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**Articles**

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<b>Change Trends In Agricultural Extension Strategies: Who Dictates? .....</b>	<b>3</b>
<i>Beyuo Alfred Naamwintome. ....</i>	<i>3</i>
<i>Dr. David Millar. ....</i>	<i>3</i>
<b>A Knowledge Management Processes Driving Performance is Unlikely to Succeed without a Knowledge Audit.....</b>	<b>14</b>
<i>Wasin Liampreecha.....</i>	<i>14</i>
<i>Korakot Chamnanchang.....</i>	<i>14</i>
<b>Industrial Applications of the Analytic Hierachy Process in Dveloping Countries. .</b>	<b>30</b>
<i>Christian Baruka Alphonce .....</i>	<i>30</i>
<b>Aesthetic Analysis In The Study Of Graphic Desings Visual Perception In Advertisement Of Products In South Western Nigeria: A Case Study Of Akure Consumer Of Products .....</b>	<b>38</b>
<i>Oladumiye E.B.....</i>	<i>38</i>
<i>Ogunduyile S.R.....</i>	<i>38</i>
<i>Ogunlade B.A .....</i>	<i>38</i>
<b>An examination of housing and environmental health of a heterogeneous community of Agege, Lagos, Nigeria .....</b>	<b>56</b>
<i>Omole, F.K.....</i>	<i>56</i>
<i>Eke Edward E.....</i>	<i>56</i>
<i>Olorunfemi, S.O .....</i>	<i>56</i>

<i>Bako, A.I</i> .....	56
<i>Source: Author's Field Work, 2012</i> .....	63
<i>Source: Author's computation, 2012</i> .....	68
<b>Biological Observations on the Elephantsnout Fish <i>Mormyrus Rume</i> (Mormyridae) From Ose River, Southwestern Nigeria</b> .....	<b>75</b>
<i>Dominic Olabode Odedeyi</i> .....	75
<b>Effect of Landscaping on Residential Property Values in Akure, Nigeria</b> .....	<b>83</b>
<i>Ajayi, M.A</i> .....	83
<i>Omole, F.K</i> .....	83
<i>Ogunleye, M.B</i> .....	83
<i>Bako, A</i> .....	83
<b>Adult Education in Nigeria: Effects of Food Security, Women and Youth Development</b> .....	<b>94</b>
<i>Zuofa, Comfort. C. (Ph.D)</i> .....	94
<i>Adeyemo, Abiodun. O. (Ph.D)</i> .....	94
<b>Using Reflection Journal to Evaluate Students's Responses to Problem-Based Learning for First Year Chemical Engineering Students</b> .....	<b>109</b>
<i>Aziatul Niza Sadikin</i> .....	109
<i>Mimi Haryani Hassim</i> .....	109
<i>Jamarosliza Jamaluddin</i> .....	109
<b>Application of Geographic Information Systems to Management of Municipal Solid Waste Depots in Lagos Island Local Government Area of Lagos State</b> .....	<b>116</b>
<i>Bolanle WAHAB</i> .....	116
<i>Saeed OJOLOWO</i> .....	116
<b>Appreciation and Enjoyment: Zhang Dai and Tourism in Late Ming China</b> .....	<b>130</b>
<i>Xiaolin Duan</i> .....	130

# Change Trends In Agricultural Extension Strategies: Who Dictates?

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## **Abstract**

Agriculture Extension Services is core to every nation's agricultural development. There are efforts by the various stakeholders to improve extension services through various means and processes. The outcomes of the interactive processes between farmers and frontline staff in this effort so far in Ghana, if not Africa as a whole, have not been effective and hence the need to review the strategies used so far with the bid to contribute towards development intervention in the agricultural sector. The framework adopted for this review process is to do a trend-analysis within a Grounded Theory approach. Grounded Theory being a general methodology for developing theory that is grounded in data systematically gathered and analyzed. This is liaised with anecdotal empirical data collected in the field and an extensive literature review. The findings include the fact that a lot of efforts had been made in terms of strategies towards agricultural development. However, in all these efforts, the dominant position is that agricultural extension has meant a teacher/pupil relationship – with the frontline staff assuming the position of knowing it all and farmer being illiterate, uninformed, and must be taught . However the reality on the ground in terms of the knowledge status of the farmer is to the contrary. Hence the recommendation is to see the farmer as an expert just like the agricultural extension agent if not better, and thus all agricultural extension strategies should start from this fundamental principle. . This means that, sustainable extension strategies should be process-focused, interactive bottom-up, and endogenous; engendering mutual learning for all stakeholders.

