Re-Building Sudan
AFTER THE WAR

PLANNING, STRATEGY AND DEVELOPMENT

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CHAPTER 03

CONCEPTUAL

An Accelerated Sustainable Development Action Plan for Post-war Sudan

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ABSTRACT

PURPOSE: This chapter will formulate the required poverty eradication strategy with the required pro-poor and social protection policies and other needed procedures to contribute to Sudan's post-war recovery.

DESIGN/METHODOLOGY/APPROACH: The chapter uses quantitative and qualitative analysis to conceptualise all required policies, strategies and approaches that will create the needed synergies between the pro-poor, social protection policies and economic opportunities. The analysis is based on evaluating technical processes and services together with an intensive literature review from earlier published papers.

FINDINGS: The analysis process led to identifying the science, technology and innovation (STI) policies for the development of smart cities all across Sudan; certain governance policies towards an efficient and just new civil service; strategic management policies to link all economic sectors instead of acting in separate silos; and the required natural resources management policies for better productive synergies across Sudan.

VALUE: The chapter draws a clear path towards building peace in the minds of all men and women, while increasing their nationalism and ensuring their dignity and prosperity in post-war Sudan.

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RESEARCH LIMITATIONS/IMPLICATIONS: The study dwells on the available limited data; future work could be expanded when more data are available.

PRACTICAL IMPLICATIONS: The chapter could easily be part of a serious programme for an elected technocrat government.

KEYWORDS: *Policies; Poverty Eradication; Pro-Poor; Social Justice; Compact Urban Development; Aerotrain; Governance; Darfur Region*

INTRODUCTION

No one will argue that pre-war Sudan was indeed a fragile state, as it fits the OECD definition as being "a state that has weak capacity to carry out basic functions of governing a population and its territory and lacks the ability to develop mutually constructive and reinforcing relations with society" (Hoeffler, 2012). It is clear that the government during the period 2021-2024 failed to provide two basic functions: security and economic opportunity (Fund for Peace, 2024). If one takes an income of US$1.25 or less a day as the poverty headcount measure, during the past 30+ years the rate of poverty of Sudanese society at large has drastically increased to over 70% of its population. This has also been evident noting the fact that the middle class has completely disappeared from within the Sudanese population.

It is imperative to start the post-war development process by devising a coherent poverty alleviation strategy, based on the required set of public policies, measures and strategic programmes. These will address systemic inequalities, protect vulnerable populations, promote social justice, and foster inclusive growth. Sugihartono (2024) eloquently analysed why Sudan has failed as a state to achieve sustainable development despite being rich with its natural resources. She attributed this failure to the following main reasons:

- Sudan faces a geographical challenge with its diverse landscape ranging from vast deserts to floodplains, presenting considerable difficulties to infrastructure development. Investment, particularly in transportation and power generation, will be key to unlocking Sudan's potential towards sustainable development.
- Systemic corruption in the extractive industries, particularly oil and gold, have undermined efforts to harness these natural resources for the gain of the wider population. It is therefore essential to promote and adopt transparency and sound management in these industries through adequate policies to ensure the wealth will benefit all Sudanese people.
- Policy instability, together with lack of the appropriate infrastructure, has restricted the country's ability to attract the investment required to develop its natural resources sectors. Stable and coherent economic policies are crucial and a must-have to promote economic growth through the required international investor trust.

Most importantly, however, an ultimate resolution to the Darfur conflict will be of utmost importance in order to dream of that peaceful and prosperous Sudan. This conflict calls for a careful intervention of gradual social inclusion to the people of Darfur to resolve this level of ill-feeling of marginalisation, and to bring the social weave of the Sudanese society to its previous benign status. In addition, new and innovative outside-the-box solutions to meet these difficult requirements, particularly in the transportation, power generation and specially tailored infrastructure, are in order to reverse the upheaval cycle the Darfur region has been under and experiencing since the British colonialism era.

To achieve the above objectives, Hoeffler (2012) considered four main policy areas. These will be used to embed the structure of the proposed poverty alleviation strategy in the form of briefs around the important and required charters, measures and strategic programmes that a practical Poverty Eradication Strategy (PES) for post-war Sudan should possess. These briefs will be introduced in the following four sub-sections:

1. The Main Structural Policies Required for Sustainable and Equitable Growth:
2. The New Social Inclusion Act for a Perceptive Post-war Sudan:
3. Reforms for Macro-economic Sustainability and Stability: and
4. The New Public Sector Management Framework:

These four sections of the proposed PES will essentially recognise, explain and address all of the different aspects, challenges and available cost-effective opportunities. All the possible identified policies and processes to cement and galvanise the devised PES will be described.

