

# Socio-economic impacts of wetland conversion on residents of port Harcourt municipality, rivers state, Nigeria

## Abstract

Increased demand for land space in most urban areas often triggers the conversion of wetlands resulting in their total disappearance with attendant implications on man's survival. This study examined the socio-economic impacts of wetland conversion on residents of Port Harcourt municipality. Data were sourced from both primary and secondary sources. Four (4) out of the twenty-four (24) reclaimed wetland sites were purposively selected for the study. The cross-sectional research design was used since there was no manipulation of the variables under investigation. A sample size comprised 280 heads of households from the eight proximate communities within the four selected reclaimed sites. The study revealed that wetland conversions have both positive impacts on residents of the study area. On a positive note, wetland conversion is a means of increasing land space for needed physical development and the provision of urban goods and services. The negative impacts of wetland conversion include the destruction of sources of livelihood for the people, the destruction of natural heritage and aesthetic areas and the destruction of conservation areas among others. The study advocates for the adoption of a sustainable wetland management strategy with an emphasis on the wise use of wetland resources to ensure the continued existence of wetlands in their pristine state, as this is the only way we can preserve the services that wetland provides to the survival of the human environment.

**Keywords:** conversion, social and economic impacts, land reclamation, urbanisation, livelihood, Wetland

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## Introduction

The Ramsar Convention, which came into force in 1975, defines wetlands as areas of marsh, fen, peatland, or water that is either natural or artificial, permanent, or temporary. It also includes water that is static or flowing, fresh, brackish or salt including areas of marine water, the depth of which at low tide does not exceed 6m.<sup>1</sup> Wetlands all over the world are very important subsystems of the general ecosystem which play vital roles in the sustenance of humans and other segments of the environment by providing support to diverse activities affecting human existence and the sustainability of their sources of livelihood.

Wetlands provide significant economic benefits to society with a dynamic inter-dependency between the local economies, the general ecosystems of the environment and society. There are properties of the biophysical systems embedded in wetland areas which determine the nature of economic activities in the affected regions. Wetlands also support diverse communities of invertebrates, which in turn support a wide variety of birds and other vertebrates. The ecological complexity of the wetland ecosystems can be seen in the interdependencies of their various components with primary consumers ranging from crustaceans, molluscs, and some aquatic insects like dragonflies. They also have geese and deer that rely on the abundance of algae, plants, and detritus for food for their survival. Wetlands further support a variety of carnivores, including, alligators, and osprey and maintain biologically diverse communities of ecological and economic value chain to society.<sup>2</sup>

Urbanisation with its attendant quest for land space to foster physical development have remained a major threat to the survival of the wetland ecosystem in most urban areas as it upset its role in providing socio-economic benefits to the people of the affected region.

The rate of physical and demographic growth in city of Port Harcourt have engendered massive encroachment into wetland areas in the form of wetland reclamations and conversions, which has initiated the gradual disappearance of wetlands and its services in Port Harcourt Municipality. Wetlands reclamation and depletion have become a re-occurring phenomenon in the city leading to a palpable disconnect between the ecological systems (wetlands), the economic systems and societal benefits accruing from the wetland ecosystem. On the flip side of wetland depletions, there are some short run benefits such as engendering urban development because most reclaimed wetlands are used to build institutional, residential, industrial, economic, and commercial developments within the Port Harcourt Municipality.<sup>3</sup>

It is pertinent to assert that these Wetland ecosystems are habitats for varieties of aquatic life and migratory birds and serve as sources of livelihood for the natives that depend on them. The reclamation of these wetlands implies total damage to the varieties of aquatic life and the life support system of the peasantry and their subsequent extinction. The natives who originally depended on aquatic resources for livelihood have lost their sources of economic sustenance; this exposes them to economic hardship as experienced in Port Harcourt Municipality Rivers State. In some circumstances, residents (community groups and rival urban gangs) annex and reclaim these wetlands to expand their hold and territories within a settlement. These settlements are mostly unplanned and often lead to urban chaos as it becomes a source of concern for the government and residents alike.<sup>4</sup>

