

# ANALYSIS OF THE POSITIVE AND NEGATIVE EFFECTS OF URBAN SPRAWL AND DWELLING TRANSFORMATION IN URBAN CITIES: CASE STUDY OF TATI SIDING VILLAGE IN BOTSWANA

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## ABSTRACT

*The study attempt to address issues of urban sprawl in cities in Botswana. The study analysed the causes of urban sprawl and dwelling transformation in the Tati Siding village in Botswana. The research employed a non-probability purposive sampling and qualitative descriptive case study research approach, using semi-structured interview. The study showed that urban sprawl has negative effects in Tati Siding village amongst them was the need for more services and infrastructure development which need budget provision from government and increase in crime. The study also showed that the economic benefits of urban sprawl were house rental and increase in land value. The research suggested that villages nearer the city be provided with similar services and infrastructure so that people do not show preferences to a particular village because of its better services and infrastructure. The study also suggested that government must introduce levies to compensate for the increase in the property value after planning, development of services and infrastructure and shift the cost of infrastructure provision to developers by incentivizing developers to bear the cost of providing services and infrastructure in sprawling areas.*

**Keywords:** Urban Sprawl, Dwelling Transformation, Urban Cities, Urbanization

## INTRODUCTION

Urban sprawl is a global phenomenon affecting many cities and towns across the globe. Urban sprawl is multi-dimensional and cut across many disciplines (economics, environment, geography, town planning, sociology and public health) and requires interdisciplinary approach (Gomez-Antonio, Hortas-Rico & Li, 2015; Morollón, Marroquin & Rivero, 2016). According to Karwinska, Bohm & Kudlacz, (2018) urban sprawl is an economic, spatial and social phenomenon. Authors describe urban sprawl by use of words like scattered, leapfrogging, low-density outward expansion of cities, auto-dependent land development, uncoordinated development of areas or unplanned urban growth etc (Christiawan, 2019; Gomez-Antonio, Hortas-Rico & Li, 2015; Masoumi, Hosseini & Gouda, 2018; Morollón, Marroquin & Rivero, 2016). Masoumi, et al., 2018 adds that urban sprawl can also be a planned urban growth. Many authors define urban sprawl in different ways depending on their disciplines. But the commonality is that urban sprawl whether planned or unplanned has an outward growth into adjacent areas, especially agricultural land and natural habitats. Because it transects many disciplines there is no agreed definition of urban sprawl. Urban sprawl has both positive and negative effects. The negative effects of urban sprawl include loss of agricultural land, household and industrial waste pollution, entry of immigrants into the village, reduced community ties, loss of heritage, loss of occupation as a farmer, traffic congestion, etc. while the positive effects include cultural diffusion, taxes and land rent, agglomeration, road improvement and the use of public transportation, drainage improvement, adequate fresh water service, the growth of entrepreneurship, opportunity for residents to move into house or store rental among others (Christiawan, 2019; Masoumi et al., 2018). At the rate at which urbanization is happening across the continents pressure is put on governments to create more jobs, more services and infrastructure and housing for the growing populations resulting in pressure on the land

resource which is finite. Urbanization affects the spatial pattern and urban form calling for sound land legislation, policies and regulations. Deliberate policy (national/local development planning frameworks) responses are required to optimize urbanization and minimize challenges. Governments need to invest in infrastructure and public goods and create jobs to cater for the growing urban populations especially the youth.

The researchers undertook this study to investigate the effects of urban sprawl on the transformation of Tati Siding village in Botswana. The village was chosen because of its location relative to the city of Francistown and it is within the greater Francistown area. From the researchers' investigation the village is experiencing rapid population growth as attested by the last four decades' population census with the village recording the highest population in 2011 within the district, with an annual growth of 0.063% and unemployment rate of 27.9% (Statistics Botswana, 2015). The village's rapid growth is linked to its close proximity to the city of Francistown the main city provides nearly all goods and services that are required by the village. Tati Siding village helps to accommodate the population spill over from the city of Francistown. When rapid population growth induces urban sprawl there is inevitable pressure on the basic services and related infrastructure, leading to major impacts like increase energy, land demand, water consumption, pollution, traffic congestion, crime, unemployment etc. These adverse impacts will have direct impact on the quality of life of people living in the village. Sprawl creates environmental, social and economic impacts for both the cities and countryside (Ludlow, 2014).