The Main Structural Policies Required for Sustainable and Equitable Growth

To successfully manage a project such as developing a post-war Sudan, one needs to identify all the available no-cost/low-cost solutions, sometimes called low hanging fruits, particularly in a scarce resource situation. While project management offers numerous benefits, it is not without its challenges. These challenges can hinder any project's progress and impact on its overall success. In our case for a post-war Sudan, inadequate resource allocation is envisioned to be a main challenge that can face this project. Without the right resources, this project may not be completed on time or within budget. Stakeholders therefore need to carefully assess resource requirements and allocate them effectively to ensure that our project has the necessary support to succeed.

With regard to the above project management strategies, the following are the briefs of some critical structural tactics, measures and strategic programmes for successfully leading Sudan into sustainable and equitable growth.

Aristotle's framework for action for a better stable and just society

A well-designed Poverty Reduction and Social Protection (PRSP) framework will revolve around the implementation of Aristotle's call for increasing the middle class for a better stable and just society, therefore enacting the principle of "Leaving No One Behind" by focusing on the well-being and development of the most vulnerable and most impoverished 15-20% of each region's population. Taking these targeted groups out of acute poverty will indeed impact the social and economic development of these communities and their country, as in the case of Brazil between 2003 and 2011. The technological development strides that Brazil experienced during that decade were simply provoked by educating and technically training the poorest 10% of Brazil's population. The result was a huge wave of technological development to the whole country.

Waqf, Zakat, Investment and Retirement (WZIR) State Fund

There is a clear need for a well-structured welfare system that should facilitate financially supporting actions such as social security, unemployment insurance, social housing, education policy and health care, and enacting Aristotle's approach at least for the 15-20% most vulnerable and impoverished members of society. This poverty alleviation strategy calls for utilising a number of financial sources at each state level to ensure we have adequate funds for supporting the implementation of the proposed Social Inclusion Act. Zakat is a major pillar of Islam; this amounts to 2.5% of any form of wealth including gold, silver, and coins, residential assets and business assets, all sorts of cattle, agricultural crops, and/or Investments (such as stocks, bonds, or rental properties) (Bonyan Organization, 2025).

For the sake of the proposed poverty alleviation strategy, and while the old zakat system was centralised and all collected funds were handled at the federal level, we propose that the zakat, waqf returns, and even the retirement funds are collectively dealt with at each state level to ensure that the needs of the most impoverished in each state are met at an early stage. At a later stage, all registered population in a specific state will become welfare receivers as investment returns start to pour steadily into the WZIR State Fund.

The following briefs present another two main sources that will substantially increase the returns of the suggested WZIR State fund.

State/municipality co-operatives for basic services

This brief introduces another new innovative and effective funding mechanism that is based on the co-operative business venture model. While co-operatives have the disadvantage of remarkably depending only on its members' participation and expertise that often result in unsophisticated management, our proposed model has been developed further as a co-operative-private-partnership (CPP) model. The CPP model locks up on the profit incentive as a vital stimulant to attract private sector investment. The CPP model is authorised to work hand-in-hand with the WZIR State Fund.

State Circular Economic Investment (CEI) Act

For post-war Sudan, we present the new and innovative State Circular Economic Investment (CEI) Act; this calls for a new investment model to support each state in generating its needed cash flow and best utilises the natural resources it possesses in a just way. The investment model supports state agriculture and/or industrial projects to attract the private sector with zero taxes, free land and free basic services of electricity and industrial water. The model calls for a partnership between the investor with a profit share of 15%, together with 50% of profit share for the state government, 20% profit share for the federal government, 5% profit share for the workplace employees and 10% for the WZIR State fund. In addition, each state gets priority to mine and extract the natural resources that have been bestowed within. Added value operations and activities for any of the state's natural resources should also be planned within the border of that state. If a genuine technical reason exists for transferring the raw material across the state border, then a 15% state sales tax is applied.

The New Social Inclusion Act for a Perceptive Post-war Sudan

The main structural policies introduced in the previous section set the grounds for the main and core part of the proposed Poverty Alleviation Strategy (PAS). As stated before, the PAS is expected to instigate a return to the previous socially harmonised weave of Sudanese society, and to bring the required level of dignity and prosperity for all its nationals including the smallest farmers and technical workers in Darfur, and all through to its jobless college graduates in Khartoum.

