Challenges of Urbanization to Squatter Settlements in Greater Khartoum- the Case of Dar Elsalam El- Magarba in Khartoum North, the Sudan

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ABSTRACT

East Nile locality witnessed rapid urbanization during the last decade which created challenges to Dar Elsalam El- Magarba squatter settlement which dates back to more than half a century. This research aimed to examine these challenges and to propose a model for its upgrading to consolidate with its rapidly growing and urbanizing geographic neighborhood. Sources of data included field visits during January and February 2020; direct discussion with some head persons in Dar Elsalam El- Magarba; firsthand experience of the author's living in its neighborhood for more than a decade; GIS analysis of relevant satellite imageries which produced detailed maps for its morphology particularly roads elongation and width and housing units and surface elevation; beside local authority file data; and the Internet. Rapid urbanization in East Nile locality had consequent on architectural disconformities of Dar Elsalam El- Magarba with its surrounding residential areas, change of functionality of some houses on its outer skirts; rise of land rent, excess division of its occupied area; population crowdedness; over pressure on its lacked behind services, traffic congestion; promotion of some traditional houses to multi-storey type, and acceptance of advantages of location centrality. These influences created challenges to Dar Elsalam El- Magarba itself and, more excessively to its geographic neighborhood and this requires wise intervention that could be through the proposed "DLSSLSSPA" model "after the first letters of itsfive consecutive principles and four consecutive steps", and a final assessment to judge for its success (positivity) or failure (negativity).

Key words: geographic proximity,neighborhood change, Informal settlements, spatial polarization, urbanization, upgrading, consolidation

Squatter settlements are unauthorized owner-occupied self-built mode of housing provision. "The unauthorized owner-occupier developer secures a plot of land (either acquitting illegally, through organized mass invasion or gradually by families or small groups, or informally through de facto tenure agreements with landowners) and then constructs a housing unit without official permission, registration or building code" (Aciolyjr and French, 2012). Colonization has disrupted the traditions of self-reliance and resulted in them being

replaced by the notion of government as the provider of services including housing and the development of self-help groups, initially in squatter settlements is the microcosm of this larger process (Haywood, 1986). Later, housing has been viewed as a consumer good which must be given a very low priority in development issues and this view undermined the contribution of the housing sector to economic development (Matovu, 2000).

United Nations estimates suggested that nearly one billion people now live in slums worldwide representing 16/th of the planet's population and is expected to double by 2030 (Beardsley et al., 2008), where one in seven people on the planet are expected to reside in urban informal settlements by 2030 (Corburn et al., 2017) and "If no action is taken, the number of slum dwellers worldwide is projected to rise over the next 30 years to about 2 billion" (Dasgupta et al., 2009). They account for 71.9% of the population in Sub- Saharan Africa (Dasgupta et al., 2009), and comprise some 3070%- of the housing stock in many cities and towns in developing countries, and their scale is attributed to the inadequacies of housing finance systems and land development, along with the pressing demographic growth and mass poverty (Pugh, 2000). They comprised a mix of owners, landlords and tenants (Kumar, 1996)and their communities differ in size, character, age, and level of political and social organization (Beardsley et al., 2008).

Upgrading is a term given to measure to improve the quality of housing and the provision of housing- related infrastructure and services to settlements that are considered to be slums or that developed illegally. Upgrading has to be understood in the context of cities in low-and middle-income nations where a large and often rapidly growing proportion of the population live in squatter settlements (Sattrethwaite, 2012). Three thematic approaches were identified which are the progressive improvement of physical infrastructure provision; community microplanning and physical transformation through holistic plan (Abbot, 2002). Governments have moved from eradication policies to provision, enabling and participatory policies which was motivated by the recognition that informal settlements were not a problem but a solution to the formal housing markets that cannot fulfill its demand (Khalifa, 2015). The scope of upgrading varies from some minor improvements- for instance some communal water taps, paved roads, and lighting - to comprehensive improvements to the housing and good-quality infrastructure and services, and provision of legal tenure of the land to the occupants. "The consolidation process typically takes many decades after which time these informal are often indistinguishable from neighboring formally developed areas. The consolidation, however, is not a given and it does not always takes place, often the rudimentary settlements remain so, depending on level of community cohesion, investment capacity in housing, tenure security, and owner-occupation" (Aciolyjr and French, 2012). "In terms of wide-scale human welfare and sustainability, the conditions of life in urban squatter settlements have enormous

significance. Their scale is attributed to the inadequacy of housing finance systems and land development, along with pressing realities of demographic growth and mass poverty" (Pugh, 2000). Attempts were done to propose models and strategies to upgrade squatter settlements. Ahern, (2013) proposed "Five strategies to build resilience capacity and transdisciplinary collaboration are proposed: biodiversity; urban ecological networks and connectivity; multifunctionality; redundancy and modernization; adaptive design".

This research objects toshow that planned squatter settlements require continuous re-planning to cope with growth of a city, and that previously planned squatter areas became obstacles to provisioning of services for themselves and for their geographic neighborhoods in addition, to propose an intervention model for their consolidation with their growing urbanized surroundings, by taking Dar Elsalam El- Magarba squatter settlement as an example. These objectives will discover challenges to Dar Elsalam El- Magarba and whether such an intervention model could help to render its inherent problems of growth and the recurrent rapid modern growth of its residential neighborhood.