## LITERATURE REVIEW

### Urban Sprawl

Urban sprawl is defined differently by various authors. The word urban sprawl is used by different scientific disciplines and carries various meanings. Sprawl has been used to define a range of situations, which form patterns, describe a process or are a result of certain consequences. OECD (2018) describes urban sprawl as a development pattern characterized by low population density. Many authors describe urban sprawl using various words like low-density, scattered, discontinuous, auto-dependent urban development pattern, physical expansion of urban areas into rural and natural areas adjacent to urban centers, leapfrogging away from denser areas, transforming open undeveloped land into single-family residential homes, unplanned form of growth, planned growth, sporadic settlements amongst others (Gomez-Antonio, Hortas-Rico & Li, 2015; Rafferty, 2015; European Environment Agency, 2016; Egidi, Cividino, Vinci, Sateriano & Salvia, 2020; Aurambout et al., 2018). In their study Egidi, et al., (2020) states that urban sprawl is a controversial process causing territorial reorganization of cities in both advanced economies and emerging countries. Urban sprawl just like urbanization involves movement of people from rural to urban causing population increase in the receiving areas. For this study the researchers adopted the definition of urban sprawl as planned or unplanned expansion of residential dwelling into agricultural and communal land.

### Urbanization

Urbanization is a process that causes growth in a country's urban population which affects the economy, political and cultural importance of cities relative to rural areas (Pravitasari, 2015). Makowska-Iskierka (2015) describes urbanization as a complex process involving several steps that changes rural areas into urban permanently. In most scholarly articles urbanization is generally described as a shift in population from rural to urban settlements (Pravitasari, 2015; Sitharam & Dhindaw, 2016; Zhang, Li, Liu, Chen, & Chai, 2017). Urbanization in developed countries started as countries became industrialized and in most developing countries is due to factors such as rapid natural population growth and rural-urban migration which caused urban growth (Bekele, 2005). From the above it is clear that urbanization is mainly caused by industrialization, natural increase of population and rural-urban migration. It is projected that by 2035 half of the African continent's population will be living in urban areas (UN Economic Commission for Africa, 2017).

The effects of urbanization just like those of urban sprawl can be both negative and positive. Among the negative effects of urbanization are sprawl as a result of unplanned and uncontrolled city growth, pollution resulting from overcrowding which leads to public health issues, increased unemployment, shortage of affordable residential housing, transportation challenges for commuter, inadequate infrastructure and poor service delivery (water, solid waste management and water waste treatment), cities become too expensive for low-income earners, encroachment into agricultural land, development of slums (squatters), increased urban poor and crime (Pravitasari, 2015; Jarah et al., 2019; Sitharam & Dhindaw, 2016). The positive effects of urbanization simply represent the benefits effects of urbanization which include economic improvement, commercial growth of activities (growth in trade and tourism), social and cultural integration (people of different ethnicity, religions and income levels can stay and work together), provision of better services and transportation networks, efficient services are among the positive effects of urbanization (Pravitasari, 2015; Jarah et al., 2019; Sitharam & Dhindaw, 2016). The benefit effects of urbanization is further supported by the report of United Nations Human Settlements Programme (2016) which states that urbanization can bring change to countries when planned and managed, can be beneficial economically and can drive innovations and productivity contributing to national and regional development and mitigate poverty.

### Overview of Urbanization in Botswana

Since attainment of its independence in 1966, Botswana has been undergoing urbanization proved by the level of development of its settlements to date. Botswana urban population is at 70.9% of total population with a rate of urbanization at 2.87% annual rate of change (Central Intelligence Agency, 2020). Its cities and towns have been sprawling induced by factors like migration of people from rural settlements to cities and towns in search of a better life and jobs, population increase, economic development in cities and towns. Urbanization just like urban sprawl happens on land. Botswana's population in 2019 was estimated at 2, 024, 900, the urban population of Botswana increased from 7.8 % in 1970 to 70.2 % in 2019 growing at an average annual rate of 4.65% (Knoema, 2019). In Botswana, urban areas are defined as any settlement with a population of 5 000 (and above) of which 75% of the workforce is engaged in non-agricultural activities. Botswana's urban areas comprise diverse settlements that include mining towns, commercial, administrative and industrial activities. Included in the urban category are settlements referred to as major villages, agro-towns and more recently urban villages. These settlements experience in-situ urbanization and while displaying the influence of the global economy (for example existence of multinational chain retail shops, commercial banks etc.) to which Botswana is part, urban villages also display strong cultural traits unique to Botswana (Department of Town and Regional Planning, 2009). The settlements surrounding the cities and towns in Botswana form peri-urban areas and the city population spillover occurs to these areas.

