



The theoretical bases of Sudanese development planning and some of the related negative impacts, 1898-1990

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Abstract

This research aims to clarify and discuss the theoretical bases of Sudanese development planning and their related negative impacts from 1898-1990. Sudan in its progress towards achieving development during that period adopted not exclusively, the concept of spread of innovation, the center-periphery theory, the growth poles strategy, the theory of general polarized development, the cumulative causation, and models of economic duality. Basically, they correspond with capitalist and socialist thought of development. They resulted in an imbalanced pattern of regional development, the agricultural dualism of deteriorating traditional and modern irrigated agricultural sectors, and environmental degradation, especially in areas with high ecological fragility, rural impoverishment, and socio-political instability. This research views these negative impacts as due mainly to the alienation of development planning from Sudan's internal reality.

Keywords: Development thought, colonial policies, national policies, disparate regional development, rural poverty, environmental degradation

Introduction

Sudan is considered one of the largest countries in Africa and the Middle East and includes numerous physical geographical regions and different tribal and ethnic compositions. Since the colonial period and the subsequent national governments, Sudan has adopted many development plans that were based on theoretical foundations aimed at achieving socio-economic development, particularly agricultural development. This is because the agricultural sector supports about 80% of the population and represents the most important sector in the country's national income. The reality of development planning in Sudan reflects the failure of these theoretical references to achieve their goals, perhaps because of their different intellectual sources that did not agree with the reality of the country, or perhaps because of environmental and administrative challenges, political instability, social unrest, and others. This research aims to review some of the main theoretical bases for development planning in Sudan and their negative impact from 1898-1990.

Theoretical bases of development planning in Sudan from 1898-1990

Development planners in Sudan have adopted many

theoretical concepts and theories for development that have been included in various development plans. The concept of the "diffusion of innovation" was introduced into Sudanese development plans in the early sixties of the last century. This concept views the regions of the heart are located in the form of a network hierarchy of spatial systems, sending impulses of innovation to the margins that dominate them (Friedman, 1972) [20]. This process occurs in three stages. In the first stage, the core regions impose a state of organized dependency on their margins by building institutions in the marginal regions that are controlled by the core region authorities. In the second stage, the self-reinforcing process takes control of the margin, which is exposed to six feedback effects resulting from the growth of the heart region. These effects include sovereignty effects, information effects, psychological effects, modernization effects, linkages effects, and production effects. In the third stage, the entry of the heart region into the margins will support and expand the flow of information to the non-independent region "dependent" on the heart region, which will produce intolerable negative effects from the sovereignty of the heart region.

The possibility of exchanging information and the possibility of modernization will increase in any spatial

system if the condition for a successful challenge to the control of the center region over its margins is met. This will develop the natural spread of the existing core regions, the weakening of their hierarchical arrangement, the emergence of new core regions in the margin, and the gradual integration or overlapping of large parts of the margin into one or more core systems.

One of the concepts that has been used in Sudanese development thought and is related to the concept of the "diffusion of innovation" is the concept of growth pole strategy. The pole is defined as a point in the abstract economic space to which the "positive" central forces are attracted and at the same time, the "repulsive" central forces emerge from it. This happens through the areas of influence associated with the group of different activities that make up the pole, and the small centers form the basic structure upon which development plans are built (Funnel, 1976)^[21]. The "pole" field will be created, at any given time, through a series of fields surrounding other poles that exist at different levels of development and interrelationships.

Achievement of the goals of formulating development policies in Third World countries needs to provide some conditions that distinguish the centers of growth poles (Appalaraju, *et al.*, 1976)^[6]. These conditions include, firstly, (1) the presence of production, distribution, and specific commercial activities that have achieved the level of even a little performance, and secondly (2) the development and building of direct and indirect links between the previous activities and groups of other activities included in a "mixture" of reciprocal mutual integrative exchange, and thirdly (3) the growth of the previous activities (1) at a good rate to propel the system of interconnected activities in (2), and fourthly (4) the continuous development of the system of activities and operations found in (1) to (3) through distinct spatial concentration that is characterized by a degree of relative positive or confirmed centrality in the national space and in regional development, and fifthly (5) the growth and provision of infrastructure for sites included in (4) to justify external influences and added influences of grouping of those activities included from (1) to (3) for the purpose of achieving good emplacement and supporting urban infrastructure and facilities and the ability to focus activity in (4) to reach a performance level under (5) to include the socio-economic development of the surrounding areas and human settlements through trade operations, communication and other diffusion mechanisms for growth (Appalaraju, *et al.* 1976)^[6].