The research problem, data sources and methods

The majority of the squatter settlements in Khartoum state have been upgraded through planning and re- planning, however, they still inheriting their prime problems of growth. These problems were further exacerbated by influences exerted by rapid urban growth around their neighborhoods and internal transformations such as division of houses, transforming to storey-type buildings and high land value which consequent in further crowdedness and over-pressure on inadequate available public services. Some squatter settlements became central places within the vast growing modern residential neighborhoods where the executed afore-planning and re-planning became uncompetitive in regard to rapid changes in the urban milieu. These have created serious challenges to these squatter settlements and to their geographic neighborhoods which could be exemplified by Dar Elsalam El- Magarba squatter settlement.

Sources of data included; field visits during January and February 2020 where Dar Elsalam El- Magarba was divided into four geographic sections, in each section five head persons were selected conditionally lived for more than two decades there, and practiced some community services, and are able to highlight challenges facing Dar Elsalam El- Magarba due to rapid urban growth in East Nile locality. This was further supported by direct observation and firsthand experience of the author's living there for more than a decade, beside data collected from local authority files. Arc map 10.5 was used to produce detailed maps for location, general morphology, distribution of housing units and roads elongation for Dar Elsalam El-Magarba based on Google maps 2020. GIS analysis also produced general elevation map based on DEM 90 USGS.

A model of intervention was built to upgrade Dar Elsalam El- Magarba squatter settlements

(Figure1) including five consecutive principles and five consecutive steps. It was named as "DLSSLSSPA", after the abbreviation of the first letters of its consecutive principles and steps. These principles were Diffusion of Innovation; legitimacy; Sustainability; Space-base information; and Community Participation. The steps were Living habitat improvement; Subsidiary intervention; Step-wise intervention; Partial Demolition; and Assessment of the model on specified time span by field experts and community experience. Assessment could judge for continuation of upgrading (positive assessment) or suggests for compulsory demolition of Dar Elsalam El- Magarba (Negative assessment) and adoption of new practical alternatives.

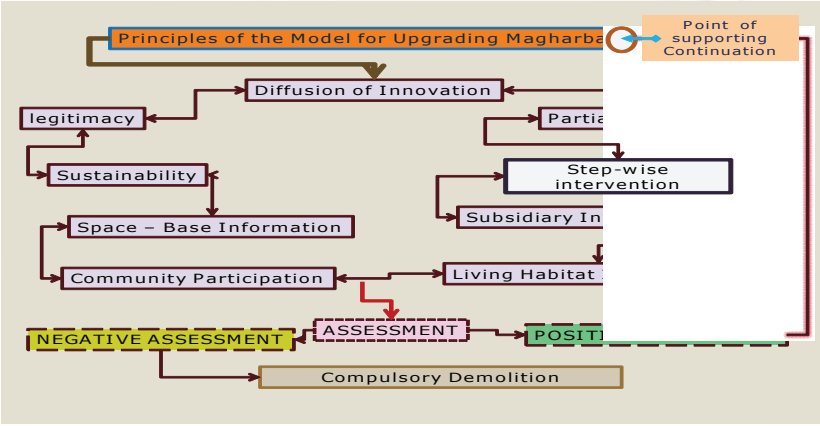

Figure 1: "DLSSLSSPA: A model for upgrading Dar Elsalam El- Magarba squatter settlement

Urban growth and development of squatter settlements in Khartoum state

Khartoum State's population doubled 140 times during the period 19052000-, and while the number of population doubled by 12 times at the national level it doubled here by 50 times (El Bushra et al., 2005). The occupied area doubled 250 times during that period (El Bushra et al., 2005), particularly by the begging of 70th of the past century by influxes of migrations where it was "until 1970s dominated pull factors - economic growth, while from 1970s onwards pull factors-drought and conflict with high level of displacement prevailed where the majority of urban poor seeking better livelihoods opportunities, security and services" (Pantuliano et al., 2011). Net migration increased from 0.2 million in 1983 to 0.5 million in 1993, and then to 1.8 million in 2008 (Abdel Ati, 2012), which have over pressed on the already existed high population density of 169/km2 for whole the State (National Council for Population, 2002).

The wide gap between demand and supply, and the unaffordable cost of housing for the vast majority of households in Greater Khartoum have manifested in over-crowding and massive

growth of informal settlements. The State in Sudan has opted to replace sites-and-services with core housing as an alternative housing policy because of its perceived economies of scale (Hamid et al., 2014). Over the last two decades, most of the urban population growth in Sudan has been absorbed through a process of residential densification "sub-letting in existing districts" and through "illegal" occupation of sites on the edge of towns (Post, 1994). Over one hundred squatter settlements (Figure 2) have come to form a tight ring around Sudan's capital cities (El Bushra et al., 1995). Their Types included inner-city slum areas which are either engulfed or annexed by urban expansion; outer slums which are areas planned by the authorities and distributed to landless; and squatter settlements that built on illegally occupied by newcomers (Eltayeb, 2003).

