

## **Whither Sustainable Rural Development? A critical exploration of remote communities in and around the Okavango Delta, Botswana**

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### **Abstract**

*Short title: Sustainable Rural Development in the Okavango Delta, Botswana*

Rural areas constitute the critical mass, which drives economic growth and development in many developing countries. They contribute mainly to manpower and the production of industrial raw materials needed in urban centers. Through a combination of critical review of literature, case studies and field observations, this paper explores the state of rural transformation and progress in the Okavango Delta of Botswana. It specifically examines land use and tenure-ship in the area. It also explores the issues surrounding the state of social, physical and institutional infrastructures and how these affect rural development. The analysis shows that the current model of land tenure-ship constitutes a major challenge in human-wildlife interactions. Analysis also indicates that basic rural infrastructures (i.e., social, physical and institutional) are grossly underprovided in most remote communities. While the paper highlights the roles and importance of Community-Based Organizations (CBOs), particularly Community Trusts (CTs) and other administrative structures as well as local knowledge in Sustainable Rural Development (SRD) activities, it concludes that an integrative endogenous-exogenous development process is necessary for enhancing capacitated-sustainable rural infrastructures and pro-poor policy implementations, which are in turn meant to drive rural entrepreneurship/employment and local development.

**Keywords: Land use, community trusts; indigenous knowledge, pro-poor policy, rural employment**

### **1. Introduction**

Without doubt, one of the major goals of any well-meaning government is the realization of the potentials of its citizenry particularly those resident in relatively remote local communities. The reason is that any economy derives its labor force and industrial raw materials mainly from rural communities, particularly so in the developing economies. This is more evident in sub-Saharan Africa (SSA) where majority of the population resides in the countryside. For instance, out of the 2 million people constituting the entire population of Botswana, only about 21.6% resides in urban communities. And of the 78.4%, which constitutes Botswana rural population, about 9.6%

of them reside in Ngamiland District<sup>1</sup> where the Okavango Delta (Figure 1), which is an entirely rural area, is situated (CSO, 2011). Granted that Botswana system of settlement categorization<sup>2</sup> is somewhat novel as this does not necessarily

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<sup>1</sup> It is instructive to note that the desire of local institutional structures and traditional authorities (chiefdoms) to retain their administrative relevance and thus perpetuate themselves in certain Botswana rural settlements demand that such communities' status remains as a village or at best a township.

<sup>2</sup> Ngamiland District is further sub-divided into 3 sub-Districts including Ngamiland West; Ngamiland East; and the Delta (aka Okavango sub-District). The Okavango Delta, which is one of the largest inland Deltas in the world, is located in northwestern Botswana. Covering an area of about 15000 square kilometers, the alluvial fan-like Delta receives its annual water flow from the upland plains of Angola's Cuito and Cubango Rivers (Mendelsohn, *et al.*, 2010).

depend on human population but careful planning and infrastructures availability, which is evident in the few communities categorized as urban as opposed to rural, the fact remains that majority of the communities in the country are typically rural. Their relatively remote nature, fewer human population and haphazardly unplanned structural arrangements truly attest to their rurality. Admittedly, the constitution of what is known as a rural community is contextual. Depending on the level of progress, what constitutes a rural settlement in one geo-political space might be conceived differently in another location.

Over the last four decades, Botswana has experienced a rapid transformation from a purely subsistent economy to a middle income country through mineral extraction and tourism. However, the modernization and improved economic growth experienced by the country have not had much effect on poverty rate, unemployment and inequality amongst Botswana, particularly those who are resident in the countryside. For example, headcount poverty was estimated at 30% from 2002-2006 (UN, 2007). Botswana core welfare indicators survey for 2009-2010 suggests that unemployment rate was 17.8% (CSO, 2012). Nonetheless, the prevalence of poverty in the country is more noticeable in the rural areas where 64.4% of those categorized as poor people resides (Tumelo, 2004; BIDPA, 2001; IPC/BIDPA, 2005). In comparison with the national average, headcount poverty rate in Ngamiland East and West is acclaimed to be severe and was estimated at 40 and 50%, respectively (Ngwenya, 2009).

Indeed, the Okavango Delta, which is a part of the Ngamiland District, is an international tourist destination, attracting thousands of tourists annually. Acclaimed as a major driver of rural development and Community Based Natural Resource Management (CBNRM), the tourism industry in the Okavango sub-District and Chobe District constitutes about 7% of the national Gross Domestic Product (GDP), and also provides employment for about 34% of the population in the two districts (WTTC, 2010; Owen, 2013). Paradoxically, the well-being of many rural people in the area remains dismal, perhaps as a result of the relatively fewer percentage number of people who are employed and lowly paid. However, many factors may have been responsible for the high poverty level amongst community people in the area. For instance, lack of access to social infrastructures, which might compromise human capability and functioning; lack of access to material assets (such as land and property) and less tangible assets (social capital); lack of self-esteem, dignity, choice and power; marginalization through lack of political participation and social dialogue (Chant, 2006), are likely to contribute to deprivation and people's

mystery. Overall, the goal of any rural development program is to minimize poverty-inducing indicators and by this enhance rural people's quality of life. While the direction of rural development in the area is still nebulous<sup>3</sup>, its impact through various government efforts to achieve improvement in the living conditions of rural people also remains to be seen.

This paper, therefore, examines land use and tenure-ship in the Okavango Delta of Botswana. Then it explores the issues surrounding the state of social, physical and institutional infrastructures in the area and how these affect rural development. In highlighting the roles and importance of Community Trusts (CTs) and local knowledge in rural development activities, the paper goes further to emphasize an integrative endogenous-exogenous process of development for achieving capacitated-sustainable rural infrastructures. It concludes that a concerted effort is needed to enhance and strengthen rural infrastructures in order to drive employment generation and entrepreneurship development. The paper begins by exploring some basic concepts in Sustainable Rural Development (SRD).

## 2. Conceptual framework

First, an attempt is made to highlight the key issues surrounding the concept of Sustainable Development (SD) in order to situate the discourse within the right perspective. The Brundtland Commission also known as the World Commission on Environment and Development (WCED) provides a profound meaning of SD by defining it as the '*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' (UN, 2007). Explained differently, SD is realized when the strategies employed as the pathway to a holistic human progress and well-being drive the desire to meet and enhance the needs of existing or contemporary generation without necessarily jeopardizing the well-being and needs of future generations. On the one hand, if SD will succeed, it will hinge on three main pillars of environmental protection, economic progress and effective resource use at both

<sup>3</sup> The Ngamiland District Development Plan-7 (NDDP-7), 2009-2016, provides a projection of electricity supply to 15 villages including those across the Okavango River in two phases within the period. Nonetheless, while it is acknowledged that this area would receive electricity for the first time, no information was provided as to when many other villages yet in that category will be connected to the national grid. Also, the use of sustainable energy sources is already contemplated in the Plan indicating that all government institutions should have started using solar energy by 2016. However, no mention is made of how this initiative would be extended to riverine and other villages (like Jao Flat) where accessibility is a real challenge. This lack of clear-cut arrangement in the provision of amenities cuts across other rural infrastructures as well.

community and national levels (Kolawole and Laogun, 2005). On the other hand, its failure would hinge on three major shortcomings, which are poor resource governance, information failure and misapplication of technology.

Simply defined, rural development is the holistic process of transforming the socio-economic, cultural and political conditions of the people residing in relatively remote and sparsely populated communities with the ultimate aim of improving their quality of life and well-being. Adopting a policy oriented perspective, Elands and Wiersum (2001), define rural development as *'the process of reaching the desired futures of the countryside. It is also a process of strengthening the liveability [sic] in rural areas'*. Thus rural development is aimed at equitable distribution of resources, closing the gap of rural-urban disparity, reducing poverty and unemployment (Jibowo, 1992; Moseley, 2003). Although agriculture is an important component of rural development, more attention is now focused on rural off-farm employment as a result of the current changes in global economic networks, which are underpinned by globalization (Ward and Brown, 2009). Consequently, rural entrepreneurship, manufacturing, tourism and recreation are other sectors on which emphases are currently placed. This notwithstanding, it is still strongly believed that agriculture plays a crucial role in rural livelihoods and sustainability of agrarian communities (Paniagua, 2013), and therefore cannot be underestimated. Thus the United Nations (UN) admits that *'[a] healthy and dynamic agricultural sector is an important foundation of rural development, generating strong linkages to other economic sectors'* (UN, 2009). It remarks further that:

*'Rural livelihoods are enhanced through effective participation of rural people and rural communities in the management of their own social, economic and environmental objectives by empowering people in rural areas, particularly women and youth, including local cooperatives. Close economic integration of rural areas with neighbouring urban areas and the creation of rural off-farm employment can narrow rural-urban disparities, expand opportunities and encourage the retention of skilled people, including [the] youth, in rural areas. There is considerable potential for rural job creation not only in farming, agro processing and rural industry but also in building rural infrastructure, in the sustainable management of natural resources, waste and residues'*.

