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Invasion of Wetlands in Kumasi by Informal Economic Activities and Consequences for Urban Management

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Abstract: Wetlands were considered as waste lands for breeding mosquitoes, home for all kinds of shanty settlements with no basic housing facilities. This study seeks to identify the effects of informal activities along wetland areas in Kumasi metropolitan specifically Sepe-Buokrom- Dichemso areas. The study was in a form of case study covering Sepe-Buokrom and Dichemso areas in the Ashanti region of Ghana. Systematic sampling technique was employed to select the various informal activities within the area. The study revealed that the main informal economic activities within the communities were washing bays, mechanical workshops, petty trading, carpentry works, and etc. Majority of businesses operating along the selected areas had permit for their works. Flooding, poor environmental conditions and poor management of waste disposal were the effects of the activities along wetland areas. Malaria and typhoid were the most prevailing diseases within the study areas. Low cost of land and access to customers were some of the reasons people were operating their businesses along wetland areas. The study concludes that, wetlands in Kumasi are undergoing negative transformation and hence losing their social, economic and environmental values due to unsustainable activities including improper waste disposal and unplanned settlement.

Keywords: Wetlands, Informal Commercial Activities, Effects

1. Introduction

The economic pedestal of every town can be deemed as the means of survival and sustainability of the development of the economy. Studies on the economic base of the settlement, inform planners about how the town has developed, where it is today and the future prospects [1].

The urban economy is explained as a system of production, distribution and consumption embracing the sum total of all productive activities within an urban area and the parts of its hinterlands that has a level of dependency on the facilities and services available in the urban area [2]. Urban economy is not the physical boundaries of the settlement but rather includes all the adjourning areas that have a degree of dependence on it [1].

This definition presupposed that studies on the urban economy both formal and informal are very critical in planning. The informal sector can be defined as a legitimate but marginalized sector of the urban economy that has come to exist to employ and provide income for the poor as a rational response to formalization and over-regulation of the labour process by the state [3].

In Ghana most informal commercial activities take place along main streets and lorry terminals usually unplanned, therefore endangering lives due to vehicular pedestrian conflict. Moreover traders take advantage of the wetland spaces along the streets for their operations. The wetlands are to serve as buffer between the water bodies and the built-up areas. These lands are encroached upon because of pressure from the urban communities for economic activities. Operations in these areas have become dangerous due to low lying nature and therefore liable to flooding.

On 3rd June 2015, over 159 people lost their lives through a major disaster caused by continuous rainfall and fire at the Kwame Nkrumah Circle in Accra which is a wetland area. Wetlands are among the most productive life-support systems in the world and are of immense socio-economic and ecological importance to mankind [4, 5]. The study seeks to identify the effects of informal activities along wetland area in Kumasi metropolitan area specifically Sepe-Buokrom-Dichemso areas.

1.1. Definition and Importance of Wetlands

Wetlands are generally defined as transitional area between permanently flooded deep water environments and well drained uplands [6]. The Ramsar Convention defines wetlands to include a wide variety of habitats such as marshes, peat lands, floodplains, rivers and lakes, and coastal areas such as salt marshes, mangroves, and sea grass beds, but also coral reefs and other marine areas no deeper than six meters at low tide, as well as human-made wetlands such as waste-water treatment ponds and reservoirs. This study defines wetland as Land where an excess of water is the dominant factor determining the nature of soil development and the types of animal and plant (flora and fauna) communities living at the soil surface. It spans a continuum of environments where terrestrial and aquatic systems intergrade [7]. By these definitions, wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. They occur where the water table is at or near the surface of the land. More often, land value is more a reflection of the assessor's value than any intrinsic quality of the land.

Wetlands have been given the lowest estimate in terms of land value, because land is assessed based on the potential benefits it could provide to the purchaser. In most cases, wetlands are seen as land unfit for both farming and building. Wetlands are indeed valuable ecosystems although they occupy only 4% of the earth's ice-free land surface [8].