**Key words:** Change, agricultural extension, stakeholders, dictate, strategies.

## 1. Introductory Background

Professionals in various fields of human endeavour have been trying to extend knowledge in their areas to the wider society through the appropriate means possible. These knowledge extension processes is with the view to increase productivity and, so doing, promote human development. The outcomes of some efforts have been favourable and others not; largely due to the mode of 'extending this knowledge'. In all the instances, improvement is usually sought by way of optimizing efforts. Change in human endeavour started long ago and is still progressing. Man started primarily as a hunter and gatherer and existed in this state for many years. It is only about 10,000 years ago that he started to practice agriculture and this started off development in this sector and various fields of human endeavour to date. In agriculture especially, the percentage of population who is active in it decreases as industrialization progresses. In developed or highly industrialized countries, this percentage rarely exceeds 6% but in many developing countries, it is over 60% (Sene, 1995). Progress made in agriculture is mainly over 50 years ago and this is due to distribution of inputs, seed selection and the dawn of motorization and this progress has not been uniformly distributed if it is optimum at all.

Majority (three-quarters) of the world's poorest peoples, who are smallholder farmers, are resident in rural areas, and the vast majority depend on agriculture for their livelihoods, survival, and their backbone is agricultural productivity (Millar, 2008). However, this group is perceived as "... illiterate, in-accessible, powerless, unorganised, suspicious of outsiders, unaccustomed to change, unable to take risks and convinced by lifelong experience that their situation is not likely to improve. They often have very little capital, very little land and very little experience in handling or opportunity of obtaining credit. They speak a bewildering assortment of languages and often live in inadequately understood ecologically vulnerable environments such as semi-arid grasslands" according to Raymond (1990:25 as cited in Millar).

However, Africa's growth and progressive development of this sector is one of the most effective ways of tackling poverty and reducing hunger. Smallholder farmers produce 50–80 per cent of the staple foods that are consumed in developing countries, but unfortunately, many are inadequately served by extension and advisory services according to Pye-Smith (2012). Agriculture is very vital for every economy and in the case of Ghana; it employs some 60% of the total labour force as main activity, contributes 40% of Gross Domestic Product (GDP) and provides about 64% of exports according to Agricultural Extension Handbook (2006 as cited in Millar, 2008). At the regional level, joint efforts are beginning to emerge and reflecting the importance of agriculture. Progress is being made towards the creation of common agricultural policies which seeks to harmonize procedures for land access, natural resource management, assistance for farmers and access to credits especially for women who are recognized as the driving force in micro credit-programmes because they are financially responsible and use loans to the benefit of their households and communities especially in the rural areas (Spore, 2005). Also in these areas, more than a billion people are challenged with long distances, poor infrastructure and seasonal incomes and thus cannot invest in the future. For instance, in Ghana and Papua New Guinea production rates of banana has exceeded local demand but supply to markets in the surrounding towns is difficult because of poor roads (Spore, 2005) and this is a reflection of a challenge.

These challenges are of serious concerns and worth strategizing to overcome. This makes Change in this regards imperative and thus ensuring that knowledge in the various fields of human endeavour such as agriculture is extended in an effort to cause change for man progress is paramount. It is not surprising that this started long time ago even though without much success. For instance the Green Revolution has brought about impressive increase in production but with associated problems of equity, stability and sustainability (Mazur and Titiola, 1992). Since the 1840s and early 1900s (Leeuwis, 2004; Spore 2003) traditional universities in United Kingdom and United States of America respectively developed a social role to extend their knowledge in an effort to serve the educational needs of rapidly growing local communities. This gives a reflection on the age of extension and could be attributed to an effort to inform and thus cause a change in these communities

for the betterment of man. As a body of knowledge, extension is a science was developed first as a specialization within rural sociology with a focus on change and thus, an instrument for promoting change. Its practice in other fields such as environmental protection, preventive health, customer education and so on is accumulating a wealth of information according to Roling (1990).