Thus the multi-faceted nature of rural development demands that a holistic approach is adopted in implementing projects that enhance the quality of rural life. There is need to strengthen

rural capacity through careful planning and management that take into consideration the complex natures of rural areas, which ordinarily appear simple but intricately present themselves as enigmatic to the outsider change agent. That said, the distinctiveness of one rural locality from another suggests the need for the deployment of different rural development approaches and strategies based on the peculiarities of the socio-cultural and ecological characteristics of different communities and regions. Globally, there are many approaches used in implementing rural development projects and programs. Nonetheless, the subject-matter and geographical scopes of rural development influence, to a large extent, the kind of approach used in any rural transformation agenda. Specifically, sectorial, holistic and regional approaches are commonly used in implementing rural development projects and programs in Africa (Jibowo, 1992). On the one hand, while the sectorial approach is employed, through prioritization, to carefully identify and select important sectors of the rural society (e.g. health, agriculture, education, etc.) with a view to positively transforming them, one after the other over a given period of time, the holistic approach directs all efforts towards the development of all the rural sectors at the same time. On the other hand, regional approach is used where the society is compartmentalized into various zones suited for particular development projects. Analytically, rural development comprises two major aspects, which are *'the contents and process dimensions'*. While the contents dimension encompasses the implementation of diverse rural development initiatives as outlined above, the process dimension considers *'the renewal of rural institutions, procedures and culture, and their impact on social space'* (Elands and Wiersum, 2001). I shall return to this shortly. Depending on how appropriate they are to local contexts, strategies for implementing rural development projects and programs in many developing economies include community development, agricultural extension and Integrated Rural Development (IRD) (Williams, 1978). But more importantly, *'strategies [meant] to deal with rural development should take into consideration the remoteness and potentials in rural areas and provide targeted differentiated approaches'* (UN, 2009). As such, rural development programs in southern African countries, for instance, may not necessarily follow the same route as those in West African region. While most West African economies are purely agrarian in nature due to favorable ecological factors, most southern African countries, which are semi-arid in nature (e.g. Botswana), are dependent on mining and tourism. While farming plays a major role in the livelihoods and survival of communities particularly those located along river courses in

the Okavango Delta, tourism has been used as a major driver of rural development in the area. Through the Community Based Natural Resources Management (CBNRM) Framework, community people are encouraged to participate in rural development activities that are employment generating and environmentally sustaining. As rightly observed by the UN (2009), '*investments in environmental protection, rural infrastructure, ..., health and education are critical to sustainable rural development*'. Thus, Sustainable Rural Development (SRD) is achievable where and when the development process of the low-income population residing in rural areas is '*self-sustaining*' (Lele, 1975). Defined explicitly, SRD connotes the implementation of an all-involving life improving projects and programs, which take into consideration the need for environmental protection, effective resource management, social equity and economic gains amongst local community people. Good leadership and effective flow of information are also central to good delivery of development (Kolawole, 2001). Indeed, the prevailing global challenges demand that strategies aimed at tackling climate change, desertification, drought, flood and other related natural disasters are pivotal to the success of SRD (UN, 2009), particularly in a peculiar environment such as the Okavango Delta.

### **3. Sustainable land management and the state of infrastructures in the Okavango Delta**

#### *3.1 Land use and tenure-ship in the Okavango Delta*

In agrarian communities, land is a principal means for agricultural employment, income generation and food production in sub-Saharan Africa (Jerneck and Olsson, 2013). Unlike in the rest of Botswana where land tenure-ship is in the forms of communal or tribal, state and freehold tenure (MMEWR, 2006), the prevailing land tenure systems in Ngamiland (West, East and the Delta) are communal and state-own land where the former constitutes 79.3% of the entire land in the district (MLH, 2003). While the Tawana Land Board holds the communal land in trust for community people and administers its use through the Tribal Land Act of 1968, the state land in the district is administered by the Department of Lands (DoL) in the Ministry of Lands and Housing (MLH) through the invocation of the State Land Act instrument. While it is soothing to know that a greater proportion of land in the district is communally-owned, it is however discouraging to note that community people were merely involved in consultative participation in the development of the Okavango Delta Management Plan (ODMP), which in itself makes community people voiceless in the formulation and implementation of land use policies (Magole,

2009). Participation is synonymous with mere consultations where and when community people's opinions on certain development issues are sought without giving them any significant consideration in decision-making and program implementation. This is at variance with the ideal type interactive involvement that echoes the all-round involvement of community people in project conceptualization and implementation (Agarwal, 2001). By and large, participatory strategies that do not take into consideration conflict situations and adequate negotiations prove to be problematic in development project/program implementation (Leeuwis, 2000). That said, community people's awareness that communal land belongs to them points in a positive direction; it strengthens the sense of ownership and identity, which tends to encourage and motivate people's desire to invest in land improvement, all things being equal.

Land use in the district are broadly categorized as communal area, which is further sub-divided into human settlements, arable and pastoral farming lands (all constituting 49.6% of the total land area in the district); Wildlife Management Areas (WMAs) (34.3%); Ranches (6.4%); Leasehold farms (2.2%); and National Parks and Game Reserves (7.5%) (MLH, 2003). In terms of economic growth and development, land use in Ngamiland is basically directed at agricultural production, tourism and wildlife conservation. It was not until 2011 and 2012 that copper mining activities began in Toteng area of the Ngamiland East. While agricultural activities, which are purely subsistent in nature, serve to enhance grassroots livelihoods and economic growth, tourism together with wildlife conservation is meant to drive both economic growth and environmental conservation. Thus an integrative land use plan that incorporates agricultural production and tourism-based ventures was contemplated by the Department of Lands in the MLH, the national land authority in Botswana. Although seen as very crucial to local livelihoods survival, agricultural production has not received as much blessings as wildlife-based tourism which is highly favored by conservationists and international stakeholders (Magole, 2009). This bias may have been largely influenced by the seeming marginal contribution of agriculture to the national revenue. Although WMAs, which were established under the Wildlife Conservation Policy (Government White Paper No. 1 of 1986) (MLH, 2003) and legally backed by the Wildlife and National Parks Act of 1992, serve as a platform for Controlled Hunting Areas (CHAs) where wildlife resources could be sustainably accessed and used by community people (Magole, 2009; DWNP, 1996), there still appears to be some hitches in access to these resources. Thus

community people become disenchanted and uncooperative with the government and its programs in situations where they perceive that their rights are trampled upon by anti-poor policies (Scott, 1993). The importance of nature conservation cannot be over-emphasized but problems arise where there is an imbalance between conservation and people's livelihoods strategies. As such, the contiguity of human settlements and wildlife areas has continued to generate hues and cries amongst community people. Besides, poor choices in policy objectives as well as non-recognition of local-level aspirations in decision-making in animal disease control have engendered lack of thrust and disenchantment between community people and the government. In an attempt to minimize disease spread between wildlife and livestock, disease control areas were created through the erection of fences by the Department of Animal Health and Production (DAHP), which in themselves are problematic to the movement of livestock in search of pasture and water. Not only that, farmers and community people perceive the fences as access barriers to natural resources such as veldt products, which form part of their livelihoods systems (Darkoh and Mbaiwa, 2009). Other negative effects on the fences include human-wildlife conflicts, poaching, increased stress on animals, high mortality amongst migratory wildlife due to entanglement along the fences (Albertson, 1998). The incessant human-wildlife conflicts, which mainly play out in the forms of crop raiding by marauding elephants and loss of livestock to carnivores such as lions and hyenas continue to create an apprehensive atmosphere engendering what could be rightly termed stifled sustainable development environment. One of the findings of a social survey conducted from 2011-2012 in 8 major farming communities of the Okavango Delta indicates that all the 592 farmers interviewed linked reduction in farm productions mainly to climate change, and damages caused by wildlife and livestock (Kolawole *et al.*, 2012). Widely claimed to have been responsible for many losses they had recorded in their livestock business, farmers at the cattle posts around Chanoga community, in the first quarter of 2013, gunned down a roving lioness, which they perceived as constituting a threat to their lives and properties (The Ngami Times, 2013).

