

Marine Cadastre: A Possible Tool For Effective Marine And Shoreline Management In Ghana

Isaac BOATENG, Ghana

Key Words: Marine Cadastre, Marine Space Administration and Shoreline Management

Summary

This paper discusses the importance of marine cadastre to the reduction of conflict among maritime stakeholders and how it can contribute to effective integrated coastal zone and shoreline management in Ghana.

Ghana is endowed with numerous valuable natural resources both on land and sea. Exploitation and management of these resources often leads to conflict, land tenure dispute and environmental problems due to poor administration of land and marine rights, interest and responsibilities.

In June 1999, the government of Ghana launched a new national land policy that sought to address some fundamental problems associated with land administration and management in the country. A computer aided information system land cadastre was proposed. At the moment the government of Ghana is working on implementing a system for the management and administering land in a spatial context with limited attention to the interface (shoreline) and marine spatial data infrastructure where issues of pollution, overexploitation, conflict and disputes are not only national but also international.

This paper concludes that marine cadastre could provide the basis for identifying wider variety of stakeholders and involving them in the decision-making processes associated with good marine administration and coastal zone management. The identified stakeholders could be made to take responsibility of any damage they may cause to the environment.

Marine Cadastre: A Possible Tool For Effective Marine And Shoreline Management In Ghana

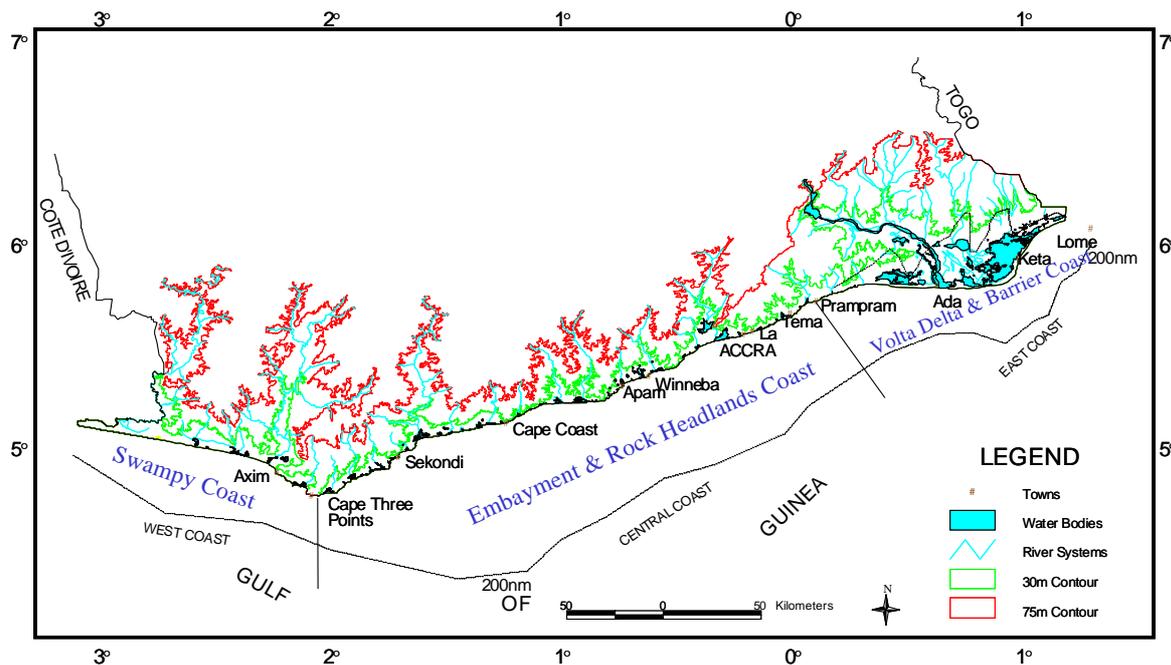
Isaac BOATENG, Ghana

1. INTRODUCTION

Ghana shares trans-boundary waters of the western Africa coastline defined by the Guinea Current Large Marine Ecosystem that extends from Bissagos Islands (Guinea Bissau) in the North to Cape Lopez (Gabon) in the south. The ecosystem stretches from the coast of Guinea Bissau to Angola, covering sixteen countries (Angola, Benin, Cameroon, Congo, Democratic Republic of Congo, Cote d'Ivoire, Gabon, Ghana, Equatorial Guinea, Guinea Bissau, Liberia, Nigeria, Sao Tome and Principe, Sierra Leone, and the Republic of Togo).