The purpose of the proposed New Social Inclusion Act is to introduce a legal way in Sudan to promote the social inclusion of marginalised people including women and young people, and particularly of distant rural areas. This intends to remove the current challenges of economic inequality, lack of access to quality education and healthcare, and their current status of social isolation. The Act will ensure the system will provide the targeted population with opportunities to exert an influence and improve their skills and livelihoods. The Act will ensure enacting the principles of social justice, being respect for the human person, promotion of the family, the individual's right to own property, the common good, the dignity of work and workers, and the pursuit of peace and care for the poor. Enacting social inclusion creates a context where everyone should feel a sense of belonging and participation; this is achieved through actions taken to look after and stand up for self, others, and the natural world.

In the case of Sudan, as is the case with many other developing countries, there is a dire need to craft specially tailored social policies that will essentially provide the targeted populations with the tools and resources they need to succeed in their communities and society as a whole. The aim of this Act is to develop an inclusive social welfare system to ensure that all Sudanese people have the best of opportunities to enjoy life and do well in society, making sure no one is left behind or excluded. The Act will essentially ratify and adopt the main structural policies that have been introduced in the previous section, as its main application to support the Social Inclusive Act (SIA).

Social welfare is usually made up of several programmes to reduce poverty. Globally some countries such as France, Belgium and Finland spend about 30% of their GDP on social welfare. The world's largest social welfare scheme is the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in India for poverty alleviation through rural employment generation. The fiscal system established by the application of the above structural policies should allow Sudan to craft a robust Social Security and Welfare system to successfully combat poverty with the provision of social housing, healthcare, education policy and better living conditions.

Reforms for Macro-Economic Sustainability and Stability

Sugihartono (2024) has identified economic policy instability and lack of the appropriate infrastructure among the main reasons that have restricted the country's ability to attract the required investment to develop. Furthermore, it is crucial to design special and most befitting coherent economic policies to promote inclusive economic growth. Policies are also needed to resolve the country's geographical challenge with its diverse landscape, particularly in the transportation and power generation sectors, in order to unlock Sudan's potential towards sustainable development. Smart reforms altering the old ways are therefore essential to ensure success after the drastic failures of the classical ways that have been used since the country's independence. For example, it is important to think of a new unit that should be formed to protect the country's natural resources such as Gum Arabic, gold, etc. Placed under the police force and customs, this unit will be trained to undertake their job and its difficult tasks through the surveillance of drones (unmanned planes) that are equipped with firearms; and these drones will be licensed to apprehend and neutralise any illegal smuggler or contrabandist trying to smuggle any of these natural resources out of the country.

In each of the identified three sectors, namely infrastructure, power generation and transportation, we will first identify all the available no-cost solutions, sometimes called the low hanging fruits, particularly in a scarce resource situation as in Sudan. Once the no-cost solutions have been exhausted, then the low-cost solutions will follow.

Power generation economic reforms

Energy in all its forms is considered an essential catalyst for poverty alleviation and economic growth. Therefore, the scarcity of electricity production and its distribution are considered among the biggest obstacles to sustainable development in developing countries. Currently, 70% of electricity beneficiaries are concentrated within the central states, representing only 30% of Sudan's total population. The problem of generating and distributing electricity in Sudan is particularly acute due to its vast area and distributed of its dispersed population. Before the war, the installed power generation capacity in Sudan was 4,500 megawatts (MW), where about half of the capacity was from fossil fuel sources, about 43% from hydroelectricity, and the remainder (7%) from renewable energy sources such as solar and biomass. Transmission and distribution of electricity has been limited, particularly in the rural areas in western Sudan (EIA, n.d.)

The Grand Ethiopian Renaissance Dam (GERD)

GERD is located 25 miles from Ethiopia's border with Sudan, and with an expected capacity of 5,150MW. This will improve access to energy within Ethiopia and make it more feasible to export electricity to nearby regional nations, promoting integration and growth (Al-Dalil, 2024). Away from getting into the current dispute between Ethiopia and Egypt, and if GERD becomes a living reality, Sudan should sign for power evacuation of most of the estimated electric production of GERD into Sudan's transmission lines. The cost of hydroelectric power is usually about 2-3 cents/kWh: therefore, this option is the cheapest for Sudan, even much cheaper than gas turbine power generation that is usually around 6 cents/kWh. In this case, all Sudan needs to do is to strengthen its 500kVA transmission line, and extend it further into western Sudan, all the way into Al Junaynah in the Darfur region. Economically, all fossil fuel power generation in Sudan should cease once the GERD is up and running, giving way to much lower electricity tariffs becoming a reality. This would then support the reduction of the financial burden on the population, while allowing for as much industrial expansion as Sudan can take in terms of power generation requirements. Fossil fuel cars should also be replaced by electric cars.