Squatter settlements grew rapidly where by 1983 they made up 17% of the total urban area, and increased to 40% in 1985 (Figure 3) and then to 60% in 1990, while it dropped to 20% by the year 2000 (Figure 4). That was because of interventions by demolition, planning, re-planning, and transfer of some squatters to newly planned residential blocks such as Dar el Salam. The major consequences could be that "poor people being moved off prime value land, dramatic rise in value of real estate and cost of living, unskilled labor-growing numbers and competition from neighboring countries" (Pantuliano et al., 2011).

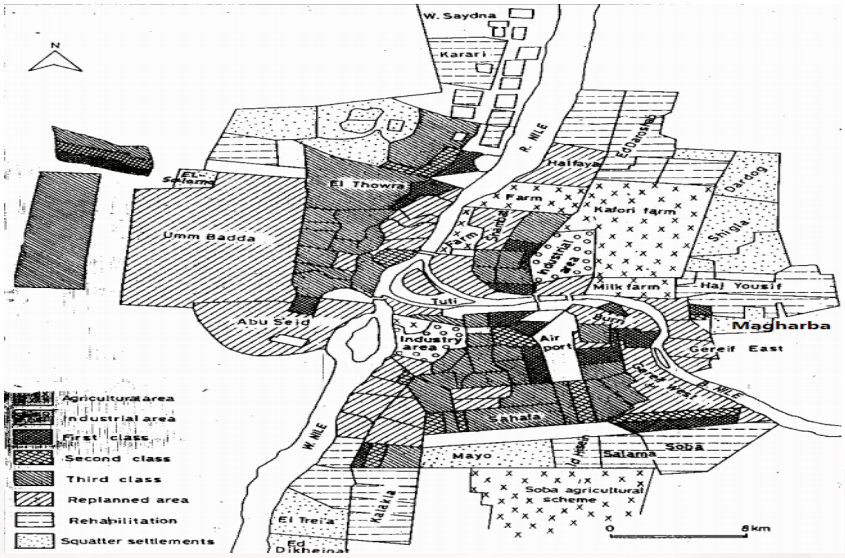

Figure 2: Khartoum State residential areas and slums
Source: Ahmed A M.1989.

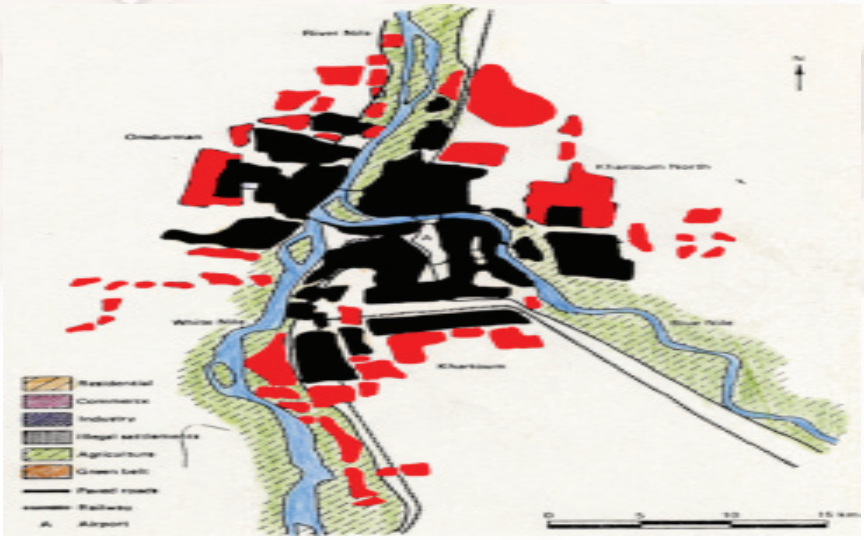

Figure 3: Squatter settlements in 1985 (40%)
Source: Ministry of urban planning, Khartoum state, 2000

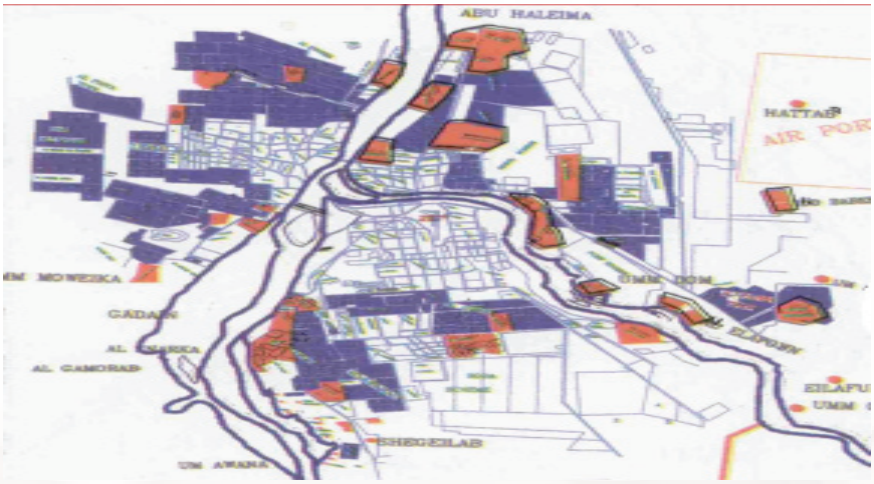

Figure 4: Squatter settlements in 2000 (20%)
Source: Ministry of urban planning, Khartoum state, 2000