Development planners in Sudan also adopted the model of cumulative causation, which believes that once development begins in a particular center for any reason, then the region will develop its driving force for growth through the process of cumulative causation. This growth momentum will expand through the interaction between the developing center and other parts of the country. Here we find that the movement and trade factor that lacks balancing effects has wash-out effects the reversed negative impact on deteriorating regions will delay their growth, and will also increase the economic gap between the regions. Through migration, the poorest regions lose their most active and youngest workers, they also lose financial activities, and there is a collapse of small and traditional industries that, as

a whole, cannot compete with the rich, developing regions. Thus, continuous growth occurs in developing regions at the expense of other locations and regions (Myrdal, 1957)^[42].

Friedman (1966)^[19] developed the "general theory of polarized development" as a model of spatial transformation that is linked to national development in societies in transition where regional politics become a critical political issue. The relationship that arises between the center and the margins of the country during the transition to an industrial economy is a colonial relationship because the powerful regions reduce the rest of the economic space to be limited to the roles of the non-major (sub) tributary area. In the "General Polarized Development Theory" the core regions transmit the pulses of modernization to the margins in which they dominate. These modernizations lead to a conflict between the elite of the core regions and the elite of the marginal regions (Friedman, 1972)^[20].

The center-periphery model exists at the global level, the continental level, the regional level, and the city level, as a result of the effects of economic transformation. There are some underlying structural relationships that govern the behavior of the "regional" center and periphery (Friedman, 1966)^[19]. It is possible to describe the center-margin relationship. It is essentially a colonial relationship, as the marginal "productions" in the center far exceed those that can be obtained from investments in the margin, and what remains of the margin will produce raw materials, specifically agricultural. This leads to the continuation of cyclical trends in inter-regional frameworks in favor of the center. The growing regional imbalance will lead to political pressures aimed at reversing the traditional flow of resources to the center, which may help raise the incomes of individuals on the periphery to reach a level on par with the rest of the population. This can be seen in the civil war in South Sudan and political tensions in western Sudan.

Decision makers in Sudan mentioned many justifications behind their adoption of growth pole strategies in development, including reducing the regional imbalance in development, as distributing development across these polar centers will modernize the backward regions. This is because the spatial imbalance and marginalization of the residents of the marginal areas are ultimately the result of the inevitability of the position of poor regions in the development process (Gilbert *et al.*, 1976)^[6].

The adoption of growth pole strategies as centers of modernization in Sudan during the sixties of the twentieth century was influenced by two groups of forces, like the rest of the Third World countries (Appalaraju, *et al.* 1976)^[6], the first is the influence of the continuing patterns of relations that were inherited from colonial backwardness, marginal status, and external sovereignty, and the second is the forces that emerged after World War II and the post-colonial periods and the political economy of the Third World countries individually. Adopting growth pole strategies in Sudan aimed to reshape the spatial system in line with the state's policies for economic and social construction in order to achieve balanced regional growth.

The theory of growth pole strategies had failed in many Third World countries by the end of the seventies. These reasons included that it did not support the development or growth of its geographical backbone, and although it achieved some success in reducing disparities in regional

development, it was characterized by weakness as local forces of influence, and at the same time it exacerbated disparities and Internal regionalism, specifically urban-rural disparity.

Dual economic models seek to understand the close relationship between a deteriorating traditional sector and a growing and developed modern sector, which exists specifically in countries that were exposed to colonial rule, such as Sudan. These models include two types, static duality and dynamic duality. Static duality is concerned with the limited overlap between traditional and modern sectors, where several types can be distinguished. There is "social duality" that serves to confirm cultural differences, and there is "cooperative duality of enclave societies" that maintains the behavior of labor, capital markets and products through which interpenetration occur between countries, and industrial and traditional societies in the developing world. Dynamic dualism confirms that these two parts of static duality are valid for many developing countries. Agricultural duality exists in Sudan, with two agricultural sectors, one traditional and the other modern and advanced.