The total land area of Ghana is 238,533 km² and has a coastline of 550km. The coastal zone in Ghana represent only about 6.5% of the land area and it is home to 25% of nation's total population of 20 million. Ghana's Exclusive Economic Zone extends to the 200 nautical miles. The coastal zone also extends from the low water mark to the 30-metre contour (figure 1).

FIGURE 1 : MAP SHOWING THE COASTAL ZONE OF GHANA



Source: after Armah and Amlalo, (1998).

A system for the administration and management of land in spatial context (land cadastre) have existed over many years but no such system exists in Ghana. Lack of land cadastre has been blamed for the numerous problems in the land administration in Ghana. To solve the land administration problems, the government came out with a 20 years Land Administration Programme (LAP), which will produce a land cadastre for the country. The LAP, which officially took off in 2003, is expected to create a land cadastre that will ensure good land administration and the management of land records. In spite of the existence of similar and perhaps serious administration problems in the marine environment; the government gave limited attention to the issue of marine space administration when developing the LAP policy.

However, the consequences of poor marine space administration are very substantial and they are draining the economy millions of dollars every year due to the numerous health and environmental impacts they have on the populace. According to the environment Minister (Miss Christine Churcher), 'over-exploitation of fisheries resources, impacts from land-based settlement activities and pollution from urban and domestic sewerage run-off, and from industry (such as gas and oil mining in particular off the coasts) of maritime neighbouring countries (Angola, Cameroon, Gabon, and Nigeria) are resulting in a rapid degradation of vulnerable coastal and offshore habitats'. Other activities, which are culprits, include agriculture; transport sources, erosion and poorly planned and managed coastal developments. The impacts especially on near-shore and shared living marine resources are of regional proportions, putting the economies and health of the populace at un-imaginable risks socially, economically and politically.

Given this background, it is quite clear that if the issue of marine administration is not tackled now along side with the LAP, the poor marine space administration and its associated environmental, social and economic cost may over-shadow all the benefit that could be reaped from the land cadastre. It is therefore, the interest of the author to draw attention of the government and policy makers to the importance of efficient marine space administration and also to propose marine cadastre as a possible tool to solve the problem. Of course, Ghanaians would like to see their coast and Exclusive Economic Zone well managed much as they would like to have the land administration improved. This is because about 25 % of Ghanaian livelihood depends on coastal and marine resources.

2. MARINE CADASTRE

Collier, et al (2001) identified that there is an increasing realisation that the interest of a nation does not stop at the land-sea interface. Truly there are marine rights and responsibilities to which countries including Ghana has sovereign right of claim (United Nation Convention on the Law of Sea, UNCLOS). The increase competition for the access and usage of coastal and marine resource in recent times is similar or even more than the land base competition. Hence there is the need to manage coastal and marine resources for equitable access and in a sustainable way as well as ensure that users take responsibility of the damage they cause to the coastal and marine environment.

Many research have been conducted on the issue of marine space administration, ocean tenure and boundaries. Some of the researches were conducted in Australia (Grant and Williamson, 1999, Collier et al, 2001), Canada (Nichols et al, 2000, Ng'anga et al, 2001.), New Zealand (Robertson et al, 1999, Hoogsteden, 2001), South Africa (Rommelaere, 1983, Watermeyer, 2001, Wonnacott, 2001), USA (Fowler and Treml, 2001) and Netherlands (Barry et al, 2002)