Francistown is the second largest city in Botswana, with a population of about 100,079 (Statistics Botswana, 2015) and it is the oldest town established in 1866 after discovery of gold deposits. The city is the capital of the northern area of Botswana and it is a major migration destination in the region (MLMWS, 1997). It is this city that support Tati Siding village with various services required to sustain the village. Tati Siding is one of Botswana villages continuously growing, transforming and swallowing its surrounding agricultural and communal land. Tati Siding village measures approximately 4931.5 hectares and is located approximately longitudes 210 17' 30" S and latitudes 270 28' 25" E. The village is located within the North East District, south of City of Francistown along the Francistown-Gaborone road A1. Tati Siding falls within the boundaries of the Greater Francistown planning area. In 2001 Tati Siding population was 4 376 and it qualified to be classified as a Tertiary II (population within 1 000-4 999) as per the Revised National Settlement Policy of 2004 (Department of Town and Regional Planning, 2009). The population of Tati Siding has been growing rapidly to 8 189 as per the last population census of 2011. Tati Siding was declared a planning area in 1994, as part of the Greater Francistown Planning Area, and has a development plan which has legal backing from the Town and Country Planning Act (Department of Town and Regional Planning, 2009). The declaration of the village as

a planning area was a turning point in the urban transformation of Tati Siding village. As part of the land reforms for rural development in Botswana government introduced modern urban planning and land management practices. Since the village has been declared a planning area a development plan was developed called the Tati Siding development plan 2007 – 2031, the village area was organized in a grid-pattern system with demarcation of parcels of land for residential plots for allocation to citizens of Botswana and Botswana Housing Corporation was given a site for construction of residential houses. The transformations of Tati Siding village has seen the older wards having a few traditional built dwellings, house construction has undergone considerable improvement and transformation with the majority of houses constructed from durable materials (bricks and roof of corrugated iron sheets or roof tiles). Tati siding village can be termed a semi-urbanized village to emphasize that the village is not fully urbanized in terms of physical environment and urban services even though most residents are engaged in non-agricultural activities and live an urban life.

### **Effects of Urban Sprawl**

Evidence from literature is that effects of urban sprawl have both positive and negative externalities. Some researchers have depicted sprawl as a contributor to urban and environmental problems. A number of researchers have identified the following negative impacts of sprawl which the researchers have classified into economic, environmental, planning laws and policy and social dimension;

#### **Economic Dimension**

- Severe shortage of affordable housing in areas where the sprawling is occurring (Jarrah, et al., 2019; OECD, 2018)
- Household mortgage debt (Carlos & Daniel., 2020). Individuals acquire house mortgages from financial institutions like banks to develop their plots and/or buy plots, the mortgage is a debt that one has to pay back according to the loan agreement payment terms, and this become a financial burden for individuals which may affect their take home pay and budget in addition these residential developments contribute to sprawl.
- Increasing unemployment (Jarrah, et al., 2019). Urban sprawl normally starts with population increase due to migration of people from other areas into a particular area and in most cases jobs may not be readily available or not enough to cater for the people in a particular area in addition to the residents of that locality causing increase unemployment.
- Loss of income due to loss of occupation primarily as a farmer (OECD, 2018; Christiawan, 2019). Individuals who were primarily farmers who lost their farmland due to conversion to residential and other land uses end up losing a source of income which was derived from farming.
- Transportation commuting issues, (Jarrah, et al., 2019). Effects of sprawl are that individuals who stay at sprawled areas are forced to use cars to commute to and from work and those who do not own cars are forced to budget for transportation to and from their work place/shopping/hospitals etc., this comes at a cost to individuals who have to budget for the cost of commuting either fuel for the car or transport money.
- Price of land impaired by urban sprawl falls (attractiveness) (Karwinska, Bohm, & Kudlacz, 2018). Sprawl lowers the attractiveness and lowers the value of the land.
- A higher dependence on imported food (Christiawan, 2019). Farmland lost due to conversion to residential area reduces the amount of food that can be produced by farmers to feed their community and surplus to feed the nation forcing government to depend on imported food.
- Inadequate investment (Jarrah, et al., 2019). Sprawling areas lack investment.
- Economic losses in tourism areas due to degraded landscape scenery (OECD, 2018; Christiawan, 2019). Sprawl consumes farmland, wildlife habitat as well as other biodiversity areas that could attract tourists in the area and contribute foreign currency to a nation.
- Higher infrastructure and public service costs, such as water supply, sanitation, electricity, public transport, waste management, policing and other services which become expensive to provide in fragmented areas of low-density (OECD, 2018; Jarrah, et al., 2019; World Bank, 2019; European Environment Agency, 2016). Reduced levels of public services (Aurambout, Ricardo, & Land, 2018).