### 3.2 How sustainable is land use in the Okavango Delta area?

Earlier in this paper, the concept of Sustainable Rural Development (SRD) has been explored. This sub-section therefore carefully outlines land management issues in relation to the well-being of both people and environment. Small farmers in and around the Okavango Delta are noted for both dry land and flood recession farming (also

traditionally known as *Molapo* farming). Nonetheless, while farmers in the panhandle area of the Delta are noted for dry land farming, those in the mid-Delta and distal areas are noted for their practice of traditional flood recession farming (Meyer and Bendsen, 2003). And while dry land agriculture is purely rain-fed, *Molapo* farming is dependent on seasonal flood pulses of the Okavango River, which is noted for its fertile alluvial deposits on which farmers cultivate arable crops (such as maize, millet and sorghum) soon after the flood has receded. Although not formally recognized by the government thereby depriving them the modern usufruct to land resources (Van der Post, 2009), *Molapo* farmers are still allowed to practice this traditional agriculture (Magole and Thapelo, 2005). This is, however, with a proviso that those whose farms are very close to the river channels should not apply chemical fertilizers in order to prevent water pollution. Further investigations suggest that only upland farmers whose farms are about 200 meters away from the river channels are allowed to apply chemical fertilizers. Under the Integrated Support Program for Arable Agricultural Development (ISPAAD) initiative, only registered farmers including those who can afford the use of machineries such as planters (which would enable them plant in rows) could access government's fertilizer subsidy (Kolawole, *et al.* 2013). This implies that farmers who do not have the wherewithal to acquire such implements and those who practice the traditional mode of agriculture are disadvantaged in accessing government's agricultural aid. This policy tends to induce distrust and animosity between the government and community people who might perceive their rights as being trampled upon. Besides, the policy appears to have some loopholes, which might engender infraction and eventually could be counter-productive to environmental sustainability in the long-run. As earlier observed, community people tend to revolt against environmental conservation and government policies where they perceive that they are not fairly treated and adequately involved in development programs (Scott, 1993). The possibility of infractions in the unregulated use of fertilizers apart, hapless farmers who are powerless and do not have political or any form of institutional connections for accessing these agricultural inputs are left to their fate to continue to cultivate already stressed farmlands. This unsustainable use of land resources and its impact on soil degradation and livelihoods might not be easy to quantified in the long-run.

Field observations have shown that the state of agricultural soils in the Okavango Delta areas is not encouraging. Soil suitability analysis for the Ngamiland District categorized soils into very fertile; fertile; moderately fertile; moderate to low;

low; very low; and unknown. The analysis also showed that the most fertile soils are found along the river channels possibly as a result of rich alluvial deposits, high moisture content and organic matters (Magole, 2009). Nonetheless, laboratory analysis conducted on soil samples from the distal, mid-Delta and panhandle areas by our research team showed that most soils in the Delta area are low in *cation-exchange-capacity* (CEC) and grossly deficient in essential macro- and micro-nutrients (Kolawole, 2013; Kolawole *et al.*, 2013). This is a major challenge to agricultural productivity, which customarily is the mainstay of community people besides animal husbandry in and around the Okavango Delta. Regardless of this unwholesome scenario, the political economy and ecology of agricultural land management appear somewhat deficient in enhancing Sustainable Land Management (SLM). The World Bank (2006) defines SLM as a holistic '*knowledge-based procedure that helps integrate land, water, biodiversity, and environmental management (including input and output externalities) to meet rising food and fiber demands while sustaining ecosystem services and livelihoods*'. It thus aims at striking a balance between the maintenance of ecosystems integrity and their productive capabilities, which solely hinge on the land and its associated resources. Achieving SLM goals in the wetland plains of the Okavango Delta and its environs would depend on the extent to which an integrative management measures are implemented to enhance environmental sustainability.

Given the sandy nature of the soils in the Delta area and their peculiar poor structures and, coupled with less rain and intense sunshine, mineral elements that are prone to high volatility, such as nitrogen (N) and the like, are easily lost into the atmosphere through evaporation. Procedures for mitigating excessive loss of nutrients by enhancing soil quality are therefore plausible. It is instructive to note that the continuous application of chemical fertilizers alone cannot be the antidote to the problems of soil infertility particularly where low CEC, which is commonplace in the Delta area, is associated with agricultural lands. In a condition of low CEC, soils that are rich in essential elements cannot release them for plant uptake. Therefore, a right combination of organic and inorganic minerals or perhaps through other soil amendments is the pathway to enhancing soil fertility in a peculiar ecosystem like the Delta and its surroundings (Kolawole, 2013; Scoones and Toulmin, 1999). It is also noteworthy to mention that the prevalent mixed farming system practiced in Ngamiland creates the right platform for the use of organic materials in soil amendments; cow dung and other wastes from small stock reared by community

people serve as necessary ingredients for a large-scale production of organic fertilizers.

#### 4. State of infrastructures in the Okavango Delta

Without any doubt, rural infrastructures and rural development are not mutually exclusive. However, while rural infrastructures are a necessity, they are solely not sufficient and therefore cannot on their own drive rural development. People need to drive infrastructure to make them work. As acknowledged elsewhere, '*development is about people*' (Kolawole, 2000) whose onus in infrastructural development itself cannot be gainsaid. While it is admitted that physical rural transformation is partly an indicator of the level of development of infrastructural facilities available within a given rural setting, their functionality and usefulness are a function of the local-level manpower and human capability, which can appropriately avail themselves of the benefits of such amenities. A self-sustaining rural development process entails the development of skills and capacity, which enhances effective resource utilization at the local community level (Lele, 1975). Intricately interwoven, rural infrastructures are pertinent to economic development and socio-political-cultural well-being of local communities. Central to rural development are rural education and training, entrepreneurship development and employment promotion, both of which are a scaffolding of community-level progress and empowerment when rightly enhanced by appropriate infrastructures.

Borrowing from Ekong's (2003) insights, rural infrastructures are social, physical and institutional capitals that drive and govern the production, distribution and consumption of goods and services within rural communities, and between them and urban centers. Put explicitly, rural infrastructures are in the forms of *social* (including facilities ranging from educational, health, hospitality communication to water and electricity supply); *physical* (such as transportation, storage, processing, irrigation, flood control and water resources development facilities); and *institutional infrastructures* (which include rural credit and financial institutions, farmers organizations, agricultural extension institutions, community development or self-help organizations, cooperatives and marketing services). All this governs the structural ordering of social, economic, cultural and political activities of rural communities. Associated with huge capital outlay and investments, the funding of most of these infrastructures is vested solely in the government and other large co-operations. Public-Private-Partnership (PPP) is therefore essential for driving rural change and development

in any progressive society. But then, some aspects of institutional infrastructures might be conveniently funded by individual groups and members of a community as in the case of the formation and sustenance of local associations such as thrift societies and other self-help groupings. More importantly, institutional infrastructures play a key role in mobilizing community people for social action and change; mobilizing financial resources and spreading risks for productive economic activities; developing rural leaders; providing trainings programs and enhancing the uptake of agricultural innovations; and offering the platforms for the marketing of agricultural produce and by this ensuring the integration of grassroots population into the mainstream of the national economy and advancement (Ekong, 2003). Viewed as a whole, institutional infrastructures are those which largely give impetus to the enhancement of social and human capitals in rural communities. The state of infrastructures in Ngamiland and particularly in the Okavango Delta area is still not desirable. Barring Maun, the District capital, where most of the amenities are available and concentrated many remote communities in the Delta lack basic amenities that could enhance the growth and development of rural businesses and other livelihood activities.

