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RESEARCH ARTICLE

COASTAL ECOSYSTEM VALUATION OF SUSTAINABLE LIVELIHOOD SYSTEMS OF LITTORAL COMMUNITIES IN PARTS OF ILAJE, ONDO STATE, NIGERIA

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Authors' contributions: This work was carried out in collaboration among all authors. Authors OOG and NLEW designed the study, wrote the protocol and went to the field for sampling. Author OOG wrote the first draft of the manuscript. Authors NLEW and LCO managed the analyses of the study as well as managed the literature searches. All authors read and approved the final manuscript.

ABSTRACT

The Livelihood in the Ilaje coastal ecosystem is similar to that in other coastal areas; however, their way of life is not maximally sustained hence there were shocks, trend and seasonality resulting to a chaotic economic situation. To ensure a sustainable way of life during the hard times, the locals diversified to other alternative income sources within their coastal areas. This study focuses on economic valuation of coastal ecosystem services in Ilaje, with the objective to understanding the potential opportunities associated with the inhabitants of the area. The ecological approach adapted primary and secondary sources using well-structured questionnaires and personal interviews / discussions, focused group discussions, and key informant interviews to obtain data, purposive sampling technique, using 20 % of 125 questionnaires administered by simple random technique. Sampled site was validated using a hand-held Garmin geographic positioning system *(GPS-Garmin Dakota 10 model*). Data analysis involved descriptive analytical tools (frequency count, averages, percentages and charts, and 4-point Likert-type scale) to ascertain significance of livelihood activity. Mangrove economic valuation was based on Barbiers' classification. Result revealed fishing as major livelihood and occupational activities of members of the communities besides other alternative income sources as exemplified in result Figures and Table 1. The mangrove recorded significant roles: as firewood (34%) in Ikorigho, herbs (24%) in Odonla, housing (46%; 50%, 26% and 28%) in Ikorigho, Molutehin, Odun-Igo and Awoye, respectively besides other non-significant alternative roles. The well-known resources are fishes among other resources with 84% awareness in Odonla, Molutehin and Odun-Igo respectively; 88% in Ikorigho and 92% in Awoye. Ikorigho had the highest level of interaction (56%) between 21-30years, while Odonla and Molutehin respectively had least (4%) interaction between 1-10years of inhabitant-ecosystem co-existence. Trading is the most engaged alternative income source besides fishing while inhabitants prefer government to traditional effort for mangrove protection.

Key Words: *livelihood, coastal valuation, mangrove, ecological interaction, resource awareness*

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1.1. INTRODUCTION

Coastal areas around the world are dynamic environments at the interface of terrestrial, marine, and freshwater systems. Nearly 2.4 billion or 40 % of the world's people already live in these areas (https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/05/Ocean-fact-sheet-package.pdf). Coastal wetland ecosystems are also part of the important landscape with major unique features of natural environmental resources in the wealth of a nation, particularly in parts of the earth with coastal and littoral physiognomy and ecology (Nsirim *et al*., 2020). These coastal ecosystems include, but are not limited to: estuaries, beaches, wetlands, shores, mangroves, seagrasses and salt marsh, coral reefs, and other essential habitats for marine life. The unique feature of coastal wetlands is the fascinating rich biodiversity adapted to specific hydrological regimes and dynamics with range of critical ecosystem services they provide for sustainable utilization and livelihood to mankind survival (Anjan *et al*., 2017). This zone supports a range of natural and built environments, all of which contain some economic or societal value.

Within the context of this study: A value is how much something is worth in quality or/and quantity. An asset is an item of worth and natural assets can be defined as natural resources from which goods are produced and services provided (landforms, flora, fauna, waterways, wetlands, etc.) (World Bank, 2004). Ecosystem services is the benefits that people receive from the natural environment (i.e. transformation of the natural asset into products valued economically (World Bank, 2004). This study focuses on qualitative valuation of coastal marine resource ecosystem services in Ilaje, Ondo State, Nigeria. Valuation is important because it provides methods and techniques to determine how changes in coastal marine ecosystem services can be translated into qualitative and quantitative (cost) benefits to society. Economic values play an important role in everyday life and provide useful information about human happiness and welfare. Valuation provides a consistent framework to understand human–nature interactions across a broad range of coastal and marine resources, and to evaluate the sustainability of these interactions.

Several school of taught has X-rayed livelihood in various dimensions to: entail the activities, assets and the access that jointly determine the living gained by rural households or individual (Ellis, 1999; 2000). It also comprises the capabilities, assets and activities required for a means of living (DFID, 2000; 2014). It constitutes adequate stocks and flows of food and cash to meet basic needs of life and it comprises people, their capabilities (stores, resources, claims and access) and activities required for a means of living including income and assets which can be tangible or intangible assets. Tangible assets are physical resources while intangible are assets are claims and access (Krantz, 2001). Livelihood involves the capacities, goods such as capital and social, and the activities needed to live (FAO, 2009).