Growth, development, and planning of Dar Elsalam El- Magarba

Dar Elsalam El- Magarba squatter settlement (Figure 5) started as a small village in Khartoum North, named after El- Magarba tribe which settled on declared land recognition

by Batahien tribe in late 19th century. By mid 1970th it grew rapidly through de facto of land tenure agreement with landowners on behalf of being their ancestors' ownership. This spatial growth was part of an increase in occupied area in Khartoum north which increased from 6.3 km2 in 1970 to 46.5 km2 in 1980; and then to 204.9 km2 in 1998 (Survey Department, 1998, and Engineering Affairs, 1999).

Rapid spatial expansion of Dar Elsalam El- Magarba made official intervention a necessity where in situ planning was imposed conforming to official attitudes of planning in Sudan since 1956 which have range from extensive demolition to selective demolition and resettlement and some upgrading (Ahmed, 1989). Official intervention in Dar Elsalam El- Magarba during 19931994- produced a grid of narrow roads and corridors (Figure 6) discordant with rain water natural discharge and collection of household disposals and wastes; house plot area of 200 m2 minimally and 600m2 maximally, increase of built area to accommodate more population, division of Dar Elsalam El- Magarba into eight blocks; provisioning of piped water and electricity services. It also produced very few open spaces for community services which shortly, obliged them to use open spaces in neighboring residential areas to build basic schools for their children.

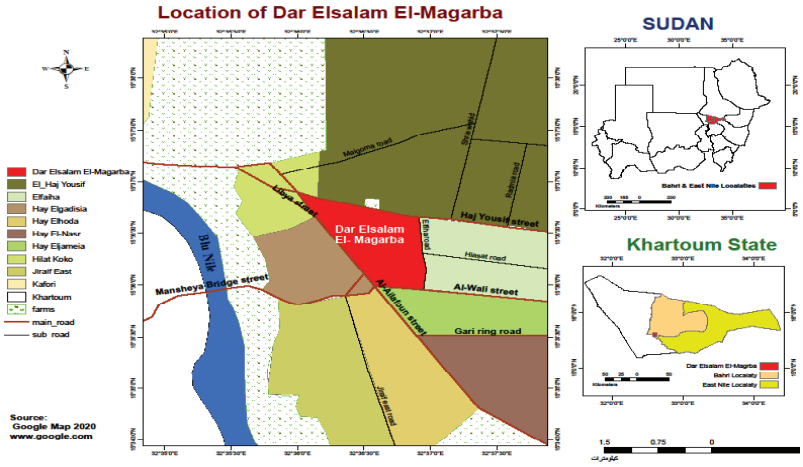

Figure 5: location of Dar Elsalam El- Magarba squatter settlement
Source: GIS analysis based on Google maps 2020

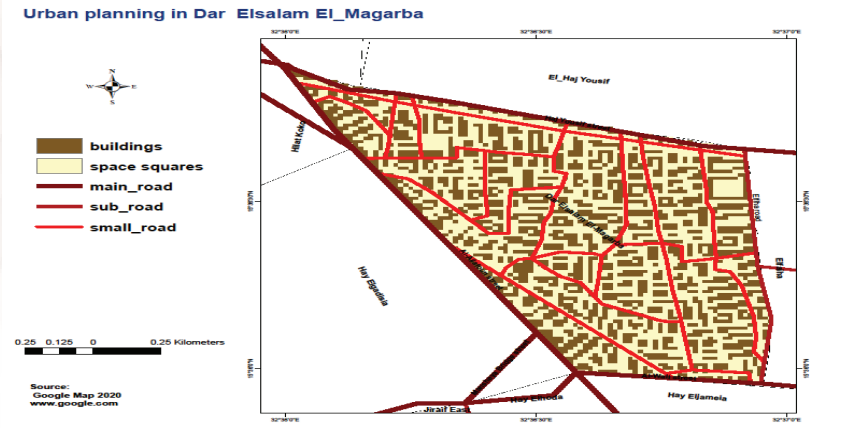

Figure 6: Morphology of Dar Elsalam El- Magarba produced planning intervention
Source: GIS analysis based on Google maps 2020

Intervention for Dar Elsalam El- Magarba planning also, produced two main narrow unpaved roads, one extending northeast-southwest with a length of 1042 meters and a second one extending north-south with a length of 748 meters (Table 1), meeting together in small traditional market in the middle of Magharba. The northern limit of Dar Elsalam El- Magarba is delineated by Haj Yusuf Street extending for 1750 meters; Wali Street from the south with 680 meters extension; Elfaiha street with extension of 1000 meters in the east; and Al-Ailafoun Highway extending for 1714 meters in the west (Table 1). A geometrical shape of Dar Elsalam El- Magarba over as estimated area of 1,500,000 square meters was ultimately produced, neighbored by Graif east from southwest, "Faiha" from the south and the east; Haj Yusuf from the north; and Elgadiesia from the west (Figures 5 and 6).