#### *4.1 Social infrastructures*

While social infrastructures such as educational institutions ranging from primary to University level are available in the capital (Maun), the same cannot be said of many other villages within and around the Delta. Although it is reported that 90% of the remote settlements in Ngamiland District *'have been provided with facilities such as schools/health posts and portable (sic) water'* (NDDP-7, 2009), the reality on ground may not necessarily suggest the adequacy and proper functioning of these social infrastructures. Admittedly, education infrastructure is inadequate in Ngamiland leading to congestion in certain primary and secondary schools with their attendant features of poor or inadequate social-physical facilities (NDDP-7, 2009). As such, community people resident in remote villages where there are no educational establishments are compelled to send their children to distant communities where such facilities exist. This may have accounted for the high level of illiteracy in the area, which is engendered by the high level in school drop-outs. While rural health posts exist in many settlements, most or all of the rural communities rely on the main health facilities at the far away centre for serious health concerns thereby constituting a major challenge to the very sick people who need immediate medical attention in times of emergency. Spatial distributions of these facilities show that some health posts are as

far as 121 kilometers to the major health facilities. Examples are Chukumuchu and Nxauxau communities, which are 121 and 102 kilometers away, respectively, from a major hospital (Ngwenya, 2009).

Okavango Delta is a tourist destination, which attracts many people from around the globe. As such, hospitality business is a commonplace particularly in major settlements such as Maun, Shakawe, and in locations right in the Delta itself; there are many hotels and lodges providing accommodation and tourism services for visitors. But then, most of the lodges in the interior independently devise ways of providing suitable social infrastructures for the comfort of their guests. While it is admitted that rural telephony has extended its tentacles to almost all the nooks and crannies of rural communities in the area, there are still other settlements which appear totally cut off. A case in point is a community like Jao Flat situated right in the heart of the Okavango Delta. Also, postal services are only available in major settlements. While electricity supply reaches many rural communities in the Delta, a significant number of the communities are still without this social amenity. Given that conventional power generation, supply and distribution prove to be a major challenge in Botswana, the country is somehow strategically positioned to avail itself of solar energy derived from the abundant sunshine it enjoys all the year round. Doing so will enable remote communities access and use power supply on a sustainable basis. Influenced by the arid environment, water supply (where provided) in most or all the rural communities is incessantly erratic. And more often than not, the water is not well processed (but impregnated with dirty particles and colloidal materials) even when the taps are running. Although it is claimed that water supply exceeds daily demands in the Okavango sub-District (NDDP-7, 2009), observational evidences show that many community people still rely on water obtained directly from the river channels for their daily domestic needs. Nonetheless this water is often not treated before use by community people. And closely associated with the direct use of untreated water from the river channels are human water-borne ailments, such as diarrhea and the like (Tubatsi, 2013), which in turn impacts on human capital and reduction in number of manpower for meaningful socio-economic activities and of course community development (Chambers, 1983). Located in Maun and Gumare, the Public Health Department of the North-West District Council provides sanitation services in Ngamiland. Nonetheless, sanitation facilities in settlements in Ngamiland District portend a dismal situation. More than 50% of the households in Ngamiland West had no toilets (NDDP-7, 2009).

Also, 52.3 and 39.3% of the households in Ngamiland Delta and Ngamiland East had no form of sanitation facilities, respectively (MLH, 2003). This thus constitutes a serious pollution problem to the water channels in the area. It is also admitted that the use of fire woods, paraffin and candles as sources of energy is common in rural communities within the District (NDDP-7, 2009). This has a direct relationship with the unavailability of electricity sources in very remote settlements and cattle posts in and around the Delta. Thus community people – in an attempt to generate energy for cooking and heat – cut down woody plants in the environment, leading to environmental degradation. While it is acknowledged that over the years, many rural communities have been reached through the Rural Electrification Program (REP), there are still a significant number of remote villages across and around the Okavango Delta that are yet to be supplied with electricity. A few examples abound. Amongst many others, remote communities such as Jao, Danega, Habu, Tsodilo, Chukumuchu, Semboyo, Phuduhudu and Ngarange are yet to be connected to the national grid (Figure 1).

#### 4.2 Physical infrastructures

A significant number of the inland communities have relatively good road networks, which could enhance the creation of easy and effective transportation linkages. Apparently celebrating the contributions of tourism to the development of infrastructures within rural communities in Botswana, Mbaiwa (2003) vividly captured the building of tarred/tarmac road networks connecting major settlements in northern Botswana (where Ngamiland District falls) but without any mention of the appalling conditions of access linkages and feeder roads (sandy and gravel) in the interior of the Okavango Delta. Analysis indicates that only about 5% of the 21 roads in Ngami sub-District are paved with bitumen. While majority (~62%) of the roads is categorized as sands, a significant proportion (~24%) is gravel. Of the 42 roads in the Okavango sub-District, only about 24% of them is paved while the rest either constitute sands (36 %), gravel (31%) or earth (~10%) (MLH, 2003). Besides, most of the paved/tarred roads are narrow and already in a state of disrepair. Most remote villages are linked only by feeder roads, which are seasonal in nature. Many of these communities are difficult to reach during the periods of rains and floods. Riverine communities naturally depend on dug-out canoes (*Mokoro*) as means of transportation. Except for the ferry services provided for tourists by some companies, no such service is provided by the government in riparian communities. Indeed, it is acknowledged that challenges in accessing the interior Delta abound (NDDP-7, 2009). Also, petrol filling stations are

situated in major communities which are in many cases long distance apart. For instance, an individual who embarks on a journey along the eastern axis of the Okavango Delta could be faced with the challenges of refueling on a long lonely road; although there are two filling stations in Gumare in the mid-Delta area, a traveler might end up jeopardizing his or her trip from Maun to the panhandle area if s/he does not fuel his or her vehicle in places like Maun or Sehitwa before fully embarking on any journey.

In terms of irrigation, only government and commercial business establishments could boast of irrigation facilities in the area. As water resources facilities are grossly under-developed, traditional farmers rely on their age-long indigenous knowledge of flood recession (*Molapo*) farming in sustaining their livelihoods system. As agricultural activities are largely rain-fed in Botswana, dry-land farmers are vulnerable to the vagaries of the prevailing weather conditions. This in itself is problematic to agricultural growth and rural development not only in the Delta but in the entire country.

#### 4.3 Institutional infrastructures

Financial and credit institutions (such as banks and credit/loan financing agencies) abound in major commercial centers such as Maun. Nonetheless, the facilities are absent in remote villages and settlements. Consequently, community people who are able and who wish to avail themselves of banking or credit facilities will have to do so while in places like Maun, Shakawe, Gumare and a few other settlements. The CBNRM is one of the major instruments through which community and rural development programs are implemented in the Delta and in other parts of the country. For this reason, Community-Based Organizations (CBOs) such as Community Trusts (CTs) and Village Development Committees (VDCs) are prominent social institutions in the rural communities of the Delta. The District Development Committees (DDCs) serve as an interface between the Local Governments Councils (LGCs) and the VDCs. There are 55 VDCs in gazetted villages in Ngamiland out of which 25 are found in the Okavango sub-District (Ngwenya, 2008). Also, there are a total of 166 cooperative societies in Botswana of which 12 (7.2%) of them are found in Ngamiland. As a result of the '*excessive control and manipulation*' meted out to the societies by the legislative framework that set them up, the cooperatives have not been effective and as such are not able to provide employment opportunities and social protection for their members (Sekele and Lekorwe, 2010).

The charismatic traditional leadership frameworks in rural communities serve as a motivation for



community mobilization. The traditional *Kgotla*<sup>4</sup> system is a structure of local administration that regulates the elements and processes<sup>5</sup> of rural communities in the Delta and Botswana at large. Thus, traditional institutions are strongly positioned to govern side by side with the mainstream district and national governments. While the CTs play crucial roles in CBNRM administration and natural resource access and utilization, a lot remains to be seen in terms of the successes achieved in enhancing SRD; only a few of the CTs substantially generate revenue needed for advancing members' socio-economic statuses. For instance, only Okavango Community Trust (OCT), Sankuyo, Khwai, Okavango Kopano Mokoro Community Trust (OKMCT) appear to be doing well in terms of fund generation (NDDP-7, 2009; Mbaiwa, 2003). I shall return to this shortly.