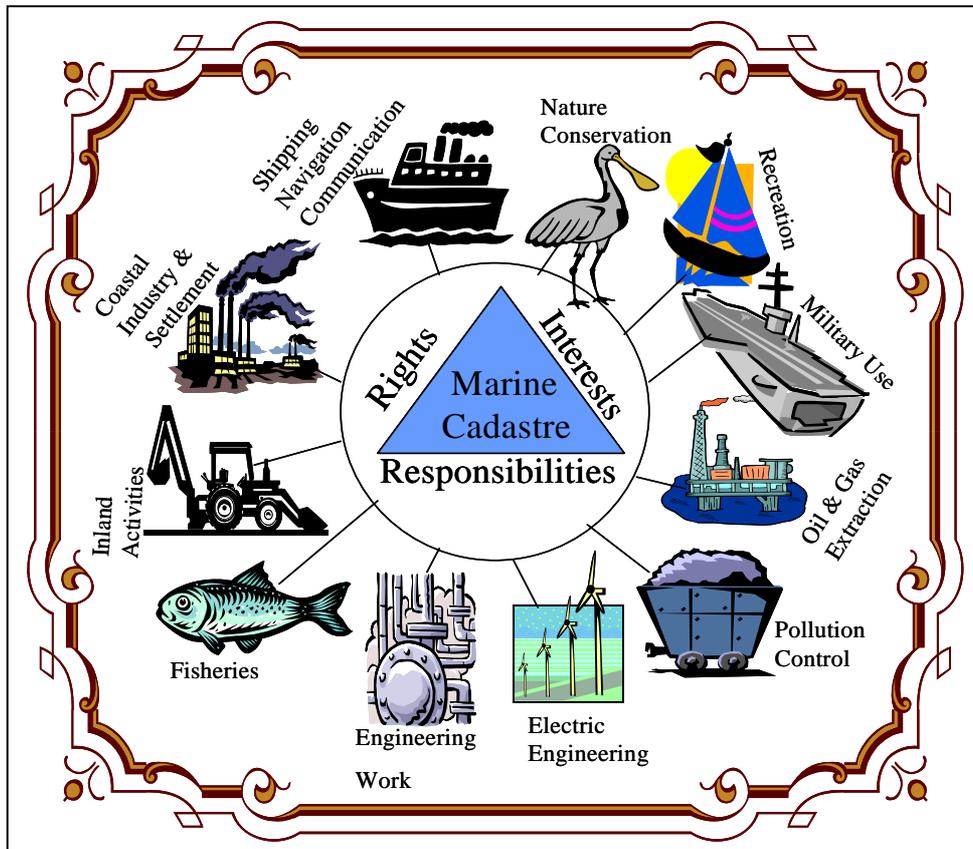
The results of most of the research saw marine cadastre as the way forward to the issues of ocean governance. The proponents of marine cadastre have advance two definitions for the concept. The two definitions are:

- A system to enable the boundaries of maritime rights and interests to be recorded spatially managed and physically defined in relationship to the boundaries of other neighbouring or underlying rights and interests.

- A maritime information system, encompassing both the nature and spatial extent of the interests and property rights, with respect to ownership, various rights and responsibilities in the marine jurisdiction.

Sutherland, (2005) identified that though the two definitions are stated from two different perspectives (boundary and broader view) they converge on the point that a marine cadastre is basically a marine information system in which the primary information held relates to rights and interests together with restrictions and responsibilities to marine spatial extents.

Figure 2: Hypothetical View Of Coastal And Marine Information System



Like all new concepts, developing marine cadastre is not without problems. Collier et al, (2001) outlined the following problems of marine cadastre:

- The concept of tenure does not exist at sea,
- It is not possible to use classical means of boundary demarcation offshore,
- The marine environment is three dimensional – classical 2D simplifications will not suffice,
- It is possible (common) for multiple (overlapping) rights to exist in a single locality,
- Rights can vary with time, adding a fourth dimension to the spatial data, and
- The baseline to which many maritime boundaries are related is ambulatory.

It must be noted that the problems outlined above are surmountable if they would be given further research, political will and proper legislations and policies, the concept of marine cadastre could be made a reality.

3. SHORELINE MANAGEMENT

According to Bird (1993) shoreline management refers to the maintenance of salt marshes, mangrove and inter-tidal mudflats, sandflats, to preserve sites for nature conservation, and to ensure the continue existence of beach and coastal dunes. Shoreline management recognises inter-tidal areas, lagoons and waters as a single interacting and indivisible resource unit that lies between the hinterland and the open sea and whose future must be planned and managed as a unified whole (Clark, 1992).

Shoreline therefore acts as the interface between land and sea. This implies that both land and maritime management problems are likely to affect the shoreline and vice versa. Based on this the shoreline serves as a bridge between land cadastre and marine cadastre. It is therefore implied that marine cadastre is likely to ensure effective shoreline management since it matches rights and interests with responsibilities and restrictions. Given marine cadastre and appropriate environmental policies and legislations, any maritime stakeholder whose action or activity cause damage to the shoreline could either be restricted or held responsible for management of the damage.