In Nigeria, 49% of animal protein consumed is from fish<sup>5</sup> and the greater percentage of this is from captured fisheries. Wetlands constitute an important ecosystem for fish production; their loss has a direct consequence on sustainable fish production that provides a source of livelihood to millions of people. The problem arising from

wetland reclamation and depletion is further compounded by a loss of economic fortunes of the inhabitants of the affected area. This is in line with the findings of Ajibola, Adeleke and Ogungbemi,<sup>6</sup> who noted that wetlands provide numerous goods and services to the local population. Reclamation and conversion of these valuable wetlands means destroying the sources of livelihoods of the local population. It is worth noting that wetlands constitute good sites for agriculture and traditional farming which serve as sources of livelihood for the people. The conversion of these wetland areas means a total removal of the primary sources of livelihood of the people with devastating economic situations. The conversion of wetland areas means a total removal of the primary sources of livelihood for the people of the affected region.

The conversion of wetland ecosystems for physical development has sometimes resulted in the desecration of sacred lands, alterations of divinities and changes in the value system of the affected communities. It is also observed that wetland areas are good sites for tourism and recreation activities that provide sources of income and economic services to the affected indigenous people. Wetland removal means total alienation of the people's sense of social life, culture and interactions. The rising pace of population growth in Port Harcourt municipality, its spatial extent, and the subsequent encroachment into wetland areas have created a series of problems as identified above with its impacts on the social, health and biophysical environment of the affected region. Hence, this study aims to identify highlight the socioeconomic characteristics of the respondents as well as the socioeconomic impacts of wetland conversion on the residents of Port Harcourt Municipality.

## Related literature

Conventional economics indicates the fundamental, relative scarcity of resources as the underlying cause of the loss of many wetland ecosystems, whose environmental space has been converted to other uses such as agriculture. It is similar those wetlands whose water has been diverted to supply other needs, biota have been extensively modified or harvested, and those whose capacity to absorb wastes has been overburdened or bypassed.<sup>1</sup> In this same vein, Lonson and Mazzaresse<sup>7</sup> in their study asserts that the conservation of wetlands will be associated with forgone opportunities which could be the benefit forgone from possible alternatives or uses of wetlands. Besides, going ahead with these alternative activities often results in the opportunity costs of forgone benefits that would have been otherwise derived from the conserved wetlands. Therefore, quantifying and evaluating the conservation benefits in a way that makes them comparable with the returns derived from alternative uses can facilitate improved social decision-making in wetland protection versus development conflict situations.<sup>7</sup>

Cost-benefit analysis based on the economic values of wetland ecosystems and the efficiency criterion has offered one of the best methods to aid the decision-making process in this context. Given the above, sustainability concerns can be introduced as a series of constraints in the cost-benefit analysis, and this may require further development indices and multi-criteria decision analysis framework and methods to aid policymakers in policy conflict and goals trade-off situations. Thus, the cost-benefit criterion may need to be modified as policymakers introduce or respond to concerns other than economic efficiency. For example, equity concerns, employment concerns and zero-net loss biodiversity conservation concerns.<sup>1</sup> However, governments have formally adopted the sustainable development policy objectives, as well, as imposed a range of national conservation

measures and designations to complement the Ramsar Convention to protect wetland ecosystems.<sup>8</sup>

Wetlands perform several functions and are potentially very valuable, important, and fundamentally useful for environmental and ecological balance. This valuable ecosystem has been under immense pressure due to human use of the ecosystem for agriculture, industrial development, housing development and urbanisation. It is observed that some past conversion of wetlands might well have been in society's best interests, where the returns from the competing land use are high. However, wetlands have frequently been lost to activities resulting in only limited benefits or on certain occasions, even costs to society.<sup>8</sup>

The pollution of wetlands, often regarded as natural sinks for waste, has been an important factor in their degradation. The essential features of wetlands such as the ability to supply water have traditionally been treated as public goods and exposed to open access pressures with a lack of enforceable property rights allowing unrestricted depletion of the resource.<sup>9</sup> The adoption of the conventional economics principle is good at comparative equilibrium analysis of systems dominated by market processes, which is evaluated in terms of economic welfare and changes. Wetlands can therefore be considered from a broader historical and co-evolutionary perspective; one that recognises the significance of the locally tabled "lock-in" effect caused by non-market institutions like state-governed systems, common property or even open access features.<sup>10</sup>