The theory of stages of growth was among the development theories that Sudan tried to embrace and which was linked to Marxist thought. It is considered important since it works to organize economic growth through different stages by applying it to the national and cultural borders of countries. Marxist thought assumes the existence of five stages of development. They are primitive socialism, ancient slavery, medieval feudalism, industrial capitalism, and socialism. According to the views of Marx (1961) ^[38] and Engels (1962) on feudalism, capitalism prevails in class relations in rural areas. Marx considers the growth of agricultural productivity a precondition for the emergence and dominance of capitalism because the basic step in agricultural development is the exclusion of peasant farming in order for structural changes to occur.

List in 1885 ^[36] developed a classification based on the transformations of the functional distribution to include five stages. They are the stage of naivety, the stage of nomadism, the agricultural stage, the stage of agricultural industrialization, and the stage of agricultural-commercial industrialization. To achieve progress in the field of agriculture, two methods can be followed, either stimulating demand for export or developing local industrial development (List, 1885) ^[36].

Sudanese development planners also adopted the high pay-off input model. This model assumes that there is a switch from the traditional agricultural sector into a productive sector that contributes to economic growth in investment, which will make debt repayment inputs available to farmers in poor countries. There are three types of investment with relatively high productivity in order to achieve agricultural development (Hayami *et al.* 1971) ^[39]. They are the ability of agricultural research stations to produce new technical knowledge, the ability of the industrial sector to develop, produce, and market new technical inputs, and the ability of farmers who are skilled in using modern agricultural factors. The Sudanese decision-makers were impressed by the high pay-off input model in its adoption of increasing agricultural productivity and diversifying agricultural production, which was placed in Sudanese development plans.

Sudanese development planners also adopted some development theories that treat the process of transition from an agricultural society to an industrial society. One of these theories is the concept of structural transformation which focuses on the primary, secondary, and tertiary stages of production. There are five stages for the leading sectors in the theory of transition, including the stage of traditional society, the stage of tribal conditions for launching, the stage of leadership towards maturity, the launching stage, and the stage of the era of high mass production (Rostow, 1960) ^[48], where there is a dynamic role for the agricultural sector in the process of transformation or transition.

Three stages of transformation have been distinguished in Sudanese development (Lee *et al.*, 1977) ^[35]. The first stage is the pre-industrial stage (the period until 1965), which was characterized by the limited application of modern agriculture and limited industrial activity, specifically the presence of few opportunities for employment in the manufacturing industry, limited local savings, a deficit in foreign trade and the need to import capital. The second stage is the emerging-industry stage (the period 1965-1985), during which agriculture continued to expand at a moderate rate, while industrial production grew at a rapid rate, but it was limited only to narrow lines of production groups. The third stage (1985 and beyond) was characterized by the application of modern agriculture for the purpose of export, industrial diversification, and approved savings to finance internal investment needs, providing a balanced business account and unified local markets to achieve economic scales. It can be said that the last stage is unreal, as modern technology has not been applied to agriculture in all countries, in addition to the scarcity of savings, especially since economic crises are considered major obstacles to financing internal investment and the existence of a balanced trade account (Lee *et al.*, 1977) ^[35].

Some negative impacts of the theoretical bases of Sudanese development planning from 1898-1990

Sudanese development planning was designed on various sources of theoretical bases where many relevant central problems were initiated.

Agricultural production systems in Sudan before the advent of colonialism were characterized by the presence of two ecological strategies. First, the practitioners of nomadic pastoralism and shifting agriculture benefited from the advantage of accumulating nutrients available from the energy of harvestable food due to their continuous movement. Second, they benefited from the flood irrigation strategy that takes advantage of the flows of water and nutrients through technology and simple methods to overcome moisture and fertility problems in soil (Cox *et al.*, 1979) ^[14].

The British administrators brought most parts of tropical Africa into the global exchange system by introducing some basic cash crops, which affected the development of self-sufficient agriculture and imposed external factors. The success of producing cash crops depended on the relationship between that crop and the existing complexity of food crops and the exchange mechanism (Cleophas, 1988) ^[34]. The inclusion of self-sufficient agricultural systems into capitalist methods of production has changed the entire food production system in Sudan. The traditional

agricultural system based on communal ownership collapsed under the influence of colonial economic policies and foreign control activities (La-Anyane, 1985)^[33].

The differences in natural conditions and economic resources in Sudan and the demands of the colonial state, the means used to transform self-sufficient farmers differed greatly, as did the degree of intervention of the colonial state in this regard. As a result, this has affected the regional and sectoral development of the country. During the colonial period in Sudan, the country was a margin that produced cotton for the heartland region, which was British, and similarly produced food to meet local demand. In western Sudan, the impoverishment of self-sufficient farmers by including them in the capitalist economy through cash crops led to the instability of families to fully reproduce themselves in agriculture, as large numbers of the population, especially young males, were forced to lose income from their work in production, on the entry of wage labor economies in cities (Ibrahim, 1978)^[30].