#### **Planning Laws and Policy Dimensions**

- Lack of public transport, poorer connectivity, traffic congestion (Jarrah et al., 2019; Aurambout et al., 2018). In a sprawling area pressure is put on the existing public transport and road network due to the increased numbers of

people in a sprawled locality, people commute using either public transport or private cars this puts pressure on roads causing traffic congestion.

- Unplanned growth and un-coordinated development (Karwinska, Bohm & Kudlacz, 2018). Lowers the investment accessibility of areas, making planning for other services like airports and services and infrastructure difficult and limited.
- Unequal distribution of public amenities (Christiawan, 2019). The effects of sprawl are that provision of services and infrastructural development to various locals end up not distributed equally.
- Formation of dormitory towns (OECD, 2018). Sprawl will cause isolated or leapfrogging formation of towns which makes provision of services and infrastructure difficult and costly.

### **Environment Dimension**

- Loss of vegetation (Habitat loss for fauna and flora or irreversible damage to local ecosystems) and biodiversity, habitat functions, agricultural resources, and soil (Gerten, Fina & Rusche, 2019; European Environment Agency (EEA), 2016; OECD, 2018; Aurambout et al., 2018).
- Increased (air, noise, light) pollution, water pollution and alteration of the hydrological properties of the water (OECD, 2018; Karwinska, Bohm & Kudlacz, 2018; Christiawan, 2019; European Environment Agency, 2016; Aurambout et al., 2018).
- Loss of productive agricultural land leading to higher dependence on imported food (OECD, 2018; Christiawan, 2019; European Environment Agency, 2016).
- Energy and climate change (due to higher energy consumption and higher greenhouse gas emissions per individual) (OECD, 2018; European Environment Agency, 2016; Aurambout et al., 2018).
- Environmental impacts through transformation, degradation and fragmentation of urban areas and change in perception of the landscape (OECD, 2018).

### **Social Dimension**

- Social effects such poverty, lack of opportunities, psychological problems, alcoholism, drugs, crime, violence and other irregular behaviors, limiting the quality of life, reduced community ties, missing cultural identity, loss of rural heritage (Jarrah, et al., 2019; World Bank, 2018; Christiawan, 2019).
- Higher costs for transport associated with commuting for families, increase in commuting time between homes, places of work and places of other activities (OECD, 2018; (European Environment Agency, 2016); Schwartz, 2018)
- Mobility issues such as traffic congestion (OECD, 2018; Christiawan, 2019)
- Reduction in social interaction (OECD, 2018). People of various ethnicity, religions and income levels unable to live and work together because of segregation by income status
- Car dependency especially with weak or no connection to public transport, increased car dependency has negative effects on health and accidents (OECD, 2018; European Environment Agency, 2016).
- Public health issues such as stress, obesity, high blood pressure, respiratory problems (e.g. asthma as a result of air pollution) (Jarrah, et al., 2019; OECD, 2018; European Environment Agency, 2016)
- A reduction in food production and self-sufficiency (OECD, 2018; Christiawan, 2019). Due to loss of farmland, farmers are unable to be self-sufficient because of reduced productive land.
- Walkability and densities needed for transit (Schwartz, 2018).

The above negative effects of urban sprawl conflict with conservation efforts, agriculture and social development and threatens sustainability of the environment and if not stopped will impede the attainment goal eleven of SDGs. Sprawling communities make it more expensive to construct and operate infrastructure and other services rather than in well-designed cities. The World Bank (2019) states that unplanned growth interrupts continuity of the city wide transport and other infrastructural network imposing a cost on the entire city.

### **Economic Benefit of Urban Sprawl**

In counter viewpoint, other researchers have argued that sprawl has positive economic benefits, the following are the positive economic benefits identified by various researchers;

- Buildings constructed in locations in which land is inexpensive, houses (affordable housing) or stores rentals, increase in value of property, taxes accrual and urban expansion, and employment in housing and infrastructure construction generates economic activity (Carlos & Daniel, 2020; European Environment Agency, 2016; Christiawan, 2019; Chemupati, 2017; Carlos & Daniel, 2020).
- Lower land values are considered the main driver of development patterns, sprawl tends to happen where property values are lower on the edge of urban centers (European Environment Agency, 2016).