1.2. Classification of Wetland

Classification of wetlands involve the grouping of wetlands by specified characteristics (vegetation, hydrology, soils, animal species present, function, value, etc.) to serve specific goals [9]. This classification categories wetlands under mapping, planning, acquisition, regulatory and other purposes. Hydro Geomorphic (HGM), hydrogeology and landscape systems are just a few of the many wetland classification systems developed to categorize wetlands.

The premises of HGM scheme of classification is based on the fact that wetland structure and functions are expressions of geomorphic setting, water source and hydrodynamics [10]. Based on HGM dynamics of wetlands defined four classifications of naturally occurring wetlands [11]. However, identifies a more detailed listed HGM wetland classes that are distinguishable at the content scale as depression, tidal fringe, lacustrine, fringe, slope, mineral soil flats, organic soil flats, and riverine [12].

1.3. Urbanization and Land Use

Land cover is greatly affected by land use which is defined as the arrangements, activities and input that people undertake on a certain land cover type. From these definition it can be seen that land cover refers to physical conditions on the ground or natural cover of the land such as forest, grassland, etc, whilst land use refers to the human activities such as residential areas, industrial areas, and agricultural fields. The most basic definition of urbanization is the transformation of land from rural land uses, such as agriculture, to urban land uses, such as housing [13].

Over the past half century, a great rural-to-urban population shift has occurred and the process of urbanization is set to continue well into the 21st century. It is understandable that as urbanization expands the land with its natural vegetative and forest covers are cleared to give way for residential and industrial purposes. It has been shown that there has been an increase in runoff after vegetation removal, as a result of urbanization. Presently it is clear that the complex and in some cases complicated urban drainage systems allow a quick runoff of precipitation away from surfaces. The net effect of which culminates into less evaporation and less groundwater recharge, thus affecting the local hydrological cycle [14].

1.4. Environmental Consequences of Urbanization

Urbanization is the driving force for modernization, economic growth and development. The implications of rapid urbanization and demographic trends for employment, food security, water supply, shelter and sanitation are overwhelming. Physical development in wetlands largely destroys the environmental functions of the wetlands due to its adverse effects including flooding through pollution of groundwater and rivers to the ultimate destruction of the wetland itself [13].

The primary cause of urban flooding is heavy rainstorm proceeded by a long lasting moderate rainfall that saturates the soil [15]. Floods in urban conditions are flashy and occur on both urbanized surfaces and in small urban creeks. Some causes of urban floods are improper land use and channelization of natural waterways, failure of the city protection dikes and inflow from rivers during high stages in urban drainage system. Other causes of urban flooding are blockage of drains and street inlets by silt and garbage and inadequate street cleaning practices [16]. Water pollution is any contamination of water that reduces its usefulness to humans and other organisms in nature. Pollutants such as herbicides, pesticides, fertilizers and hazardous chemicals can make their way into water supply. As human settlement along the banks of river bodies increase, the volume of household and industrial waste discharged into the river greatly increase, and in most cases beyond the threshold at which the stream can assimilate and thereby become polluted [17]. In other words, stream may have assimilation capacity, but as the population increases and urbanization become the sole objective and motivation for human strive, the natural

assimilative and refinery ability of these water bodies are exceeded causing our water bodies to be contaminated. This results in deterioration of human, animal, and plant health unless it goes through a costly purification procedure.

Wetlands are naturally converted to dry land largely through sedimentation, eutrophication or stream-cutting and draining, and that human activities have largely accelerated these processes in many places [18].

The main activity that destroys the wetland either directly or indirectly is physical development. In the same light, human settlements along river bodies promote the use of wetlands as waste disposal sites.

2. Methodology

The study was in a form of case study covering Sepe-Buokrom and Dichemso areas in the Ashanti region of Ghana. The field study covered over two hundred and eighty respondents (280) with 40% (112) coverage. The communities covered over a half km. Structured questionnaire were administered to respondents involved in informal economic activities along the areas under study. Systematic sampling technique was employed to select the various informal activities to be interviewed. The sample size was based on the population estimates of informal activities within these settlements. Sample size was based on the recommendation made by researchers have developed certain rules of thumb about sample sizes [19].