Small hydroelectric power generation systems

In May 2008, the Faculty of Engineering and Architecture at Khartoum University undertook a study to investigate the possibility of utilising the hydroelectric power present in irrigation canals in the various agricultural projects by applying small hydro generation systems to meet some of the rural areas' needs for electrical energy. The study indicated the possibility of developing small hydroelectric generation as a solution to the problem of scarcity in production and distribution of electrical energy in the rural areas within the four agriculture schemes (Hassan, 2008). It was also found that most agricultural projects are located parallel to high-voltage power transmission lines. The electricity generated by small hydropower in those locations can therefore play a major role in reducing electricity losses that occur in long distance power transmission lines. The study recommended connecting the generating station directly to the national electricity grid. This reduces the costs of supplying and establishing a new network or isolated distribution lines in the identified areas. A new patented design was developed and used to erect the small hydropower stations, which befits the use with the existing old main irrigation gates as requested by the Ministry of Irrigation.

Al-Kawther reservoir scheme (Patent No. 975, September 2003) (Hassan, 2003)

The Al-Kawther Hydroelectric Scheme has been engineered to pursue sustainable development in Sudan as its main objective. The proposed dam design and location has been optimised to allow for synergy maximisation, allowing for substantial contributions in the different development sectors (agriculture, water resource management, hydropower generation, socio-economic development, etc.). Despite its supreme location, the site of the Al-Kawther Scheme (Figure 1) has never been identified or investigated before as a potential candidate for water storage and/or hydropower generation in Sudan.

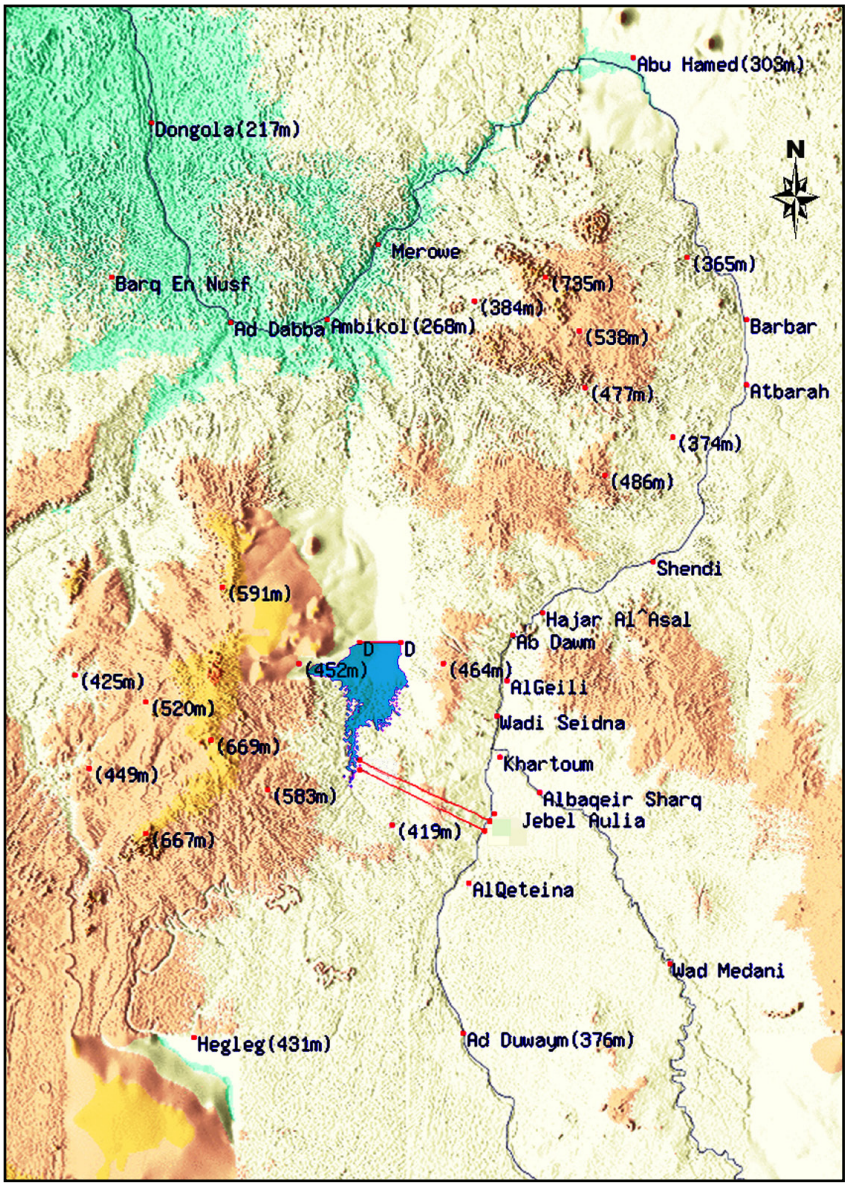

Figure 1: Al-Kawther Hydroelectric Project Dam and Reservoir
Source: Developed by the author