- Strong growth in real estate wealth, due to intense construction dynamics and expansive trend of prices, housing wealth largely due to household ownership (Carlos & Daniel, 2020).
- Transfer of various types of entrepreneurial activity outside the city borders brings economic benefit (Karwinska et al., 2018).
- Commercial growth results from the expansion of urban land use efficient services (European Environment Agency, 2016; Christiawan, 2019).
- Road network improvement and easier accessibility which facilitate the movement of local people to meet their daily needs, use of public transportation which helps to provide transportation for commuting workers, reduced transport costs (Christiawan, 2019; Chemupati, 2017; Hartati, Budhi & Yuliarmi, 2017).

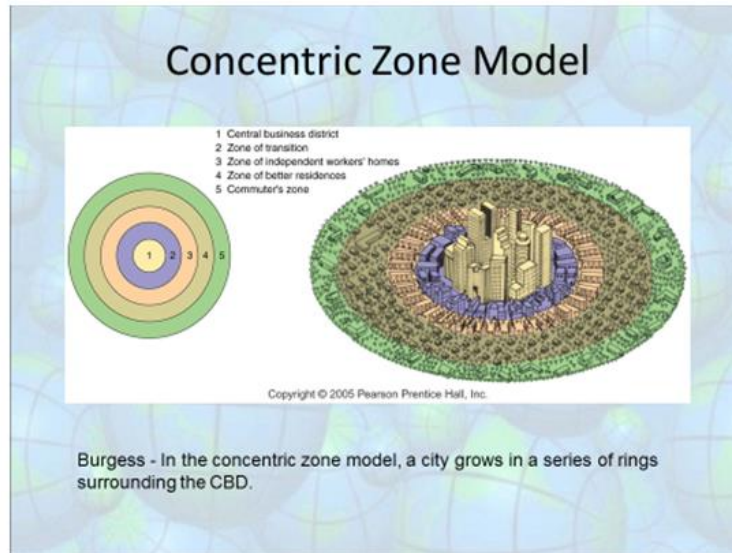
There are a number of benefits attributed to sprawl and they have been articulated by various researchers. The researchers point out the following as economic benefits as a result of urban sprawl: more construction of houses on cheap land and these houses are more affordable than houses in the city, commuting time is less for individuals staying in lower density areas than in high density areas because of less intensive traffic jam making the cost of commuting low, land in urban sprawl can bring economic benefits because construction of houses and other buildings in the land is cheap (cheap labor, cheap raw material like gravel, river sand) and it means many people can afford to build and jobs are created during construction which helps to provide temporary employment to people who are jobless in the area. However, urban sprawl costs government as it increases government expenditure for construction and maintenance of infrastructure which outweighs the tax and rates collections government may be collecting in the sprawl area. The distance between work and home is increased by the sprawl making people to be dependent on automobile this benefit the automobile industry as people purchase their own cars and public transport benefit by providing transport at cost to commuters (European Environment Agency, 2016; Christiawan, 2019; Masoumi, Hosseini & Gouda, 2018). Individuals in sprawling areas are able to earn an income through house or building rental, business opportunities in the areas, and are able to be creative and become entrepreneurial and incentive for farmers are amongst the economic benefit of sprawl (Christiawan, 2019). In the study by Habibi & Asadi (2011) provides a number of economic benefits of urban sprawl which includes low commuting expenses, transport system improvement, private car ownership, price of land subsidies, economic growth and increasing income.

From the literature review it is clear that urban sprawl causes and effects are varied in each country, city and town. There is no universal definition for urban sprawl researchers define urban sprawl depending on which discipline they are from, hence urban sprawl is a multidisciplinary phenomenon with its causes and effects affecting the economic, environmental, social and policy dimensions. It is also evident that urban sprawl effects are not always desirable. The urban sprawl's positive externalities are outweighed by the negative externalities of urban sprawl hence the need to devise strategies to curb the urban sprawl.

## **Model of Urban Sprawl**

### **Concentric Zone Model**

There are many urban growth models, but for this study the Ernest Burgess concentric zone model was used to explain urban sprawl. The model was devised to understand the overall patterns of land use. Urban growth theory models explain internal demographic, spatial and economic growth of cities (Jschecht, 2013). The three phenomenon of a city's development (growth) are interlinked. Burgess theorized that there were five concentric zones in a city which were determined by spatial competition as Zone 1, 2, 3, 4, & 5. He further states that spatial competition decreases with distance from zone 1 with property prices being highest in zone 1 and declining towards the city's edge (Social Science, 2020; Shawabkeh, Bagaeen, Al\_Fugera & Hijazi, 2019).