This situation usually creates many barriers and internal constraints in socioeconomic systems, so that conventional assumptions about individual behaviour and market mechanisms may not be appropriate. Therefore, welfare economics is then insufficient as the tool for evaluating system changes and traditional instruments cannot be trusted to realize social welfare improvement.<sup>11</sup> Thus, economic systems utilizing wetland resources at an unsustainable level may be "locked" into such a development pattern. It is therefore convenient to say that sustainable economic system practices should be adopted to invigorate wetland management practices.

In the rendering of Schuyt<sup>12</sup> wetlands in Africa are an important source of water and nutrients necessary for biological productivity and often sheer survival of people and indeed contain numerous goods and services that have economic values and functions not only to the local population but also to people living outside the periphery of the wetland areas, noting that the degradation of the wetlands implies total alienation of the people's source of basic needs and survival. Richard<sup>13</sup> asserts that since wetlands are complex multi-functional systems, they are therefore likely to be the most beneficial if sustainably and economically conserved as integrated ecosystems (within a catchment) rather than in terms of their component parts.

## Study area

Port Harcourt Municipality, the study area, lies along the Bonny River, an eastern tributary of the lower Niger, 41 miles (66km) upstream from the Gulf of Guinea in Nigeria Niger Delta area.<sup>14</sup> It is located approximately on latitude 4° 17' 98" – 4° 47' 21" E and longitude 6° 09' 99" – 6° 59' 55" N of the Greenwich Meridian (Figure 1).<sup>14</sup> Port Harcourt experiences tropical humid climate with lengthy and heavy rainy seasons and very short dry seasons. The municipality is endowed with abundant sunshine and the temperature ranges between 25°C and 28°C.<sup>15</sup> Port Harcourt is characterised by a low-lying coastal plain, which geologically belongs to the sedimentary formation of the recent Niger Delta, with an elevation of less than 15.24m.<sup>16</sup> The drainage of the is poor because of the presence of many

surface water bodies and heavy annual rainfall, which is between 2000mm and 2400mm.<sup>17</sup> However, Bonny River, New Calabar River, creeks and streams drain Port Harcourt Municipality, and all enter the Atlantic Ocean through estuaries.<sup>18</sup>

## Methods and materials

The research adopted the constructivist research worldview while the research approach was qualitative. Both primary and secondary sources of data were used. The cross-sectional research design was used since data were collected at one time from respondents. The sample size was three hundred and eighty (380) respondents who were mainly heads of households derived from the use of the Taro Yamane formula. There are twenty-four (24) reclaimed sites (Figure 1) in the study area, four (4) sites were purposively chosen for study. The four sites include Eastern Bypass, Borikiri Sandfilled, Eagle

Island and Ibeto. The population of the study include the population of eight proximate communities within the reclaimed study sites as shown in Table 1.

## Results and discussion

### Socio-economic characteristics of respondents

Figure 2 shows the Age-sex distributions of respondents. From the analysis, the modal age cohorts of both male and female is between 40-49, having 28% and 27.7% respectively. The modal marital status of the respondents is 66.8% indicating that most of the respondents are married (Figure 3). The occupational distribution shows that most respondents are civil servants (36.8%), followed by traders and artisans 25% and 15.8% respectively (Table 2).

