Gibe III hydroelectric project is the best option in the power sector developments, and would boost the economic and social integrations among the Eastern African countries. As part of their financing process, the Banks have made their own assessments on the environment and social impacts of the project.

The ESIA assessments conducted by the International Consultants have been performed on the basis of the requirements and guidelines of the Environmental Protection Authority (EPA) of Ethiopia, and the various International Standards and policies. The documents produced are:

- I. Environmental & Social Impact Assessment;
- II. ESIA Additional Study on Downstream Impact;
- III. Public Consultation & Disclosure Plan;
- IV. Resettlement Action Plan;
- V. Environmental Management Plan;
- VI. ESIA & RAP for Transmission Lines; and
- VII. Archaeological Studies

The ESIA documents have also been reviewed by Environmentalists, Sociologists, and other pertinent professionals from the EPA, JP Morgan, African Development Bank, USAID and the World Bank. Approval has been obtained from the Environmental Protection Authority and the Environmental Monitoring Unit of EEPCo.

The Executive summaries of the documents had been posted on AfDB's website for the mandatory 120-days public disclosure. Currently, the final versions of the documents are accessible on the Gibe III website <http://www.gibe3.com.et>.

The Executive summary of the ESIA Reports are translated to Amharic and 7 other major local languages in the upstream area (Dawerogna, Hadiya, Welayitigna) and downstream areas (Karogna, Nyangatom, Dasenechegna, Bodigna, Mursigna) and are presented to the inhabitants.

The Satellite Environment and Social Issues Office established at Jinaka, with Staff from the major tribes, is continuously working towards educating the downstream population about the project.

In addition, SOGREAH, a Consultant recruited by the European Investment Bank (EIB) has conducted Environmental and Social Independent Review (ESIR) and generally concludes that the Gibe III project is a major opportunity to initiate the economic development of the Lower Omo, one of the least developed regions of Ethiopia. It also recommends that any financial support to the Gibe III HEP is closely linked to the simultaneous socio-economic development of the Lower Omo region and maximizes the benefits from the river flow regulation. The ESIR Consultant clearly identified some of the issues which are strongly exaggerated, and not supported by any tangible scientific evidences.

From the foregoing, it can be concluded that most of the issues raised by NGOs and activists seem to originate from misconception of the facts and simple hearsay which are not supported by any kind of independent studies. The various studies conducted for Gibe III Hydroelectric Project have proved that the project is most attractive in technical, economic, social, and environmental terms.

## **2. Project Benefits**

Some of the major benefits of the Gibe III Hydroelectric Project are the following:

### **2.1 General Benefits**

- More energy production for local consumption / Investment
- Improvement of living standards for the surrounding population
  - Small Scale Irrigation Schemes (Solar, Diesel...)
  - Modern fishing technology
  - Provision of Infrastructure like water supply, electricity, roads to the surrounding areas.
- The Project also foresees nationwide Job opportunities during the construction phase for more than 6,000 people with reasonable share go to the inhabitants in the project area. Currently, more than 2,500 people are engaged in the Project. It creates about 430 million Euro Equivalent (about 6 billion Birr) market for local businesses of manufacturing, Finance, Transport, Hotels and other Services.

### **2.2 Benefits to Women**

- As women are culturally regarded as “responsible” for household energy consumption, they have to travel long distances to collect fire wood. This could be changed by provision of electricity to the rural area.
- Both women and men will benefit from the employment opportunities that will be created from convenient and safe access road facility.
- More women will be engaged in income-generating activities, by running shops, restaurants, bars and selling local products to construction camp workers.

## 2.3 Benefit for the Downstream Area

### 2.3.1 Flow Regulation (Flood Protection):

The Gibe III Dam is believed to positively contribute to the downstream area. Some of the envisaged benefits are summarized as follows:

- Flood regulation (avoidance of un-regulated catastrophic events). The presence of Gibe III Dam and reservoir will provide flood protection to the downstream flood prone areas.
  - The 2006 floods have resulted in the death of hundreds of people and thousands of animals and displacement of more than 15,000 populations in the Dasenech area.
  - Huge resources were required to rehabilitate the Health, Education, Shelter, Water & Sanitation, Agriculture, Livestock, Fishing, Roads, and etc facilities after the incidence.
- Reliable and timely water supply for the recession cultivation (prevention of wash-aways of cultivations due to sudden and irregular floods)
- Reduction of evaporation losses in the flood plains
- Sustainable flow and positive hydrological balance to Lake Turkana which is characterized by high rate of fluctuations and level reduction at an alarming rate.
- Reduction of extended drought periods. The presence of the Dam shall allow continuous and regulated flow to the downstream river system.
- Long term sustainable development schemes that can positively change the lives of the downstream population are envisaged as part of the Management Plan.
- The presence of the Dam shall allow continuous and regulated flow to the downstream river system.
- Beyond maintaining the existing natural environment (ecosystem), several developmental interventions that guarantee improvements in the livelihood of the indigenous population are recommended in the Environmental Management & Monitoring Plan.

### 2.3.2 Wet-seasoned (Artificial) flooding

EEPCo responsibly understands that the Omo River is the life blood of particularly the downstream communities. The flooding is required to maintain the overall productivity, biological activities, and related biodiversity values by allowing annual regulated submersion of

adequate portion of Lower Omo basin. It will also guaranty timely discharge of the flows for the agriculture, livestock and fishery production.

The controlled flood release is foreseen from the reservoir during the month of September or end of August to coincide with the peak flows from the residual basin.

The dam design has incorporated all the necessary provisions like bottom and middle level outlets which can accommodate a flow of 25-50 M<sup>3</sup>/sec and 1,000 -1,200 M<sup>3</sup>/sec respectively, to guarantee the release of an Ecological flow and flooding for maintaining the downstream recession cultivation.

Moreover, installation of flow variation acoustic warning system: “alert and danger” posts and acoustic signals shall be provided downstream of the dam to alert/inform the abrupt release of waters to the downstream communities.

## 2.4 Regional Benefits

- Strategic partnership and economic integration in the region which will have significant contribution for regional economic cooperation and stability.
- Lower unit energy costs for the receiving systems
- Shifting from the expensive and insufficient thermal generation to hydro generation in the regional as well as international power markets.
- Accelerating cross-border electricity trading with the neighboring countries and further to other nearby countries.
- Hydropower counterbalances energy capacities and reduction of CO<sub>2</sub> emissions by thermal or other types of generation plants. (About 4.5 million t/y of CO<sub>2</sub> emission).

## 3. Public Consultation

The Project has conducted a series of public consultation in 2006, 2007 and 2008 in which around 2,000 community members and local officials were consulted.

Also, as part of consecutive duties, the project’s Environmental and Social Monitoring and Management Team has also carried out the same campaigns by translating the Executive Summaries of ESIA documents for the upstream and downstream communities in their own respective local languages. In this case, around four thousand community members and local officials have participated and expressed their views and concerns during the consultations.



The whole events of the consultation have been documented with audio-visuals and copies are delivered to wereda administrators of the respective communities.

Particularly, when the Environmental and Social Monitoring & Management Team of Gibe III HEP carried out the public consultations, disclosure and extensive discussions with the downstream communities, they said that they are much satisfied with the mitigation measures and the proposed plans of the project.



**Fig. 1- Community members have strongly aspired for the developments like irrigation activities in their own village (Feb, 2010)**

The Gibe III HEP also opened additional Environmental and Social Impact Management and Mitigation Team Satellite Office at Jinka town and hired four individuals from the major communities in the downstream. The office is conducting a serious of public consultations and works closely with the communities by creating public awareness in relation to the Omo River and the construction of the Gibe III HEP. This office is also gathering some information relevant to the office from the Project Affected Population. Generally the office is working as bridge between the project and the agro-pastoral communities at the downstream of the project.

#### **4. Impacts of the Dam on Lake Turkana**

The other claim that frequently forwarded by the coalition of campaign groups is that the Project has not conducted adequate studies on Lake Turkana and they assert that the dam will reduce the Omo River's flow into the Lake, causing the Lake to drop up to 12 meters. In addition, the group also argues the reduction in the inflow to the Lake will critically alter the ecosystem, affecting ~300,000 people.



If anyone who could read the ESIA Reports and further assesses and consult concerned bodies on the issue, he could have a clear understanding of what is going on the Project regarding Lake Turkana.

To this end, the allegation stands on the dune of the sand that any technical person couldn't estimate and pronounce that the Gibe III Dam by itself could store that amount of water which will drop the Lake to 12 meters.

