

## **Towards “A Sudanese Development Program”**

Elfatih A. B. ELTAHIR

(eaeltahir@gmail.com)

September 2020

A year ago, I wrote an article about [“Elements of Sudanese Renaissance”](#) that outlined a few potential initiatives towards social and economic development of the country. Although Sudan made some progress in its current transition towards establishing political freedoms, signing of a peace agreement, and rejoining the international community, the economic transition is facing difficult challenges.

In addition, the COVID-19 pandemic is presenting significant economic challenges at global, regional, and national levels. The decline in oil prices left a significant negative impact on the economy of the Gulf region with implications to surrounding countries including Sudan. The ability of international partners to support transition in Sudan will be limited due to the slowdown in global economy. These challenges compound the difficult state of the Sudanese economy, and will continue to do so in the near future. National efforts need to be redoubled in order to achieve any economic progress or stabilization in this difficult environment.

In order for ongoing transition to succeed, significant steps and structural economic adjustments will have to be introduced including:

1. creation of enabling conditions and substantial incentives for enhancing local production in agriculture and industry, and offering robust incentives to attract investments by Sudanese expats;
2. direct money transfer to limited-income families, and progressive taxation to relatively high-income individuals and companies with strict enforcement;
3. continuation of subsidies in basic electricity consumption and immediate lifting of subsidy on the high electricity consumption tier;
4. investment in public transportation for the masses, coupled to lifting of subsidy on fuels;
5. securing of foreign financial assistance and loans for use in controlling the process of gradual evolution towards a single and free exchange rate;
6. limits and constraints on imports, and close government monitoring and control on exports by public and private businesses including foreign currency proceeds.

These steps are necessary but not sufficient. Economic recovery and economic development are tied closely. Making real progress in addressing the current economic situation, and in achieving the aspirations of the young generation is closely linked with the launch of the economic development process. Hence, the narrative of events in Sudan has to change soon into a positive and constructive national dialogue about a Sudanese Development Program, with a specific set of national projects. This article is an attempt in that direction.

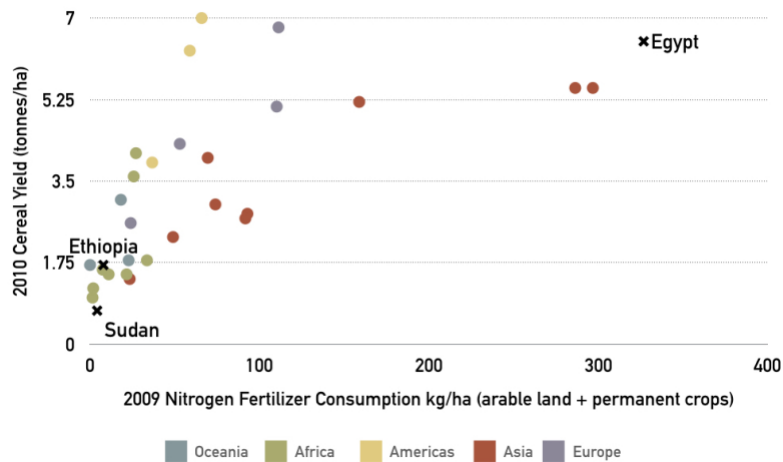
In addition to development of a productive local economy, employment of the youth, and stimulating the depressed economy, a new development program should aim at enhancing national production and exports at the expense of consumption and associated imports. There is an urgent need for transforming the dominant culture in society from consumption to production. In the next few years, Sudan will have to invest in a carefully selected set of national projects, each with potential to increase substantially the capacity for local production and export of goods and services to rest of the world.

Development has many dimensions. Here, I focus on economic development, and describe five concepts that can be developed into new national projects. The projects cover a range of sectors from agriculture, to livestock, tourism, water, and hydropower sectors. Most of the proposed projects have direct connection to water resources development (consistent with the author’s background!), a topic of strategic importance to Sudan. Additional projects need to be developed covering oil and gas, mining, logistics, and industrial sectors.

The projects are proposed as early stage concepts, not as proposals ready for implementation. They need to be developed further, screened and compared with alternative projects, before a formal social, economic, technical, and environmental feasibility analysis is carried, leading to potential implementation if survived scrutiny and approved by authorities. The expected international support for political and economic transformations in Sudan requires preparing thoughtful and feasible projects for consideration, potentially supporting them financially or promoting them to foreign investors.