Tabe 1: Road characteristics within Dar Elsalam El- Magarbaand its outer skitrs

Name	surface	Shape length	Road length	Type
Magharba-Mid. Street	unpaved	0.006967	748	No mid-island
Dar Elsalam El- MagarbaStreet	unpaved	0.009436	1042	No mid island
Al Wali Street	Asphalt	0.006339	680	Two-ways
Haj Yusuf Street (Kassala Street)	Asphalt	0.016292	1750	Two ways
Kaddafi Highway	Asphalt	0.015639	1714	Two-ways

Source: GIS analysis based on Google maps 2020

Recent urbanization in east Nile locality

East Nile locality witnessed empirical residential development during the period 2005-2019, following the opening of Munshia Bridge in 2005 that linked Khartoum town with east Nile locality. The eastern part of Khartoum town represents a recent "**urban growth pole**" in Khartoum town. It is characterized by first class residential areas extending along three main north-south roads meeting with Khartoum-Medani Highway to connect with new first class residential extensions in Soba area. Excessive increase in land rent in Khartoum east drove many peoples to seek for alternatives among which, and preferably due to geographic proximity and affordable land prices and rents, was the east Nile residential areas. They are part of the skeletal plan for development and promotion of Greater Khartoum for the period 19912000- over an area of 8000 hectares for development, where 4700 hectares were allocated to residential areas to enroll growth up to the year 2000 (Banaga, 1994). The plan basically proposed the development of urban centers neighboring the already existing occupied areas to enroll population activities and services provided that being connected by transportation networks. Some residential areas developed rapidly around and close to the Blue Nile such as Huda; Gadisia; "Hai" Gama'a, Hai Nasr; and Munshia east, and very recently Blue Nile Hai. Some others developed along the Ring Road connecting Gaily Oil Refinery with Munshia Bridge, and along Al-Ailafoun High Way connecting with Soba Bridge (Figure 5). Older residential areas of Hajj Yusuf and Hilat Kuku were also developed and similarly, remote residential areas of Tilal; Wadi Akhdar "Green Valley", IDD Babiker were also rapidly developed.

This rapid growth of residential areas was accompanied by huge Arab agricultural investment schemes which made of the east Nile locality a "regional growth pole" in Khartoum State.Manymarket areas have developed including Suk Kuku, for example, where its domain extended southwards and eastwards along the main roads passing by Dar Elsalam El- Magarba squatter settlement, to connect with towns of Khartoum and Khartoum north and Omdurman via transportation networks, and similarly did Suq Sitta (six) which connected remote residential areas of the locality with central places in the locality and other parts of Khartoum state (Alredaisy, 2011). Along the Ring Road and Al-Ailafoun Highway many residential areas were developed (Figure 7) and similarly, many service centers including central markets (Figure 8); car maintenance works; private clinics, banks branches, oil service stations, schools; and some University colleges.

Figure 7: Modern residential growth in east Nile Locality (Hai El-Nasr)
Photo credit: Samir Alredaisy (December 2019)

Figure 8: East Nile New Central market
Photo credit: Samir Alredaisy (December 2019)

Consequences of recent urbanization on Dar Elsalam El- Magarba squatter settlement

The results of rapid urbanization in east Nile locality on Dar Elsalam El- Magarba could be outlined in the following facets:

- **Architectural disconformities:** Some houses on the outer skirts of Dar Elsalam El- Magarba were transformed to modern multi-storey type and became alike to the surrounding first class residential areas or neighboring formally developed areas (Figure 9), however; many houses are still keeping their primary design and traditional building material (Figure 10). This further caused landscape distortion and disconformity with surrounding first class residential areas (occupancy distortion).
- **Change of the out skirts functionality:** Outer skirts were utilized by businesses works such as car service, private schools, clinics, oil stations, and maintenance workshops, retail trade shops which inevitably increased land rent and some population translocation.
- **Proximity influences:** Many traditional houses inside Dar Elsalam El- Magarba were transformed to multi-storey types due to changes on its outer skirts and tendency towards architectural similarity with its neighboring first class residential areas. This led to upgrade of many house standards by modern architectural designs and sewerage system, beside rise of land rent by sale to well-off people which caused in the departure of some poor people such as Nubba group to depart to some remote areas in east Nile locality, socioeconomic difference among residents, excess division of the occupied area to accommodate renting demand or to enroll own families, and expectedly the rise of population density, crowdedness; and over pressure on lacked behind services.
- **Location Centrality:** Dar Elsalam El- Magarba became a divergence and a convergence focal point of transportation routes as it locates at the mouth of Munshia - Bridge and at the southern inlet-outlet of Suq Kuku (the central market in East Nile locality), close to major public facilities such as East Nile Hospital, Judiciary and Land Registration Complex, and the new East Nile Central Market.
- **Traffic obstruction and congestion**: Dar Elsalam El- Magarba's mal-planning obstructed opening of alternative roads to accommodate additional vehicles, particularly it locates at the mouth of main roads and Munshia-Bridge.
- **Blockage of rain water drainage:** Rapid residential growth and flatness of the geographic vicinity (Figure 11) to Dar Elsalam El- Magarba had blocked rain water draining naturally towards the Blue Nile. This consequently increased hazards of stagnant water accumulation and dangers of traditional houses collapse.