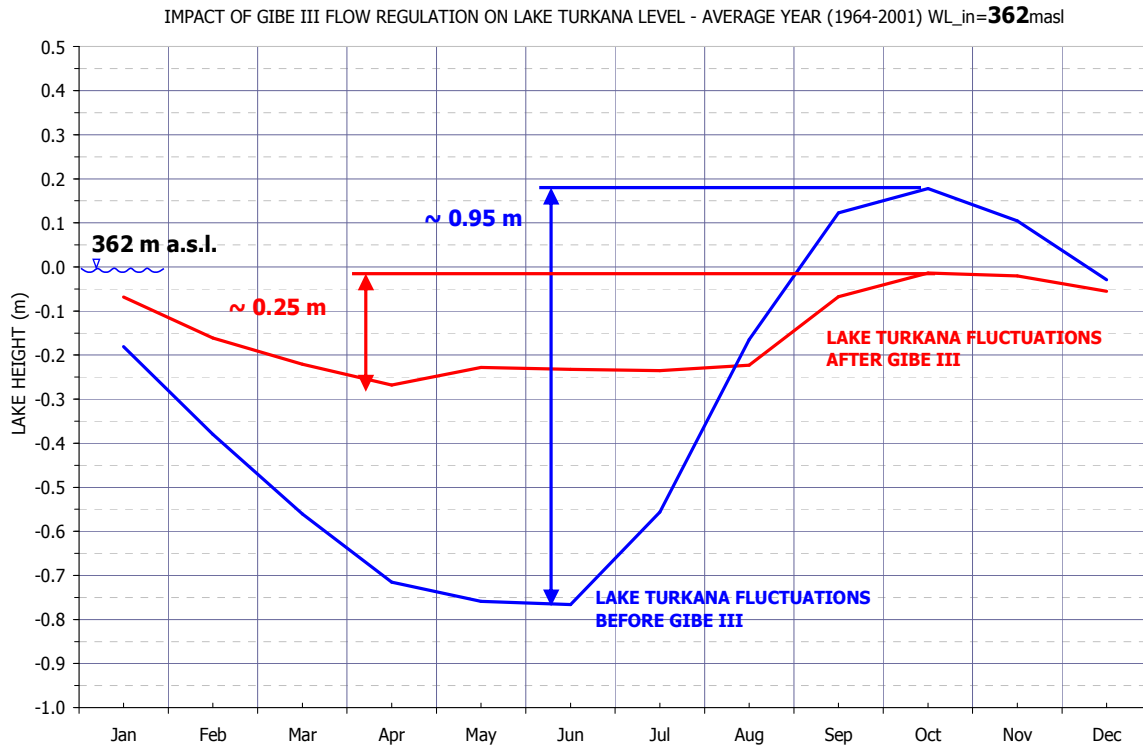
In fact, if all the inflow to the Gibe III dam is stored in the reservoir for one year without any release, the total volume would be 14.4 billion m<sup>3</sup> and the consequent reduction of the Lake Turkana's water level would be in the range of 1.5 meter. This has been confirmed by the additional ESIA gap analysis commissioned by the European Investment Bank (EIB), so that such issue could be addressed and settled once and for all.

Regarding the Lake Turkana inflow reduction, an additional hydrological assessment has been conducted by an Independent Consultant (Dr. Sean Avery) hired by African Development Bank Group. The preliminary result of the assessment shows that the Lake level is fluctuating up to 1.5 meter prior to the materialization of Gibe III Dam and this is due to the fluctuation in the inflow during dry and wet seasons. The maximum fluctuation on the Lake Turkana water level would be limited to 0.6 m after the construction of the Gibe III Dam. Consequently, the lake will have more or less uniform water level throughout the year.

The other independent study undertaken by Studio Peitrageli shows that the Lake Turkana water level has dropped constantly during the last decades. This drop was significant between 1972 and 1988 during which the water level dropped about 4 meters. This indicates that there is a long term change in the watershed and rainfall pattern of Lake Catchment.

This study has analyzed in detail the effects on Lake Turkana water level during the first impounding of Gibe III reservoir and the possible impacts during plant operation. The assessments revealed that the emergence of Gibe III reservoir with its planned wet season artificial flooding would have a positive impact on controlling the fluctuation of the lake water level both on dry years when only 13.6 billion m<sup>3</sup> of water flow in to the Gibe III reservoir and on average condition on which more water inflows to the reservoir.