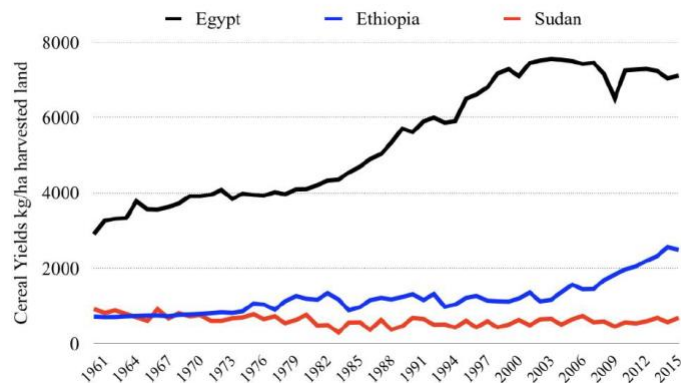
### 1. Sudan’s Green Revolution Project

Sudan, just like many African countries, lags behind the world in agricultural productivity due to the lack of adoption of important agricultural technology such as the use of improved seeds, fertilizers, etc. Farmers work hard but productivity is too low.



**Rates of Fertilizer Application and Agricultural Productivity**

As demonstrated in these two charts Sudan lags the region and the world in the rate of use of fertilizers and in cereal yields. These two empirical observations are related. In particular, the low productivity of Sudanese agriculture is a chronic problem that necessitates the launch of this project in the very near future.



This project is proposed with two main components:

- The project emphasizes adoption of modern technology using better seeds, and more use of targeted fertilizers, and financing for vertical expansion of agriculture instead of horizontal expansion. Soil fertility mapping, and new significant investments in agricultural research infrastructure are critically needed, in addition to new investments in targeted agricultural financing and marketing.
- The proposed project should promote the launch of a Sudanese fertilizer industry to start and increase local production, specifically nitrogen fertilizers, potentially utilizing Sudanese natural gas from the few sites where it was discovered.

Here, I propose the creation of a large-scale fertilizer factory in or around Gezira or in South Kordofan utilizing natural gas discovered in these regions.

This is probably the most important project among the five proposed. There is a great potential for increasing productivity of agriculture in Sudan significantly with modest investments in agricultural technology (increased use of fertilizers and new seeds varieties). International support for political and economic transitions in Sudan can be targeted towards financing this project with potentially significant and quick returns.

The recent success of the 2019/2020 wheat season offers a proof for the potential for a quick progress in this field. The large increase in productivity resulted from limited investments by the African Development Bank in a new targeted seeds variety.

## 2. Export of Livestock and Meat to Egypt: “Virtual Nile” Project

The Nile flows from Sudan into Egypt supplying water which supports life in Egypt. Most of this water is used for irrigation. However, with growths of population and economic activity, this water is not enough to satisfy demand. Increasingly, Egypt is relying on import of crops to satisfy local demand. These imports are grown using water resources in other regions and hence often described as “virtual water” imports. A significant fraction of this water demand is needed as feed for livestock in order to produce meat for local consumption. It takes roughly about 10 (5 to 20) cubic meters to produce a kilogram of meat. In a recent study by my research group, we estimated that Egypt currently consumes the equivalent of 14 cubic kilometers of water in the locally producing meat (See below).



On the other side of the border, Sudan is rich in livestock with large populations of camels, cows, and sheep. For economic reasons mentioned earlier, there is an urgent need to expand Sudanese exports of livestock and/or meat. Currently Sudan exports camels to Egypt, but export of other animals is limited in scale.

This project aims for a dramatic expansion of Sudanese exports of livestock and/or meat to satisfy Egypt’s increasing demand for meat. I am aware that Sudan already exports livestock and meat to Egypt. This proposal is about moving that activity into a much higher level, with long term political commitments and robust economic sustainability. The goal is to achieve billions of dollars in livestock exports per year, which translates, very roughly, into millions of free-range sheep exports, equivalent to the export of a few cubic kilometers of virtual water. This water is mostly rainwater that falls on Sudanese soil and naturally irrigates the Sudanese grasslands, feeding the exported livestock. To be explicit, “Virtual Nile” is not about exporting Nile water, but rain water!