Based on personal observations and experiences gathered during field work, the agricultural animators or extension officers locally known as *Balemisi* are few in number and appear laid-back as they have not been able to effectively convey important agricultural technologies to farmers. Field investigations show that most local farmers are not in regular contact with these officers. Also, most small farmers are not aware of the Integrated Support Program for Arable Agricultural Development (ISPAAD), not the least its operational framework (Kolawole, *et al.* 2013). This is an indication of a lack of effective information flow from government agencies to the recipients of development initiatives. This alone is a major bane of sustainable development. Barring major marketing outlets and shops in relatively urban centers in Ngamiland, most remote villages lack marketing facilities through which they could access basic household essential goods.

Overall, the pillars of any SRD are intricately built on sustainable social and physical infrastructures, which are well complemented and driven by a

well capacitated institutional infrastructure; although with the conscious effort to negate all internally and externally destabilizing forces or dynamics. In any human society depicted here as the *rural community field*<sup>6</sup>, there are internal and external wrangling (conflicts, distrusts, personal interest, apprehension, third columnist effect, etc) which tend to always impede progress and change (Figure 2). While positive forces that need strengthening exist, the ever present anti-progress forces/factors need to be identified and promptly neutralized by a purposeful leadership wherever and whenever they emerge in the system. While internal and self efforts are totally plausible in development initiatives, the role of the insightful outsider-partners in filling existing gaps in pertinent technical areas and skills development cannot be underestimated. Without any doubt, SRD that contextualizes ecological and people's socio-economic and cultural well-being is achievable where and if appropriate structures are put in place and adequately galvanized for a context-specific rural employment promotion and entrepreneurship development. Thus in a '*capacitated-sustainable rural infrastructure model*', well-informed and skillful local institutional arrangements that are in themselves sustainable, and which are embedded within any rural society, form the foundation or structure on which the superstructures are built. Consequently, both sustainable social and physical infrastructures form the scaffolding and the superstructures for achieving SRD.

## 5. Community Trusts and Rural Development

In southern Africa, one major pro-poor policy thrust in rural development focuses on the need for local communities to benefit from the natural resources (including wildlife and wild resources) available to them in their immediate environments. This is achievable through a clearly defined framework known as the Community-Based Conservation (CBC) or Community-Based Natural Resource Management (CBNRM). Community-based tourism approach is now seen as a major driver of biodiversity conservation in southern Africa, and particularly in Botswana (Mbaiwa and Kolawole, 2013). Operating within the CBNRM framework are institutional arrangements or infrastructures, which are responsible for administering and managing the natural resources held in trust by rural communities. Thus, one distinct institutional

<sup>4</sup> Historically, the *Kgotla* is a system of local-level administration in rural communities of Botswana where issues bordering on community well-being (*morafe*) are deliberated upon exclusively by the men folk (Mgadla, 1998). It is the Community Council Assembly, which also serves as a law court in any Botswana village. It wields substantial power in grassroots social order, community mobilization and development. The chief or local headman is traditionally known as *Kgosi* (*Dikgosi* when more than one). His or her deputy is known as *Kgosane*. The headman has a group of men popularly referred to as bootlickers (known locally as *Malope*) who are very loyal to him or her. This group of people serves as the ear of the *Kgosi* in all community matters. Nonetheless, modernization associated with the post-colonial era has transformed the *Kgotla* to an all-inclusive public gathering place for both men and women.

<sup>5</sup> Elements (such as roles, ranks, norms, values, belief, power, sanctions, facilities, mores, etc.) and processes (such as communication, socialization, social-cultural linkage and boundary maintenance) are the stabilizing forces within any human society (Loomis and Beegle, 1950).

<sup>6</sup> Rural community field connotes a social space where competing forces and dynamics interplay to either stabilize or destabilize the social system. It could also mean a social space in which individual members co-existing within it are competing for relevance, recognition and survival. Leadership tussles and personal interests, for instance, could engender chaos and stalemate in any development initiative.

arrangement responsible for the management of communal natural resources is the Community Trust. Community Trusts (CTs) are grassroots organizations, which (in conjunction with other relevant partners) are primarily engaged in wildlife-related development and conservation activities. These include safari hunting, photographic tourism, lodges and campsites, and other community-related activities such as nature walks and game drives. In Botswana, for instance, a greater part of the CBNRM activities takes place within Community-Controlled Hunting Areas (CCHAs) known as Wildlife Management Areas (WMAs), which have been zoned and designated as Land Use Plans by District Councils and District Administrations. Over 150 CTs have been established in Botswana (Hitchcock and Kalahari Peoples Fund, 2013). These Trusts operate and manage their funds differently. While some CTs save funds generated from projects in special accounts held in trust for them in designated banks, and through which members are paid periodically (e.g. the *Nqwaa Khobee Xeya* Trust of *Kgalagadi* District notably does this) (Van der Jagt *et al.*, 2000), some invest their funds in scholarships, income generating ventures, and community self-help infrastructures (Schuster, 2007).

Overall, the goal of CTs is to enhance development at the local level through the implementation of empowering initiatives including those which focus on income and employment generations. While success stories abound in some CTs (as earlier observed), there have been cases of financial impropriety as well inappropriate rural development projects identification and implementation, which do not meet community aspirations and needs (Hitchcock and Kalahari Peoples Fund, 2013). Despite their shortcomings and seemingly vague activities, it is admitted that the CBNRM framework and activities have had a positive impact on natural resources conservation which otherwise was not so in the past (Kgathi and Ngwenya, 2005). Among others, the questions of how CTs engage in rural development and what factors are responsible for their successes and failures in development projects, therefore, arise.

## 6. The role of indigenous knowledge in rural community development

The process dimension of rural development considers community participation and involvement in Rural Development efforts as pertinent (Elands and Wiersum, 2001) in enhancing the progress of the countryside. Some schools of thought have distinguished two ideal-typical processes as *exogenous* and *endogenous* development (Van der Ploeg and Long, 1994; Lowe *et al.*, 1995; Elands and Wiersum, 2001).

While exogenous development, which uses a '*top-down*' approach in project delivery, is externally induced, endogenous development is a '*bottom-up*' approach based on local initiatives in Rural Development efforts. Indeed, indigenous knowledge<sup>7</sup> which is a major component of rural existence is the engine of endogenous development. It is the fabric of rural people's culture. Building on local knowledge infrastructure is a veritable route towards enhancing rural development process. In real terms, it is a strategy for jump-starting community empowerment and progress in an era of globalization. Local knowledge is a component of community human capital. Rural community people have sophisticated environmental and natural resources knowledge (Atte, 1991; Rajasekaran *et al.*, 1991), which they have acquired over many years of careful observation, experimentation and validation (Kolawole, 2001). The need to recognize and perpetuate its desirable components for development purposes is buttressed by the proposition on the '*usage preference*' of indigenous knowledge (Kolawole, 2012a; 2012b). Thus any development project or initiative that ignores the role of this capital is possibly bound to fail. Many examples of failed development projects abound in developing countries (Manyozo, 2010; Kolawole, 2001; McCorkle, 1994; Atte, 1991). By virtue of its multiplicity, local knowledge cuts across diverse development fields including agriculture, health, architecture, music, hydrology, environment, etc. All of these aspects are an important component of both the national and local-level economy of Botswana. Still not fully and appropriately utilized, exploring their strength and applying them in specific situations could enhance sustainable livelihoods and rural development where native philosophers and local artisans are recognized and duly rewarded for their intellectual property. In its bid to mainstream community people's knowledge in the formal sector, the government of Botswana has already provided the framework for the development of a national policy on Indigenous Knowledge Systems (IKS). Working in partnership with the Ministry of Infrastructure, Science and Technology, community people, native philosophers and other stakeholders, the Centre for Scientific Research, Indigenous Knowledge & Innovation (CesRIKI) based at the University of Botswana has the mandate to produce a policy document, which will eventually be ratified and signed into law. Indeed, the completion of the document has reached an advanced stage (Kolawole, 2012). If well

<sup>7</sup> Indigenous and local knowledge are used interchangeably in this paper. It could also be referred to as community people's knowledge.

implemented, the policy will serve as an instrument with which to valorize local knowledge infrastructure, and with the ultimate goal of entrenching SRD.