The British administration has neglected the traditional sector for several reasons. They include the fact that this sector requires a large monetary supply to raise its productivity, the fragility of its production, and its susceptibility to failure, and it cannot produce long-staple cotton, which is considered the most profitable crop in the international markets. The British also realized that they would not stay in Sudan long, so they focused their efforts on exploiting the easy-to-exploit clay plain in central Sudan. The preference for the modern agricultural sector over the traditional sector has resulted in a clear inconsistency in the patterns and characteristics of production in the modern export-oriented sector, and between those patterns and characteristics that prevail in the traditional sector. This traditional sector is characterized by the lack of surplus raw materials that developed countries need for recycling and processing in their factories and by the presence of a geographical hinterland in which a population lives, the majority of whom work to produce food and local consumption.

The application of the concept of cumulative causation has led to the emergence of agrarian duality between a modern and developed irrigated agricultural sector and a traditional and backward rain-fed agricultural sector. This latter sector is characterized by several characteristics, including its inability to absorb large employment, unemployment-underemployment, low annual productivity, and zero-marginal productivity for the worker. Meanwhile, the modern irrigated sector in central Sudan has received extensive research on the possibility of applying high-yield seed types and modern methods for improving husbandry crops, chemical fertilizers, marketing services, financial credit assistance, and others. Agricultural development and the establishment of industries and basic services in the mudflats of central Sudan by British rule provided the infrastructure for cumulative causation to operate.

Also, the major consequence of implementing cumulative driver policies in Sudan is the emergence of pockets of food deficit in degraded regions such as Kurdofan and Darfur, especially in the northern ranges adjacent to the Sahara. The deterioration of traditional agriculture and income distribution is considered one of the most important causes of the food deficit there (World Bank, 1990)^[56], as farmers,

who were previously exposed to the blows of weak development policies in Sudan, are concentrated in these marginal lands (Green, 1986)^[25].

Related to the previous results is what is known as center-periphery relations, between the core region, which is central Sudan, and the margin regions, which are the other parts of Sudan. The mudflats of central Sudan were imposed as a core region; it created a state of organized dependence on its margins through the construction of institutions in the marginal regions governed by the authorities of the core region (Friedman, 1966)^[19].

The inclusion of the resources of the marginal regions within the heartland region of Sudan can be seen, for example, through the impoverishment of self-sufficient farmers by introducing them into the capitalist economy through cash crops. This led to the impoverishment of families in Darfur in reproducing themselves entirely in agriculture (Ibrahim, 1978)^[30], and for government authorities to control small producers in the Umm-Rawaba region in Kordofan through a policy of converting an estimated portion of crop production in the traditional sector to commercialization during the period 1983-1984 (Khogali, 1991)^[31]. Self-sufficiency agriculture was also exposed to threats of depletion of its resources, such as manpower and the continuous transfer of (value) costs at the expense of the pockets of the traditional sector through the export sector, which works in the interest of the market economy (Oestdiekhoff *et al.*, 1980)^[45]. The inevitable result of this was the depletion of the value of the surplus from the traditional sector.

The agricultural regions for the purpose of self-sufficiency have formed margins that produce manpower for the core regions. These margins are exposed to strong negative forces aimed at countering the trickle-down effects of economic growth so that the balance of this group of forces increases the process of regional imbalance. Likewise, centrifugal forces and the failure of businesses to realize investment opportunities at the margins lead to negative effects of industrial development to expand the regional imbalance in Sudan.

The emergence of "growth poles" to overcome these contradictions led to the emergence of new centers of depletion on the margins of Sudan. The development of growth pole centers is called "polar development", which is considered an important focus in Sudan due to the prevalence of the concepts of "redistribution with growth", where two forces influence these policies (Appalraju *et al.*, 1976)^[6]. First, there are the forces of influences and persistent patterns of relations inherited from situations of colonialism, marginality, external domination, and internal underdevelopment. Secondly, the forces that emerged after World War II, in the post-colonial periods, and the political economy of the Third World countries.

