

Settlement in Transition: A Transformation of a Village into a Small Town in Western Sudan

Mohamed Babiker Ibrahim, Associate Professor, Department of Geography, Hunter College of the City University of New York, New York, New York, USA

E-mail: mibrahim@hunter.cuny.edu

Phone: 212-772-526

Leo C. Zulu, Associate Professor, Department of Geography, Environment, and Spatial Sciences, Michigan state University, East Lansing, Michigan, USA.

E-mail: zulu@msu.edu

Frederick. L. (Rick) Bein, Professor, Department of Geography, Indiana University- Purdue University at Indianapolis. Indianapolis, Indiana USA.

E-mail: rbein@iupui.edu

Final – Ready for resubmission

Acknowledgements

We would like to thank the people of Shubbola and our research assistant Mirgahani Awad Bashir for their hospitality and help while the lead author in the field. We thank Dana Reimer for her help. Part of his work was supported by the PSC-CUNY 40 Research Award Program at Hunter College of the City University of New York.

This is the author's manuscript of the article published in final edited form as:

Ibrahim, M. B., Zulu, L. C., & Bein, F. L. (2018). Settlement in Transition: a Transformation of a Village into a Small Town in Western Sudan. *Urban Forum*, 29(1), 85–106. <https://doi.org/10.1007/s12132-017-9323-2>

Abstract

UN-Habitat Projects Sub-Saharan Africa's global share of the urban population to increase from 11.3 per cent in 2010 to 20.2 percent by 2050. Yet little is documented about the underlying urbanizations processes, particularly of emergence of small towns. This article uses household interviews, focus groups, observation and secondary data to examine the spontaneous transformation of a Western Sudanese village, Shubbola, into a small town. We use changes in building construction approach, materials, and style as an indicator of develop, and provide rare documentation of the process, the main actors, choices taken, timescales and outcomes of the rapid urbanization of Shubbola between 2006 and 2013. Housing transformation was variable but involved a gradual process of replacing traditional non-durable building materials (wood and straw) with modern durable ones (sun-or fire-cured bricks, cement blocks and metal roofs). Unlike traditional top-down models of urbanization generally driven by government investment, Shubbola epitomizes an organic, bottom-up process dependent on self-reliance and agriculture development fueled by remittances from urban-based relatives. While many small towns with similar origins fail to do so, Shubbola already provided important urban services to its inhabitants and surrounding rural areas. The study enhances understanding of small towns and underlying urbanization processes, and their contribution to often neglected bottom-up, low-cost processes that do not fit traditional top-down models. It also contributes to literature and policy on sustainable cities and their role in sustainable development as encapsulated in UN Sustainable Development Goal 11. The study contributes to understanding the processes and implications of rapid urbanization in the Sudan and Africa, and other world regions.

Keywords: urbanization, transformation, village, small town, Sudan, Shubbola,

1. Introduction

Urbanization is considered one of the measures of development and modernization (Henderson 2003; Kabwegyere 1979). Two thirds of the world's population are projected to live in cities within the coming two and the half decades (UN 2009). Yet our knowledge of the nature of urbanism and the process of urbanization in both developed and developing countries remains meager (Wirth 2010: 129), even less so for the emergence of small towns (Asomani-Boateng 2011; Mapes 2009; Mayer and Knox 2010; Servillo et al. 2017; Tacoli 2017). In recent years, the rapidly growing number of villages that graduate into towns has accelerated urbanization rates (Ibrahim 2014; Sudan 2008 Census). The objective of this qualitative study is to document bottom-up the transformation of a Western Sudanese village into a small town manifested primarily through changes in building construction. The transition of a village of straw huts into one with durable fired bricks and metal roofs and in settlement patterns epitomizes the organic adjustment to becoming a small town in a developing country context.

Most future urban growth will take place in developing countries. Most of it will be in small and medium sized cities (Cohn 2006). Sub-Saharan Africa's (SSA's) urban population is projected to increase from 11.3 per cent of world population in 2010 to 20.2 percent by 2050. Already, more than a quarter of the 100 fastest-growing cities in the world are in Africa, with 52 African cities exceeding one million inhabitants in 2011 (UN-Habitat 2014: 23). This poses an important question: "Will African cities have the ability to cope with such an increase in spite of the lack of institutional and infrastructural capacity to absorb the additional urban dwellers (UN-Habitat 2014: 25)?" What challenges and opportunities will this rapid urbanization present?

While there is some documentation of transformation of African villages into towns and cities going back to the colonization era and before, the processes and pace of change vary considerably. In Sudan, the transition is evident in current morphologies of Omdurman and Wad Medani where old neighborhood streets maintain the short and irregular pattern of villages (Ibrahim and Omer 2014; Winters 1977). Some cities originated from a coalescence of groups of villages, such as two to six villages for Sudanese cities of Shendi, Damer, El-Obeid and Berber during the 18th and 19th centuries (Burckhardt 1980; Crawford 1951; Pallme and Petherick 1980). Even large cities like Khartoum, Omdurman, Shendi and Wad Medani developed from villages (Abu- Saleem 1979; Burckhardt 1980; Winters 1977). The transformation pace can be fast, e.g., less than ten years for Omdurman at the end of the 19th century (Crawford 1951). Similar village-city transformations are evident in other African countries such as Kampala in Uganda and Gondar in Ethiopia (Winters 1977, 1982). In southeast Ghana, the majority of urban settlements began as hunters' camps, which later developed into villages and then towns (Boateng 1955).

The definition of a town varies considerably. It can be based on population size, function or socioeconomic factors. There is some agreement that a town is simply a settlement bigger than a village but smaller than a city. While population thresholds of 5,000-20,000 have been used for many African, American and European towns (Blumin 1983; Mabogunje 1990; Morgan and Pugh 1969), under European influence many African cities have been defined by function rather than size. Thus, Aburi in Ghana, a village inhabited by 3,142 people was considered a town because it was the seat of a chief. Yet Nsawam, with a population of 8,642, was classified a village (Boateng 1955:161). One important distinction between villages and towns is morphology — the form and process of formation and transformation of human settlements, including buildings. Traditional houses in Sudanese villages are built mainly of millet straw, a

non-durable material, and wood. In contrast, urban houses are mostly built of durable materials such as sun-dried bricks, fired bricks, and cement blocks and metal roofs. Morphologically, streets and alleys of villages are narrower, shorter and irregular, while urban streets are long, wide, often laid out in grid format and paved. As with other Sudanese towns, Shubbola's changes in building materials from non-durable to modern durable materials, and in morphology, also reflect transformation of social life and living standards.

Adopting the morphology and function definitions of towns, and Sudan's size-based criterion of at least 5,000 people, we use qualitative methods to document the unique bottom-up socio-spatial processes that transformed Shubbola village into a town. After the introduction, we position the research in the broader literature on rapid urbanization and small towns in both the Global North and South, present the study site, research methods, and the underlying socio-economic transformations. We highlight the morphological processes, focusing on changes in house building and associated local perceptions. We discuss the findings in the broader context of SSA's rapid urbanization small towns and new thinking on urbanism globally, before concluding.