In order for such project to succeed, Sudan will need to invest heavily in the livestock sector, especially in veterinary services, and in new science-based approaches to maintain and expand productivity of the national livestock sector. Overall structure and details of this project should

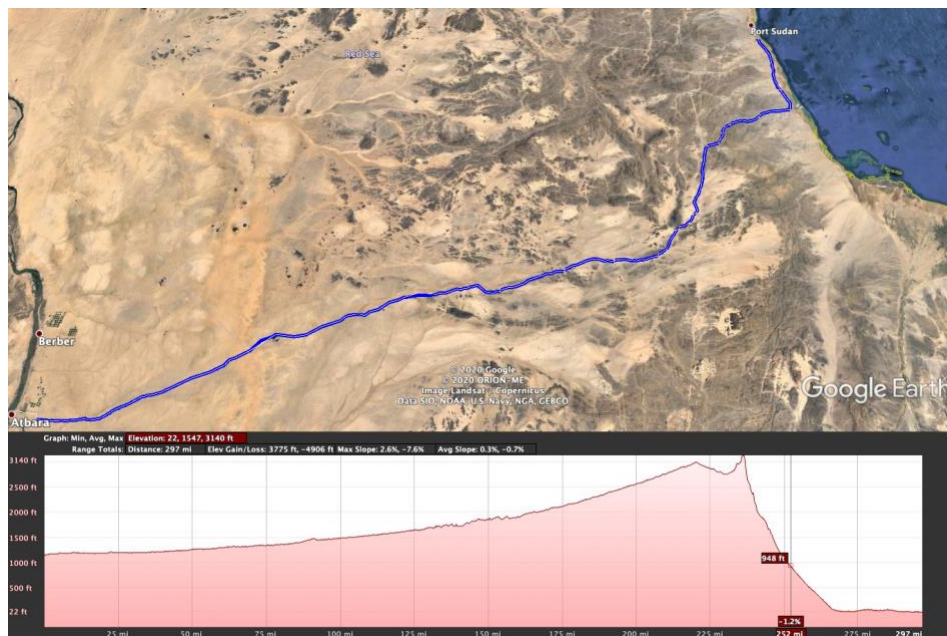
be scrutinized by experts in veterinary medicine, livestock economics, and other related fields. This is an invitation for constructive criticism.

The benefits from this project are likely to be widely shared covering most regions of Sudan. This project should offer an example for a potential economic collaboration with Egypt driven exclusively by national interests on both sides of the border.

### 3. Red Sea Development Project

The Red Sea region is the poorest region in the country in terms of water resources (including rainfall and river flow). However, the same region enjoys the best relative location in terms of access to rest of the world, and with great potential for logistics and tourism industries. Also, population density in this region is relatively low despite of the cool weather in the mountains!

Here, I propose the transport of Nile water to the Red Sea region to support development of coast and the mountains. A pipeline can be properly designed to transfer limited amounts of water from the Nile to Red Sea coast. In order to transport water from the Nile to Port Sudan, initially, water has to be pumped uphill over the Red Sea mountains. However, all that energy (and more) can be reclaimed through hydropower generation of electricity as water flows downhill to Port Sudan. Water level in the Nile is higher than Red Sea. Some of this potential energy difference can be converted to electricity, after accounting for friction losses. The water transported to Port Sudan should be used to meet local demand in that city, and for regional economic development.



As a general, and rough, set of specifications:

- The pipeline length is about 440 kilometers, and with a nominal capacity to transport about 500 MCM (0.5 cubic kilometer) per year.
- The pipeline follows the highway between Atbara and Port Sudan, supplying water to Haya, Sinkat, Gebeit, Arkawit, Suakin and Port Sudan.
- The intake is located at elevation of about 350 masl (meters above sea level), and the outlet near Port Sudan at about 30 masl, i.e. the transported water would gain a net potential energy difference of about 320 meters. (In comparison, transport of water into the western regions of Sudan will require pumping water into destinations located at significantly higher elevations than the Nile.)
- The pipeline has 4 main segments, roughly, Atbara to Haya, pumping water uphill by about 300 meters; then Haya to Gebeit, pumping water again by about 200 meters; and then Gebeit to Suakin, dropping by about 820 meters with the potential to generate electricity out of this hydropower at one or more stations. The last segment is relatively flat from Suakin to Port Sudan.
- The electricity used to pump the water uphill can be supplied from Merowe dam, or from specially designed solar energy stations.