Nonetheless applicable to both urban and rural settings, community development (CD) is a major component of rural development. The main similarity between urban and rural community development is that they both emphasize the concepts of '*community creation*', '*self-help*', '*citizen participation*', and '*technical assistance*' from the government (Ekong, 2003). That said CD has various meanings to different people. Indeed, Sanders' (1958) four approaches to CD also reflect in its many definitions. From his own perspective, CD is viewed as a *process* of transformation and positive change in any community amongst social scientists. On the part of those who are action-oriented, it is a *method* used to accomplish a desirable change in the well-being of any community. To some other categories of experts, CD is a *program*, whose contents and procedures will be, or have been carefully planned and implemented. In another vein, others – who are perhaps social activists – viewed the concept as a *movement*. In the context of this paper, however, the definition of CD by the 1962 Rio de Janeiro International Conference on Social Work will suffice. Thus CD is viewed as a '*conscious and deliberate effort aimed at helping communities recognize their needs and to assume increasing responsibilities for solving their problems thereby increasing their capacities to participate fully in the life of the nation*' (Ekong, 2003). And if community people must take responsibility for their own destiny, then it is only logical for the machinery of any development agency (locally, nationally and internationally) to create the enabling conditions and systems that will make local people function optimally. How community people function would depend ultimately on the extent to which they are allowed to utilize endogenous wisdom and experience (in addition to external aid avail to them) in addressing local problems and challenges. In other words, local people's capabilities and functioning will ultimately depend on how their knowledge systems are adequately appropriated in the development process. Whether this goal will be achieved depends on the fervor with which the issue is approached.

## 7. Conclusions

This paper provided a conceptual framework on SRD [section 1]; examined land use and tenure-ship in the Okavango Delta [section 2]. It then explored the issues surrounding the state of social, physical and institutional infrastructures in the area and how they impact on rural development [section 3]. It also highlighted the roles and

importance of CBOs (e.g. CTs), and local knowledge in Rural Development and rural community development activities in the Delta [sections 4-5]. Indeed, that a majority of the Batswana population and particularly those in the Okavango sub-District reside in rural communities – where there are many poor people – points to the utmost need for policy-makers in rural development to devise development strategies that would ultimately fast-track the implementation of pro-poor policies that can help in lifting the rural people out of poverty. In terms of human-wildlife conflicts, analysis in this paper suggests that the contiguity of human communities to wildlife areas constitute a major ecological challenge even though the CBNRM framework is designed to address some of these hitches. Also, the political ecology and economy of soil fertility management in the Okavango Delta are not entirely favorable to resource-poor farmers, particularly those who farm along the river channels. Currently, rural infrastructures in the Okavango Delta are inadequate to warrant a veritable local level development in an era of globalization. Analyses show that most rural infrastructures in the Delta are either not adequate and where available are not functioning optimally. Amongst many others for instance, education infrastructure is inadequate in Ngamiland leading to congestion in certain primary and secondary schools, where social facilities are in most cases lacking. Although rural health posts exist in some communities, many rural people depend on the major but few health facilities in far-away urban areas when they are critically ill; lack of transportation in remote villages, which is a challenge most of the time, could hinder quick health delivery leading to death in many circumstances. In another vein, supply of pipe-borne water to rural households is either erratic or non-existent in some villages thereby making local people to rely on untreated water from river channels leading to the occurrence of water borne diseases in rural communities. A significant percentage of the households in the entire Ngamiland District had no form of sanitation facilities. As many communities are still not connected to the national power grid, access to energy and utilization is a challenge; rural people continue to use wood fuel, leading to deforestation and environmental degradation. Most roads are either not tarred or in a state of disrepair; only 24% of the 42 roads in Okavango sub-District are paved/tarred.

Also, irrigation facilities are non-existent in farming communities; rain-fed agriculture therefore suffers from the vagaries of weather conditions and climate change. Besides, agricultural communication and information flow is somewhat defective as many farmers claimed lack of knowledge about national agricultural

issues because of minimal or no contact with the relevant agricultural extension agency. Information failure has, therefore, proved to be a major bane of sustainable agricultural and rural development in the area. Although a tremendous success has been achieved in the activities of certain CBOs engaged in tourism-based initiatives, there are cases of corruption (amongst officials of CTs), and dissonance between community aspirations and implemented rural CD projects. Indigenous knowledge is a key driver of rural community development. While plans are already underway in Botswana to mainstream and utilize this local infrastructure for development purposes, there are still important issues to be addressed to make this a reality; there is need for a reward system that recognizes and adds value to local people's knowledge and for their contributions to development. That said it is essential to ensure an active PPP in the provision of physical and social infrastructures, which demand huge capital investments. All things considered, and based on the 'self-sustaining' notion of an ideal rural development, a right mix of endogenous and exogenous processes is essential for achieving a balanced SRD. Overall, it is imperative for government to enhance and strengthen rural infrastructures in order to drive employment generation and entrepreneurship development. Achieving SRD is only possible through '*rural institution renewal*' where physical, social and institutional infrastructures are sustainably provided in addition to a well enhanced local manpower, which can take responsibility in the management of these resources. In other words, rural administrators and members of institutional infrastructures need to be adequately empowered (in terms of knowledge, skills and attitudes) if only to sustain other forms of community-level infrastructures now and in the future. And if necessary policies and machineries are set in motion to make infrastructures available and function properly, with the ultimate goal of making them translate to people's socio-economic and physical well-being, then the ambiguity shrouding the delivery of quality rural development will probably have been cleared.

## References

- Agarwal, B. 2001. Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. *World Development* 29 (10): 1623–1648.
- Albertson, A. 1998. Northern Botswana veterinary fences: critical ecological impacts, Botswana's Okavango People's Wildlife Trust, Maun, Botswana.
- Atte, O.D. 1991. Indigenous local knowledge as key to local level development: Possibilities, constraints and planning issues in the context of Africa. *Studies in technology and social change* No. 20, Iowa State University, Technology and Social Change Program, Ames, Iowa.
- BIDPA 2001. Impact of HIV/AIDS on the Botswana Economy. BIDPA Briefing March 2001.
- Chambers, R. 1983. *Rural Development: Putting the Last First*. John Wiley & Sons, New York.
- Chant, S. 2006. Re-thinking the 'Feminisation of Poverty' in relation to aggregate gender indices. *Journal of Human Development* 7 (2): 201–220.
- CSO 2012. Unemployment rate is 17.8 percent as per the Botswana Core Welfare Indicators Survey 2009/10. Central Office of Statistics, Gaborone. [on line]. Available at: [http://www.cso.gov.bw/index.php?option=com\\_ke\\_yindicators&id=115](http://www.cso.gov.bw/index.php?option=com_ke_yindicators&id=115) (27/11/2013)
- CSO 2011. The 2011 Botswana Population and Housing Census. Central Statistics Office, Preliminary Results Brief Gaborone, Ministry of Finance and Development. [on-line]. Available at: <http://www.cso.gov.bw/media/2011%20Census%20Alphabetical%20Index%20of%20Districts.pdf> (07/10/2011)
- Darkoh, M.B.K., Mbaiwa, J.E. 2009. Perceived effects of veterinary fences on subsistence livestock farming in the Okavango Delta, Botswana. *UNISWA Research Journal of Agriculture, Science and Technology*, 12 (1): 65-74.
- DWNP 1996. *Botswana's Community Based Natural Resource Management Program*, Gaborone, Botswana: Department of Wildlife and National Parks.
- Ekong, E.E. 2003. *Rural Sociology: An Introduction and Analysis Of Rural Nigeria*. Dove Educational Publishers, Uyo, Nigeria.
- Elands, B.H.M., Wiersum, K.F. (2001). Forestry and rural development in Europe: An exploration of socio-political discourses, *Forestry Policy and Economics* 3: 8-9.
- Hitchcock and Kalahari Peoples Fund 2013. Steps in the formation of community-based resource management institutions and legal bodies for conservation and development activities in Botswana. [on-line] Available at: [http://www.kalaharipeoples.org/index\\_htm\\_files/steps-cbn.KPF.pdf](http://www.kalaharipeoples.org/index_htm_files/steps-cbn.KPF.pdf) (27/05/2013)
- IPC and BIDPA 2005. *Poverty Status Report for Botswana: Incidence, Trends and Dynamics*. International Poverty Centre, Gaborone.
- Jerneck, A., Olsson, L. 2013. More than trees! Understanding the agroforestry adoption gap in subsistence agriculture: Insights from narrative