4. ISSUES OF COASTAL AND MARINE ADMINISTRATION IN GHANA

Ghana rectified the UNCLOS in June 1983 but had not rectified two amendments to the convention which include the Agreement relating to the implementation of Part XI of the Convention which, came into force in 28 July, 1996 (This Agreement deals with the various issues which include costs to States Parties and institutional arrangements, decision-making mechanisms for the Authority, and future amendments of the Convention) and the Agreement for the implementation of the provisions of the Convention relating to the conservation and management of straddling fish stocks and highly migratory fish stocks (in force as from 11 December, 2001). This clearly indicates that Ghana has not given the issue of ocean governance the seriousness it deserves. The maritime jurisdiction of Ghana covers the following extent:

- Territorial sea (0-12 nautical miles)
- Contiguous zone (12-24 nautical miles)
- Exclusive economic zone (12-200 nautical miles)
- Continental shelf (up to 200 nautical miles)

A lot of poaching, pollution and abuses goes on in Ghana's Exclusive economic zone due to inadequate resources to police the area and to enforce the various rules and policies that relates to access and exploitation of Ghana's coastal and marine resources. The Minister of Defence, Dr Kwame Addo Kufour appealed to the Commander of the US Naval Forces in Europe (Admiral Henry Ulrich) for support.

The commander visited Ghana in February this year to talk about the Gulf of Guinea maritime safety and security conference, which was hosted by Ghana Arm forces in March 2006. The Defence Minister said, “Ghana Navy was inadequately resourced to apprehend foreign fishing trawlers that poached from the country waters”. The Minister appealed to the US to help with logistics to patrol the maritime zone of Ghana, because narcotic drug trafficking as well as smuggling was thriving in the coastal areas (*General news, Thursday 2 February, 2006, www.ghanaweb.com*).

Apart from the issues raised by the Defence Minister, there are other major problems. These include:

Depleted fisheries: Due to inadequate resource to enforce both national and international fishing regulations most artisanal fishermen and commercial trawlers used illegal fishing nets (small mesh size) and other fishing equipments that catches young fish, endangered species and also destroy other marine life and their ecology.

Plate 1: Illegal Fishing Net Found at Ghana beach ready for Fishing



Artisanal interest verse Commercial trawlers; often there is a Conflict between the local artisanal fishermen and the commercial trawlers. To protect the jobs of thousands of the local fishermen, the fishing regulation in Ghana require the commercial trawlers to operate beyond 200

nautical mile and leave the coast to the 200 nautical miles for the artisanal fishermen who use canoes with outboard motors. The commercial trawlers often flout this fishing regulation due to inadequate policing and enforcement. This always resulted in protest by the local fishermen who see the action of the trawlers as destruction of their livelihood. Not only this but also there is often conflict between local interest, commercial interest and conservationist regarding access and usage of coastal and marine resources.

Plate 2: Artisanal Fishing Port in Ghana



Pollution; this is also a major factor affecting ocean governance and coastal and marine life in Ghana and the entire Gulf of Guinea Large Marine Ecosystem. Offshore mining, oil spillage, land-based refuse, dumping from shipping vessels and discharge of untreated industrial and domestic sewage among others pollute the sea waters and negatively impact on coastal and marine living organisms and their ecosystem.

Plate 3: Refuse Dumping at Sea Washed at Shore, Chorkor, Accra



Destruction of mangroves and wetlands; it is estimated that 55% of the mangroves and significant wetlands along the coast of Ghana (especially around Accra area) have been decimated through pollution and over-cutting.

Coastal erosion; alterations to fluvial sediment discharge regimes from dam construction for domestic and industrial water supply, irrigation and Hydro Power generation together with high wave action, construction of port jetties which cause sediment deficit down the drift and illegal beach sand mining for construction have led to severe coastal erosion along the entire coastline of Ghana.

Plate 4: Coastal Erosion at Nkontompo, Takoradi



5. MARINE CADASTRE AND EFFECTIVE SHORELINE AND MARITIME ADMINISTRATION IN GHANA

Barry et al (n.d) observed that the tension concerning rights of access, usage and possession of the ocean and the concomitant obligations pertaining thereto are similar to those pertaining to land. However, this observation does not exist in Ghana. Since most maritime stakeholders and users exploit the coastal and marine resources without taking responsibilities of the harm they cause to the environment.