Forty respondents were considered by many as minimum size for a sample [20]. Others opt for a minimum of 100 units and we encourage the election of at least 87 cases. Consideration was also given to the standard errors of the statistics and confidence intervals. The formula n = was used in determining the sample size of the study where n= sample size, N= sample frame or total population of the study area, α is the confidence level (which was 90%).

The total sample size for Sepe-Buokrom and Dichemso engulfed with the wetlands were 213 and 57 houses respectively from the activity-count on the 10th February 2015. From the interpolation, sample sizes of 87 informal activities were obtained as the sample population for the economic activities for the study. The table 1 below shows the sample size determination.

Table 1. Sample size determination.

Settlements	Sample Frame	Sample Size
Sepe-Buokrom	214	214/280*100 = 76
Dichemso	66	66/280*100 = 24
Total	280	100

Source: field survey, 2015.

In terms of data analysis, both quantitative and qualitative techniques were used in analyzing responses. The reason for the combination of techniques were to ensure that the generalization would be based on credible and reliable means of analyzing data from the field.

3. Result and Discussion

3.1. Informal Economic Activities Along the Wetlands

The various forms of informal activities in Dichemso and Sepe-Buokrom were expressed in diverse ways. A larger proportion of this group were seen trading along the shoulders of the main roads. Others were chaotically placed within the various communities, mainly in the form of home-based economic activities.

Availability of ready market along roadside, proximity of the location to their houses and low cost of wetlands were the main reasons economic activities were located along the wetlands. Figure 1 below indicates the nature of informal economic activities along the Sepe- Buokrom- Dichemso wetland areas.
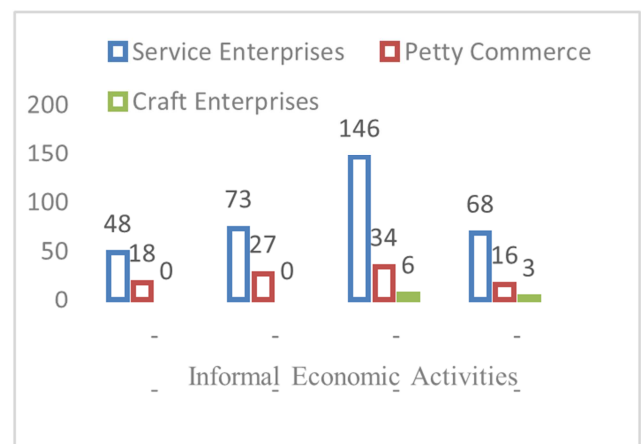

Figure 1. Informal Economic Activities.

3.2. Age, Sex and Educational Background of the Respondents

The average age for the respondents were between 30-45 years, this age range falls under the economically active working group. 85% had attained primary education and 15% had no formal education at any level. It was evident that, the youthful age has direct impact on the economy. The data indicated that, 67% and 33% of the sellers were females and males respectively in Dichemso and Sepe-Buokrom. This implies women were more into commerce than men.

3.3. Business Operations and Registration

The study revealed that, all the sampled respondents in Dichemso, displayed proof of permit for their businesses. Seventy-four percent (74%) of the traders in Sepe-Buokrom have permit for their informal activities whilst 26% do not have permit for their businesses. All the sampled traders in Dichemso decorated registration of their businesses from the required and appropriate local authorities such as the Kumasi Metropolitan Assembly (KMA), Sub-metros among others.

Fifty- Eight (58) of the sampled traders in Sepe-Buokrom indicated that, they have registered their businesses with the appropriate authorities whilst 18 indicated that; they have not registered their informal activities. This implies that, traders

register their informal economic activities in order to pay taxes to the required local authorities. The table 3 below indicates respondents who have obtained permit and registration to operate their businesses.

Table 2. Permit for business operation.