This potential project will have several benefits and advantages:

- This project has the potential to create a new population center in the sparsely populated region of Eastern Sudan, alleviating some of the population pressure from Khartoum.
- Transport and supply of water into a region where development is constrained to a large degree by shortage of water and energy; I estimate the nominal capacity stated above may supply water to about 5 million people;
- Transfer and supply of electricity to fuel economic development in the seaport and logistics sector, for new industry dedicated for export, and tourism; I estimate in its nominal capacity this system will generate electricity comparable in scale to that generated from Roseries, and may supply electricity to about 3 million people supplementing existing power plants;
- Generation of electricity from solar energy and hydropower, all renewable and sustainable sources;
- The pipeline follows the existing road and passes through most cities and towns of the Red Sea province (Port Sudan, Suakin, Sinkat, Gebeit, Arkawit, and Haya)
- Storage of water at a small reservoir located at the highest point to reduce evaporation losses;
- The same system can be optimized to store electric energy by pumping water uphill into storage whenever excess electricity is available in the national grid.

Although the amount of water involved is small, Sudan should seek to get explicit approval for this water transfer from the Nile basin countries, since Port Sudan is located outside the basin.

An alternative source of water for Suakin and Port Sudan is from the groundwater aquifer beneath Tokar delta, transferred via a coastal pipeline. The scale of such transfer would be significantly smaller than the Nile water, and would only cover the coastal region but not the mountains. However, if this option is pursued, it should be part of a master plan to rehabilitate the irrigation system in the delta, and to protect Tokar from flooding by Khor Baraka. Further studies can be carried to compare these two options, and possibly combining the two options by supplying the mountains from the Nile and the coast from Tokar.

#### **4. Sudanese Tourism Project: “Visit Nubia”!**

Most countries in the Middle East and North Africa manage to balance their foreign accounts through either income from oil and gas industries (Saudi Arabia, Kuwait, UAE, Qatar, Oman, Libya, Algeria) or through income from tourism (Lebanon, Egypt, Tunisia, Morocco, and Jordan). Although oil sector is somewhat developed in Sudan, the tourism sector is still at its infancy.

In general, opportunities for development of the Sudanese tourism industry should be explored with a focus on archaeology in the north, sea resorts and sports along the Red Sea, camping and sustainable hunting of wild life in the desert regions, and developing new attractive touristic resorts in Jebel Mara and the Nuba Mountains. National tourism projects could be launched to develop opportunities in the winter season when the weather in Sudan is more pleasant compared to the harsh weather of summer.



**Map of Nubia, Museum of Fine Arts, Boston**

In launching the Sudanese tourism industry, I propose a national project developed around the Nubian archeological sites, to welcome millions of tourists every year. In particular, three sites can be emphasized:

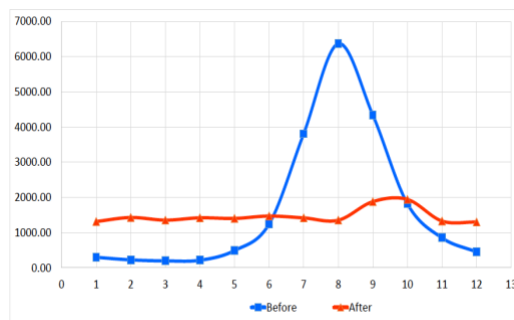
- Kerma, the crown-jewel of Sudanese archaeological sites (2500 BCE-1500 BCE)
- Gebel Barkal, “believed by Egyptians to be primeval home of their supreme god Amun” (1500 BCE -660 BCE) and
- Meroe, site of the Nubian pyramids, third kingdom of Kush, 270 BCE- 370 CE.

Choice of these sites as well as other details in this project should be scrutinized and approved by experts in archaeology and other related fields. This is an invitation for constructive criticism.

Luxury hotels can be built to host tourists in Khartoum and each of the three sites. For each site: (i) two large hotels can be built one next to the Nile, and the other hotel located in the desert overlooking the archaeological site; (ii) protected desert areas can be established within short distance from the three sites to provide potential outings for the tourists; (iii) visitors can spend time visiting the Nubian archaeological site, learning about the Nile and traditional Sudanese life around the river, or they can take excursions into the desert to enjoy the natural desert landscape and the associated flora and fauna. Regarding logistics of a typical tourist visit: the trip from Khartoum to Meroe and back can be taken by cars. From Khartoum to Gebel Barkal is a short flight. From Gebel Barkal to Kerma can be travelled by a river cruise. Khartoum or Dongola airports can act as the arrival/departure gates for Sudan in any touristic visit that covers the three sites. The emerging tourism in northern regions of Sudan should be integrated with similar activities in upper Egypt, especially at this early stage of tourism industry development in Sudan.