The distribution of many growth pole centers has covered different parts of Sudan. Examples of this included the Kosti Meat Factory, the Babanusa Dairy and Cheese Production Factory, the Sag el Na'am Project in Darfur, the development of the Habila region in the Nuba Mountains, the construction of the Kadugli Textile Factory, and others. Many projects were developed at the national level but failed at the local level (Arifi, 1978)^[7]. The inclusion of Bedouins in the case of the Babanusa project to produce

powdered milk for markets created a conflict between the aspirations of the Bedouins and those responsible for the project. The Bedouins' resistance to the project was based on their doubts about the government's true goals (Al Mowag, 1983) ^[4]. The closure of open pastures and imposing them on certain individuals or groups has also, led the Bedouins to find themselves forced to live in a fence or stop their ownership according to what is determined by the project. The shortcomings of the livestock production system and pasture management in motivating Bedouins to adapt to living in a fenced pasture system have become clear (Behnke, 1985) ^[12].

Sudan inherited, following colonialism's departure in 1956, a dual economic system consisting of a broad sector of traditional rural agriculture alongside a small modern non-agricultural sector. Development efforts during the British colonial period and subsequent national governments resulted in a pattern of polar development centered on the fertile areas in central Sudan, which have high potential in agricultural and livestock production in addition to water sustainability compared to the regions of western and eastern Sudan and the far north of Sudan. The Gezira scheme played a paradoxical role in the capitalist transformation of Sudan, as it worked to strengthen non-capitalist production relations and develop marginal capitalism (Tony *et al.*, 1991) ^[55]. The areas previously developed by colonialism continued to attract agricultural production, industries, and urban growth, which led to its continuation as the heartland region of Sudan.

In the post-colonial period, the neglect of the traditional agricultural sector can be attributed to the focus of Sudanese development plans on short-term investment returns, which the modern agricultural sector achieves with high reliability, and the belief that the future lies in the mechanization of agriculture production and the commercial aspects associated with it. In addition to that, the dominance of the concept of the unrecoverable expenses of an investment in this sector, the tyranny of development thinking of the colonial era, the lack of appropriate methods and methodology for developing natural and human resources in it, and the difficulty of collecting taxes, and its need for huge financial credits and loans that Sudan cannot meet.

One of the positives of adopting dual economic models was that Sudan made great efforts during the colonial period and after its departure in intensive scientific research on the possibility of applying high-yielding seed types, modern methods of growing crops, and the use of fertilizers, and in researches related to marketing, and financial security assistance for modern agriculture and irrigation destined for export. The shortcomings of dual economic models have contributed to further neglect of this sector, such as their treatment of agricultural productivity gains as a factor that transforms the agricultural production function without imposing a demand on resources, in addition to their neglect of the problems of resource use in inter-sectoral goods markets (Hayami *et al.*, 1971) ^[39].

The application of the high pay-off input model in Sudan has many shortcomings such as not including the way in which resources will be allocated between alternative public and private sectors of economic activity, and not treating investment in research as a source of mechanisms for High debt repayment, in addition to not explaining how to

develop and localize technologies in a specific society governed by economic conditions.

The adoption of the theory of diffusion of innovation in Sudanese development resulted in the introduction of modern agriculture since the period of British colonialism in Sudan, then the introduction of modern agricultural machinery such as tractors in the extensive rain-fed agriculture in eastern Sudan, then in the regions of the Blue Nile, Kordofan and Darfur, and the associated development of agricultural research and training of cadres. Working and improving the breed of cows to increase milk and meat production, as types of cows were brought from the temperate regions and were crossed with local types to produce milk during the plan to make Sudan the food basket of the world, in addition to fodder production. In the field of improving poultry, a new type that produces more eggs and meat was introduced and implemented by the state, such as Geziera Farms for dairy products and Hillat Kuku Farms for dairy products, as well as by the private sector.

The adoption of the concept of diffusion of innovation during the colonial period led to the improvement of some sectors of the macro-economy, but the transfer of technology created some aspects of conflict, such as the different views of participants who worked in institutions, consulting bodies, and others toward technology. Some view technology as a marketable commodity, while others see it as challenging the prevailing traditions in traditional societies. This is because it stimulates citizens to do different things in different ways and also proposes new goals for human efforts such as obtaining money and the dynamics of desires, and some view growth economics as a demand for social justice (Goulet, 1975) ^[24].