Community	Permit to operate		Business Registration	
	Yes	No	Yes	No
Dichemso	24	-	24	-
Sepe- Buokrom	56	20	58	18
Total	80	20	82	18

Source: Field survey, Author's February, 2015.

The table 3 below indicates the years of operating business along the Dichemso and Sepe-Buokrom wetland areas. In the 2 communities, 35 of the respondents have been operating below 5 years, 57 between 5-10 years, 19 between 5-10 years, 12 operating between 15-20 years.

Table 3. Years of operating businesses.

Community	Below 5 yrs	5-10 yrs	10-15 yrs	15-20 yrs	Total
Dichemso	6	13	2	3	24
Sepe- Buokrom	29	46	17	9	76
Total	35	57	19	12	100

Source: Field survey, February, 2015.

The survey indicated that, the predominant activities along the Dichemso stretch were trading involves petty traders, food vendors, and mobile credit vendors among others and was the major predominant economic activity as a result of the strategic location of the community along the airport residential area. On the other hand, the predominant economic activities with the Sepe-Buokrom were trading and Carpentry/sawmilling. Figure 1 and 2, show some of Predominant activities along the wetland
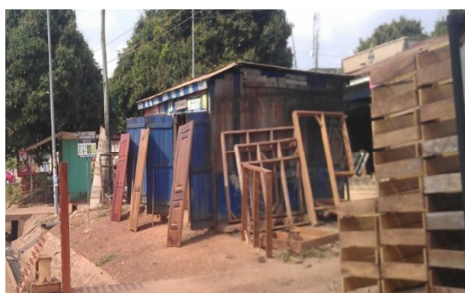

Figure 2. Doors and timber frames (Author's, 2015).

Figure 3. Trading along the street (Author's, 2015).

3.4. The Use of Land and Water Bodies by the Informal Economic Activities

The study revealed that the main informal economic activities within the communities were washing bays, mechanical workshops (including spraying shops), trading, carpentry shops, and churches. All the washing bays and the spraying shops were using the water bodies for their operations. The washing bays and the mechanical workshops found the water to be important to their operations and were ready to preserve the water bodies. However majority of the respondents, 57% were of the view that the presence of the water bodies were of no importance to their activities but rather dangerous to their health.

Further search from the custodians of the areas revealed that most prefer the use of wetlands for residences. Washing bays have constructed sanitary facilities on top of the river course. People leaving along the wetlands prefer to use the water bodies for refuse damp. The study identified that, within the radius of about 200 metres, 10 different fuel stations were in operation. Most of these fuel stations were within the wetland areas understudy. Rangelands were also found within the communities. Figure 4 shows major activities.
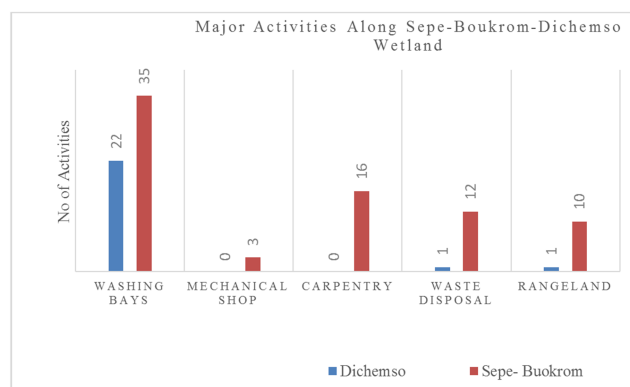

Figure 4. Major Activities along Sepe – Boukrom – Dichemso.

3.5. Effects of Economic Activities Along the Wetlands

The study revealed that within the 2 communities, flooding, poor environmental conditions and poor management of waste disposal sites were the effects of the activities along wetland areas. According to the respondents flooding was the main effect followed by poor environmental conditions and poor management of waste as shown in Figure 5. The respondents complained of diseases such as malaria, typhoid and cholera, with malaria and typhoid been the most prevailing diseases.