2. Neglected but even more unforgettable: urbanization, small towns and their role in sustainable cities/towns and development

Globally, "urbanization in developing countries presents the single greatest transformation of this century," and "Africa is ground zero in this urban revolution" (Grant 2015:331). Formation of small towns is the rapidly expanding frontier for urbanization since many such towns have grown out of rural settlements (Blumin 1983:54), making accessible the potential benefits of urbanization to millions of new people worldwide. Already, small towns host about half the global human population, and will absorb much of projected future

population growth (Tacoli 2017). Further, the build-up area in developing countries is projected to triple, from 200,000 km² in 2000 to 600,000 km², by 2030 (Suzuki et al., 2009). Between 1978 and 2000, the number of small towns in China exploded from 2,176 to 20,312 while the number of cities increased only to 663 from 90, together raising China's urban population from 18% to 39% (Zhou et al. 2004). Despite these trends, research on urbanization has focused on (large) cities, neglecting small towns in both the Global South (Asomani-Boateng 2011; Han 2010; Owusu 2005) and Global North (Mayer and Knox 2010; Mapes 2009; Servillo et al. 2017; Tacoli 2017). Studies on spontaneous or organically evolving small towns and associated urbanization processes have received even less attention globally (e.g., Steinführer et al. 2016).

Cotemporary and past research on small towns has followed three main tracks: 1) the ontological challenge of defining a town (administrative, morphological or functional), 2) analysis of the relationship between towns and their regional context, and 3) the policy approaches to towns and their operational scales (Servillo et al. 2017). Despite attempts at standardizing definitions, challenges remain, with real life impacts. For instance, fuzzy and inconsistent definitions of a small town may have exaggerated urbanization rates in China by including essentially rural populations (Yok-shiu 1989). While research on small towns can contribute to the literature and policy on tracks 2 and 3 (Owusu 2005, Servillo et al. 2017; Tacoli 2017; Ward & Shackleton 2016), much work has treated small towns and rapid urbanization in one-dimensional, crisis terms. Adverse impacts highlighted include crowding, environmental degradation, impoverishment, limited resources for infrastructure and services, declining social cohesion, underdevelopment or unsustainable development (Bloom et al. 2008; Grant, 2015; Kabwegyere 1979; Owusu 2005). These can impede productivity and neutralize economic benefits expected from urbanization (Bloom et al. 2008). Some associate rapid urbanization and

the proliferation of small towns with “loss of control over major parts of urban growth” from illegal low-income squatters and clandestine developers, which undermine efforts to plan and develop cities (Turner 1968). A study in China linked the urbanization boom and proliferation of small towns to much of the land-use changes that have raised surface temperatures in the southeast at an accelerated rate of 0.05°C per decade (Zhou et al., 2004). Neglect of small towns in policies and plans of developing countries (Grant 2015; Owusu 2005, 2008) frustrates the search for corrective action. For instance, potential contributions of models of indigenous African urban structure, architecture design, planning principles and management to contemporary urban development and sustainability have largely been ignored in in Sub-Saharan Africa (Asomani-Boateng 2011).

The foregoing challenges notwithstanding, improved understanding of small towns and their emergence has a lot to offer to knowledge and policy on urban areas and development (Owusu 2005, Servillo et al. 2017; Tacoli 2017; Ward & Shackleton 2016). Small towns offer important urban socio-cultural, economic (non-farm employment, markets for food producers and processors, and provision of goods and social services—education, healthcare, water etc), and political functions to their population and those living around them, at lower cost (particularly organically evolved ones) than cities and with a lighter ecological footprint (Asomani-Boateng, 2011; Linn 1982; Owusu 2005, Servillo et al. 2017; Tacoli 2017). Improvements in housing quantity and quality are a major element of urbanization. Higher dependence on the use of local building materials in small towns reduces construction costs per house unit (Linn 1982).

With the paradigm shift to a physical-environmental approach to urbanism underlain by notions of sustainability including green urbanism, livable urbanism, ‘counter urbanization’

(Champion 1999) and ‘urban villages’ in China (Wang et al., 2009), small towns can teach planners, architects and politicians how to follow sustainable development pathways for the future (Grant 2015; Knox and Mayer 2013). Small-town urbanization mixes elements of cities and urban living with those of rural villages and living. This includes urban agriculture, which previously discouraged in cities, is now increasingly promote for enhancing nutrition and food security from fresh, locally grown food while providing clean air and jobs, and ‘greening’ for urban spaces (Asomani-Boateng; 2011; Grant 2015; Steinkuehler et al. 2016; Tacoli 2017). Adoption of indigenous urban forms and architectural models such as compounds/courtyards can help to housed more people per unit area and for Africa also “help shape thinking about Africa-imbued sustainable development” (Asomani-Boateng 2011). Small towns are also associated with active grassroots participation, high social capital in the form of rich interpersonal relationships and generalized trust which help inhabitants to solve local problems and improve the quality of life (Asomani-Boateng 2011; Besser 2009), and with local empowerment through decentralization (Owusu 2005, 2008).

Africa, and the Sudan within it, epitomizes the foregoing global rapid urbanization, underlying processes, and proliferation and role of small towns, while bringing unique elements. A critical function for many small towns in Africa is that of service centers and market places for hinterland agricultural products. Thus the economy of the town of Testour (Tunisia) is closely linked to the agricultural patterns of its hinterland. Emergence of a dominant pattern of market-oriented agriculture has significantly shaped urban structure and functions as market towns and service centers (Hopkins 1979: 316-320). Migrants who work in such small towns often carry the seeds of urbanization change back to their village (Abou-Zeid 1979). The transition processes of villages into towns, however, are poorly documented.

The function of small towns as growth centers and vital functional interfaces between developing rural and urban communities and systems is particularly salient in Africa. This perspective transcends the false dichotomy of rural and urban problems and concentrates on interlinkages thereof (Kabwegyere 1979; Owusu 2005; Southall 1977). Some scholars are nevertheless skeptical of benefits to rural areas generated by small towns. Kabwegyere (1979) found that small urban areas in Kenya were unable to generate the expected development, becoming instead centers of underdevelopment. In Egypt, Abou-Zeid (1979) found that despite the growth of its population, the small town of Mersa Matrouh did not, and could not, play an effective role in developing the region. The town was too undeveloped to have a positive influence on undeveloped surrounding areas are often overstated.

The notion of nodes is important to urbanization. Nodes of transportation are generally associated with urban growth and economic development. In Africa, a vast increase in the volume of trade accelerated urban development while the new means of transport by river, railway and road produced a concentration of population at certain nodal points (Hoyle and Smith 1998; Morgan and Pugh 1969; Taaffe et al.1963). Towns have been nodes of certain types of structural, economic and socio-spatial relationships within regions (Coquery-Vidrovitch 1991). Rich agricultural hinterlands have made many important African cities/ports, such as Ibadan in Nigeria and Kumasi in Ghana, commercially active nodes (Morgan and Pugh 1969:439).

As for process, transformation in buildings and their construction is an important dimension of urbanization. Buildings are artifacts that reflect cultural values, heritage, technological advancement of a society, and links between people and their physical environment (Lees 2001). In SSA, building styles and materials used indicate the level of

urbanization because they generally vary between rural and urban areas. Earth (mud), mudbricks, wood, and grasses are commonly used building materials in rural areas (Afolabi Ojo 1968; Oruwari et al. 2002). In contrast, durable materials are used in towns and cities (Hamdan 1960; Konadu-Agyemang 2001; Ngowi 1997). There are, however, areas with no distinction in building materials between rural and urban centers among the Yoruba in Nigeria, and houses in Ethiopia (Afolabi Ojo 1968; Bascom 1962; Taffese 2012). Use of durable materials has also changed recently, including a shift from solid fired earth bricks to hollow concrete blocks which are considered more cost-effective (Taffese 2012; Tipple and Korboe 1998).