Diversity of this extension especially in the agricultural sector ranged from the centralized top-down parachuting of messages from the Ministries and Marketing Boards, to a host of others. These extension strategies faced and will continue to face challenges of the time especially in view of the target beneficiaries who are the stakeholders. According to Pye-Smith (2012:5), "One of the root causes of low productivity in Africa is the poor performance of the extension and advisory services". Small-scale agriculture is acknowledged to have the potential of providing growing and sustainable revenues as well as consolidating the most positive social and cultural values of rural societies in West Africa (Spore, 2004) but has suffered greatly, to the detriment of family and national well-being and health as a result of traditional development programs (Rivera and Corning, 1990) which had been tailored towards economic growth without regard to the process.

It is in the light of this that, the paper examined the concept of extension and in the context of agricultural development and soft system perspectives. I discussed agricultural extension strategies. I argued and concluded in favour of strategies that are process-conscious. Even though the end and the process in any human endeavour are important, the process adds evaluatory component to it. I employed grounded theory, a general methodology for developing theory that is grounded in data systematically gathered and analyzed.

## **2. Methodology**

The methodological framework adopted for this review process was to delve into the history of agricultural extension services dating back forty (40) years or more; hence both a time-trend analysis and evolutionary analysis of extension approaches in Ghana was done, within a Grounded Theory approach. Grounded Theory being a general methodology for developing theory that is grounded in data systematically gathered and analyzed from interrelated concepts (Lingard, Albert, and Levinson, 2008). A study which is guided by this theory seeks no representativeness to achieve statistical generalisability but rather aims to describe, explain and has the potential of predicting phenomena based on empirical data. Such study typically leads to theory/ies that pertain/s to specific aspects of the phenomenon being studied and thus employs comparative, iterative, and interactive method (Charmaz, 2012). Hence the theories of the various models of agricultural extension services are analysed and confronted with contemporary findings. This review was triangulated with anecdotal empirical data collected in the field and an extensive literature review.

## **3. Agricultural Extension**

Extension originates from the academia since the 1840s and the early 1900s in the West and connotes teacher/student relationship (Leeuwis, 2004). Agricultural extension has been conceived as a service to "extend" (research-based) knowledge to the rural sector to improve the lives of rural residents who are mostly farmers. In the field of agriculture, the extension agent transfers knowledge, technology to the farmer without due respect to the role of the smallholder farmers; a top-down approach which ignores multiple sources of knowledge. The agricultural extension agent has been trained to assume the position of an expert who sends down information to the farmer and the farmer listens and receives. The agricultural extension agents of government generally decide what is best for farmers and equally acting as advisers and policemen (Pye-Smith, 2012). In the case of Ghana, agricultural extension services provision started in the colonial era with the emphasis on cocoa and other tree crops for export (Anderson, Feder and Ganguly, 2006) and extended to other crops after independence. The main focus of this public agricultural extension provision was to advise farmers to apply subsidized inputs to increase yields (Amezah and Hesse, 2002) since the growth of agricultural productivity was constrained by farmer backwardness (Anderson et al, 2006).

Intervention packages made very little use of indigenous modes of production if at all but relied more on whole-sale importation of technology according to Millar (2008).

Agricultural extension thus, is very much focused on increasing production, improving yields, training farmers and transferring technology; the end. This notion of agricultural extension does not only defy participation with its attendant effects of severing or blocking off the needs and demands of farmers but is linear and fits best in the hard-system model; issues of processes have been neglected in this model. From a system perspective, agricultural extension requires both the extension agent and the farmer to exist as one whole (Roling, 1995).

This (hard-system) model of extension is that which was adopted and emphasized by the World Bank in the mid-1970s and funded in forty countries which proved impressive results according to Benor and Baxter (1984). This model of agricultural extension does not reflect the real situation since according to (Millar, 2008) the farmer is an 'expert' in his or her own right just like the agricultural extension agent and this can be harnessed for agricultural development. The farmer, as a child is born into farming and thus schooled in it. For instance "Children begin learning the essentials of farming by following their parents to the fields" according to Spore (2004:1). Knowledge and experience of farmers and the mapping out of intervention processes are vital and the utilization of these has the potential of guaranteeing food security and agricultural development (Millar, 2008). This makes them active researchers and experimenters and not passive receivers of ideas of scientists (Roling, 1995; Titilola, 1994; World Bank, 1998). Agricultural extension should be seen as non-formal and continuous education service with the focus of improving the welfare of smallholder farmers who are the majority. It should be seen as facilitation and a learning process with target beneficiaries. It should not only be farmer-centred but participatory and equally takes into account local culture and tradition of the farmer.