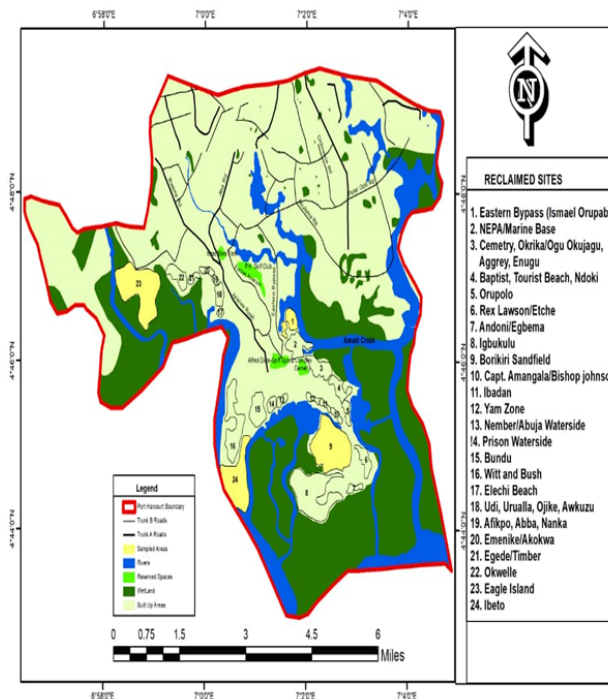


Figure 1 Reclaimed Sites and Sampled Locations.

Source: GIS Lab. Department of Urban and Regional Planning, Rivers State University, 2023

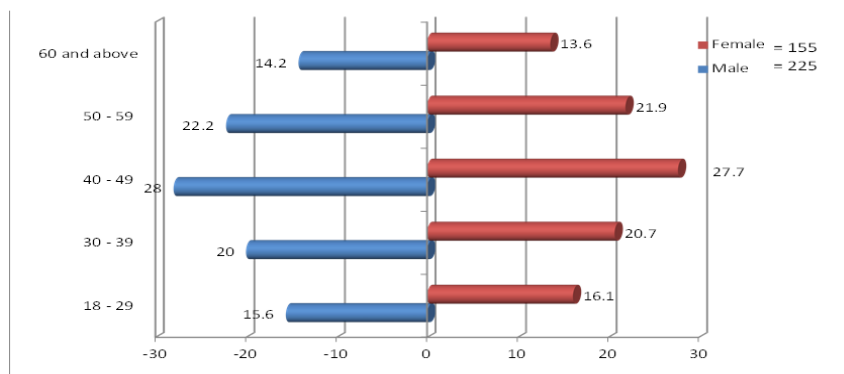


Figure 2 Age-Sex Distribution.

Source: Authors' Field Survey, 2023

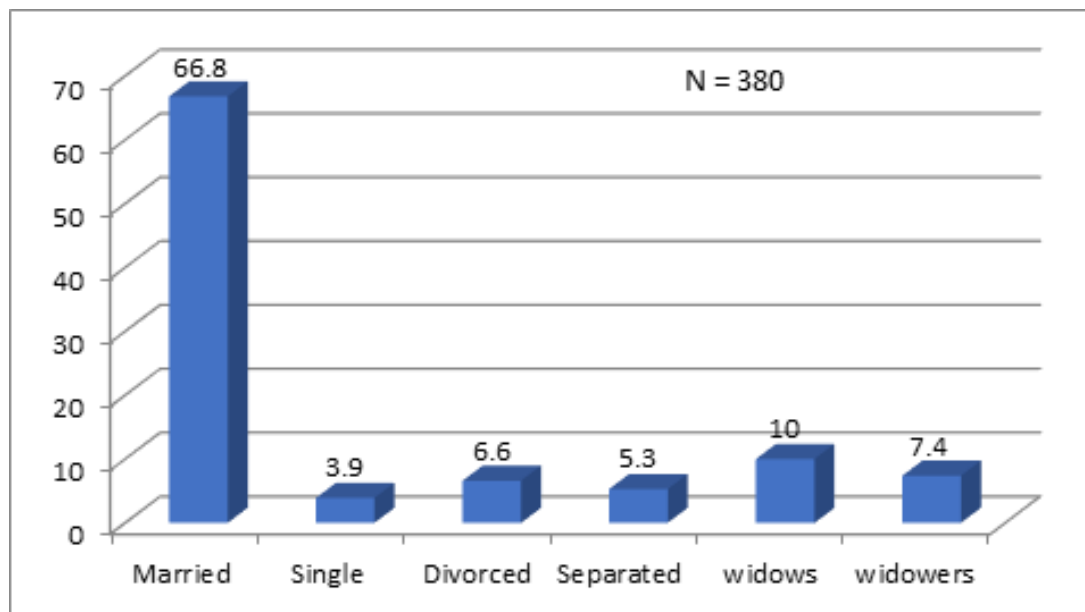


Figure 3 Marital Status of Respondents.