As for Africa generically, literature about the transformation of small settlements into urban centers in the Sudan is also scanty and fragmented. Further, most of the increase in small urban centers is associated with the establishment of large agricultural schemes in combination with improvement of transportation (El Agraa et al. 1986; Hale 1974; Ahmad and Abu Sin 1990). Thus, the establishment of the large-scale, Gezira-Managil Irrigated Scheme and the building of railways has enhanced the growth of small urban centers (El Agraa et al. 1986). Establishment of the New Halfa agricultural schemes transformed the small New Halfa settlement into a town that serves the 25 villages of the scheme (Ahmad and Abu Sin 1990).

One study has investigated the relationships between transportation, growing trade, development, and growth of small and intermediate size urban centers in the Sudan, particularly in the Gezira Managil agricultural scheme (El Agraa et al. 1986). The authors found a significant relationship between transportation and growth of urban centers near or along railway lines and paved roads. All the 14 small towns of the Gezira agricultural scheme are located at or near transportation lines. Further, some administrative and commercial centers that were important

before the establishment of the Gezira scheme in 1925, like El Messellamiya, declined because they were by-passed by the establishment of railway lines.

In eastern Kordofan districts, the 1912 establishment of the railway from Kosti westward to El Obeid led to the decline of the administrative center of At Tayyara (Figure 1) because it was located far from the railway line. The emergence and growth of Um Rowaba village into a town also benefitted from being located along the railway line (Agab Al Feyya 2013). The westward railway-line extension to Nyala in 1959 helped to transform Babanousa, Ed Da'en and Nyala from small villages into cities (Abu Sin 1980; Hale 1974).

Rural-rural and rural-urban migration is major dynamic accounting for increases in population in emerging towns. Markets of these towns also serve increasingly larger agricultural hinterlands (El Agraa et al. 1986). However, village-based market centers in rainfed cultivation areas have also flourished and gradually transformed into small towns as defined by the Sudan 2008 census (Ibrahim 2014). Similar to Shubbola, many of these small towns have become nodes that serve wide hinterlands (Ibrahim and Zulu 2014).

In sum, responsible research can no longer neglect small-town urbanization and the unique underlying processes, forms, challenges, opportunities, and their transformative potential in urban development. Small towns uniquely channel the import and dynamics of the rapid urbanization turn that is set to epitomize 21st century development, particularly in the Global South (Grant 2015). Such research can contribute to debates and action on the paradigm shift in thinking about urban development based on sustainability and encapsulated in the UN Sustainable Development Goal 11 (SDG11): Sustainable Cities and Communities - Make cities and human settlements inclusive, safe, resilient and sustainable. Embracing small towns and understanding underlying urbanization processes also allows urban scholars and practitioners the

conceptual inversion to understand small towns and cities more from below—from the perspectives of the majority of dwellers who use towns/cities for their needs—than from above (Asomani-Boateng 2011). This study specifically examines bottom-up urbanization processes which are increasingly important in developing nations with limited state resources promoting and/or managing urbanization, using the Sudan as a case study and the transformation of building materials and morphology as a major dimension of urbanization.

3. Methods and study site

3.1 Study area

This study was carried out in East Kordofan District in Northern Kordofan State (Figure 1). East Kordofan is the homeland of the Gawamaa tribe who are traditional, small-scale farmers cultivating sorghum and millet as staple foods, and sesame, karkadi, groundnuts and Gum Arabic as main cash crops. The Bazaa, Hubbania, Nuba and Shanabla are minor tribes in the area. The Bazaa and Shanabla are pastoral nomads. The study area is known for its rich natural resources despite the marginal rainfall (300 mm annually falling June to October).

Shubbola started out as a large village located at the center of East Kordofan, inhabited by 5,000 people in 2014. Recently, Shubbola has emerged as an important economic center in the district. It has become an important crop and animal market while also providing adjacent smaller villages with social services such as water supply, education and health facilities. In addition, regular cash remittances sent by emigrant family members living in larger cities have funded increases in farm size and commercial agricultural productivity (Ibrahim and Zulu 2014). The resulting rural development is reflected in improvements in life-style, most notably in housing quality through rapidly growing house construction/remodeling using durable materials (fired bricks and cement blocks).

3.2 Methods

This study is a part of broader research conducted 2006-2013 to investigate socio-economic changes in eastern Kordofan district. The study included a household survey (N=70) conducted in Shubbola settlement in June 2011, using the wide main street passing as a sampling transect to systematically select every third household ((N=70) and interview, alternating on either side of the street. While this paper uses some findings from the survey, the main sources of data are two focus group discussions comprising a total of fifteen participants and conducted in September 2014 in Shubbola (lasting 2-3 hours each), field observations over seven years (2006-2013), review of secondary data. All participants in the focus groups were males, ages 30-70. Despite the importance of women's perspectives in the urbanization process, cultural practices prevented male interviewers from interviewing women in a traditionally closed society. Further, men engage in and make most of the decisions on house building and upgrading in the area. All respondents had at least an elementary education. Selection of respondents for focus groups was purposive, targeting people who had built part or the entire house with durable materials. Discussions included changes in housing construction, common parts of the house chosen for initial remodeling/upgrading and why, sources of durable materials, general time duration to complete particular sections of the houses (a room, outside wall, etc.) and expected time to complete the entire house with durable materials, and advantages and disadvantages of the improved/new buildings and traditional houses. Broader socio-economic information included common sources of income, including external funding from lending institutions. Local perceptions of when most of Shubbola houses would be built with durable materials were also

sought. All information was analyzed qualitatively, mainly through contextualized description and content analysis.

In addition, photographs taken over the seven years were used to document the gradual transformation of building construction in Shubbola. The lead author conducted the main interviews and photo documentation while a research assistant (Mirgahani Awad Bashir) facilitated the focus groups.

4. The economy and socio-economic transformation

The study area is one of the richest districts of North Kordofan State in terms of crop and animal resources. Income from the sale of crops and livestock products has significantly enhanced the local and regional economies and development. Economic benefits extend to the national scale. The smallholder crop and livestock sector contributed 22% to Sudan's gross national income in 2008 (Bank of Sudan 2008).

Recent changes have extended beyond agricultural commercialization to consumption patterns, including diet. Cultivation practices have shifted considerably from subsistence to commercial, and sesame cultivation has burgeoned to occupy 90% of farmers' fields (Ibrahim and Zulu 2014). This change was primarily catalyzed by remittances sent by emigrants strategically sent by family members into the cities to access external finances for their families in Shubbola. The emigrants generally send remittances weekly through cell phone transfers to a merchant in the village who transfers the money to the receivers. The remittances range between Sudanese Pound (SP) 50 and 500 per month – U.S. \$22.12 - \$221.23 (Ibrahim and Zulu 2014). Remittances help farmers to meet consumptive costs for survival and to enhance agricultural productivity, including the renting of tractors. The use of tractors is recent, but it has contributed significantly to the increasing farm size, crop production, and farmer incomes. Average sesame

production has nearly quadrupled (371 percent increase) between 1977 and 2010 (Ibrahim and Zulu 2014). The income increase has reduced poverty, graduated many from subsistence to commercial farming and helped to diversify livelihoods to non-agricultural jobs such as trades, livestock marketing, and furniture production (Ibrahim and Zulu 2014). These changes signify socio-economic transformation, including growing investment in improved housing.

The recent income gains have also altered local diets. This, following introduction of wheat flour as free food aid during the Sahelian droughts of the mid-1980s, enhanced incomes have accelerated the replacement of bread made from millet and sorghum, which most rural people eat to wheat bread. Seven bakeries have emerged to cater for this and other imported urban dietary tastes among the people of Shubbola and adjacent villages.