Poor development planning schemes, building on water course without proper engineering considerations, dumping of waste into the water bodies were the reasons for the flooding within the communities. During the raining season residents find it difficult to get access to their homes due to floods.
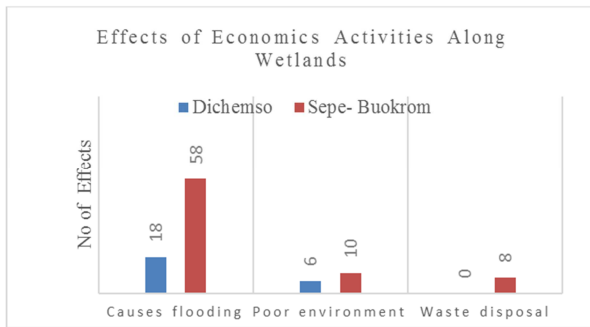
Figure 5. *Effects of Economic activities along the wetlands.*

Figure 6 below shows a 2-storey block of flats at Dichemso, which is located within the wetland area and very close to the Subin River. No occupant is at the ground floor and access to the house becomes a problem any time there is rain.

Figure 6. *2-storey block of flats at Dichemso.*

3.6. Reasons for Operating Along the Wetland

The study also sought to find out why respondents prefer to operate within and along wetland areas, the following were revealed; cost of wetlands considered to be inexpensive than those within the business districts, residents with 30 years and above have become custodians of the lands they have occupied, others paid some drinks to the custodians of the land and some of them consider themselves as custodians of the land. The water bodies within the study areas serve as resources for the mechanical shops, spraying and washing bays as shown Figure 7.
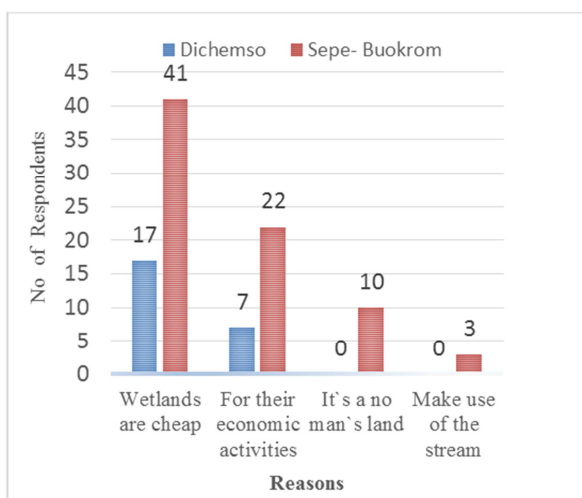

Figure 7. *Reasons for Operating along the Wetland.*

4. Conclusion

Petty trading, carpentry, mechanical Shops and washing bays were the main activities along the wetland areas understudied. Low cost of wetlands and access to customers were some of the reasons people were operating their businesses along wetland areas. Malaria, typhoid and cholera were the prevailing diseases within the Dichemso- Sepe-Buokrom area.

Most of the activities along the wetland especially the washing bays and the mechanical shops used the natural resources (water bodies) for their economic activities depleting the wetland conditions of the areas. Both liquid and solid wastes were discharged into water bodies within the wetland areas. Washing bays and buildings have their toilets on top of the water course which were opened directly into the river. Wetlands in the country have been degraded by farming, settlements and other socio-economic activities. In the case of the study areas, the wetlands have been degraded for human settlements.

Wetlands in Kumasi are undergoing negative transformation and hence losing their social, economic and environmental values due to unsustainable activities including improper waste disposal, unplanned settlement. The study recommends that, City authorities (Metropolitan and Sub metro) should conduct continuous inspections of all activities within the wetland areas in Kumasi to ensure proper sanitation and provision of basic housing facilities. Unproved activities should not be continued. All activities within such areas should be regularized in order to increase income tax for the central government.

Future development within the wetland should take into account developmental planning schemes and engineering considerations in order to make the best use of the wetland. National Policy on wetland and Ramar convention should be implemented to promote and protect wetlands in Ghana.

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