The concept of sustainable livelihoods (SL) or as could be christened "*Livelihood Sustainability*" has its origin from the Brundtland Commission on Environment and Development (Krantz, 2001). A livelihood can be classified as sustainable, if it is resilient in the face of external shocks and stresses, if it is independent from external support, if it is able to maintain the long-term productivity of natural resources and if it does not undermine the livelihood options of others (Kollmair and Gamper, 2002). It is sustainable when it is resilience, recover from and cope with any form of stress and shocks while maintaining or enhancing its capabilities and assets without compromising the future, and not undermining the natural resource base (FAO, 2009; DFID, 2000; 2014; Orinya, 2016). In other words, a livelihood is sustainable besides its' resilience to environmental intrusions if it provides sustainable livelihood opportunities for the next generation, which contributes net benefits to other livelihood at both local and global levels in the long run (Chambers and Conway, 1992; Orinya, 2016). Sustainable livelihood can be defined in relation to coastal environment as:" their sustainable utilisation of biodiversity for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem." It can also be defined as: "human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations (RCS, 2010a). Also, a livelihood is environmentally sustainable when it contributes to the stability of environmental assets and has a sustainable positive net benefit effects on other livelihoods sources (Stephen *et al*., 2009). It has also been explained that livelihood is sustainable when it has the capacity to meet the immediate needs of the people while its ability to meet future needs is not jeopardized (Carney, 1998). The Livelihood in the Ilaje coastal ecosystem is similar to that in other coastal areas. In this study location, fishing and aquaculture are the two main industries. However, the entire way of life in the study area is not maximally sustained. Almost every activity has shocks, trend and seasonality resulting to a chaotic economic situation. In order to provide for a sustainable way of the life during the hard times, the locals typically turn to other alternative source of income for wages within their coastal areas of domain.

Several research efforts focusing on household studies, village studies, and farming systems that later informed and influenced development studies and livelihoods thinking have been reported (Farmer, 1977; Long, 1984; Moock, 1986). Several studies with regards to coastal ecosystem, its biodiversity and conservation priorities

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and sustainable livelihood in parts of Niger Delta have been documented (John *et al*., 2013; Anthony and Adeleke, 2014; Onwuteaka, 2014; Ajibola *et al*., 2015; Ayansina and Ulrike, 2015; WIA, 2015; John *et al*., 2016; Dirisu *et al*., 2019; Vivek *et al*., 2019; Roslina and Shamzaeffa, 2014; Gbayisemore *et al*., 2022a, b). Again, from time immemorial coastal wetlands have played a decisive role in nurturing many cultures and civilizations, but their dealings with mankind is full of fraught, misunderstanding and fear. Furthermore, despite the characteristics and importance of Ilaje coastal ecosystem, the area and its ecosystem have been subjected to enormous pressures upon its sustainable livelihood and benefits in the area for several decades. This is through many factors of both anthropogenic and natural intrusions with consequence degradation due to the demanding ecosystem services of the biosphere. There has been unsystematic exploitation of the resources, coupled with urban infrastructural development, pollution from associated industries, agro-industrial chemicals, and deforestation for local consumption in addition to absence of appropriate legislation. All these constitute the bases that informed the need for the assessment and evaluation of the Ilaje coastal communities in Ondo State, as an initiative to understanding the level of ecological interactions and livelihood capitals and potential opportunities associated with the inhabitants of the area.

The study is significant hence it is expected to provide a better understanding of the livelihood potential of the Ilaje coastal ecosystem in Ondo State. The results obtained shall widen the knowledge on sustainable livelihood and ecological scenarios associated with the interaction between the inhabitant of the area and capital assets of the environment. It will provide additional information that would form the basis for further research, development, utilization and perpetuation of the ecological importance of the natural resources and capital assets of the area. This will go a long way in salvaging the area by preventing further declining and threat to biodiversity; moreso proffer future directions and initiatives that will aid policy and decision makers, agencies, ministries and environmental scientists and conservationist in the selection of areas for sustainable development planning, investment and sustainable livelihood.

2.0. MATERIALS AND METHODS

2.1 *Study area, location and site*

The study was conducted in Ilaje Council Area, Ondo state. In light of it equatorial geographical situate in South Western part of Nigeria, its neighbourhood co-existence at the northern, eastern, western and southern locations have been elucidated by Gbayisemore *et al*. (2022a, b). The area is known for its longest coastline in Nigeria with distance coverage of 82 kilometers and with its coastal ecology characterized by equatorial environmental conditions, littoral floristics and edaphic conditions. The study area with its location and sample sites are characterized by tropical environmental conditions of two distinct season (dry & wet seasons), maximum temperature and relatively high humidity due to proximity to the high sea *cum* maximum rainfall which decreases in amount and distribution from the coast to the hinterland (Gbayisemore *et al*., 2022a). The flora landscape is littoral in its formation and characterized as follows: a luxuriant riparian vegetation complex of fresh and marine ecosystem, in patches of heterogenous and homogenous composition which exist in inter zonal discrete quanta and continuum horizontal distribution, vertical stratification of high forest zones of mangrove swamp forest near the Bight of Benin, tropical rainforest in the centre part, and patches of derived savanna forest of woodland which are known to exist on the gentle slopes of Yoruba Hills in the northern fringe.