Shubbola increasingly provides socio-economic services to its population and to adjacent villages, illustrating functions of an emerging town. They include primary and intermediate-level education, enhanced health services from a clinic upgraded in 2000 into a medical center, and safe drinking water from a borehole equipped with a pump and a diesel engine with tank trucks used to extend water supply to people and animals in nearby villages and camps of pastoral nomads. It also provides a market for agriculture and other products. These services are recursively drivers of development and the transformation of the village into a nascent, vibrant and viable small town, as well as indicators of such change.

5. The urbanization and morphology of Shubbola

5.1 Shubbola and Sudan's rapid urbanization

Analysis of the transformation of Shubbola from a village into a town cannot be dealt with in isolation from the process of rapid urbanization taking place in the country since 1965 (El Agraa et al. 1986; El Bakri et al.1987; Ibrahim 2014; Pantuliano et al. 2011). Government driven

industrial and agricultural development drove much of the rapid urbanization in the Sudan in the 1960s. The concentration of light industries such as textiles, food, beverages, shoes and soap accelerated rural-urban migration and the growth of cities like Khartoum and Omdurman (El Bakri et al.1987; El-Bushra 1980; Hamdan 1960). Extreme adverse conditions (push factors) such as drought in western Sudan and civil war in the South, Darfur, Southern Kordofan, and Blue Nile States, along with poverty and poor rural development policies, have since the 1980s increased rural-urban migration and accelerated urbanization (Ibrahim 1985; Ibrahim 2014; UN-Habitat 2009). According to Sudanese census authorities who classify settlements of 5,000 or more people as urban centers (Ibrahim 2014), Shubbola qualifies as a town. The social functions described earlier affirm this status, buttressed by its emergence as a node addressed below.

5.2 Emergence of Shubbola as a nodal urban center

The emergence of Shubbola as a multi-dimensional node is both a symptom and driver of its urbanization. Similar to the growth of many African towns, trade in crops and livestock with the hinterland has made Shubbola the second largest market for such produce in the district after the city of Um-Rowaba (Ibrahim and Zulu 2014). Shubbola's urbanization around agricultural/livestock markets echoes many Medieval European towns that developed within localized market systems (Blumin 1983:65). In the Sudan, the importance of towns depends largely on the services they provide to their hinterland, mainly marketing services (El Agra et al. 1986). Shubbola as a small town is unique in that it has grown as a commercial node in isolation of other urban centers. Unlike many African towns/cities, Shubbola's nodality does not stem primarily from its connection with improved transportation (it is connected to adjacent villages and the city of Um-Rowaba via tracks and dirt roads), but rather from trade and services rendered to surrounding villages. Shubbola's location within the richest agricultural districts of

North Kordofan State, particularly its role as a major trading center for commercial crops such as sesame, and the significant incomes from agriculture have significantly enhanced the nodality of Shubbola as a regional market. Finally, the social services that Shubbola provides (education, health, water) to its residents and adjacent villages, and the associated socio-economic benefits, enhance its importance as a regional node. Shubbola residents also see themselves as an urban society distinct from surrounding rural communities. The most visible manifestation of this transformation to an urban nodal center is the tremendous improvements in housing type and quality. These important commercial and service nodal functions of this organically formed town (based on agriculture advancements and local self-reliance) have come at much lower cost than if the government had driven the urbanization from above, illustrating the importance of such small towns to enhance human welfare and development.

5.3.Processes of change in building form and construction

5.3.1 Typology of evolution of house construction

The turning point in the urban transformation of Shubbola was the introduction of modern urban planning and land management practices as part of recent land reforms for rural development in the Sudan. In 2005, Shubbola's streets were planned into wide streets organized in a grid-pattern system along with demarcation of land parcels – 500 square meter plots for house construction (Ibrahim and Zulu 2014). These provide the 'skeleton' for physical and social-spatial development (Figure 2a). Hitherto, all buildings, except one house and the village mosque, were huts built of non-durable materials of millet straw and wood. Since 2005 house construction has undergone considerable improvement and transformation, leaving three classes of buildings by construction material:

1. Traditional huts or building made of millet straw and wood

2. Mixed-material houses (*dradir*) with parts built of straw and wood and others with durable materials
3. Modern houses/buildings constructed from only durable materials.

Currently a small share of houses are in categories 1 and 3, while the majority are in the mixed transitional class 2. The mix of traditional and modern building materials has emerged since 2006 after major income gains. This transformation in houses and their construction has been a good indicator of Shubbola's urbanization process.

5.3.2 Availability of modern building materials

Construction materials for the traditional houses (Figure 2a) are locally produced. Traditional materials are used to maintain walls and roofs (Figure 2b), and replace deteriorating old straw (Figure 2c). Traditional houses or parts made of traditional materials (straw, wood) often last no more than two years. A reasonable share of the durable materials (sun-dried bricks and cement blocks) are locally made and available, making them reasonably inexpensive and new building construction sustainable. Sun-dried bricks are made of clay; cement blocks out of locally available sand and cement procured from Um Rowaba town (Figures 2d, 3a). Most residents build their improved houses with cement blocks (Figure 6). The local availability and affordability of the durable building materials and other resources for house building signify self-reliance, which bodes well for sustainability in the emergence and advancement of Shubbola town. Other modern building materials, such as fired bricks (Figure 3b) and iron roofing sheets, are brought from the neighboring town of Um Rowaba (40 kilometers away), and therefore relatively expensive for most residents.

5.3.3 Gradual change in building construction

As with older urban areas in Sudan and most of SSA, new house construction or improvement observed between 2006 and 2013 in Shubbola is a gradual, variable process, and reflects improvements in income and lifestyles. Completion of new house construction or conversion to modern materials generally takes 2-5 years or longer. While variable by family, most families add durable materials to parts of their houses to upgrade traditional huts to mixed-material ones locally called *dradir* (*durdor*, sing., *dradir*, pl.). The upgrades can be an extension of an existing structure or adding discrete buildings or structures within the family compound, or the outside wall. From 2006 to 2008, most of the changes involved *dradir* construction, enhancing house/room walls made of wood and millet straw with durable materials and thatch roofs with metal ones. Often, residents build or reinforce the walls with durable materials while the roof cone remains thatch made (Figure 3a). *Durdor* has the added advantage of reducing the risk of fire compared with huts made completely of straw and wood. Later construction stages gradually advance integration of durable materials until completion.

The following anecdotes illustrate the diverse building choices, decisions, materials, approaches and styles that make Shubbola's transformation process from a village to a small town unique and self-sustaining. Some residents built the outside wall of the house first using sun-dried bricks lined with cement to protect it from rain. After three to five years, they constructed a connecting bedroom (Figure 3c). One household took five years to complete the upgrade, starting in 2008 with two bedrooms to enhance family security and protection from the elements (rain, cold, and heat) and from fire (Figures 3d, 4a). They added a modern toilet two years later in 2010 (Figure 4b), and durable outside walls in 2013 (Figure 4c), completing the transformation into a modern house no different from a typical urban house elsewhere in Sudan.

Shubbola's transformation in building construction and into a small town has been fast. Within two years, observations and photo records show the image of a village replaced by an urban scene. For instance, a house in one area (Figure 4d) next to Shubbola's sole builder's house was transformed from a traditional millet-straw hut in January 2010 into an improved house built of durable materials except the outside wall by January 2011 (Figure 5a), and by August 2012 the fence was also converted to durable materials, completing the transformation. The owner of the opposite house upgraded into a *durdor*, starting with the outside walls, and then the huts (Figure 5b). During the two-year period, bedrooms and outside walls of durable materials were added. The process repeats itself across Shubbola.