Figure 9: Two opposite faces of Elgadissia first class residential area (left) and Dar Elsalam El- Magarba squatter settlement(right)
Photo credit: Samir Alredaisy (December 2019)

Figure 10: Contradictory types of buildings: multi-storey and traditional inside Dar Elsalam El- Magarba squatter settlement
Photo credit: Samir Alredaisy (December 2019)

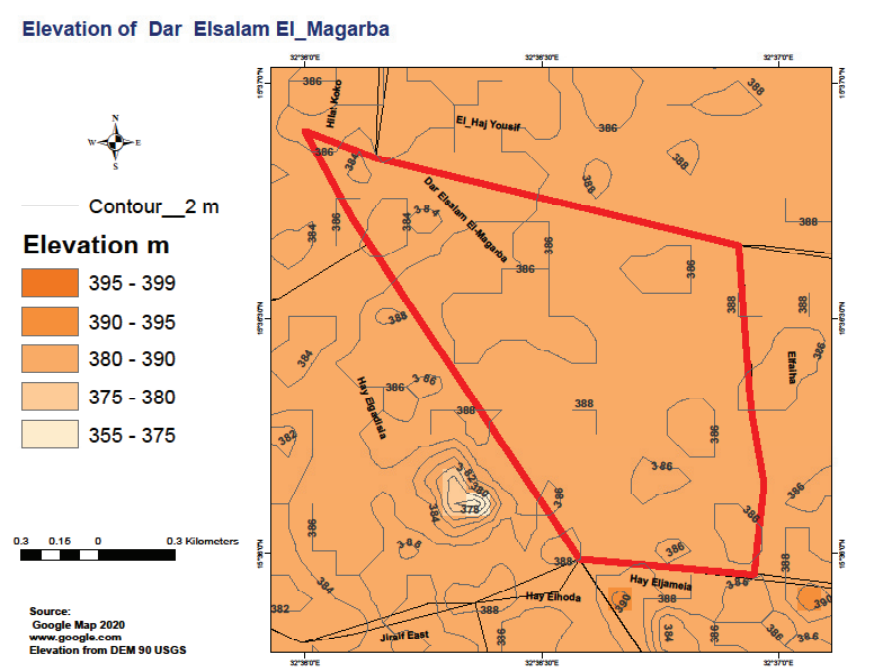

Figure 11: Elevation of Dar Elsalam El- Magarba and its neighborhood
Source:GIS analysis of Google maps 2020

Discussion

The long sequence of urban growth and urban development process in the changing world of Greater Khartoum has consequent on challenges to the inherited squatter settlements such as Dar Elsalam El- Magarba. This sequence is capable to cause urban hazard that could hurt the environment of these human habitats. This is particularly effective since urban planning in Sudan failed to deal adequately with the problems of rapid urbanization due to poor performance relating to developments in the planning environment (Post, 1996), however, it attempted to elucidate the overall political climate, increase popular participation, and decentralizing of efforts (Post, 1996).

In addition to urban hazard, rapid urbanization in East Nile locality had resulted in spatial polarization of its various settlements which increased inequality between them and effected exchanges in their relative positions. Dar Elsalam El- Magarba was subject to that and furthermore, was subject to urban polarity thatcould lead to social structure changing; urban social divisions and inequalities; and intensifying socio-spatial divisions. This was observed within the contrasting urban mosaic of Dar Elsalam El- Magarba's vicinity. According to (Snir et al., 2018), each of these contribution factors can be associated with a typical spatial pattern,and these factors can reinforce each other in specific spatial locations.

Urban hazard, spatial polarization, and urban polarity could be conceptualized within the risk of residential vulnerability framework within which the urban residential system of the East Nile locality became subject to the big influences of the dangers of rapid urbanization in Khartoum state. That rapid urbanization was determined by the overall socio-economic characteristics of the Sudan, including political instability and wide spread of rural and urban poverty; as well as environmental characteristics of onsets of drought and desertification; and the recurring incidences of population displacement. This residential vulnerability was further fueled in Dar Elsalam El- Magarba by geographical shift from traditional type of housing to modern one, inside Dar Elsalam El- Magarba and the old residential areas surrounding it, particularly Haj Yusuf from the northward side. Rapid growth accompanied with architectural modernity in the geographic vicinity of Dar Elsalam El- Magarba was essential to impose that residential vulnerability, but being enhanced by some other vital factors that could be framed within diffusion sprawl, communications and capital investment generated by geographical transaction and contact with rapid urban growth of eastern Khartoum town. This was evidently seen by huge sale of houses in some old residential areas, such as Burri residential area, and movement to the new residential areas in East Nile locality. These residential areas were part of the skeletal plan for development and promotion of Greater Khartoum for the period 1991-2000. It targeted the doubling of residential area fifth times compared to what was there in 1990, and included in East Nile locality areas such as Om Duban (EL Ailafoun small town), Abu Deilaig (central village) and Geili (industrial area) which are lying on the outer ring relative to the old residential mass and connecting them together by circular roads such as the ring road (Figure 5) and Nile bridges such as Munshia- Bridge. It also targeted to get rid of centrality of trade works via the division of Greater Khartoum into central areas, such as the central market in East Nile locality (Figure 8); beside encouragement of vertical growth and improvement of services of residential areas and that of squatter settlements (Banaga, 1994).