Economically the peoples' livelihood is an embodiment of culture represented in diverse activities mostly associated with subsistence agronomic and aqua-cultural practices, artisans and traders of local foodstuff to the mode of dressing, dancing, and wood crafts as well as traditional industries in pottery making, cloth weaving, tailoring, carpentry, and blacksmithing. Natural resources include timber and non-timber forest products and non-forest resources as well as diverse mineral deposits. The State politically comprises 18 local council areas including Ilaje - study location (Figure 1) which occupies the entire southern part of Ondo State with five major kingdoms housing over 100 communities including the sampled sites: Odonla, Ikorigho, Molutehin, Odun-Igo and Awoye (Figure 2) (Gbayisemore *et al*., 2022a).

2.2 *Field Sampling and Data Collection*

The field sampling for data collection of response by the littoral community and their interaction with the natural resources adapted primary sources (descriptive and explorative approach of literature review) and secondary sources (Participatory Rapid Appraisal using well-structured questionnaires and personal interviews / discussions, focused group discussions, and key informant interviews) to obtain data on environmental and socioeconomic

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details of respondents on livelihood valuation due to ecosystem services (Edet *et al*., 2017; Edwin-Wosu and Anaele, 2018).

A purposive sampling technique was used for selected study sampled sites to determine size of respondents in selected sampled sites; using 20% of 125 questionnaires of the entire population of inhabitant to administer by simple random technique. Ground-trotting was adopted to validate the sampled site using a hand-held Garmin geographic positioning system *(GPS-Garmin Dakota 10 model*) for georeferencing of exact sampled point (Table1) and sampled sites (Odonla, Ikorigho, Molutehin, Odun-Igo and Awoye) imagery delineation as earlier reported in Gbayisemore *et al*. (2022a).

Fig. 1. Ondo State indicating Ilaje – study location

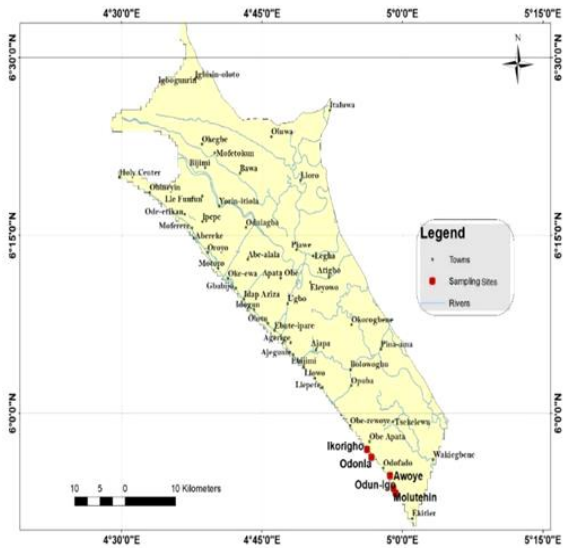

Fig. 2. Ilaje –study location indicating sampled sites

Table 1. Coordinates of sampled site in parts of Ilaje coastal ecosystem, Ondo State

S/N	Lat. (N)	Long. (E)	Alt.	Community / Sampled site
			Igbokoda	
1	06º08.543’	004º47.618’	17ft	Jetty
			Odonla	
2	05º56.407’	004º56.768’	9	Jetty
3	05º56.391’	004º56.743’	28	Sampled site
4	05º56.387’	004º56.737’	21	Sampled site
			Ikorigho	
5	05º57.042’	004º56.241’	27	Sampled site
6	05º57.035’	004º56.222’	43	Sampled site
			Molutehin	
7	05o53.816’	004o59.048’	30	Jetty
8	05o53.802’	004o59.025’	15	Jetty
9	05o53.782’	004o59.034’	15	Jetty
10	05o53.817’	004o59.054’	10	Sampled site
11	05o53.743’	004o59.021’	4	Sampled site
12	05o53.743’	004o59.017’	7	Sampled site
13	05o53.774’	004o59.046’	-15	Sampled site
			Odun-Igo	
14	05o53.433’	004o59.231’	7	Jetty
15	05o53.427’	004o59.226’	13	Jetty
16	05o53.404’	004o59.237’	14	Jetty
17	05o53.446’	004o59.250’	14	Jetty
18	05o53.297’	004o59.287’	-1	Sampled site
19	05o53.300’	004o59.287’	4	Sampled site

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20	05o53.324'	004o59.288'	15	Sampled site
21	05o53.299'	004o53.302'	24	Sampled site
22	05o53.444'	004o53.189'	59	Sampled site
			Awoye	
23	05o54.838'	004o58.766'	9	Sampled site
24	05o54.901'	004o58.737'	4	Sampled site
25	05o54.904'	004o58.693'	12	Sampled site

2.3 *Data Analysis*

The data generated were subjected to descriptive analytical tools such as: frequency count, averages, percentages and charts as adopted in Edet *et al*. (2017) were used in the analysis of the study and levels of response anchors to ascertain the significance of livelihood activity in the area was captured based on 4-point Likert-type scale method (Ifeanyi-Obi and Mathew-Njoku, 2014), with the "thumb of rule" as: very significant, significant, less significant and not significant with assigned weight of 4, 3, 2 and 1 respectively to valuate coastal livelihood systems by the respondents.