Based on the fast rate of building transformation in the central open space of Shubbola to a virtually urbanized scene between January 2010 (Figure 5c) and August 2012 (Figure 5d), it is reasonable to expect the full transformation of all or most of the remaining houses with modern durable materials within a few years, advancing the urbanization process. The rains of August turned the open space into a green park, and the diverse colors of painted houses enhance the urban nature of the resulting scene. The telecommunications antenna at the back (Figures 5c and 5d) are further indications and tools of advancement of information-technology infrastructure.

Another locally and more broadly promising feature of this self-evolving urbanization process is the self-reliance nature and dependence on local rather external formal sources of finance. The gradual building approach is a response to lack of access to external funding. Nevertheless, remittances from urban-based relatives allowed some families for the first time in 2013 to construct all their building structures at once using cement blocks or fired bricks and cement (Figures 6a, 6b). This self-reliant process provided access to urban functions, goods and services without or with minimal central government intervention.

5.4 Local perceptions of improved buildings

Asked about advantages and disadvantages of the newly constructed buildings, all respondents valued the buildings with durable materials over *dradir* and huts, and had only positive things to say about them. The multiple advantages revolve around better enhanced protection of family members and property from the weather elements, theft, damage and fire damage. Specifically, the buildings keep furniture and dishes protected from weather elements and dirt. Second, these buildings protect inhabitants from roof leaks and moisture damage to belongings. Third, new buildings are warmer than huts and protect inhabitants from the winter cold. Fourth, new buildings give Shubbola a modernized, urban image, motivating residents living in uncompleted new buildings and huts to work harder—even to borrow money—to complete the building using durable materials. Fifth, the new beautifully colored buildings give them a sense of pride in becoming part of an urban society. This has motivated women to grow flowers around their houses, enhancing their beauty and urban look (Figure 6c). Sixth, new and improved buildings have improved the protection of inhabitants from frequent fire outbreaks, such as one that destroyed huts of twenty-six family homes in 2009. Finally, the new buildings protected their assets from theft better following three reported incidents of store break-ins during the first half of 2014. Thus, the quality of construction material influenced various dimensions of social wellbeing and reflected levels of urbanization.

5.5 Discussion

So, what makes Shubbola's process of urbanization from a village to a budding small town unique? This project contributes to literature on: 1) self-evolving, self-reliance based urbanization, 2) the use of house-transformation form and processes as an indicator of urbanization, and 3) on small towns and urbanization and their contribution to contemporary notions of new urbanism and sustainable development.

First, in contrast to the top-down, government driven processes that have produced many of the small towns in most African countries (Abu-Zeid 1979; Kabwegyere 1979) and small towns in the Sudan such as Atbara and Kosti (Shilgami 1991; Sikainga 2002), Shubbola's urbanization process was organic, bottom-up, locally driven and rapid. To be sure, urban centers in other parts of the Sudan, such as New Halfa and small towns of the Gezira scheme, have played a similar role (Ahmad and Abu Sin 1990; El Agra et al. 1986). However, their urbanization processes benefitted from government investment including transportation networks while Shubbola's emergence and was more dependent on a significant agricultural resource base (land and water) and advancements in agriculture driven by available (tractor) technology and supported by remittances from family members. Shubbola town's foundation in self-reliance also enhances the cost-effectiveness argument for urbanization into small towns relative to cities, including in housing provision (as in Grant 2015; Linn 1982; Tacoli 2017).

Second, this study illustrates the use of house transformation, both in form and process on a self-help basis, as indicators and outcomes of Shubbola's urbanization. We have documented the transformation in building materials, styles, stages, and pace of building, the main actors, and the local context within which the urban transformation unfolded. Although buildings are artifacts that reflect cultural values, heritage, technological advancement of a society, links between people and their physical environment, and an important dimension of urbanization (Lees 2001), previous studies have rarely used or documented the transformation process of buildings and their construction as an indicator of the urbanization processes. Isolated studies (e.g., Awanyo et al. 2016 for Ghana) have narrowly studied house transformation to characterize and predict house transformers or to assess its potential to address problems of urban housing shortage within the capitalist housing market; and some have recognized the

phased construction/transformation of self-help housing over several years due to limited access to credit. The transformation of Shubbola from a village to a small town meets three key factors for defining a town: population size (>5,000 for Sudan), integration of street and land-management planning, and performing urban functions (including provision of services as well as creation of jobs other than agriculture). Yet the only other notable case where transformation from a village/settlement into a town (based on Sudan's population threshold) was linked to a shift to use of durable building materials was Tuti Island in the 1980s (Ibrahim and El-Tayeb 2015). Additionally, Shubbola is essentially a second-generation European-style town sharing the British grid-pattern street system. It is distinguishable from the induced top-down plans and designs of first-generation Sudanese cities such as Khartoum and Port Sudan at the beginning of the 20th that included building of city infrastructure and transportation networks, by the more organic or spontaneous genesis, making use of the existing social services and infrastructure. Shubbola's grid-based street morphology differs from the oldest parts (core or down town) of other Sudanese cities that developed from villages (e.g., Omdurman and Wad Medani), which are characterized by narrow, irregular and short streets (Abu- Saleem 1979; El-Arifi 1980; Ibrahim and Omer 2014; Winters 1977).

Approaching urbanization through house transformation also necessitated a bottom-up approach and the conceptual inversion which Asomani-Boateng (2011) argues is necessary to understand small towns and cities more from below – from the perspectives of most dwellers who use towns/cities for their needs. This included locally derived principles observed in Shubbola's house transformation, such as the use of fire resistance and durability of materials, and the indigenous African compound model that may meet Asomani-Boateng's call retain some indigenous architectural forms that can teach modern architects and town planners about

Africa-based notions of sustainable development. Such a bottom-up approach also allowed the tracing of main drivers of Shubbola's urbanization back to self-reliance driven by local remittances, resources and knowledge of urban returnees, and technological advancements in agriculture. Proximity and visits to Um Rowaba and other nearby cities exposed Shubbola's people to affluent urban lifestyles and provided new knowledge including on building construction methods and styles, and modern materials, further catalyzing urbanization.

The house transformation, bottom-up approach to Shubbola's rapid urbanization (7-8 years) also makes for socio-culturally appropriate urbanization that still delivers to its inhabitants and surrounding rural areas. Many small towns with similar origins have largely failed to provide such urban functions and services e.g., New Halfa and small towns of the Gezira scheme in the Sudan (Ahmad and Abu Sin 1990; El Agraa et al. 1986). For instance, many small African cities fail to meet the provision of potable water, schools, a health clinic, markets and other urban services Shubbola's transformation has extended to a growing population of residents and people in the environs (UN-Habitat 2014: 25).

Third, insights from Shubbola's gradual, self-evolving urbanization process and accompanying mixes of urban and rural attributes/functions illustrate the contribution of small towns and urbanization to modern notions of urbanism in the Global North and South (see Asomani-Boateng 2011; Grant 2015; Knox and Mayer 2013; Steinführer et al. 2016; Tacoli 2017). These notions address to the central role of urbanization in sustainable development encapsulated in SDG 11. Desired elements of sustainability in economic, social, and ecological dimensions, including maintaining rural/urban linkages and enhancing agricultural markets while ensuring food security, a local livelihoods support focus, organic and cost-effective urbanization, and social capital in the form of a self-help spirit and social cohesion, were an intrinsic part of

Shubbola's urban transformation. Admittedly, the self-reliant emergence of Shubbola town also benefitted from urban-style street planning, formal land management, and external infrastructure such as cell-phone towers and a nearby major road and its role in establishing Shubbola as a regional market node. This study additionally illustrates, particularly for developing countries that urbanization can happen without heavy, direct government investment or dependence on poor access to credit, and still provide key function of towns and cities. It further provides some assurances to embrace Africa's coming urbanization boom and complementary contribution of both small towns to large cities.