According to Marx's five stages, Sudan can be placed in the feudal stage of the middle ages, while according to List's classification; it can be placed in the second, third, and fourth stages. The nomadic stage still exists in parts of western, eastern, and southern Sudan (formerly). Feudalism prevails in rural areas where farmers have large holdings or ownership of agricultural land. This feudalism is characterized by unfree labor, forced economic coercion in excess of withdrawing the surplus, and the integration of economic and political forces at the point of production and the living economy, where the surplus is consumed and does not accumulate in the form of expanded production. In the feudal system, ownership of the means of production is divided between the direct producers and the ruling class of the land, which takes the surplus production in the form of rent for working time, production, or money (Alavi, 1982) ^[5]. As a result, a two-class model of feudal society will emerge. This can be represented in Sudan by the production of crops on the Aba island, where farmers produce for the Mahdi family who own the land. This may provide an understanding of what tensions exist between the landless class and direct producers in the Third World (McEachern, 1982) ^[40].

Writings on colonialism and associated changes have characterized some parts of the Third World economy as feudal or semi-feudal, with colonial societies resembling European societies before the advent of capitalism. Feudalism embedded embryonic in the relations of advanced capitalist production and the environment available to it in the Third World helps in the maturity of

these relations to liberate the rapidly growing capitalist incursion into these countries. During the British period in Sudan, tribal chiefs and clerical leaders received the largest private pump projects on the Blue and White Nile. Sayyed Abd al-Rajman al-Mahdi received the Gezira Aba area in the White Nile, in addition to 9,000 hectares of arable land on the Blue Nile (Ali *et al.*, 1984)^[44], and likewise Sayyid Ali al-Mirghani and Sharif Yusuf al-Hindi in the Gezira and Blue Nile area.

Capitalist feudal production relations in these agricultural holdings were applied, where farmers were responsible not only for basic agricultural operations, but also for expenses on the main irrigation canals, installation of pipes, and the cost of cotton production. The tenancy arrangement in the island project also relied on pre-colonial social relations existing in irrigated agriculture. The socio-economic structure of the island witnessed a fundamental transformation in the process of colonization, represented by the method of transforming land into a commodity and labor into a factor of production. This process enabled certain classes in the social structure in the Geziera region to achieve economic sovereignty, and these classes maintained their positions as money lenders in a production structure that allowed production at relatively low prices compared to the prices of imported manufactured goods. Feudalism has undergone great changes in the years following independence in production relations and the shift from joint to individual accounts in the Geziera project in the late 1970s.

The application of these development theories and concepts, generally, has negative impacts on food security in Sudan. The traditional sector in Sudan has faced the risks of depleting resources, such as the labor force leaving the food production system, and the continuous shift of cost (value) in traditional agriculture into the export sector in favor of the market economy leads to the exploitation of the surplus value in this sector. This phenomenon is not limited only to migration and the internal labor force, but it is a characteristic associated with all production processes where traditional agriculture and market economies overlap (Oesterdiekhoff *et al.*, 1980)^[45]. This same situation can be applied to the production of cash crops in the traditional sector and the production of food for farmers and agricultural labor in export-oriented agricultural projects. The combination of the cumulative effects of capitalist agricultural expansion under Arab capital during the 1970s put Sudan on a path of increasing food deficit.

Farmers faced a rapidly declining ability to meet their consumption needs, including food, through direct production at the same time as capitalist rain-fed agriculture was reoriented toward production for increased export (O'Brien, 1985)^[43]. This has produced groups exposed to food insecurity. They included the group of poor rural families who lack access to good land, some of whom depend on wage labor in areas of irrigated agriculture and mechanized rain-fed agriculture, and the group of landless people who will be expelled to marginal lands in valuable traditional rain-fed agriculture areas, relatively high actual value (World Bank, 1990)^[56]. It is clear that groups of food-insecure people are entirely limited to developmentally backward regions.

The application of these theoretical concepts of

development in Sudan also has many environmental impacts. Efforts to develop rain-fed agriculture in northern Sudan focused on the latitudinal belts of the semi-desert and lower savanna. They followed three methodologies, including land use planning, conducting agricultural research, and stimulating the private sector. The land use planning methodology has failed due to the lack of guaranteed land ownership and the private sector's lack of motivation in agricultural planning and research (Wallach, 1989)^[54].