The total economic valuation of the mangrove was based on Barbier (1993) classification, viz: Use Values as Direct Use Values and Indirect Use Values and Non-Use Values as Existence Value. Direct Use Value entails such consumption products as fish / provisioning services and such non-consumption product as recreation from eco-tourism. The Indirect Use Value entail such benefits as carbon sequestration, storm protection and off-shore fisheries. The Existence Value considers the value perceived by the awareness of resident on account of mangroves existence and on the economic valuation of mangrove resources. Tabular analysis was used to analyse the natural resource asset from the mangroves, general awareness about the environment and mangroves, stakeholders' perception and effort for mangrove protection.

3.0. RESULT

The result of coastal livelihood systems based on the 4-point Likert scale has revealed different degrees of ecosystem services ranging from provisioning, regulating, sociocultural to habitat support for the sustainable livelihood of the community members of Ilaje; with attendance levels of significance in livelihood sources and benefits of the coastal ecosystem services (**Table** 2) among members of the community (Odonla, Ikorigho, Molutehin, Odun-Igo and Awoye) in Ilaje study location. Key informant information revealed fishing as major livelihood and occupational activities of members of the communities. The Ilaje's fishing dexterity is underlined by a popular saying among the Ilajes that: "**Ubo eri pa to, Ilaje gwa to rin meaning: Where ever the river current runs through, there you will find the Ilajes".** Other alternative sources of income include: craftsmanship in fish net, gears, fish traps and boat carving; others are fish farming (aquaculture / mariculture), logging, carpentry, welder, mechanic, hunting, fish smoking, herbalism, mat making, sea transport and trading as a result of the rich biodiversity of the environment. Fishing however remains the major agricultural preoccupation of the Ilaje. This is underscored by the fact that the Ilaje's geographical sphere has one of the longest coastlines in Nigeria.

The significant role of the mangrove ecosystem services (**Fig**.1) within the coastal communities has recorded the following percentage levels with the highest role of 34% for firewood recorded in Ikorigho, and 24% as herbs in Odonla, and housing (46%; 50%, 26% and 28%) respectively recorded in Ikorigho, Molutehin, Odun-Igo and Awoye, which had 30% of mangrove used as firewood. The least roles of mangrove in the various communities were as follows: food and hunting (2%) in Odonla and Awoye, footbridge (8%) in Ikorigho, farming and logging (2%) respectively in Molutehin which had the highest ecosystem services of the mangrove with 50% in housing, while Odun-Igo had farming as the least (4%) ecosystem role of the mangrove.

The well known resources of sustainable livelihood by the respondents are the fishes among other resources with 84% awareness in Odonla, Molutehin and Odun-Igo respectively; 88% in Ikorigho and 92% in Awoye. The least known resources include: Pig, Mudskipper, and Tortoise respectively with 4% awareness in Odonla, 4% for Snail in Molutehin, and 8% for Cray fish and Periwinkle respectively in Odun-Igo and Awoye being recorded in Fig 2.

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Table 2: Livelihood Sources and Benefit of Coastal Ecosystem Services in parts of Ilaje, Ondo State

Ecosystem services	Livelihood benefit	Livelihood sources	Likert scale of significance
Provisioning	Trading	Mangrove logging / Timber merchandising, & selling	4
	Fuel / Energy	Firewood, peat, logs, crude oil	4
	Food	Fishing, cray fish, crab, periwinkle, mudskipper, oysters and lobster picking	4
	Craftsmanship	Carpentry, welder, mechanic	1
		Fishing net / gear making,	4
		Dugout wooden boat building	4
	Aquaculture / Mariculture practices	Snail, Periwinkle, clamps, bivalves, fish smoking	2
	Farming	Piggery, plantation and other animals	2
	Sea route logistic	Boat transport, wooden boat	4
	Hunting	Wild life	2
	Herbs / Medicine	Mangrove	2
Regulating	Shore line embankment / protection	Mangrove: Protection of coastal settlement and structures	1
	Climate regulation	Mangrove: Sink for greenhouse gases and particulate, carbon soot from the local refining activities, influence local & regional temperature, precipitation and other climatic processes.	2
	Erosion & flood control	Mangrove: Retention of soil and sediments, stabilization of shore line substrate	1
Sociocultural	Educational	Primary, secondary and tertiary	4
		Non-formal	2
	Spiritual inspiration	Sacred grove	3
	Recreation	Masquerade dance and boat race	1
	Traditional birth attendance	Herbs, medicine	2
	Burial	Mortal disposal	1
Habitat Supporting	Habitat	Aquatic lives, wild lives, & insects	4
	Pollination	Insect pollinators	2
	Breeding / nursery	shrimp, crab, fish, crustaceans, mollusks	4
	Soil formation	Mangrove: Sediment retention and accumulation of organic matter soil – Chikoko.	2
	Housing	Mangrove	3