Conclusion

This study has examined the process and outcomes of urbanization within the broader context of literature on small towns and urbanization, using the transformation of Shubbola in the Sudan from a village into a functional town. We examined and documented rarely reported intricacies of the process, actors, choices, timescales, and outcomes of the rapid transformation of Shubbola village in western Sudan into a small town between 2006 and 2013. Findings of this study make three main contributions to neglected literature and policy on small towns and urbanization: 1) self-evolving, self-reliance based urbanization as a cost-effective urbanization process that needs to be better understood, and harnessed; 2) the use of transformation in house form and building processes as an indicator of culturally appropriate urbanization; and 3) new thinking on urbanization and urbanism, and the role of small towns in sustainable development.

In contrast to the top-down, government driven processes that have produced smallest towns from villages in SSA, Shubbola's urbanization has been bottom-up, locally driven and rapid, making use of the existing infrastructure and services in and around the area. Improved incomes and standards of living from technological advancements in agriculture driven largely

by remittances produced positive socio-economic changes that drove Shubbola's transformation into a town Shubbola has met criteria of a town (including a population-size threshold of 5,000) and performs core urban services, including economic (jobs, regional market node role for agricultural produce, new businesses) and social services (health clinic, schools, water and sanitation) that many small towns in SSA fail to provide. Findings demonstrate, challenges notwithstanding, that an organic, bottom-up and cost effective process largely depended on agricultural development and self-reliance can catalyze the emergence of towns and associated functions and services that can drive broader socioeconomic development without large government and other external resources. This is encouraging amidst common crisis narratives about the coming urbanization boom in Africa.

Examination of building materials, processes, actors, choices, and timescales in house transformation and in the associated settlement patterns provided useful indicators for, and a practical lens to examine, urbanization processes in their socioeconomic context. Although buildings reflect cultural values, heritage, technological advancement, and links between people and their physical environment (Lees 2001), studies have rarely used house transformation as an indicator of development globally or in Sudan. The gradual yet relatively fast house (7-8 years) transformation pace from traditional materials/houses through mixed traditional/modern material *durdor*, modern houses using durable materials typically found in urban areas reflects the self-help nature of urbanization associated with gradual and intermittent sourcing of financial resources, including remittances. The dependence on local resources, however, enhances the sustainability of the urbanization process and its benefits. Structurally, Shubbola's wide, straight planned streets bring it closer to a second generation European-style city and distinguishes it from older Sudanese cities that developed from villages and their narrow, irregular streets.

Further, the house transformation approach to understanding urbanization necessitates a bottom-up approach and contributes to new thinking on the need to understand small towns and cities from the perspectives of the residents (Asomani-Boateng 2011).

Finally, through the organic, self-help based and cost effective urbanization process, its culturally appropriate nature including incorporation of local and traditional housing materials and forms (e.g., the compound housing model), the close linkages with neighboring rural areas and links to agriculture, environment and food security, Shubbola's case contributes to debates and literature on forms of new urbanism and sustainability. This is particularly relevant in the early stages of the rapid global urbanization boom that is projected to be the most transformative phenomena in SSA for the 21st century, and small towns are the frontier of such urbanization. It contributes to meeting SDG 11, which encapsulates the new notions of sustainable cities/towns, particularly the contribution of small towns and their transformation from villages to sustainable development. Future empirical research comparing the emergence of multiple cities in the Sudan and other SSA countries would enhance understanding of the process.

References

- Abou-Zeid. A. M. (1979). New towns and rural development in Egypt. *Africa* 49 (3), 283-290.
- Abu-Saleem, M. I (1979). *The history of Khartoum* (in Arabic). Beirut: Dar Al-Jeel.
- Abu Sin, M. E. (1980). Nyala: A study in rapid urban growth. In V. Pons (Ed.), *Urbanization and urban life in the Sudan* (pp. 352- 380). Development Studies and Research Center, University of Khartoum and Department of Sociology and Anthropology. University of Hull.

- Afolabi Ojo, G. J. (1968). Traditional Yoruba architecture. *African Arts* 1 (3), 14-17 and 70-72.
- Agab Al Feyya, A. (2013). Highlights on the areas of Al Rahad and Um Rowaba towns. *Al-Sahafa Daily Newspapers Khartoum* (May 11 – in Arabic)
- Ahmad, A. M., & Abu Sin, M. E. (1990). Urban development in a rural context: The case of New Halfa, Sudan. In J. Baker (Ed.), *Small town Africa: Studies in rural-urban interaction* (pp. 247-263). The Scandinavian Institute of African Studies.
- Asomani-Boateng, R. (2011). Borrowing from the past to sustain the present and the future: indigenous African urban forms, architecture, and sustainable urban development in contemporary Africa. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 4(3), 239-262.
- Awanyo, L., McCarron, M., & Morgan Attua, E. (2016). Affordable housing options for all in a context of developing capitalism: can housing transformations play a role in the Greater Accra Region, Ghana? *African Geographical Review*, 35(1), 35-52.
- Bank of Sudan. (2008). *48th annual report*. Khartoum, Sudan.
- Bascom, W. (1962). Some aspects of Yoruba urbanism. *American Anthropologist, New Series*, 64(4), 699-709.
- Besser, T. L. (2009). Changes in small town social capital and civic engagement. *Journal of Rural Studies*, 25(2), 185-193.
- Bloom, D. E., Canning, D., & Fink, G. (2008). Urbanization and the wealth of nations. *Science*, 319(5864), 772-775.
- Blumin, S. M. (1983). When villages become towns. In D. Fraser & A. Sutcliffe (Eds.) *The pursuit of urban history* (pp. 54-68). London: Edward Arnold Ltd.

- Boateng, E. A. (1955). Recent changes in settlement in South-East Gold Coast. *Transaction Institute of British Geographers*, 21, 157-169
- Burckhardt, J. L. (1980), Berber, Damer and Shendi in 1814. In V. Pons (Ed.), *Urbanization and urban life in the Sudan* (pp. 48-78). Development Studies and Research Center, University of Khartoum and Department of Sociology and Anthropology. University of Hull.
- Champion, A. (1999). Urbanization and counter-urbanization. *Applied Geography. Principle and Practice*, 347-357.
- Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability. *Technology in Society*, 28, 63-80.
- Coquery-Vidrovitch, C. (1991). The process of urbanization in Africa: From the origins to the beginning of independence. *African Studies Review*, 34(1),1-98.
- Crawford, O.G.S. (1951). *The Fung kingdom of Sinnar with a geographical account of the middle Nile region*. Gloucester: John Bellows, Ltd.
- El Agraa, O. A., Haywood, I., El-Arifi, S., Abdalla, B. A., El-Sammani, M.O., El-Hassan, A. M. & Salih. H. M. (1986). The Gezira region, the Sudan. In J.E. Hardoy & D. Satterthwaite (Eds.), *Small and intermediate urban centers: Their role in regional and national development in the third world* (pp. 81-130). Boulder, Colorado: Westview Press.
- El-Arifi, S.A. (1980). The nature and rate of urbanization in Sudan. In V. Pons (Ed.), *Urbanization and urban life in the Sudan* (pp. 381- 411). Development Studies and Research Center, University of Khartoum and Department of Sociology and Anthropology. University of Hull.