Source: Authors' Field Survey, 2023

Table 1 Sample Communities and Questionnaire Distribution

S/N	Reclaimed sites	Sampled communities	1991 Population	2020 Population 6.5%	Household size (5)	% of Sampled population	Questionnaire administration
1	Site A Eastern Bypass	1. Ismael Orupabo	945	5869	1174	0.45	2
		2. Ogbunabali	15014	93247	18649	7.25	29
		3. Amadi –Ama	7034	43686	8737	3.40	14
		4. Nkpogu	20402	126710	25342	9.85	39
2	Site B Borikiri Sandfilled	5. Borikiri	39214	243545	48709	18.93	76
3	Site C	6. Nkpolu-Oroworukwo	52613	326762	65352	25.4	101
		Eagle Island	7. Mgbundukwu	55682	345823	69165	26.88
4	Site D Ibeto	8. Bundu	16266	101023	20205	7.85	31
Total			207170	1286665	257333	100	399

Source: NPC 1991; NBS, 2016; Authors' Computation

Table 2 Occupation of Respondents

S/No.	Occupation	Frequency	Percentage (%)
1	Farmers	20	5.3
2	Fisher folks	40	10.5
3	Trader	95	25
4	Civil Service	140	36.8
5	Exploiter of timbers/non-timber forest product	25	6.6
6	Artisans	60	15.8
Total		380	100

Source: Authors' Field Survey, 2023

### Socio-economic impacts of wetland conversion on residents of port Harcourt

Findings from the research indicate that there are positive and negative socioeconomic impacts of wetland conversion within the Port Harcourt Municipality.

#### Positive impacts

Some of the findings of this study indicate that wetland conversion is associated with lots of beneficial impacts on residents in the study area (Table 3). Some of the identified beneficial impacts include the provision of land space for physical developments (40.4%); the destruction of hideouts for criminals (21.2%); provides avenues for urban growth and development (15.4%). Other identified benefits of wetland conversion are the destructions of breeding grounds for mosquitoes (13.5%); space and avenue for striving business opportunities (9.6%) and Provide Avenue for urban growth and development (15.4).

**Table 3** Positive Impacts of the Conversion of Wetlands in the Area

S/No.	Positive impacts	Frequency	Percentage (%)
1	Provision of land space for physical development	153	40.4
2	Removal of hideouts for criminals	81	21.2
3	Destruction of breeding ground for mosquitoes	51	13.5
4	Provide space and avenue for striving business opportunities	36	9.6
5	Provide avenue for urban growth and development	59	15.4
	Total	380	100

Source: Authors' Field Survey, 2023

An important revelation from this study is to the effect that, wetland conversion in Port Harcourt municipality is highly associated with enormous benefits to residents of the area. Prominent among these benefits is the role wetland conversion plays in the process of city expansion. In other ascertain the perception of residents on the rating of the positive impacts, a subjective rating was done and the result is presented in Table 4. From the analysis, 28.8% of the respondents said the positive impacts of wetland conversion are moderate, 23.1% said it is high, 21.2% said it is low, while 9.6% and 17.3% said it is very high and very low respectively.

**Table 4** Subjective Assessment and Rating of the Positive Impacts of Wetland Conversion in the Study Area

S/No.	Subjective rating of the positive impacts	Frequency	Percentage (%)
1	Very high	37	9.6
2	High	88	23.1
3	Moderate	109	28.8
4	Low	80	21.2
5	Very low	66	17.3
	Total	380	100

Source: Authors' Field Survey, 2023

### Negative impacts of wetland conversions

Despite the positive impacts of wetland conversion, there are numerous negative impacts that wetland conversion can bring. Table 5 shows some of the negative impacts of wetlands conversions on residents of the study area. From the result, 21.1% of the respondents said it leads to the destruction of source of livelihood, 17.8% said it leads to the destruction of fishing grounds, 14.9% said it causes the removal of recreational/reserve areas, 13.5% said it leads to the destructions and subsequent extinction of wildlife species, 12.2% said it causes the destructions of wetland forest products, 11.1% and 9.5% said it leads to the removal of water transportation routes and the destructions of lands for wetland agriculture.