Note: Level of significance in study communities [(using the Likert scale; 1- non significant (NS - 1), 2- least significant (LS - 2), 3- significant (S - 3), 4- highly significant (HS - 4)]

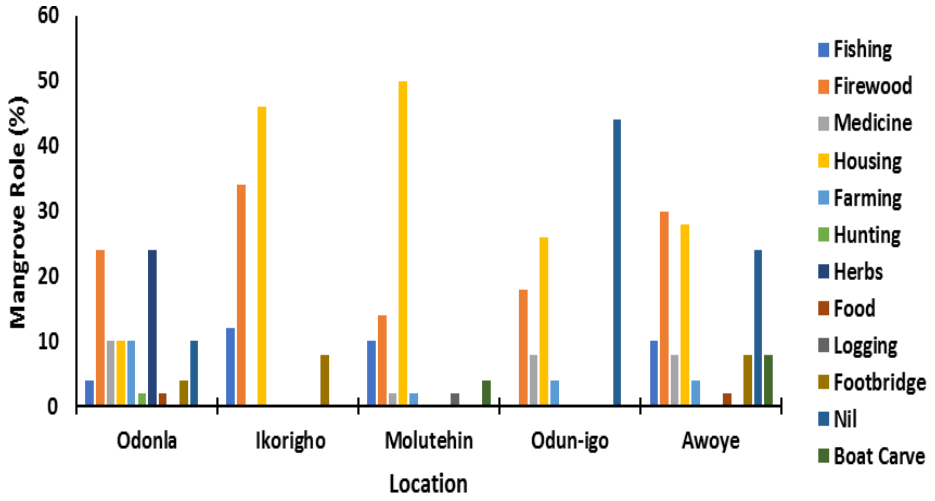

Fig. 1: Ecosystem services of the mangrove in the studied communities in Ilaje

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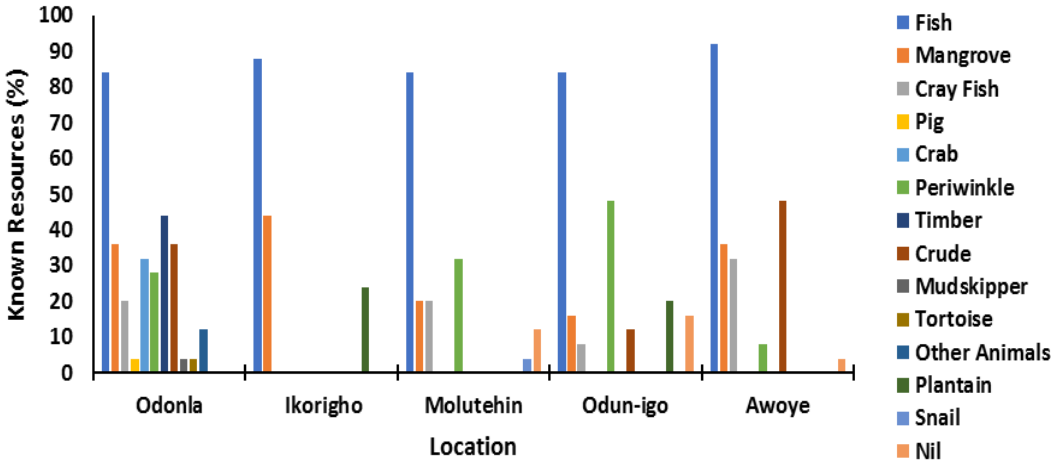

Fig. 2: Natural resource awareness of Respondents in parts of the studied communities in Ilaje

The level of interaction among the inhabitant of the community within the coastal environment has recorded 48% with 11-20 years of interaction with the ecosystem in Odonla and Molutehin respectively, 56% of interaction with ecosystem between 21-30 years in Ikorigho; 36% between 21->31 years in Odun-Igo and 44% (21-30) in Awoye. Among the communities the highest level (56%) of interaction was in Ikorigho between 21-30years, while the least (4%) interaction was in Odonla and Molutehin respectively between 1-10years of inhabitant - ecosystem co-existence as represented in Fig. 3.

The high income sources within and among the respective study communities as presented in Fig. 4., has been recorded to include: 20% of trading for Odonla and 44% of trading in Molutehin and Awoye respectively and 36% for Odun-Igo; 44%, 48% and 56% of fishing respectively in Ikorigho, Odun-Igo and Awoye which had the highest income source across the communities among the various indices of income source.