Collective rapid urban growth and development in East Nile locality has resulted in somehow, a sort of regional polarity with socio-economic power and important capabilities within the geographic region of Greater Khartoum. This regional polarity resulted in settlement divergence and population translocation by land sales; occupancy distortion due to architectural disconformities; economic disturbance due to influence of market areas, which have been allconfirmed by the case of Dar Elsalam El- Magarba squatter settlement which experienced some sort of marginalization. This was manifested insocial disadvantages and downgrading where some dissidents faced marginalization in Greater Khartoum with the outbreak of violent events associated with “Negros Gangs” during December 2019.

Upgrading of Dar Elsalam El- Magarba planned squatter settlement is a key factor for its improvement since proper planning is necessary in urban development politics to improve

human settlements managements in a sustainable way (Elnazir et al., 2004), and particularly to improve the public services and the legitimacy of property and occupancy rights (Pugh, 2000). Furthermore, informal settlement upgrading is widely recognized for enhancing shelter and promoting economic development and can address multiple environmental determinants of health and is a key strategy to promote health, equitable development and reduce climate change vulnerabilities" (Corburn et al., 2017) and would lead to a more sustainable and cost-effective urban development" (Okpala, 1999). The benefits are simply that "people obtain an improved, healthy and secure living environment without being displaced. The investments they have made to their properties remain and are enhanced-this is significantly better than removing them to costlier alternatives that are less acceptable to them. Experience has shown that informal areas upgrading projects are associated with social and economic benefits that are particularly high" (EL Menshawy et al., 2011). "Upgrading also makes a positive impact in reforming governance institutions and in particular, policy reform and changes to the regulatory frameworks that set the legal parameters for upgrading" (Horen, 2004), in addition to introduction of green spaces which have a beneficial health effect (Lee et al., 2011) and their roles in alleviating the adverse effects of urbanization in European cities have been confirmed (Ridder eta l., 2004).

Our proposed model was named "DLSSLSSPA" as abbreviation of the first letters of its consecutive principles and steps (Figure 1). It is extremely eternal for the future of Dar Elsalam El- Magarba and the whole geographic neighborhood of east Nile locality to commensurate with ''the skeletal plan for development and promotion of Greater Khartoum for the period 19912000- which was basically proposed the development of urban centers neighboring the already existing occupied areas to enroll population activities and provide work chances and services provided that being connected by transport networks''. Itwas based on the following principles and steps:

1. **Diffusion of innovation:** Objects to make the community ready to cooperate and influence on overcoming complexity of upgrading process. It could be through diffusion of concepts targeting to treat Dar Elsalam El- Magarba as a residential area needs to cope with new world's changes in human habitats. Diffusion should avoid conventional method-based approaches which are applicable to new areas or sites and instead should focus on applicable principles and best practices.
2. **Legitimacy:** Seeks to transform Dar Elsalam El- Magarba squatter settlements into a formal neighborhood. This endeavor could benefit, for example, from Favela Bairro slum upgrading program (FBP) in Rio, Brazil. That program was based on slum upgrading without full land tenure legalization and for its use of state of exception, primarily the concession of right to use but not full ownership of land, in order to allow this program

to take place (Handzic, 2009). Long term impact and sustainability of upgrading interventions of squatter settlements is limited and consolidating is beginning to provide residents with access to land tenure and services. Recognizing title and security of tenure makes a positive contribution to both the economy prospects of the poor, as well as the national economy (EL Menshawy et al., 2011).

3. **Sustainability:** Dar Elsalam El- Magarba could be framed within the trend that external interventions have the ability to deal with the key issue of vulnerability and to fight for the need to plan for the long-term sustainability of informal settlements (Abbot, 2002).
4. **Space - base information:** Necessary space-based information for Dar Elsalam El-Magarba upgrading could be provided by conceiving of landscape as the primary problem due to mal-planning and relating ill health conditions, and as the main opportunity for intervention and improvement (Beardsley et al., 2008).
5. **Community participation:** Communityparticipation is integral part of this model. Some experiences will benefit such as that of Mumbai with slum redevelopment programs. This is because "in spite of the intolerable environmental conditions in which they live, squatters have up to now shown a surprisingly high degree of popular initiative and cohesion, newcomers are pioneers, acquire attitudes and skills much different from those existing in rural areas of their origin, but their motivation and behavioral patterns often change" (Madova, 1976).It suggested for a community among slum dwellers for redevelopment. Also, policy makers and analysts, apart from focusing on tenure status, should pay attention to the existing physical conditions within Dar Elsalam El- Magarba including its location, land use, layout, and the size of the lots within it. They can impact the success of upgrading strategies by considering the preference of beneficiaries for different strategies (Mukhija, 2001).
6. **Living habitat improvement:** Implementation of physical improvements via a full package of basic services is absolutely crucial to improve the living conditions in Magharba. This is important since interventions in the built form through the provision of infrastructure have been proposed as a strategy to improve economic, social and health outcomes to informal settlements (Beardsley et al., 2008). It is also important to link upgrading and service provision as twin approaches to development of Magharba. This will make it situated within a particular development paradigm and within community support upgrading initiatives. Dar Elsalam El- Magarba could benefit from the shift of prevailing strategies for addressing non-formal settlements from large-scale clearance and relocation to on-site upgrading and improvement with the goal of integrating low-income communities into their larger urban contexts. This is because many slum areas