- walks in Kenya. *Journal of Rural Studies* 32: 116-125.
- Jibowo, G. 1992. *Essentials of Rural Sociology*. Gbemi Sodipo Press Ltd., Abeokuta. Nigeria.
- Kgathi, D.L., Ngwenya, B.N. 2005. Community-based natural resource management and social sustainability in Ngamiland. *Botswana Notes and Records* 37: 61-79.
- Kolawole, O.D. 2000. Accelerating rural industrialization through appropriate technology: need for reconsideration. In: Jibowo, A.A., Ladele, A.A. and Ogunwale, A.B. (Eds.). *Community level participation in rural development*, Proceedings of the 10<sup>th</sup> Annual Conference of the Nigerian Rural Sociological Association: 28-33.
- Kolawole, O.D. 2001. Local knowledge utilization and sustainable rural development in the 21<sup>st</sup> Century. *Indigenous Knowledge and Development Monitor* 9 (3): 13-15.
- Kolawole, O.D. 2012a. *Soil miners: Science, enthymemes and African Farmers*. LAP Lambert Academic Publishing, Saarbrücken.
- Kolawole, O.D. 2012b. Intersecting Western and local knowledge: Critical issues for development research in Africa. *Journal of Knowledge Globalization* 5 (2): 1-23.
- Kolawole, O.D. 2013. Soil science, indigenous knowledge and sustainable intensification: Implications for smallholder farming systems. *Knowledge for Development, Technical Centre for Agriculture and Rural Cooperation*. [on-line] Available at: <http://knowledge.cta.int/Dossiers/CTA-and-S-T/Selected-publications/Soil-science-indigenous-knowledge-and-sustainable-intensification-Implications-for-smallholder-farming-systems> (07/10/2013)
- Kolawole, O.D., Laogun, E.A. 2005. Between man and his environment: indigenous knowledge approaches to soil fertility conservation amongst farmers in Ekiti State, Nigeria. *Journal of Human Ecology* 17 (2): 109-115.
- Kolawole, O.D., Wolski, P., Ngwenya, B.N., Mmopelwa, G., Thakadu, O. 2012. *Engaging farmers and climatologists in adaptation to climate variability and change in the Okavango Delta of Botswana*. Technical Report, Systems for Analysis, Research and Training (START)-US National Science Foundation (NSF), Florida, USA.
- Kolawole, O.D., Mogobe, O., Magole, L. 2013. Political economy of integrated fertility management in the Okavango Delta, Botswana. *Proceedings of the ICECESS 2013: International Conference on Environmental, Cultural, Economic and Social Sustainability*. World Academy of Science, Engineering and Technology 83: 516-517.
- Leeuwis, C. 2000) Reconceptualizing participation for Sustainable Rural Development: Towards a negotiation approach. *Development and Change* 31: 931-959.
- Lele U. 1975. *The Design of Rural Development: Lessons from Africa*. The Johns Hopkins University Press, Baltimore.
- Loomis, C.P., Beegle, J.A. 1950. *Rural Social Systems: A Textbook in Rural Sociology and Anthropology*. Prentice-Hall, Englewood Cliffs, NJ.
- Lowe, P., Murdoch, J., Ward, N. 1995. Networks in rural development: beyond exogenous and endogenous models. In: Van der Ploeg, J.D., Van Dijk, G., (Eds.). *Beyond Modernization: The Impact of Endogenous Rural Development*: 87-105.
- Magole, L. 2009. *Transboundary diagnostic analysis of the Botswana portion of the Okavango River Basin: Land Use Planning*. Technical Report. The Permanent Okavango River Basin Commission (OKACOM) and the Harry Oppenheimer Okavango Research Centre (HOORC).
- Magole, L., Thapelo, K. (2005). The impact of extreme flooding of the Okavango River on the Livelihood of the Molapo farming community of Tubu Village, Ngamiland, Botswana. *Botswana Notes and Records*, 37: 8-13. [on-line] <http://www.ubrisa.ub.bw:8080/bitstream/handle/10311/949/Magole%202005%20Impact%20of.pdf?sequence=1> (27/08/2013)
- Manyozo, L. 2010. The day development dies. *Viewpoint. Development in Practice* 20 (2): 265-269.
- Mbaiwa, J.E., Kolawole, O.D. 2013. Tourism and biodiversity conservation: The case of community-based natural resource management in Southern Africa. *CAB Reviews* 8 (10): 1-10.
- Mbaiwa, J.E. 2003. The socio-economic and environmental impacts of tourism development on the Okavango Delta, north-western Botswana, *Journal of Arid Environments* 54: 447-467.
- McCorkle, C.M. 1994. *Farmer Innovation in Niger*. Studies in technology and social change No. 21. Iowa State University, Technology and Social Change Program, Ames, Iowa.
- Mendelsohn, J.M., Vanderpost, C., Ramberg, L., Murray-Hudson, M., Wolski, P., Mosepele, K. 2010. *Okavango Delta: Floods of Life*. RAISON, Windhoek.

- Meyer, T., Bendsen, H. 2003. The dynamics of the land use systems in Ngamiland: Changing livelihood options and strategies. In: Bernard, T., Mosepele, K., Ramberg, L. (Eds.), *Environmental Monitoring of Tropical and Subtropical Wetlands. Okavango Report Series I: 278–307*. HOORC, Maun, Botswana.
- Mgadla, P.T. 1998. The *Kgosi* in a traditional Tswana setting. In: Edge, W.A., Lekorwe, M.H. (Eds.). *Botswana: Politics and Society*. Macmillan Botswana, Gaborone.
- MLH 2003. Ngamiland District Settlement Strategy (2003-2027): Survey Report. Ministry of Land and Housing, Department of Town and Regional Planning, Northwest District Council, Tawana Land Board, Maun, Botswana.
- MMEWR 2006. National Water Master Plan. Final report, Volume 8. Ministry of Minerals, Energy & Water Resources, Department of Water Affairs.
- Moseley, M.J. 2003. *Rural Development: Principles and Practice*. SAGE, London.
- NDDP-7 2009. Ngamiland District Development Plan 7: 2009-2016. Final Draft, North-West District Council, Ngamiland Development Committee and Ministry of Local Government, Maun, Botswana.
- Ngwenya, B.N. 2008. Local institutions and the democratization of development in Botswana: A case study of village development committees in Ngamiland. *Okavango Report Series No. 5: Invisible Upkeep*. Harry Oppenheimer Okavango Centre, University of Botswana, Bay Publishing, Gaborone.
- Ngwenya, B.N. 2009. Okavango river basin trans-boundary diagnostic assessment (TDA): Botswana component – A socio-economic profile of river resources and HIV and AIDS in the Okavango Basin, Botswana. Harry Oppenheimer Okavango Research Centre, Maun.
- Owen, M. 2013. Tourists and employees perceptions of environmental impacts of tourism activities in the Okavango Delta, Botswana. M. Phil Thesis, Okavango Research Institute, University of Botswana.
- Paniagua, A. 2013. Farmers in remote rural areas: the worth of permanence in the place. *Land Use Policy* 35: 1-7.
- Rajasekaran, B.D., Warren, D.M., Babu, S.C. 1991. Indigenous natural resource management systems for sustainable agricultural development: A global perspective. *Journal of International Development* 3 (4): 387-401.
- Sanders, I.T. 1958. Theories of community development. *Rural Sociology* 23 (1): 2-12.
- Schuster, B. 2007. Towards Vision 2016: CBNRM's Potential to Contribute. Proceedings of the 4th National CBNRM Conference in Botswana. CBNRM Status Report 2006, IUCN CBNRMP Support Program, Gaborone, Botswana.
- Scoones, I., Toulmin, C. 1999. Policies for soil fertility management in Africa. A report prepared for the Department for International Development (DID).
- Scott, J.C. 1993. Everyday forms of resistance. *PRIME: Occasional Papers Series No 15*.
- Seleke, T.L., Lekorwe, M. 2010. Cooperatives and development: A case of citizen economic empowerment in Botswana, Series on the status of cooperative development in Africa, Cooperative facility for Africa (Coop<sup>AFRICA</sup>). Working paper No. 8, ILO Country Office for the United Republic of Tanzania, Kenya, Rwanda, and Uganda. International Labor Organization, Tanzania.
- The Ngami Times 2013. Farmers shoot 'problem lioness'. The Ngami Times, Edition 646, April 12-19. [on-line]. Available at: [http://www.ngamitimes.com/Archives.Edition64612\\_19April2013.html](http://www.ngamitimes.com/Archives.Edition64612_19April2013.html) (8/10/2013)
- Tubatsi, G. 2013. Water use practices, water quality and diarrheal prevalence in communities along the Boro-Thamalakane-Boteti river system, Botswana. M. Phil. Thesis, Okavango Research Institute, University of Botswana, Maun.
- Tumelo, S. 2004. The household income and expenditure survey (HIES). Literacy survey and Botswana AIDS impact survey II (BAIS II), 16th December 2004. Central Statistics Office, Gaborone.
- UN 2007. United Nations System in Botswana, Second common country assessment for Botswana. Final Report, 12 December 2007.
- UN 2009. Rural Development. United Nations Sustainable Development Knowledge Platform, Commission on Sustainable Development, E/CN.17/2009/19. On-line document: <http://sustainabledevelopment.un.org/index.php?menu=1263> (26/11/2013)
- Van der Post C. 2009. Molapo farming in the Okavango Delta. Fact Sheet 7/2009. Harry Oppenheimer Okavango Research Centre, University of Botswana. [on-line]: [http://www.orc.ub.bw/downloads/FS7\\_molapo\\_v1.pdf](http://www.orc.ub.bw/downloads/FS7_molapo_v1.pdf) (16/09/2010)
- Van der Jagt, C.J., Gujadhur, T., Van Bussel, F., 2000. Community benefits through community based natural resources management in Botswana. CBNRM Support Program, Occasional Paper No.