High altitude maglev vertical-axis wind turbine system

In 2018, Sudan made plans to develop utility-scale wind farms in three regions, Dongola (100MW) in the North, Nyala (20MW) in the West and the Red Sea coastal region (180MW). This marked

a significant step in bringing Sudan closer to a more sustainable and green future. A remarkable milestone was achieved in December 2022 by the Dongola Wind Pilot Project, when the project completed the installation of a 900Kw wind turbine. The commissioning and final testing phases were scheduled to begin in March 2023. The operation of the pilot project was to serve as a proof of concept to encourage private and public investment in clean energy for the African region. However, it should also be noted that wind energy systems in their current form can only thrive in geographically limited regions and locations, where the wind speed regimes allow for economic production of electric power.

To overcome the critical shortfall of the intermittent power supply for any wind power system, a new patent design was developed with the invention of improving on vertical axis wind turbines (VAWT) to allow for their effective utilisation at high altitudes and without the restriction of geographical locations where weak wind regimes exist. As shown in Figure 2, the proposed VAWT system could be erected with minimal construction lead time and without the need for year(s) of long wind speeds measuring and/or analysis. A helium lift vehicle has been designed to continuously align the VAWT system to the optimal altitudes where its design wind speed exists, therefore ensuring its operation at maximum efficiency 24 hours a day (Hassan, 2013).

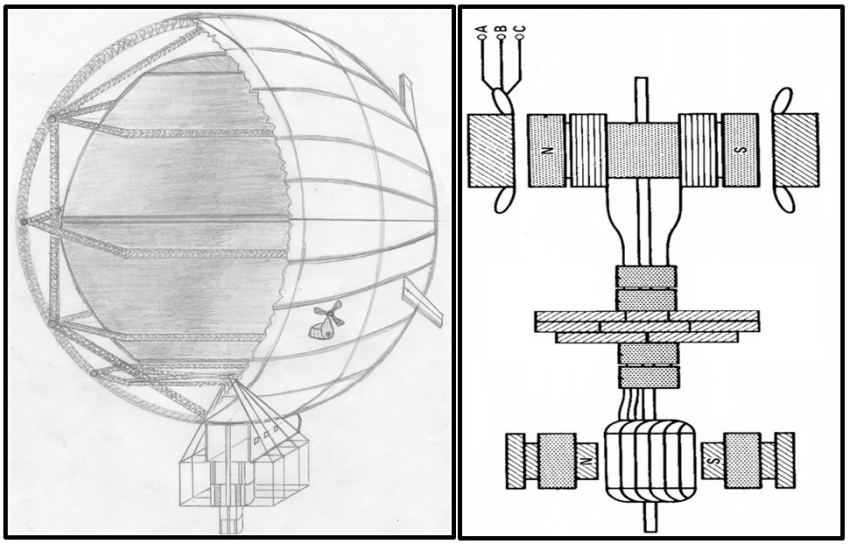

Figure 2: High Altitude Maglev Vertical-Axis Wind Turbine System (Patent WO2013/189503)
Source: Developed by the author

Infrastructure and major urban development reforms

To provide the targeted vulnerable population in Sudan with the required infrastructure that is most resilient and environmentally sustainable, while meeting the no-cost/low-cost condition, we recommend utilising the new and innovative compact urban development. The compact city or city of short distances is a new Japanese urban planning and design concept that promotes relatively high residential density with mixed land uses. They are designed so that people can access everything, such as shops, schools, parks, healthcare, and workplaces, within a distance of 15-minute walk or bike ride from their home. Compact urban forms are pivotal in advancing environmental sustainability by optimising land use and minimising the ecological footprint of cities. By concentrating development in defined areas, cities can curb urban sprawl that otherwise consumes vast stretches of natural habitats and agricultural land. Since one can easily reach more places because the distance is greatly reduced, there is less need for any car use, and travel times and costs are therefore shortened. The following has the huge cost-effective benefits when implementing the concept of the Japanese Compact Urban Design, and we therefore recommend using this concept to house the federal and state government staff, as well as to offer social housing for the 15-20% most vulnerable families.