**Table 5** Negative Impacts on the Economy

S/No.	Negative impacts on the economy	Frequency	Percentage (%)
1	Destruction of sources of livelihood	80	21.1
2	Destruction of fishing ground	68	17.8
3	Destruction of wetland forest products	46	12.2
4	Removal of water transportation route	42	11.1
5	Removal of recreational and reserve areas	57	14.9
6	Destruction and subsequent extinction of wildlife species	51	13.5
7	Destruction of land for wetland agriculture	36	9.5
	Total	380	100

Source Authors' Field Survey, 2023

Further analysis indicates that wetland conversion also has negative impacts on the social environment including the culture and the belief systems of the people in the study area (Table 6). Some of the identified socio-cultural impacts of wetland conversion include the destruction of natural heritage and aesthetic areas (17.6%), Destruction of conservation areas (15.1%), Destruction of recreational and tourist centres (12.2). Others include the removal of the sources of traditional medicine/herbs (10%), Destruction of wildlife viewing areas (9.5%), Destruction of shrines and deities (9.5) and Destruction of traditional worship centres (7.6%).

A Subjective assessment and rating of the negative impacts of wetlands conversions indicates that 39. 2% of the respondents said the negative impacts are very high, 28.4% said it are high, 25.7% said they are moderate, while 4.1% and 2.7% said rated them low and very low Respectively Table 7. An intriguing aspect of the revelation of this study is that wetland ecosystems and their resources are major sources of livelihood with significant economic impacts to the affected population. The natives rely on the wetlands for fishing, lumbering activities, palm wine tapping and refining, collection of both timber and non-timber forest products, and for recreational purposes. All these benefits are lost in the event of land reclamation.<sup>19</sup>

**Table 6** Negative Impacts on the Social Environment (including Culture and Belief System)

S/No.	Negative impacts on the social environment (including culture and belief system)	Frequency	Percentage (%)
1	Destruction of shrines and deities	36	9.5
2	Destruction of traditional worship centres	29	7.6
3	Destruction of spiritual worship centres	25	6.5
4	Destruction of recreational and tourist centres	46	12.2
5	Destruction of conservation areas	58	15.1
6	Destruction of wildlife viewing areas	36	9.5
7	Removal of sources of traditional medicine/herbs	38	10
8	Destruction of natural heritage and aesthetic areas	67	17.6
10	Destruction of the traditional education centres	26	6.8
	Total	380	100

Source: Authors' Field Survey, 2023

**Table 7** Subjective Assessment and Rating of the Negative Impacts of Wetland Conversion

S/No.	Subjective rating of the negative impacts	Frequency	Percentage (%)
1	Very high	149	39.2
2	High	108	28.4
3	Moderate	98	25.7
4	Low	16	4.1
5	Very low	10	2.7
	Total	380	100

Source: Authors' Field Survey, 2023

## Conclusion and recommendation

Port Harcourt the capital of Rivers State has and is still witnessing unrepresented urban growth and expansion which may be attributed to the changes that have taken place in the socio-economic and political status of the city. The increasing rate of urban expansion occasioned by population explosion and physical development in Port Harcourt creates a situation where there is disequilibrium in the demand and supply of land resources that further accentuate the need for wetland reclamation and conversion. Although wetland conversion has some positive impacts such as the provision of land space for physical development and removal of criminal hideouts. There are many negative consequences of wetland conversion including the destruction of wildlife and conservation areas. Wetland reclamation results in total loss of the services wetland provide with attendant negative implications on the quality of life of residents in the area. The findings of this study are in line with Schuyt (2005), that acknowledged the importance of wetlands for the sustenance of rural dwellers in Africa noting that the conversion and/or degradation of wetland ecosystems is tantamount to the destruction of sources of livelihoods of the affected population. The study advocates for the adoption of a sustainable wetland management strategy with an emphasis on the wise use of wetland resources to ensure the continued existence of wetlands in their pristine state. This is the only way to preserve the services that wetland provides for the survival of the human environment.

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## Conflicts of interest

The author declares there is no conflict of interest.

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