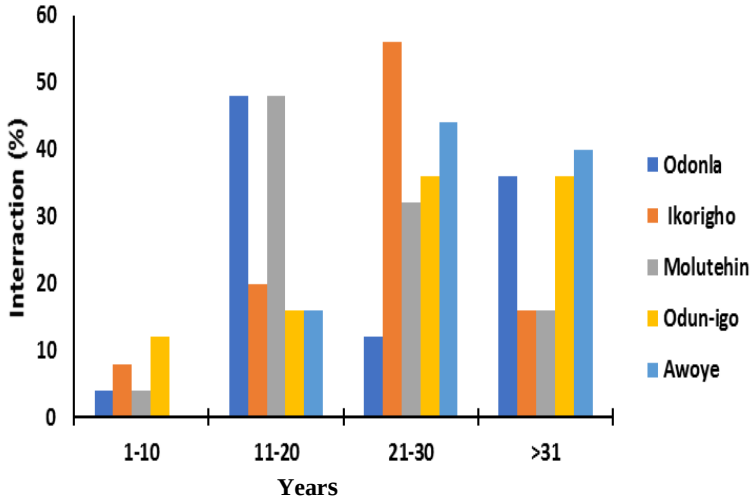

Fig. 3: Level of interaction between the inhabitants and coastal ecosystem

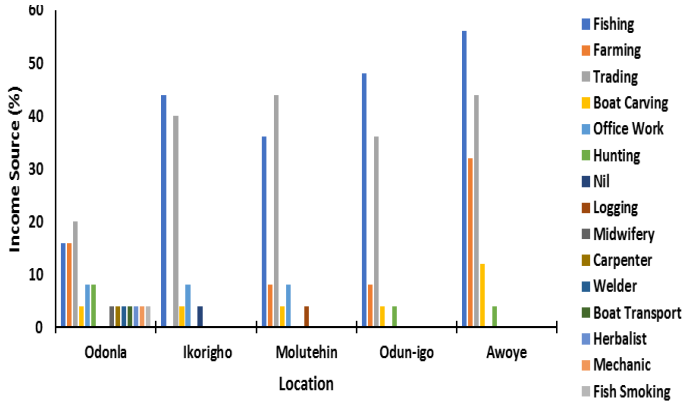

Fig. 4: Alternative income sources in parts of the studied location in Ilaje

Result of conservation profile has recorded variation in the level of choices by respondents with greater percentage (88%, 56%, 100%, 84% and 48%) of respondence in Odonla, Ikorigho, Molutehin, Odun-Igo, and Awoye respectively having preference for mangrove protection by government effort than traditional effort (Fig. 5).

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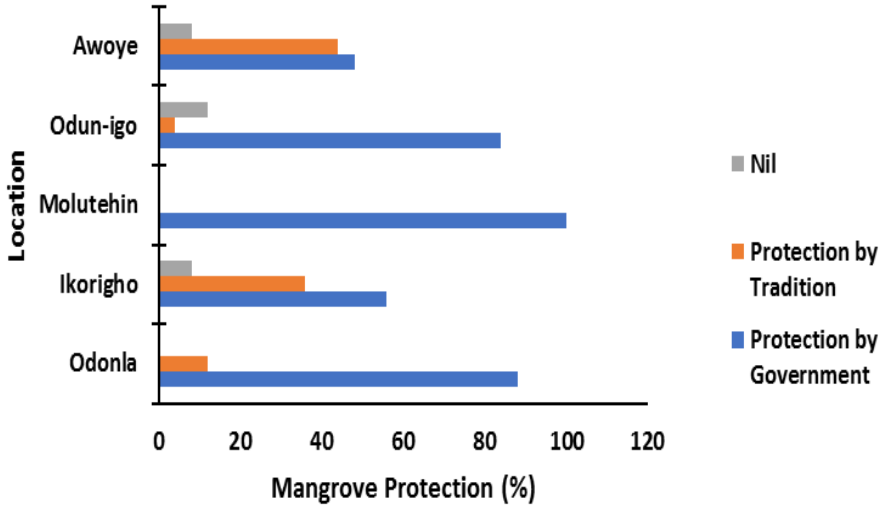

Fig.5: Mangrove protection effort in the studied communities in Ilaje

4. DISCUSSION

It has been reported that majority of rural farmers in Nigeria are poor, implying that they have poor asset base that cannot adequately sustain them (Akpan *et al.*, 2016). The major source of livelihood activity of the rural dwellers in Nigeria is agriculture for land dwellers and aquaculture / mariculture for coastal dwellers; and evidence abound that small scale agriculture and aquaculture practiced by majority of these rural dwellers lacks sufficient incentives needed for optimal household livelihood sustainability. The country's agricultural and aquaculture sectors are faced with several challenges such as; poor land ownership structure, lack of fishing gears, low level of irrigation development, limited adoption of research findings, high cost of farm inputs, poor access to credit, inefficient fertilizer procurement and distribution, inadequate storage facilities and poor access to markets have all combined to keep agricultural productivity low with high post harvest losses and waste (Akpan *et al*., 2016). In the south western part of Nigeria, specifically in Ilaje, the Southern part of Ondo State the picture of agricultural sector (aquaculture – fishing) is not far different from the national scenario. Similar incidence is experienced among the fishing communities of the coastal dwellers in Ilaje. For instance, majority of the population still reside in the coastal areas and they are depended on artisanal fish farming for their livelihood sustenance. The poor fishing gears lead to marginal fish farm holdings while those residing along the water bodies are engaged in highly contracted artisanal fishing. However, for majority of rural dwellers in coastal Ilaje, income earned from these occupations do not meet the needs of the household, hence households are often faced with the option of occupation diversification. Livelihood diversification is one of the most remarkable characteristics of rural livelihood strategy. It is a process of building rural households' capital by engaging in various activities to advance their standard of living (Ellis, 1998).