Figure 3 illustrates the proposed building complex that is designed essentially as a set of high-rise units of 50 storeys/floors, with about 175 metres height and 2,000 square metres surface area each. The complex contains a total of 1,200 apartment units and can accommodate up to 1,000 families (about 4,500 persons), supplying a substantial population with all their basic needs and services in one step (10-12+ SDGs achieved) (Hassan, 2024).

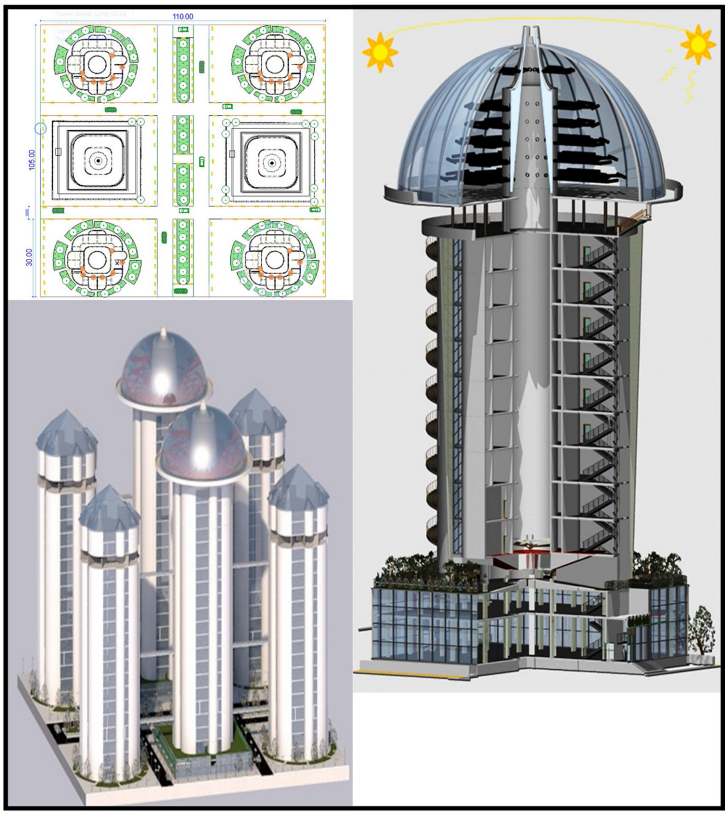

Figure 3: Applying the Japanese Compact Urban Design Approach
Source: Developed by the author

Within the 18 current states of Sudan, there exist about 126 districts or major localities where these building complexes could be erected as the nucleus of the sought Technopolis and new city centres. Eventually, these can easily house the targeted government officials and the vulnerable population in each municipality. These locations could also become the new city centres where the central markets and public transport centres are planned and located. Using the patented design for the wind turbine system (WO2013/890503) described before, each building could house a wind system of 500kW and therefore not only supply its tenants with their demand of electricity and desalinated drinking water but could also export the excess power generated to the national grid as extra power.

Public transportation infrastructure for the New Technopolis City Centres

To give the reader an idea to what extent the road transportation network has been disastrous and devastating and offers considerable difficulties to both moving people and goods around the

country, the Table 1 gives an indication of the distances and travel times between the major cities in the Darfur region as just one example of the level of productivity loss and the associated high opportunity costs.

Table 1: Lost Productivity in the Form of Lengthy Travel Time

City (from)	*City (to)*	*Current travel distance (km)*	*Time Taken*
Al Junaynah	AL Fashir	396	6h 50min
	Muglad	800	13h 53min
	Diling	1,107	17h 29min
	El Obeid	1,002	15h 55min
	El Fula	979	17h 50min

Source: Developed by the author

The network of paved roads is not well developed, and the harsh environment and climate between extreme heat and tenacious rains and floods often destroy these paved roads. The railways option itself does not come cheaply since erecting one mile of railway tracks is very expensive in terms of the amount of required steel and workmanship, exceeding US$1 million per mile of track! Instead, we recommend the Aérotrain as the ultimate answer for Sudan's transportation system requirements. This will cover its vast land and thousands of miles of transport network in a very cost-effective way from a capital and operational expenditure point of view, and will support all the required economic activities of its population. The Aérotrain was a hovertrain developed in France between 1965 and 1977, with the aim of suspending the train above the tracks so the only resistance is that of air resistance. The track for hovertrains is merely a steel reinforced concrete monorail in an inverted 'T' shape. As illustrated in Figure 4, the hovertrain could be propelled by a Linear Induction Motor (linear motor) propulsion system, as in the case of the S44 aerotrain. Table 2 indicates the savings in travel time between most of the destinations in western Sudan, showing how such a simple reform in the infrastructure of the transportation system will drastically increase the productivity of the whole nation.