The results of the assessments show that on average conditions, after construction of the Gibe III, the Lake will only have 0.25 m level fluctuation. This is illustrated in figure 2.



*Fig.2- Impact of Gibe III flow regulation on Lake Turkana level- Average Year(1964-2001*

Gibe III flow regulation will reduce the Turkana level fluctuation from about 1.0 m to 0.3 m. While in the case of a very dry year during which only 13.6 billion m<sup>3</sup> of water flow in to the Gibe III reservoir, the effect on the lake level will be more positive. The fluctuation would be reduced to 0.18 m from that of prior to Gibe III dam construction which is 0.76 m reduction in the lake Turkana water level during dry years. This is illustrated in figure 3.

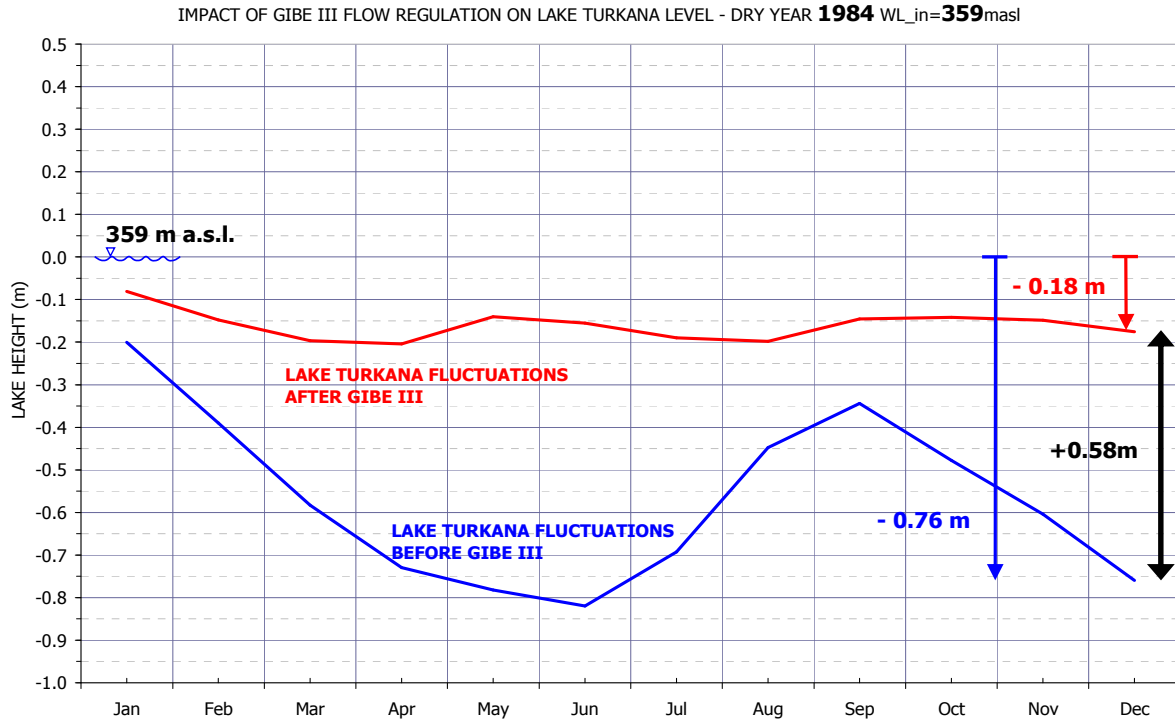


Fig. 3- Impact of Gibe III flow regulation on Lake Turkana Level- Dry year

As we can easily understand from the above figure, in very dry years (such as 1984 with only 13,600 Mm<sup>3</sup>) and for initial low level, Gibe III regulation will contain the lake level decline reduction of the shrinkage up to 75% that would occur in natural conditions. The construction of the Dam is not a threat for the downstream as well as for upstream communities. The communities also expressed their positive views towards the Project. What they would rather aspire is to have developmental activities in their own village. They attach particular importance for the Gibe III HEP because they have been well informed about the Project and its positive externalities. In fact, EEP Co will do a lot of developmental activities for both the upstream and downstream communities in accordance with the established mitigation plan.

As far as Lake Turkana is concerned, it must be underlined that the Kenyan delegation, which paid a reconnaissance visit to the Dam Site, affirmed that the impact is very minimal. It would rather give a remedial solution to the power deficiency for the Kenyan government. Who would give a witness for this than the delegates in power?