There is the difficulty of identifying most of the users and their activities as well as the environmental problems they cause due to inadequate data on users, stakeholder and their activities, interest and right in the coastal and marine area. Hence, it is difficult if not impossible to ask users to take responsibilities of any environmental damage (i.e. apply polluter pays principle). As a result of this, most damage to coastal and marine environment becomes the burden of the government. For instance, there is enough evidence to suggest that port construction at Sekondi and Takoradi are causing severe erosion at Ngerasi and Nkontompo respectively but none of the port authorities have taken responsibility to manage the erosion. Government, in responding to the appeals of the local residents who were losing their properties used her scarce financial resource to construct rock revetment at these sites (plate 5). Another

situation, which is of much concern, is the erosion at Keta and the funding of Keta sea defence by Government though earlier research has suggested that the severe erosion at Keta were caused by the construction of Volta Dam (Ly, 1980). Therefore, the cost of the Keta sea defence should have borne by the Volta River Authority.

Plate 5: boulder revetment at Nkontompo, Takoradi



Since marine cadastre relates rights and interests together with restrictions and responsibilities to marine spatial extents (figure 2) it could possibly help to solve many of the shoreline, coastal and marine administration problems if it is adopted in Ghana, given that the existing legislation and policy on environment would be enforced. These are the ways marine cadastre can ensure effective coastal and marine administration in Ghana:

- Help to clarify jurisdictional complexities in coastal and maritime zones,
- It will provide the basis for identifying the wide variety of stakeholders and involve them in the management as well as charging them with the responsibilities of any damaged they cause to both the shoreline and maritime environment,
- Help to build capacity for collaborative management, increase sense of ownership and thereby reducing the need for policing,
- Prevent ownership issues from becoming contentious (e.g. oil blocks),
- It will help to resolve uncertainties with maritime boundaries between neighbouring states, and

-Lead to the effective implementation of national and international coastal and marine legislations and policies.

6. CONCLUSION

Ghana has both land and marine administration problems. The government of Ghana in a process of solving the land management problems had implement Land Administration Programme that seeks to establish a computer aided land cadastre in a spatial context. Integrated Coastal Zone Management (ICZM) Plan has been in place since 1998. Though inadequate funding affected the ICZM plan implementation, certain amount of success has been achieved. However, limited attention is being paid to the problems of both marine space administration and the shoreline (*area between the low water mark and the high water mark*) where issues of pollution, overexploitation, poaching, conflict of interests and disputes are not only national but also international in nature.

Notwithstanding, coastal and marine resources support 25% of the population and 75% of total industries in the country not forgetting the ecological importance of coastal and marine environment. The large contributions of the two resources to the national economy cannot be overstated. It is important therefore, that coastal and marine space administration is given similar preference and attention received by land administration.

This paper propose that the government of Ghana should considered marine cadastre as the way forward for effective shoreline management and marine space administration. This is because marine cadastre will help to identify a wide variety of stakeholders and involve them in decision-making and management (integrated management). Perhaps, the most important benefit of all is that marine cadastre could be used to identify stakeholders whose action cause damage to the environment and either charge them with the management responsibilities or restrict their activities. This will help to change the current situation where the government solely bears most of the environmental problems caused by numerous national private and public users and other activities of neighbouring countries as well as passing commercial vessel in the Exclusive and Economic Zone of Ghana.

Finally, it is important to mention that marine cadastre may be viewed as a theoretical concept, however, given the needed research, participation and the most importantly, political will, the concept could be made a reality in Ghana.

7. REFERENCES

Armah, A.K. and Amlalo, D.S. (1998). Coastal Zone Profile of Ghana. Accra, Gulf of Guinea Large Marine Ecosystem Project. Ministry of Environment, Science and Technology

Barry, M., Elema, I., Molen, P (n.d.) Ocean Governance and the Marine Cadastre: the Netherlands North Sea. Retrieved may, 21 2006 from <http://www.hydro.nl/pdfs/barry-marine%20cadastres%20in%20the%20netherlands.pdf>

Barry, M. and Fourie, C. (2002). Evaluating Cadastral Systems in Uncertain Situations: A Conceptual Framework based on Soft Systems Theory. *International Journal of Geographical Information Science* 16(1) 23-40

Bird, E.C.F. (1993). *Submerging Coasts: the Effects of Rising Sea Level on Coastal Environments*. Chichester: John Wiley and sons

Clark, R. J. (1992). *Integrated Management of Coastal Zone*. Rome FAO.

Churcher, C. (2006) The Speech Delivered By Honourable Minister Of Environment and Science, Ghana at The High Level Panel Meeting on Linking National and Regional Efforts in Ocean and Coastal Management: African Perspectives at The 3rd Global Conference On Oceans, Coastal And Islands Janaury 23 - 28, 2006, Retrieved July 01, 2006 from, <http://www.globaloceans.org/globalconferences/2006/pdf/albertowusu-sarpong.pdf>

Collier, P.A., Leahy, F.J. and Williamson, I.P. (2001) *Defining a Marine Cadastre for Australia. A spatial Odyssey: 42nd Australian surveyors congress*.