are big and old and it will be "impractical to think of removing them entirely, to improve them physically without destroy them socially" (Beardsley et al., 2008).

7. **Subsidiary intervention:** The experience of the National Slum and Squatter Upgrading Program in Thailand (Boonyabancha, 2005) could benefit Dar Elsalam El-Magarba concerning this integral step of upgrading. The program centered on providing infrastructure subsides and housing loans to low-income communities to support upgrading in situ wherever possible and, if not, to develop new homes close by. Support is provided to community organizations and networks formed by the dwellers to allow them to work with city authorities, other local actors and national agencies on city-wide upgrading programs.
8. **Step-wise intervention:** Adoption of aspects of recent upgrade of informal settlements in South Africa (Brown-Luthango et al., 2017) is important for Dar Elsalam El- Magarba to achieve Step-wise intervention. These aspects included planning, tenure delivery, and public participation within a historical context and within the framework of state's evolving urbanization policies. "Land use efficiency is an important index to measure the level of land use, from the aspects of society, economy, resources and environment" (Wang et al., 2006).
9. **Partial demolition:** This will focus on thepossibility of the use of Dar Elsalam El- Magarba occupied residential area to open spaces, provide services and eradicate environmental health problems. The Chinese experience will benefit here since it was confirmed that this can enroll even aimed to more numbers of residents and open a chance to transfer people from far remote areas to reside here, change thinking of land urban use, reduce cost of living due to long transportational journeys, and control of security. This might require the change of attitudes toward land ownership among urban residents and even the policies of the State towards land allocation through urban residential plans, it might put the society of Dar Elsalam El- Magarba to accept residing in a flat rather than a house and will accommodate with rapid urbanization rates in Sudan. The Turkish model in squatter settlements upgrading (Uzun et al., 2010) might also, benefit Magharba. It firstly, demolished such areas and then legalized them but due to failure they developed a new model in 2003 that upgraded them through demolishing existing ones and constructing new residential units in the same or different area. The model provides housing units to slum owners as compensation for their slums while giving an opportunity to the squatters and low-income people living outside the upgrading area to buy a housing unit with affordable long-term payments. Thus prevents the construction of new squatters, as an enrichment tool by not sharing annuities of urbanization with squatters (Uzun et al., 2010).

Assessment of "DLSSLSSPA" model

The model's principles and steps should be assessed on specified time-span by official authority and local community and stakeholders to judge for success (Positivity) or failure (Negativity). Positive assessment could lead to continuation of upgrading process which could be fueled via point of supporting continuation indicated in the model (Figure 1). Negative assessment leads to the possibility of exclusion of some principles of the model and/ or inclusion of some new principles which might include compulsory demolition (Figure 1), because slum redevelopment strategies could involve demolition of squatter settlements and redevelopment of new, higher density, medium-rise apartment blocks, including, entirely cross-subsidized housing for the original slum dwellers (Mukhija, 2002).

This proposed model should bear in mind that: "An additional factor to be assessed is the extent to which governments and international agencies have improved income, resources, environment and tenure security in many settlements, but could not eradicate the problems as benefits did not multiply due to lack in institutional development, policy implementation, governance, participation, ignorance of the squatters' capability to bring affordable solutions through their own process" (Rahman, 2011). Also, it shouldn't consider cost and cost recovery as a perquisite to achievement and here can follow the project of large -scale squatter upgrading in Lusaka, Zambia during the 1970s which "Despite the many problems that occurred, especially with regard to cost and cost recovery, the project did have some successes and future considerations" Chawama (Pakodi, 1987).

Conclusions

This research tried to outline the challenges facing afore planned squatter settlements due to rapid and changing urbanization cadence, where Dar Elsalam El- Magarba squatter settlement in East Nile locality was taken as example. The main results suggest for:

1. Rapid urbanization will continue to make persistent challenges to squatter settlements, either planned or re-planned.
2. Continuous intervention via proper upgrading strategies and coping policies of urban planning is necessary.
3. That our proposed model "DLSSLSSPA" could be benefit to apply in similar situations in Greater Khartoum, and elsewhere.

Proper development plans to stop rural-urban migration, State's policies to provide housing to Khartoum State's citizens and harsh measures to stop land violation by new squatters are necessary prerequisites to improve urban environment and squatter settlements upgrading.

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