Source: (Meyer, 2000)

**FIGURE 1**  
**THE ERNEST W. BURGESS CONCENTRIC ZONE MODEL**

The Concentric zone model is a model that explains how settlement, such as a city, will grow. This model was developed by Ernest W. Burgess between 1925 and 1929; the model depicts circles around the center of the city. In each circle a piece of land would have a specific use (See Figure 1). Burgess identified five rings of land use that would form around the Central Business District (CBD). The rings are defined as follows; zone 1 is the central business district, zone 2 is the transition, zone 3 is the independent workers' homes, zone 4 is the better residences and zone 5 is the commuters. The model correlates the socio-economic status of households with distance from CBD, where more affluent households were observed to live greater distances from the CBD the model assumes that as the city grow and develop over time, the CBD would exert pressure on the zone immediate it (transition zone) and an outward of the CBD would invade nearby residential neighborhoods causing them to expand outward. The process would continue to with each successive neighborhood moving further from CBD. The model suggests that the inner-city housing was largely occupied by immigrants and households with low socio-economic status. As the city grew and the CBD expanded lower residents moved to adjacent neighborhoods and more affluent residents moved further from the CBD. In the CBD zone because of high competition and limited space, property values for commercial and private ownership tend to be at a premium.

The urban land use concentric model depicts more or less of what the city of Francistown is experiencing, but the spreading out of residences encroaching into adjacent areas like Tati Siding village because people are able to have larger plots and build single homes and also the plots are cheaper than in Francistown.

### Suburbanization Theory

Suburbanization is a term used to refer to the movement of people from cities to surrounding areas (Clapson & Hutchison, 2010; Ekers, Hamel & Keil, 2012). It happens when urban populations increase, incomes rise, transportation technology improves and jobs decentralized (Ekers, Hamel & Keil, 2012; Harris, 2015). Suburbanization takes a variety of low-density physical forms which includes sprawl (Ekers et al., 2012). The outward growth of urban development may consume surrounding villages and towns into a larger urban agglomeration (Clapson & Hutchison, 2010). Harris (2015) opined that suburbanization is necessary and that it reduces housing costs, though it is a major public and private expenditure, reduces farmland and impact ecosystems negatively. Suburbanization depicts what is happening between Francistown

and the Tati Siding, where Tati Siding village is in the peripheral area of Francistown and farthest from the CBD, resulting in people residing in Tati Siding village commuting to work, however, in this case study the area is not predominately for people of high-income as even low-income group reside in the village and commute to the city using public transport. In this study the main shopping centers are in the city of Francistown. Most of the Tati Siding village residents travel daily from their residence to the CBD for most of their supplies and other needs.

## RESEARCH METHODOLOGY

The researchers employed descriptive case study method for this research because the study focused on collecting the views and experiences of the residents of Tati Siding on the economic effects and benefits of urban sprawl and strategies to curb sprawl. In this study the researchers' goal was to describe the data as it occurred and the researcher did not control or manipulate any of the variables. The research employed a qualitative descriptive case study research approach, using semi-structured interview. In this study the population consisted of residents of Tati Siding village and government officials overseeing the land management and development of Tati Siding. The research population sample for this study comprised the village leadership (chief, ward chiefs, Village Development Committee (VDC) chairpersons & land overseer), other people who have knowledge about the growth and development of Tati Siding village and North East District government planners. The researchers employed the nonprobability sampling to select individuals to be interviewed. The Tati Siding residents were purposively chosen based on people who have in-depth knowledge about the history and development of Tati Siding village. The government officials were purposively selected so that interviews were done with relevant officers based on their knowledge and expertise regarding Tati Siding issues and development. A sample of thirteen (13) was sampled: two (2) government officials and eleven (11) Tati Siding village residents. The interview of key informants gave useful insight into the functioning system of the village, developmental issues and people's perception with regard to the Tati Siding urban sprawl and transformation. The government officials (planners) were interviewed as they are key land management and development officials. All interviews with government officials and Tati Siding residents were conducted by the corresponding researcher, on a face-to-face basis at workplace and residences of the residents respectively. For this study transcripts of individual interviews were collected. The interviews with residents of Tati Siding was mostly conducted in Setswana, questions were asked in Setswana and answers transcribed in English because the majority understood questions better when asked in Setswana. The researchers used thematic analysis to analyze qualitative data. Caulfield (2019) states that thematic analysis is a method applied to a set of texts such as interview transcripts. The researchers used narrative method of analysis to identify and interpret patterns and themes in the qualitative data collected for this study by examining the interview transcripts and three themes were drawn out as follows effects and economic benefits of urban sprawl and strategies to curb urban sprawl.