Fowler, C. and Treml, E. (2001). Building a Marine Cadastral Information System for the United States – a case study. *Computers, Environment and Urban Systems*, 25, 493-507.

Grant, D. and Williamson, I. (1999). Report of the Workshop on Land Tenure and Cadastral Infrastructures for Sustainable Development – Bathurst 18-22 October 1999, International Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development, Melbourne.

Hoogsteden, C. (2001). The Political Economy behind New Zealand's emerging Maritime Cadastre: Principles, Experiences and Future Challenges. Proceedings of the 12th Conferences of South African Surveyors, Cape Town.

Ly, C. K. (1980). The Role of the Akosombo Dam on the Volta River in Causing Coastal erosion in Central and Eastern Ghana (West Africa). *Marine Geology*. 37: 323-332

Kufour, A.K. (2006). Top US naval Officer Calls on Defence Minister. Ghana Minister of Defence discussion with Commander of the US Naval forces in Europe Retrieved July 7, 2006 from www.Ghanaweb.com general news February 2, 2006.

Ng'anga, S. Nichols, S. Sutherland, M. and Cockburn, S. (2001). Towards a Multidimensional Marine Cadastre in Support of Good Ocean Governance. Proceedings of the International Conference on Spatial Information for Sustainable Development, Nairobi.

Nichols, S., Sutherland, M. Ng'anga, S. and Monahan, D. (2000). Good Governance of Canada's Offshore and Coastal Zone: Towards an Understanding of Maritime Boundary Issues. *Geomatica* 54(4), 415 – 424.

Robertson, W. A. Benwell, G. and Hoogsteden, C. C. (1999). The Marine Resource: Administration Infrastructure Requirements. International Conference on Land Tenure and Cadastral Infrastructure for Sustainable Development, Melbourne, pp 242 – 241.

Rommelaere, C. (1983). Demarcation of Coastal Mining Boundaries. *Journal of the Institute of Mining Surveyors of South Africa*, XXII(2), 23-26.

Sutherland, M. (2005) The Marine Cadastre: Legal and Spatial Data Contribution to Economic, Environmental and Social Development. TS 40 – FIG Commission 4 Working Group Activities, FIG Working Week and GSDI-8, April 16-21, 2005, Cairo, Egypt

United Nations, (2006) Ocean and the Law of the Sea. Retrieved July 01, 2006 from http://www.un.org/depts/los/convention_agreements/covention_overview_conventio.htm

Wonnacott, R. T. (2001). The Determination and Accuracy of Maritime Boundaries and Zones of South Africa, ABLOS Conference, Monaco.

Watermeyer, A. (2001). The Status of South Africa's Maritime Zones. Proceedings of the 12th Conference of South African Surveyors, Cape Town.

BIOGRAPHICAL NOTES

Isaac Boateng is a founding member and Chief Executive Officer of CoastNet-Ghana, a Non Governmental Organisation involved in Coastal Zone Management in Ghana. He is also a Part-time Lecturer at the University of Portsmouth where he is undertaking a PhD research on the topic, 'Integrated Shoreline Management and Adaptation of Ghana Coast to Climate Change' at the Department of Geography, University of Portsmouth. Isaac holds MSc. Degree in Coastal and Marine Resource Management from the University of Portsmouth, MA. Level research study in Scandinavian Welfare Model at Roskilde University, Denmark and also B.Ed degree in Social Studies at the University of Cape Coast, Ghana. Isaac has also work as a Lecturer at the Liberal Studies Department of Kumasi Polytechnic in Ghana.

ACKNOWLEDGEMENT

I would like extending my profound gratitude to **Dr. Diane Dumashie** of Dumashie and Associates, UK and **Mr. Timothy Goodhead**, Head of Department, Environmental Design and Management, University of Portsmouth, UK for supporting me to attend this conference.

AUTHOR'S CONTACT:

Mr Isaac Boateng
Department of Geography,
University of Portsmouth
Buckingham Building,
Portsmouth, PO1 3HE
United Kingdom
Tel. +44 (0) 79 8416 4259
Fax. +44 (0) 23 9284 2512
Email: boatengis@yahoo.co.uk
Isaac.boateng@port.ac.uk