The establishment of large mechanized agricultural projects, the concentration of the population around water sources, and the growth and development of large urban centers with high demand for firewood for fuel and charcoal also contributed to environmental degradation. These effects were multiplied by the use of laws displacing traditional farmers and Bedouins from their lands in favor of large agricultural projects. As a result of the difficulties that the state faced in achieving its goals, there was a shift from development to crisis management and from crisis management to achieving order and mastery.

The government's inability to intervene on behalf of the victims of drought and famine led to it using subjugation as the only means of legitimizing its use of force (Salih, 1990)^[49]. Rapid population increase and climate change may reduce the carrying capacity of the land in the long term (Martin, 1975)^[37], and there is a need to expand the far-flung transportation system for agricultural areas to develop along with an adaptive physical plan for transportation under four scenarios including the reference project, agriculture for export, and growth balanced regionalism and a common Arab-African orientation (Thomas, 1977)^[53].

Intensive agricultural expansion has contributed to the degradation of natural vegetation and provided inimical conditions for sustainable agricultural production. The intensive expansion of mechanized rain-fed agriculture has been linked to the factor of high economic returns from crops, especially corn, and has also been affected by other factors outside the agricultural sector (Abdelmoneim *et al.*, 1994)^[17]. Large commercial agricultural projects had proven to fail before the economic crisis, political instability, and natural disasters in the mid-1980s in Sudan and it is difficult to say that any of them have achieved commercial success (Kontos, 1990)^[32].

The application of these theoretical concepts of development planning also resulted in conflict over resources, which occurs at the level of local communities and is exacerbated by state policies. This type of conflict in its traditional form in Sudan was the ancient competition between farmers and nomads over water and land resources. Because of its persistent nature, it took on an "ugly" identity that tore the country apart and became a challenge to many regions of Sudan (Assal, 2006)^[8]. This type of conflict has also played a role in creating poverty and leading and sustaining the ongoing conflict, where the challenge lies in its ongoing complexities, not only in recognizing its dynamism as a manifestation of large political cleavage entities but in the presence of an agenda that pushes it from the top down and from the bottom up (Gunnar *et al.*, 2010)^[27].

Environmental degradation or environmental scarcity (environmental discrimination) causes conflict when it

interacts with economic, social, and historical factors. Environmental scarcity of renewable resources, especially agricultural cropland, freshwater, marine resources, and forests, is becoming more important as a cause and/or catalyst for armed conflict especially in the developing world (Suliman, *et al.*, 2005)^[51]. The conflict in Darfur is considered an ecological conflict in origin, based on competition over natural resources, which included plant genetic resources.

Despite the soft environmental balance, the lifestyles of farmers and Bedouins, through good use of water and genetic plant resources, have preserved the region's ecological balance (Robinson, 2005)^[47]. It can be said that the government's attempt to make the Shukria tribe into medium-level stable farmers was successful because of some factors that hindered and determined their adaptation to the mixed economy and the subsequent ecological results and returns (Gunnar *et al.*, 1977)^[26]. Oil has played a role in the perpetuation of conflicts in Africa and Sudan, which confirms the relationship of natural resources to armed conflict. "Economic" businesses associated with violence and theft are not new in their connection to aspects of war, but what was new about many conflicts was the extent to which economic interests prevailed and competed with political programs (Reno, 2003)^[46].

The application of these theoretical concepts to development in Sudan has also disturbed the fundamental relationships between people and land under new dynamics of land encroachment and resource withdrawal. Although land has become a global commodity, it remains a source of livelihood and a basic reference for identity formation. The economics of resource withdrawal have spatial impacts that include foreign ownership of agricultural land, and competition between the industrial and traditional sectors in gold mining. People have experienced the loss of their lands during the recent waves of privatization and the commercialization of land rights in the regions of Darfur, South Kordofan, Red Sea, Blue Nile states, and Khartoum state (Gertel, *et al.*, 2014)^[22]. The eastern region of Sudan attracted large numbers of Bedouin refugees from the long war in Eritrea, and one of the most important consequences of their resettlement was the creation of intense conflict over land rights along the Ethiopian border, which resulted in the threat of nomadism and the extinction of herds (Bascom, 1990)^[11].

The conflict between North and South Sudan continued after the redrawing of the international borders between them, reaching the issue of ease of access and availability of lands. The claims of both parties to ownership of the borderlands between them have faced challenges from local and international actors, as contracts governing the privatization of natural resources continued, causing destabilization of land ownership.