It can be measured by using activities, income and assets (Barrett *et al.*, 2001; Zerihun, 2017). Rural households' world-wide engage in a variety of non-farm activities to generate income (Lanjouw and Lanjouw, 2001; World Bank, 2003; Umunnakwe, 2015). Households use both productive assets, mainly land and human capital, and unproductive assets such as household items and property and engage in various activities to generate income. In the present scenario, diversification has become the key word for better living and for being more resilient to shocks and stresses. In addition to other factors, diversification in livelihood requires better adaptability to the change and open to the market mechanism. Households that have diversified income sources have better welfare indicators in terms of food security, healthcare, and affording school fees among others (Riithi, 2015). The Ilaje coastal marine ecosystems consist of a variety of habitats that support many stakeholders. The most obvious being the commercial and artesianal fishery industries with the value clearly seen within the market place. These ecosystems also provide significant value and utility to the coastal population in terms of non-market values and non-use values. The immense value of coastline to the commercial industries that rely on them has been highlighted in Table 1.

Mangroves are a group of highly adaptive salt tolerant plant species inhabiting intertidal zones of tropical and subtropical coastlines. They posses' important ecological and socio-economical functions. In the various study communities of Ilaje coastal ecosystem the mangrove resources have played significant role in different dimension

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ranging from provisioning, habitat-support, regulating and socio-cultural services; in light of fishing, firewood, medicine, housing, farming, hunting, herbs, food, logging, foot bridge and boat carving. Though, with the highest provisioning role as firewood, herbs and housing, these roles were at significant variance among the study communities in Ilaje. This corroborate Jeeban and Manas, (2018) who reported some vital provisioning roles of mangrove in many aspects of human endevours in terms of therapeutic uses for malaria, diarrhea, ulcer, skin infections, diabetes and snake bite as well as source of food, fuel and fodder for coastal communities (Guebas *et al*., 2000; Cornejo *et al.*, 2005; Pattanaik *et al*., 2008). Mangroves are also potential sources of livelihood for communities through the development of policies and programmes that can help provide incentives to local people who are largely dependent on mangroves (Camacho *et al*., 2011). In some coastal areas mangrove ecosystems are converted into farm lands, resorts and aquaculture (Blasco *et al*., 2001; Ramasubramanian *et al*., 2006; Duke *et al*., 2007). Mangroves in synergy with other ecosystems have been noted for regulatory and protection functions (Harada *et al*., 2002; Macintosh, 2010; Garcia *et al*., 2014). Further studies have earlier recorded a regulatory / protective role of mangrove with regards to increase in soil / sediment accretion and shorelines stabilization (Satyanarayana *et al*., 2011), nutrient and heavy metals trapping thus facilitate improved water quality (Clark, 1998; Tam and Wong, 1999) and also act as a barrier against natural disasters (e.g., cyclones, typhoons or tsunamis) in coastal areas, (Bahuguna *et al*., 2008; Jeeban and Manas, 2018). It role in habitat support as a breeding, nesting as well as nursery ground for diverse aquatic lives have been reported (Nayak and Bahuguna, 2001; Nagelkerken *et al*., 2008; Ramasubramanian *et al*., 2006).

Research on coastal wetland has identified the need for increased awareness on the use of wetland resources that are neglected or unused because of a lack of indigenous knowledge about their economic value (Thapa and Dahal, 2009). For successful conservation and management, the participating local communities should be fully aware of the importance of wetlands as parts of water cycles, as well as the nature and effects of human impacts (Williams 2002). However, the inhabitants of the study communities in Ilaje had divergence awareness of the natural resource assets with the Fishes and Mangroves as the major known natural assets by the inhabitants. Other varying known assets include: Cray fish, Pig, Crab, Perinwinkle, and Timber, Crude oil, Mudskipper, Tortoise, Plantain, Snail and other animals. The findings imply that most of the coastal inhabitants are rural dwellers with varying levels of awareness and access to natural assets for their sustainable livelihood. This corroborates the assertion that such natural assets can be used for productive purposes to support livelihood activities (DFID, 2000; Nicol, 2000). This also suggests that households would survive with the help of key environmental resources and services as well as food produced from natural capital (Edet *et al*., 2017). In developing countries, where food security and poverty reduction receive higher priority than environmental protection, wetland conservation is difficult if the local communities do not understand the value of the wetlands (Wood *et al*. 2002). Related study has revealed that fisheries-related activities provide important sources of livelihoods for nearly 7 million people in India (Government of India, 2000). A large percentage of fishers are involved in artisanal, small-scale fishing operations in open water bodies including the sea, rivers and creeks, as well as in fish trading, processing and related activities (FAO, 2006).