2. IUCN/SNV (Netherlands Development Organization) Community Based Natural Resources Management Program, Gaborone.

Van der Ploeg, J.D., Long, A. 1994. Born from within: Practice and perspectives of endogenous rural development. Van Gorcum, Assen (European Perspectives on Rural Transformations Series).

Ward, N., Brown, D.L. 2009. Placing the rural in regional development. *Regional Studies* 43 (10): 1237–1244.

Williams, S.K.T. 1978. *Rural Development in Nigeria*. Ile-Ife: University of Ife Press.

World Bank 2006. *Sustainable Land Management*. World Bank, Washington, DC.

WTTC 2012. *Travel and tourism economic impact*. World Travel and Tourism Council: 1-14.

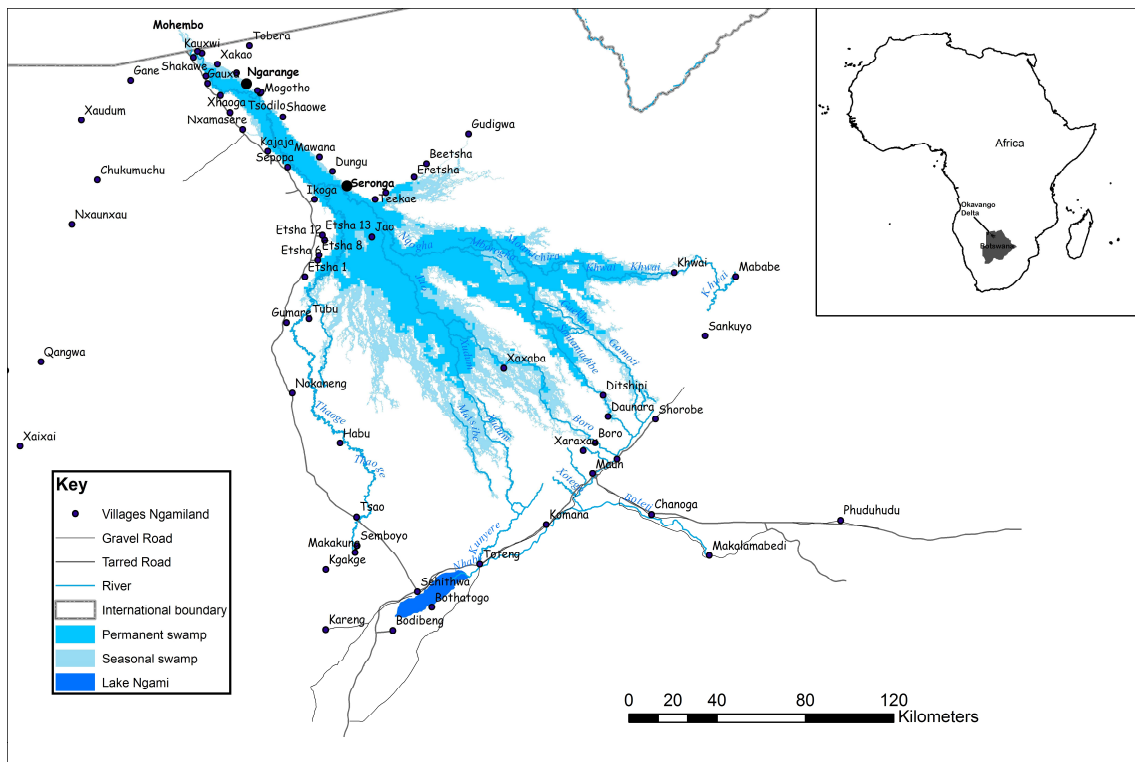


Figure 1. Okavango Delta Map showing riparian communities exposed to flood situations (Courtesy: Masego Dhlhwayo and Anastacia Makati, GIS Laboratory, Okavango Research Institute, UB, Maun)

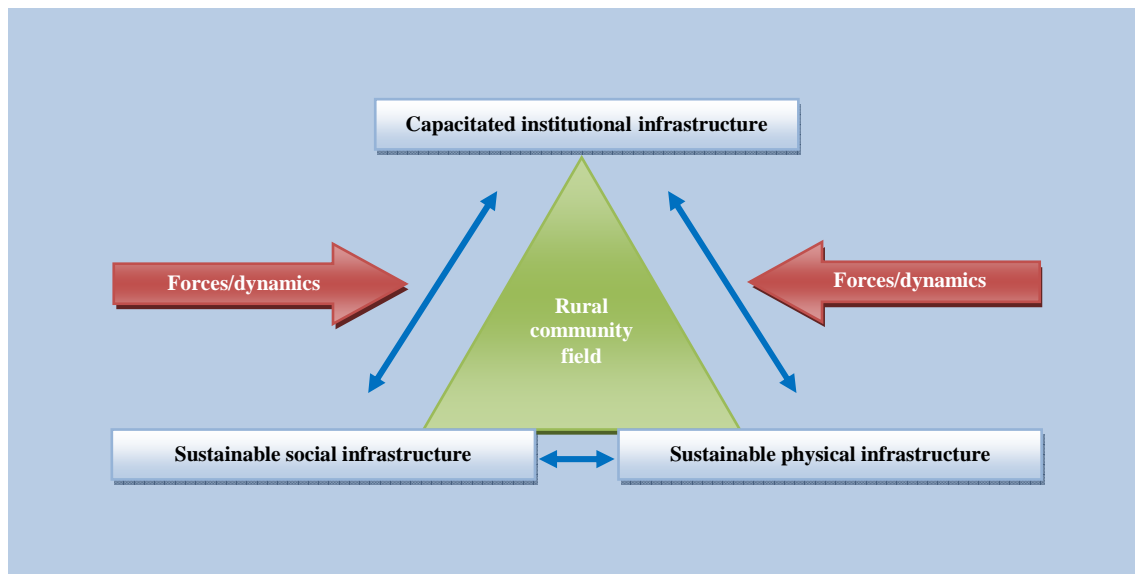


Figure 2. A paradigm of infrastructures in a scenario of sustainable rural development environment (Source: own conceptualization)