### 5. Doubling of Hydropower Generating Capacity in Roseries

Investments in expanding the national electricity generation capacity, from renewable sources, is a much-preferred approach to the use of the limited foreign currency resources in importing electricity from Ethiopia or Egypt.



One of the main benefits of the Grand Ethiopian Renaissance Dam (GERD) to Sudan is the regulation of the flow in the Blue Nile, and to a less degree in the main Nile, creating enhanced hydropower potential. The Figure above, taken from a recent presentation by the Ministry of Irrigation and Water Resources describes the redistribution of the flow in the Blue Nile, due to GERD, among the different months resulting in almost uniform flow. The existing electricity



generation system in Roseries was designed assuming the old flow regime. As a result, the current capacity of that system is relatively small designed assuming low flow during dry season. Following operation of GERD, flow in dry season will increase significantly.



A simple preliminary analysis carried in collaboration with Dr. Reem Digna suggests that the capacity of the hydropower generation system in Roseries can be doubled by increasing the number of operating turbines from six, each with 40 MW capacity, into twelve of the same size. The additional turbines can be housed in suitably designed facilities at sites selected carefully on the reservoir (see Figure above) and close to the dam. A set of twelve turbines will be sufficient to handle most of the flow in a typical year.

### **Development Model**

In my view, any of these proposed national projects is best conceived as a partnership between public and private sectors. A modern company can be launched as a joint venture between Sudanese government, Sudanese private sector (including Sudanese expatriates), and foreign investors, with majority of shares owned by Sudanese (government and private sector), and at the same time majority of shares owned by private entities (national and foreign). Achieving that would require a 49% upper limit for the fraction of shares owned by any of the 3 partners. Being a national company would insure that majority of the returns from the project remain in Sudan. Being a private company would improve standards of business management and secure the necessary investments and financing. Inclusion of foreign investors insures international standards, and access to modern technology. This development model should build on the positive aspects of the experience with Kenana Sugar Company and avoid negative aspects of that development experiment.

## **Peace and Development**

Where does the ongoing peace process fit in this proposal? In my article about “Elements of Sudanese Renaissance”, I addressed the issue of Peace through Development in Sudan. However, progress towards peace so far emphasized political reconciliation through participation of armed struggle groups in the government, while financial resources are allocated for investment in regional development without a clear rationale for deciding on: Where to target investment? How much to invest? and Why? Without addressing these questions in a rational way, the peace process will not address the root causes of marginalization.

In the following, I copy sections from my earlier article that address these important questions: “Here, I propose an initiative for addressing the challenge of uneven economic development. A “National Commission for Even Economic Development” can be created to supervise the following tasks:

- A professional survey carried out by independent international experts in collaboration with local representatives should be commissioned to produce a detailed map describing the level of economic and social development in all localities of each region in the country (all regions of Sudan). These maps should cover access to health, education, water and electricity services, as well as access to economic opportunities and jobs, and measures of gender equality, within those localities.
- The same map can then be translated into a priority list that reflects an objective ranking of different localities to be used for targeting investments in economic development by the central government.
- I propose that all the income of the central government from oil, gold, and other minerals should then be used to create a development fund that targets the least developed districts based on the ranking and criteria established above, but irrespective of region. In addition, all international donors with interest and desire in seeing stability and development in Sudan and Africa may contribute towards this development fund. Allocation of all proceeds from oil, estimated at market price, for this fund will impact the central budget significantly.
- The allocation of funds should respond to specific small-scale proposals submitted by local authorities from different localities around the country. Such process should empower the different localities and regions at the expense of the center.
- The future development investments should target access to clean water, sanitation, health (especially for mothers and children), equal educational services for girls and boys, and electricity supply, as well as training and job creation programs.
- This initiative will have to be carried out with the highest level of transparency, including the initial field surveys, professional assessments, rankings, sources of funding, investment allocation criteria, biddings, details of contracts, and measures of success.”