Understanding the socioeconomic impact of coastal ecosystem revolve around the attitude and interaction between the communities and ecosystem. The study has revealed different levels of interaction between the inhabitants and ecosystem at stipulated period of years of co-existence in the environment across the study communities. However, the highest level of interaction among community inhabitant with the ecosystem was recorded in Ikorigho.

Analysis of the socio-economic profile of the study communities has revealed that greater percentage of the respondents had fishing, farming and trading as their major primary source of income among other sources of self-employed means of livelihood survival beside the secondary occupational office work. This implies that majority of the inhabitants have alternative means of livelihood survival apart from office work. This is in tandem with several other studies which have however recorded farming and trading among other alternative as major livelihood activity done by rural dwellers in Nigeria (Ekong 2010; Nzeh and Eboh, 2010; Ifeanyi-Obi *et al*., 2011, Adesope *et al*., 2011). In Africa also, various studies have shown that while most rural households are involved in agricultural activities as their main source of livelihood, they also engage in other income generating activities to augment their main source of income (Abimbola and Oluwakemi, 2013).It has been found that diversification increased households' income (Omeoresh, *et al*., 2010), Households having non and off-farm sources of income tend to easily become secured in their income than households that do not have such access (Nasa *et. al.* (2010).

Beside the level of preference for government protection effort report has also indicated some levels of agreement for traditional or community effort in mangrove protection, however, with such effort not agreed among inhabitant in Molutehin community. The need for community participation in the conservation and management of wetland resources is understood globally (Williams 2002). Several studies have earlier proposed a community-based

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conservation approach for better wetland resource use and conservation. The implementation of community forest programs, which also incorporate the community-based conservation approach along with many other pro-poor aspects (equal access and equitable resource distribution) in the lake complex, can be a good option because they empower the poor and disadvantaged resource-dependent communities and improve their livelihoods in the long run (Mehta and Heinen 2001, Andrianandrasana *et al*., 2005, Bajracharya *et al*., 2006).

Similar study, has although recorded low participation of local people, majority of them were found to have a positive view of the conservation activities and community-led conservation model of local organizations. The positive attitudes and perceptions are a good indicator that if some conservation initiative is taken, the local community welcomes conservation organizations only if they saw a long-term benefit and local participation. Participation of indigenous communities with their traditional knowledge, skills, and practices can help resource conservation while meeting their daily requirements. Andrade and Rhodes (2012) report that the higher the level of community participation, the higher their compliance to the resource conservation; community inclusion is a must for long-term conservation. Community based conservation is a better alternative compared to central level handling of natural resources and is an effective tool in solving conflict and engaging community participation for resource conservation, including wetlands (Trisurat 2006). Community-based conservation approaches have been adopted in a few wetlands of Bangladesh for more than a decade and have been highly successful in securing public participation, benefiting sharing and conservation (Thompson and Choudhury 2007). Diouf (2002) and Baral and Heinen (2007) support the view that decentralized participatory conservation programs could help resource-dependent developing countries minimize obstacles between conservation and sustainable development if they are implemented carefully. Based on the conservation status of the ecosystem the respondence of the inhabitants was in agreement for the protection of conservation areas by both government and traditional efforts which is in tandem with the level of awareness and support policy for protection.

CONCLUSION

Wetland resources contribute significantly to the household economy of people living near the coastal ecosystem. The Ilaje coastal ecosystem offer tremendous values and benefits with very much diverse biodiversity scenarios. Besides, there are also success stories that could encourage continuing implementation of sustainable livelihood and conservation programmes. Generally, the Ilaje coastal communities depend on the ecosystem for either their own consumption or the sale of such resources for money to buy food. Fuel wood, fish, periwinkle and crayfish were the major wetland resources being extracted. The study on Ileja coastal ecosystem has revealed diverse trend of biodiversity scenarios and ecosystem services and their relative significance to the livelihood system of the community members in the area. it was evident that; food, aquacultural practices, craftsmanship, sea transport and trading are the most important livelihood benefit of biodiversity provisioning service of the ecosystem. Climate regulation of livelihood benefit is the most important regulatory service of the biodiversity, while spiritual inspiration and formal education levels are the most livelihood benefit of the sociocultural biodiversity service and habitat, breeding / nursery and housing as most important of the supporting service in the coastal ecosystem. Sustainable livelihood especially among rural dwellers is one of the prerequisites for the envisaged rural development and diversification in the country. Sustainable livelihood among coastal communities of Ilaje will help to reduce poverty, crimes; militancy, terrorism and reduce over dependency on government among others. However, sustainable livelihood itself is conditioned by the quality, quantity, accessibility and sometimes affordability of the identified five principal assets including; physical, natural, human, social and financial assets. Hence, it is hinged on the balance in these assets, and Diouf (2002) its degree of resilience to shock or stress.

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CONFLICT OF INTEREST

The Authors state that the paper is devoid of any form of conflict

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