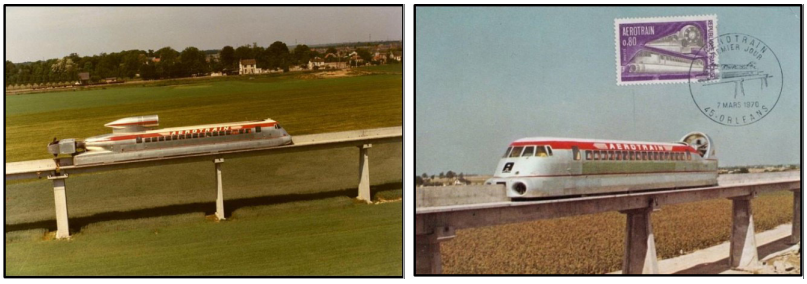

Figure 4: The Aerotrain was a high-speed hovertrain design developed in France from 1965 to 1977
Source: https://www.carjager.com/blog/article/bertin-aerotrain-1-2-i80-250-et-hv-les-trains-fantomes-de-la-grande-vitesse.html

Table 2: Travel Time Savings using the Aerotrain at an average speed of 250km/hr

City (from)	*City (to)*	*Current time taken between destinations*	*Estimated time taken via proposed aerotrain with average speed of 250km/hr*
Al Junaynah	AL Fashir	6h 50min	1h 16min
	Muglad	13h 53min	2h 33min
	Diling	17h 29min	3h 12min
	El Obeid	15h 55min	3h 22min
	El Fula	17h 50min	2h 41min

Source: Developed by the author

The initial national network of aerotrain tracks is envisioned to have 126 train stations situated within the 126 districts or major localities, where the recommended building complexes could be erected. This strategic purpose has enormous rewards and returns, when considering reducing government expenses while improving the livelihoods of government civil servants.

National education and capacity development for reform implementation

A national Sustainable Development Green Technologies Education and Utilization (SDG-TEU) hub/centre of excellence is to be developed. This will mainly focus on building and operationalising an online platform to develop and implement a programme for Training of Trainers (ToTs) in the targeted local districts and municipalities in many important capacity development areas, particularly in Technical and Vocational Education and Training (TVET). Our module in TVET will target most of the required technical education and knowledge for sustainable development in all economic sectors, including compact urban development and resilient housing construction. The following are the topics of some of the major courses that were deduced from the smart infrastructure development of the innovative compact urban residential communities, and which were presented in the previous section:

- Intrinsic skills development in the construction field.
- Modern techniques in tower construction using Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) Prefabricated Prefinished Volumetric Construction (PPVC).
- Modern techniques in tower construction utilising the concept of Design for Manufacturing and Assembly (DfMA).
- Newly designed special steel plates for the structural support of the towers for better earthquake and hurricane overloads.
- Modern giant machinery for efficient construction of high towers.
- Innovative SMART plumbing and electrification techniques in erecting and maintaining towers.
- Innovative SMART Compact Urban Development Techniques

- Vertical wind turbines in towers: construction and maintenance.
- Sustainable and efficient transportation for semi-urban rural Technopolis.
- Innovative SMART brackish water desalination techniques for standalone towers.
- Environmentally green materials for furniture development for towers.
- Efficient SMART space management for towers dwellers: wellbeing and livelihoods.
- Skills for the implementation of SMART e-governance in developing countries.
- Design and maintenance of SMART aquaponics for sustainable nutrition; and
- SMART techniques in tower building management using AI.

These courses will be accompanied with the creation and adoption of new National Green Building Codes, together with the development and adoption of a new National Green Procurement Manual/Guide. This procurement manual will form the basis of the local small and medium industrial facilities to be erected to ensure supporting the required infrastructure development of smart urban communities.

It is necessary to create an Applied Research Development and Demonstration (ARDD) Unit within the currently existing National Research Center (NRC). The ARDD unit should be capacitated and financially supported to implement demonstration projects to test running many new industrial applications, particularly those introduced in this paper. For the purpose of digital education, Ethiopia should become a strong ally in Sudan's post-war development journey. In addition to having Sudan gain most of GERD's power generation from Ethiopia, Sudan can also implement its high-speed Internet connection using the fibre optics cable that is reaching Ethiopia from the east.