## DATA RESULTS

<b>Effects of urban sprawl at Tati siding</b>	<b>Residents (No)</b>	<b>Government planners (No)</b>	<b>Total</b>
Opportunity for construction	-	1	1
Village not compact (plot coverage)	-	1	1
More services and infrastructure needed	5	2	7
Social Fragmentation	-	1	1
Increase in crime	11	1	12
Land and inheritance issue	1	-	1



Unemployment esp. youths	3	-	3
Repossession of fields	1	-	1
Waste management problems	4	-	4
Unserviced land in some part of the village	1	-	1
Loss of ploughing fields & communal land	1	-	1
Unidentified people in the village	1	-	1
Need for shops	2	1	3
Traffic congestion	1	-	1
Noise pollution	1	-	1
Illegal immigrants	1	-	1
Squatters	2	-	2
Livestock room village cause friction	2	-	2
Commuting to F/town for suply/work	3	1	4
Sewage lack capacity	1	-	1
Youth wayward and drunkenness	1	-	1
Demand for housing	1	-	1
Land finishing	1	-	1
Flooding	1	-	1
Total	11	2	13

### **The Effects of Urban Sprawl at Tati Siding village**

Under this theme, the researchers sought to identify the effects of urban sprawl on the transformation of Tati Siding village. The study results in table 1 shows the views from 11 residents and 2 government planners at Tati Siding. All eleven (11) residents' respondents identified increase crime as negative effects of urban sprawl in the village. The two (2) planners cited negative effects of urban sprawl on the village transformation as the need for more services and infrastructure.

#### **Increase in Crime**

The study findings indicated that 11 out of 11 residents have mentioned increase in crime as the major negative effects of urban sprawl on the village. One of the residents had this to say: *'All kinds of people come to leave in the village and it is some of these unknown people that commit crime in our village'*.

Another one of the residents had this to say:

*'All thieves have moved from Francistown to this village and start committing crime and stolen goods are taken to Francistown'*.

#### **More Services and Infrastructure Needed**

All two planners cited that urban sprawl impose a high demand on services and infrastructure. This seems to indicate that the rapid growth of the village is happening at a fast pace ahead of the village planned development. One of the planners had this to say: *'The growth of the village has put huge demand for more infrastructure and social services, there is need to increase schools, clinics electricity, roads and sewage systems in the village'*.

### **The Economic Benefit of Urban Sprawl at Tati Siding village**

Under this theme, residents were asked to mention the economic benefits brought about by the sprawl at Tati Siding village. 8 out of 11 (72%) of the residents cited house rent and land value as the major economic benefits brought about by the village sprawl and rapid growth of the village. 6 out of 11 (55%) the residents mentioned value of land as an economic benefit brought about by

the sprawl and rapid growth of Tati Siding village. Both planners also mentioned that house rent and land value are economic benefits brought about the urban sprawl.

### **House Rent and Land Value**

Eight of the residents who responded indicated house rent as the major economic benefit brought by urban sprawl and growth of the village. One of the residents had this to say:

*‘Most of the people here are workers, some work in government and some of them work in Francistown, so they have money to build, majority own houses in Tati Siding and rent them out to others’.*

The six residents had also cited land value as an economic benefit brought about by the sprawling at Tati Siding village. One of the residents went on to say:

*‘The village will end up not being a local village because people apply for plots here, then sell them to gain money because the value of land here is better than in other villages within the greater Francistown area. They are not from here.....’*

One of the residents also went on to say:

*‘The value of land in this village is better than the rest of other North East villages because of the serviced plots, but plots are more affordable here than in Francistown’.*

The two planners had mentioned that house rent and land value were economic benefits brought about by the urban sprawl. One of the planners had this to say:

*‘The land is serviced, there is water, sewage, electricity and tar roads especially at the new stance ward plots there attract buyers, and some of the people choose to sell their plots while others rent out their houses for economic gain’.*

Another planner had this to say:

*‘Plots are expensive in Francistown and also rent there is expensive compared to rent in Tati Siding.’*