One of the main consequences of applying these theoretical concepts in development planning in Sudan is the inability to address the problem of rural poverty. There are many major constraints to understanding the nature of rural poverty in developing countries. These obstacles arise not only from the nature of rural poverty itself but also from the circumstances of those who are not rural poor and who are aware or not aware of the nature of that poverty. This dialectic has implications for all rural development

programs and projects and for trained workers (Chambers, 1981)^[52]. As an example, the results indicated a decrease in poverty, income, and expenditure indicators among the Water Users Association in the Al-Gash Agricultural Scheme compared to non-farmers. Fundamental differences were found between them in the family income trend, the total return from agriculture, years of education, and the total cost of agriculture. Moreover, households headed by a member of a water users association are more likely to have income approximately four times above the poverty line than those whose heads do not belong to this association (Mohamed *et al.*, 2015)^[41].

Sudan was expected to achieve high growth rates after independence due to its extensive, fertile, and rich agricultural lands, significant livestock component, and capable human resources. Much of this has not been achieved in the last five decades. After enjoying moderate rates of growth and economic stability until 1975 AD, Sudan began to enter into deep structural problems. It was found that the causes of rural poverty in Sudan are linked to the bias of development strategies towards urban areas since independence (Yaqoob, *et al.*, 2016)^[39].

The national governments of Sudan have sought to reduce the poverty rate, however, despite that, it is still widespread (Abdelmawla, 2014)^[1], showing a pattern characterized by unidimensional and low multidimensional occurrences for both children and adults. This pattern indicates that Khartoum is the least poor, while North Darfur and Warab states are the poorest. While the level of poverty increased, its severity decreased in the period 1978-1980 compared to the period 1967-68. Available evidence suggests that the level and severity of poverty will increase significantly in the 1980s (Farah *et al.*, 1995)^[18].

The degradation of natural resources in rural areas of the Third World affects the productive capacity of the land, which in turn threatens food production and livelihoods among rural and urban populations. Since the poor primarily live in rural areas and depend on the land for their livelihood, rural poverty, and land degradation in these areas are considered to be linked together. Despite the significant economic growth that has occurred in developing countries since 1965 AD, extreme poverty has continued to exist. Despite the rise in per capita income, the number of poor people continued to increase. Historical migration movements, especially long-distance ones, have become less feasible with the emergence of populist states and borders. With the rapid increase in population in recent decades, there are few uninhabited areas to move to. There was also demographic pressure on resources, an increase in per capita income, and improved means of transportation and communication, which greatly stimulated internal migration, most of which headed toward urban areas (Bilsborrow, 1992)^[13].

There is an effective role for any policy in its impact on poverty and land degradation problems. A comparative study among poor farmers in northern Sudan on gum Arabic revenues in the forest agricultural system revealed the existence of links between poverty and the environment, which is responsible for land degradation. It also confirmed that "good" and "bad" policies can affect the economic incentives that determine the decisions of poor rural families to preserve or degrade their lands (Barbier, 2000)^[9].

Poverty is considered a complex phenomenon that is linked to impoverishment in one aspect and to the good situation of individuals in several aspects. Although there are many indicators of effective care that can be used to determine the level of poverty of a population, the most accepted one is based on the consumption factor. In Sudan, about 45.5% of its population lives below the poverty line. There is a significant difference in the poverty rate between rural and urban areas, reaching 26.0% in Khartoum and 69.4% in North Darfur (Ahmed, 2015) ^[3]. It is expected that the trend towards reducing global trade taxes resulting from trade liberalization will negatively affect the government budget in general and spending on education, health, and transfers to poor groups in society in particular, which contributes greatly to the exacerbation of the absolute poverty rate (Mohamed, 2015) ^[41]. The informal trade sector has the potential to contribute to rural economic development by increasing income and reducing rural poverty in the Singa region in Sudan (Adam *et al.*, 2013) ^[2].

Conclusions

This research reviewed the main theoretical bases of development planning in Sudan from 1898-1990, and some of the related negative impacts. The review revealed the dominance of capitalism and socialism theoretical bases. This contradiction brought about negative impacts, mainly disparate regional development, agricultural dualism, rural poverty, environmental degradation, drought, and armed conflicts. This research views these negative impacts as due mainly to the alienation of development planning from Sudan's internal reality. However, since this research reviewed the period from 1898 up to 1990, there is also a need, for future research on the theoretical bases of the Sudanese development planning throughout the period following the year 1990.

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