This attempt of developmental work in Sudan needs to happen at the fastest pace possible to ensure that the Sudanese people get the hope for which they are yearning. To accomplish this condition, international collaboration at its highest level should take place with China as one of the main developmental partners, who can ensure that the recovery phase Sudan longs for takes place in the shortest lead time possible and with unprecedented levels of technological innovation. Today, China builds and redefines what is possible across its vast landscapes, including bridges defying gravity, railways conquering impossible terrains, and megacities springing up seemingly overnight. For example, the Chinese company Broad Sustainable Building (BSB) was able to complete the latest marvel Mini Sky City in Changsha, a 57-storey skyscraper using modular construction machines, in just 19 days. Sudan needs to turn and embrace this new urban development technology that will allow the country to boom in urban centres development. It should do this by first establishing its industry in SMART PPVC and utilising the DfMA concept.

The New Public Sector Management Framework

We finally recommend a cost effective well-groomed civil service system. This will only consist of eight ministries, is similar to the government structure formation during the British colonialism era, and that was administratively very successful. The effectiveness of such a government will be safeguarded by a number of mechanisms, drastically reducing the load of each federal ministry in the following ways:

1. By having a mirror ministry in each state;
2. Each ministry will have the most qualified experts with relatively very high pay that is comparable to the United Nations salary scheme;
3. All public services will be offered to its requesting customers through a new and innovative e-government system, where no cash exchange will be allowed;
4. The new civil service system will only be populated from the updated National Numbers Database, where all Sudanese people need to be registered with clear and verified information for their date and place of birth, parents and family members, education qualifications and even their bank accounts, assets and real estate they each own. This system will be updated with zero-tolerance for any data modification once verified. This will allow each state to know its qualified experts to be hired to lead the different directorates within each ministry and possibly support the political decision for naming the ministers for the list of top experts as indicated by the National Number Database.

CONCLUSIONS

A foundational strategy to eradicate poverty through equitable development in post-war Sudan has been outlined. By creating localised social welfare systems, fair governance structures, and empowering the vulnerable, it envisions a society where justice and dignity become the norm rather than the exception. The strategy vision was then operationalised through implementation measures including energy and infrastructure reforms, SMART compact urban development, and public sector governance. In its totality, the strategy calls for bold reforms, innovative thinking, and most critically, to decentralise power and resources to the Sudanese people, where real, sustainable change must occur. Sudan's pathway to peace and prosperity hence hinges on its ability to:

- institutionalise fairness, justice, and accountability in governance;
- leverage Sudan's human and natural capital equitably;
- promote inclusive, community-led development;
- resolve the Darfur conflict once and for all;
- avoid the economic pitfalls of the past.

REFERENCES

Bonyan Organization (2025): *The Early Recovery Program for Refugees.* Bonyan Organization [Online]. Available at: https://bonyan.ngo/programs/early-recovery-2/. Accessed: 2 May 2025.

El-Dalil, N. (2024): Diplomatic Relations between Egypt, Ethiopia, and Sudan: The Nile Dispute. *Modern Diplomacy* [Online]. Available at: https://moderndiplomacy.eu/2024/12/12/diplomatic-relations-between-egypt-ethiopia-and-sudan-the-nile-dispute/

Environmental Investigation Agency (EIA) (n.d.): *Energy Analysis 2024* [Online]. Available at: https://www.eia.gov/international/content/analysis/countries_long/Sudan_and_South_Sudan/#:~:text=About%20half%20of%20the%20capacity

Hassan, N. (2003): *Al-Kawther Reservoir Scheme.* Local patent No. 975, Khartoum, Sudan; September 2003.

Hassan, N. (2008): *Report on Developing a small hydropower generation system and its potential for sustainable rural development in the Republic of Sudan (Arabic)*. Ministry of Higher Education, Sudan, May 2008.

Hassan, N. (2013): *High Altitude Maglev Vertical-Axis Wind Turbine System (HAM-VAWT).* https://patentscope.wipo.int/search/en/WO2013189503 filed June 2012, printed 2013.

Hassan, N. (2024): The innovative Pro-poor Environmentally Green Engineering Systems (PEGES) standard: Towards accelerated SD in developing countries. In Ahmed, A. (Ed.): *World Sustainable Development Outlook 2024*, Vol. 20, pp.211-226. WASD: London, United Kingdom.

Hoeffler, A. (2012): Growth, aid and policies in countries recovering from war. *OECD Development Co-operation Working Paper*, Centre for the Study of African Economies, University of Oxford

Sugihartono, S. (2024): Sudan's Struggle with Economic Development from Natural Resources. *Modern Diplomacy* [Online]. Available at: https://moderndiplomacy.eu/2024/10/21/sudans-struggle-with-economic-development-from-natural-resources/

The Fund for Peace (2024): *Country Dashboard, United States*. Fragile States Index [Online]. Available at: https://fragilestatesindex.org/country-data/ Accessed on: 12 April 2025.

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