### **Discussion of Results**

The study results in table 1 revealed that urban sprawl has got both negative and positive effects to the community of Tati Siding village. They mentioned that urban sprawl increases crime and the need for more services and infrastructure among other effects. The residents cited increase in crime as a negative effect caused by the urban sprawl. On the other hand, planners cited the need for more services and infrastructure affects government negatively. Provision of more services and infrastructure can be viewed as both positive and negative outcome of urban sprawl, positive in the sense that it is a development that upgrades the village and negative in that it is a costly undertaking for government and promotes sprawl, while, the increase in crime is definitely a negative outcome of urban sprawl. The results revealed that increase in crime as an effect caused by urban sprawl. This finding is supported by Kaur (2008) who suggests that urban sprawl increases crime in that criminals have lesser chance of being caught as strangers are mistaken as part of the residents. This view was also substantiated by Ellen & O’Regan (2009) who found that crime rates on cities declined more than crime in surrounding suburbs. Planners indicated that more services and infrastructure is required due to the effects of urban sprawl. These findings were supported by OECD, 2018 report that stated that urban sprawl caused massive investment in road infrastructure contributes to sprawl. This finding was also buttressed by Hussain (2016), who stated that urban sprawl compels policymakers to properly plan and ensure that proper service is delivered in a sprawled area. Hussain (2016) stated that excessive pressures on the available services will result in problems of sanitation, air pollution, inadequate access to safe drinking water, over-crowding and social problems. This finding was also supported by Habitat III (2016) report which stated that basic services and infrastructure prompt development and opportunities for people to develop their areas, and it is a key to the achievement of Agenda 2030 and SDGs. The report farther states that access to services is a basic human right and has to be provided for rapidly growing population. The finding was also supported by (The Brookings Institution, 2003; Siedentop & Fina, 2010)) who

stated that infrastructure provision to sprawling communities' costs more than in more compact built areas and that compact areas benefit from efficiency gains obtained by economies of scale. Kaur (2008); Angotti (2013) echoed the same sentiments that sprawled areas will force areas that were planned for a small number of people to cater for the sprawled community which results in overcrowding of services and infrastructure. Jarah, et al., (2019) were of the view that the inadequate distribution of infrastructure and services imposes pressure on government to increase these services and infrastructure.

The study findings have revealed that both residents and planners believed that house rent is an economic benefit brought about by urban sprawl. The study finding is supported by (Kalabamu & Bolaane, 2014) who stated that communities were developing plots for rental purposes as a reliable source of income. According to Peppercorn & Taffin (2013) individuals provide rental housing to derive income from rental properties, giving them additional cash flow and contributing to the improvement of their standard of living. This particular finding of the research is also substantiated by Nguluma (2003), who mentioned that renting rooms was one of the key sources of supplementary income for house owners and that sprawl has increased the value of a house and housing stock in settlements which helps to solve the problem of housing shortage. This finding is supported by Zhang (2015) who postulated that rural areas land price changes more likely cause housing prices.

The study findings have also revealed that land value is an economic benefit brought about by urban sprawl. Land is a readily available fixed resource and land supply is fully inelastic. The study findings are supported by Cavailhes & Thomas (2011) who revealed that there were capital gains in land prices. Lynch (2007); Cavailhes & Thomas (2011) cited land value as a property that landowners needed as an economic commodity to maximize their profits and that it gives them regular monetary value. This means those who own land in the area can rent or sell for economic gain. This finding is supported by Cavailhes & Thomas (2011) who stated that that urban sprawl causes the conversion of rural land to appreciate in value due to investment and land speculation.

## CONCLUSION AND RECOMMENDATIONS

The study results indicated that urban sprawl causes many negative effects to the village, like more services and infrastructure needed and increase in crime. Planners indicated that if urban sprawl in the village is not controlled demand for more services and infrastructure will be required in the village to cope with the sprawling village, they said the demand for more services and infrastructure comes at a cost that may not have been budgeted for in the national development plan. The conclusion drawn was that urban sprawl has got negative effects to both the residents and government. The results clearly indicate that urban sprawl has got negative effects to Tati Siding village and therefore the study objective was achieved and confirmed. The results also clearly indicate that they are some economic benefits brought about by urban sprawl at Tati Siding village namely land value and house rent.

The researchers recommended that the government should reform land laws, policies and guidelines to curb urban sprawl, for example, government may implement urban growth boundary to separate urban and rural areas, and ban development in designated areas on the urban fringe, thereby directing development to the core city, not on the periphery, which will concentrate growth on higher density areas than low density area and make provision of infrastructural (such as roads, sewerage among others) development and improvement cheaper than when providing them in sprawled areas. Government through Parliament should also establish legislation that can promote sustainability and prevent urban sprawl. The researchers have got the view that adopting policy that have positive impact on agricultural incomes on urban fringes may have direct effect on reducing the outward sprawl of cities. The local government must also formulate specific policies that will encourage high-rise buildings which do not require big plots like single type building which spatially covers a larger area. There is also need for government planners to continuously monitor the implementation of the village development plans to ensure adherence to the development plans and review the plans in a cycle of every five years or as planned, because villages and cities are continually developing and changing as the population continues to increase and the life style of the

inhabitants' changes. This study recommends that further research be carried out in other villages located at the proximity of cities since this study was conducted at Tati Siding village only.

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