- El Bakri, Z. B., Gore, P. W., & Kameir, E. M. (1987). Urban growth in the Sudan. In A. A. Saghayroun, A. Farah, S. A. Ahmed, & A. Mohamed Kheir (Eds.), *Population and development in the Sudan: The quest for a national policy* (pp. 149-163). Proceedings of the Third National Population Conference, Khartoum (October 10-15).
- El-Bushra, E. (1980). The development of industry in Khartoum. In V. Pons (Ed.), *Urbanization and urban life in the Sudan* (pp. 269- 296). Development Studies and Research Center, University of Khartoum and Department of Sociology and Anthropology. University of Hull.
- Grant, R. (2015). *Africa: Geographies of change*. Oxford University Press.
- Han, S. H. 2010. Urban expansion in contemporary China: What can we learn from a small town? *Land Use Policy*, 27, 780–787.
- Hale, G. A. (1974). Urbanization in the northern Sudan: Trends and problems. In C. O. Hodge & C. N. Hodges (Eds.), *Urbanization in the arid lands* (pp.169-186). International Center for Arid and Semi-Arid Land Studies (ICASALS) Publication No. 75-1. Lubbock, Texas.
- Hamdan, G. (1960). The growth and functional structure of Khartoum. *Geographical Review*, 50(1), 21-40.
- Han, F., Cai, J. M. & Liu, J. P. (2010). Regional economic types and spatial differentiation of small towns in peri-urban Beijing. *Urban Studies*, 17(4),123–128 (in Chinese).
- Henderson, J. V. (2003). Urbanization and economic development. *Annals of Economics and Finance* 4: 275-341.
- Hopkins, N.S. (1979). The small urban center in rural development: Kita (Mali) and Testour (Tunisia). *Africa*, 49(3): 316-328.
- Hoyle, B. & Smith, J. (1998). Transport and development: Conceptual frameworks. In B.

- Hoyle & R. Knowles (Eds.), *Modern transport geography* (2nd ed.) (pp. 13-40). New York: John Wiley & Sons.
- Ibrahim, M. B. (1985). *Adjustment to drought hazard in the semi-arid areas of the Sudan*. Ph.D. Thesis, University of Alberta, Canada.
- Ibrahim, M. B. (2014). Recent rapid urbanization in Sudan. *Sudan Studies*, 50, 39-45.
- Ibrahim, M. B. & Omer, O. A. (2014). Evolution and changes in morphologies of Sudanese cities. *Urban Geography*, 35(5), 735–756.
- Ibrahim, M, B & Zulu, L. C. (2014). Development without intervention: A successful self-initiative of rural development and urban growth in the Sudan. *Geographical Review*, 104(4), 481- 505.
- Ibrahim, M. B.& El-Tayeb, O. Y. (2015). Socio-economic changes and challenges of Tuti Island after the construction of the bridge. *Sudan Studies*, 52 (July), 15-26.
- Kabwegyere, T. B. (1979). Small urban centers and the growth of underdevelopment in rural Kenya. *Africa* 49(3), 308 -315.
- Konadu-Agyemang, K. (2001). A survey of housing conditions and characteristics in Accra, an African city. *Habitat International* 25(1), 15-34.
- Knox, P. L. & Mayer, H. (2013). *Small town sustainability: economic, social, and environmental innovation*. Birkhäuser Verlag: Basel.
- Lees, L. (2001). Towards a critical geography of architecture: The case of an Ersatz Colosseum. *Cultural Geographies* 8(1), 51- 86.
- Linn, J. F. (1982). The costs of urbanization in developing countries. *Economic Development and Cultural Change*, 30(3), 625-648.
- Mabogunje, A. L. (1990). Urban planning and the post-colonial state in Africa: A research

- overview. *African Studies Review*, 33(2), 121-203.
- Mapes, J. (2009) Urban Revolution: Rethinking the American Small Town. PhD Dissertation, University of Southern California.
- Mayer, H. and Knox, P. (2010). Small-Town Sustainability: Prospects in the Second Modernity. *European Planning Studies*, 18 (10) 1545- 1565.
- Morgan, B. & Pugh, J. C. (1969). *West Africa*. London: Methuen & Co.
- Ngowi, A. B. (1997). Improving the traditional earth construction: A case study of Botswana. *Construction and Building Materials* 11(1), 1-7.
- Oruwari, Y., Jev, M., & Owei, O. (2002). Acquisition of technological capability in Africa: A Case study of indigenous building materials firms in Nigeria. *African Technology Policy Studies Working Paper*, Series No. 33. Nairobi, Kenya.
- Owusu, G. (2005). Small Towns in Ghana: Justifications for their Promotion under Ghana's Decentralisation Programme. *African Studies Quarterly*, 8(2), 48-69.
- Owusu, G. (2008). The role of small towns in regional development and poverty reduction in Ghana. *International Journal of Urban and Regional Research*, 32(2), 453-472.
- Pallme, I & Petherick, J. (1980). Accounts of El Obeid in the 1830s and 1840s. In V. Pons (Ed.), *Urbanization and urban life in the Sudan* (pp. 79-96). Development Studies and Research Center, University of Khartoum and Department of Sociology and Anthropology. University of Hull.
- Pantuliano, S., Buchanan-Smith, M., Metcalfe, V., Pavanello, S. & Martin, E. (2011). *City limits: Urbanization and vulnerability in Sudan*. A Synthesis Report for Humanitarian Policy Group (HPG), Overseas Development Institute, London.

- Servillo, L., Atkinson, R., & Hamdouch, A. (2017). Small and Medium-Sized Towns in Europe: Conceptual, Methodological and Policy Issues. *Tijdschrift voor economische en sociale geografie*.
- Shilgami, N. I. (1991) *Kosti: The story and the history*. Khartoum: Khartoum University Press.
- Southall, A. (1977). Small urban centers in rural development in Africa. Research Proposal. Mimeo, University of Wisconsin-Madison.
- Steinführer, A., Vaishar, A., & Zapletalová, J. (2016). The Small Town in Rural Areas as an Underresearched Type of Settlement. Editors' Introduction to the Special Issue. *European Countryside*, 8(4), 322-332.
- Sudan 2008 Census (2008). Department of Statistics, Khartoum, Sudan.
- Suzuki, H., Dastur, A., Moffatt, S. & Yabuki, N. (2009). Eco² cities: Ecological cities as economic cities. World Bank Conference. Washington D.C.
- Taaffe, E. J., Morrill, R. L. & Gould, P. R. (1963). Transport expansion in underdeveloped countries: A comparative analysis. *Geographical Review*, 53(4), 503–529.
- Tacoli, C. (2017). Why small towns matter: Urbanisation, rural transformations and food security. IIED Briefing Paper, March 2017. London: International Institute for Environment and Development (IIED). URL: <http://pubs.iied.org/pdfs/10815IIED.pdf>
- Taffese, W. Z. (2012). Low-cost eco-friendly building material: A case study in Ethiopia. *International Journal of Civil, Environmental, Structural, Construction and Architectural Engineering* 6 (2),183- 187.
- Tipple, A. G. & Korboe, D. (1998). Housing policy in Ghana: Towards a supply-oriented future. *Habitat International* 22 (3): 245-257.
- Turner, J. C. (1968). Housing priorities, settlement patterns, and urban development in modernizing countries. *Journal of the American Institute of Planners*, 34(6), 354-363

- United Nations. (2009). *World urbanization prospects: The 2009 revision*. Economic and Social Affairs. New York.
- UN-Habitat (United Nations Human Settlements Program). (2009). *Urban sector studies and capacity building for Khartoum State*. Nairobi, Kenya.
- UN-Habitat (United Nations Human Settlements Program). (2014). *The state of African cities 2014: Re-imagining sustainable urban transitions*. Regional State of the Cities Reports. Nairobi, Kenya.
- Wang, Y. P., Wang, Y., & Wu, J. (2009). Urbanization and informal development in China: urban villages in Shenzhen. *International Journal of Urban and Regional Research*, 33(4), 957-973.
- Ward, C. D., & Shackleton, C. M. (2016). Natural resource use, incomes, and poverty along the rural–urban continuum of two medium-sized, South African towns. *World Development*, 78, 80-93.
- Winters, C. (1977). Traditional urbanism in the north central Sudan. *Annals of the Association of American Geographers*, 67(4), 500-520.
- Winters, C. (1982). Urban morphogenesis in Francophone black Africa. *The Geographical Review*, 72(2), 139-154.
- Wirth, L. (2010). Urbanism as a way of life. In R. Paddison & M. Timberlake (Eds.), *Urban Studies: Economy* Vol. 1. (pp. 128- 143). London: SAGE.
- Yok-shiu, F. L. (1989). Small towns and China's urbanization level. *The China Quarterly*, 120, 771-786.

Zhou, L., Dickinson, R. E., Tian, Y., Fang, J., Li, Q., Kaufmann, R. K. & Myneni, R. B. (2004).

Evidence for a significant urbanization effect on climate in China. *Proceedings of the National Academy of Sciences of the United States of America*, 101(26), 9540-9544.

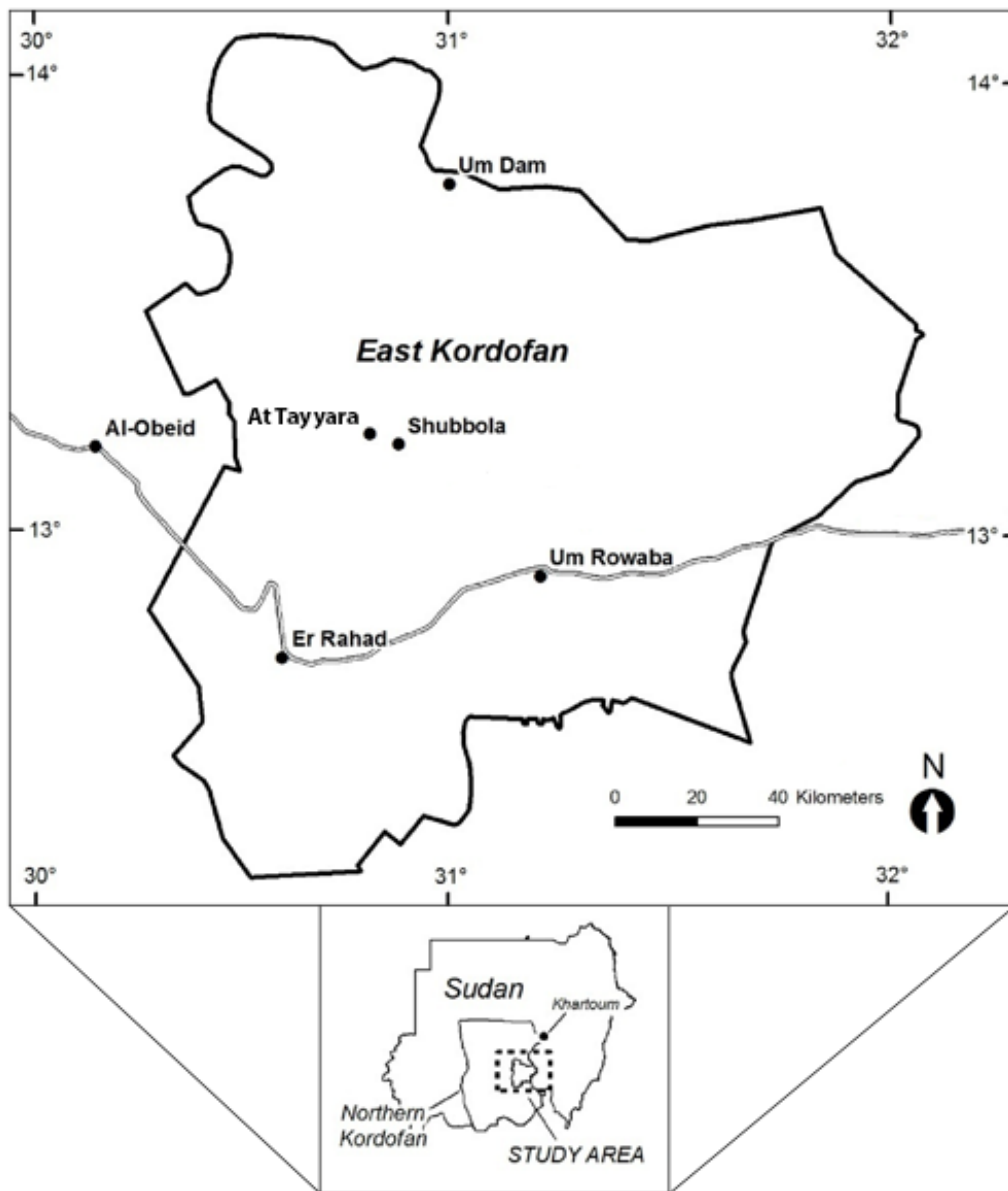


Figure 1. Shubbola town's location within the Sudanese study area.



Figure 2a (top left). Formal planning of the village grid in 2005 laid an important step towards a greater degree of urbanization.

Figure 2b (top right). New millet straw is being used for building huts.

Figure 2c (bottom left). Old millet straw is mixed with the new for maintenance of huts.

Figure 2d (bottom right). Local sun-dried bricks are made from clay soil.



Figure 3a (top left). Concrete blocks are made locally of cement and sand. When the lower parts of the houses are built of sun-dried bricks and the upper parts are built of wood and millet straw, the construction is called dradir (Pl.). Durdor (sing.) reduces the risk of fire when compared to houses built completely of straw.

Figure 3b (top right). Fired bricks are brought from Um Rowaba, a town 40 km away.

Figure 3c (bottom left). A wall made of sun-dried bricks and covered with cement to protect it from rainfall damage.

Figure 3d (bottom right). Most people start building the bed and living rooms first to protect their families from rains, winds and cold weather. Alternatively, they start with building the outside wall.



Figure 4a (top left). Two rooms of the house are built of durable materials.

Figure 4b (top right). Two years later, the toilet is also built of durable materials.

Figure 4c (bottom left). Three years later, most of the outside wall was built of durable materials. For a change, the painting of the house was changed from green to a mixture of yellow and green.

Figure 4d bottom right). Hamid Mohamed Ibrahim (Dafee'aa) was the only house builder in the village in 2010 and the houses behind him were huts built of millet straw. The number of house builders has increased in the subsequent three years (See Figure 19).



Figure 5a (top left). One year later, with the exception of the outside wall, the entire house to the right was built of durable materials.

Figure 5b (top right). After two years, the whole house is built of durable materials. The outside wall of the house opposite is built of durable materials while one hut has been changed into the more durable durdor material.

Figure 5c (bottom left). Houses near the central open space of Shubbola town are starting to develop. At present, this place has not been developed into a central market space yet.

Figure 5d (bottom right). Two years later, the central open space of Shubbola town has almost been completed. The rains of August have turned the open space into a green park. The different colors of house paint and the antenna in the background of this image makes for a more urbanized scene.



Figure 6a (top left). The entire house in this image is built of blocks.

Figure 6b (top right). This entire house is constructed with fired bricks and cement.

Figure 6c (bottom). Recent trend of growing flowers in Shubbola houses.