Farmers in many parts of the world are always seeking ways to improve their farming systems and to adapt their practices to changing agro-ecological and socioeconomic conditions. They adopt, adapt and formulate new ideas and innovations that are being tried out in different settings, evaluated and assessed for improving the way they farm. The circumstances under which farmers' experiences are developed and accumulated over generations are greatly influenced by other factors and it is these factors for instance technological changes and public interventions that make traditional adaptation and adjustment mechanisms unfeasible and ineffective (Jodha, 1990). The expertise of farmers has been underestimated and this could be attributed to lack of *process-thinking* and this has contributed to poor utilization of technology (Ison, 1990).

Process-thinking has the potential of drawing on the experiences of farmers (Spore 2004) as well as easing the overlap of interests of stakeholders who in this case are the farmer and agricultural extension agent. As a process, recognizing the interconnectedness of all elements involved and coordinating them is very relevant and this borders on communication considering the actors involved who in this case are the stakeholders. These actors are supposed to have a common interest which is the promotion of agricultural development and this has been the concern of most government and donor agencies. This has been promoted via various extension strategies which are supposed to contribute to the improvement of agriculture. Thus extension strategies are appropriate approaches or services that seek to improve the situation of agricultural development. The outcomes of these strategies employed by donor agencies are varied and thus call for review not only to learn from the shortfalls but also to recommend the suitable one/s in an effort to mitigate the unsatisfactory extension performance which has been acknowledged and commented by many scholars and observers as in training and visit (Anderson et al, 2006).

### **3.1 Training-and-visit (T&V)**

This strategy was intended to build a professional agricultural extension service which has the potential of assisting farmers to raise production and incomes and also provide appropriate support for agricultural development. It was geared towards professionalism in terms of appropriate advice to and support of the farmer. As a single line of command, it concentrated on the efforts of

effective training and visit, time-bound work, field and farmer orientation, regular and continuous training and linkages with research; thus strong linkages with agricultural research institutions, places great emphasis on a professional approach to extension and requires an exclusive devotion to extension work (Ilevbaoje, 2004).

T&V is the centralised model which existed and its focus was fortnightly training sessions as well as Extension Field Staff (EFS) following fortnightly schedule to provide the information to contact farmers (CFs) who were in turn passed on the same to non contact farmers (NCFs) and this impacted negatively on information reaching farmers (Ashraf et. al., 2009; Davis, 2008). Ghana, through her Ministry of Food and Agriculture (MOFA) implemented Training and Visit System of extension with funding support from the World Bank and others in the 1970s and this was intended to provide specific technologies on time to farmers and this system was not only top-down but also single-line in command and never contributed significantly to better client participation and effectiveness of extension delivery (Amezah and Hesse, 2002). Hence as an overall assessment, the system was inefficient and ineffective (Davis, 2008).

T&V as a system was intended and financed by the world bank to mitigate the weaknesses of the public extension which manifested as unsatisfactory extension performance (Anderson et al, 2006) but the implementation, analysis and utilization of the outcome was never critical and hence the perceived success which induced World Bank staff and management to actively promote the adoption of the T&V extension model. According to Anderson et al (2006), it was the lack of convincing evidence of major gains attributable to T&V extension which induced the fall of it.

Countries that adopted it centrally set production targets and it was the task of the extension agent to pass on information about these targets and how to attain them to farmers. This was nothing less than centre-pushing, dictation of production goals and thus failure to address the diverse service needs of poor smallholders; a rigidly top-down in approach. Farmer participation was non-existent and the focus was on the end to the neglect of the process. The approach lacked inputs from the grassroots and suggested that the ultimate source of innovation and information come only from the above according to Reijntjes, Haverkort and Waters-Bayer (1995).

It was this that necessitated greater interest in alternative extension concepts in the 1990s with stronger participatory aspects; concepts that intended beneficiaries to become empowered clients with their needs and demands articulated through service arrangements. Concerns on participation are never addressed just as in contract farming which is considered below.

### **3.2 Contract Farming**

This is another approach which sort to control the production environment of the farmer. It provides range of inputs and services to the farmers. The authorities and officers have regulatory and control functions. The advisory and supporting services are client-oriented only so far as the farmers grow the desired crops.

Agribusiness marketing and/or processing firms contracts landowners or tenants specifying prices, timing, quality and quantity /acreage of the produce to be delivered. The arrangements may include the supply of innovation from the extension organization with guidelines and inputs by the agribusiness firm, who may even control and supervise the farming operation in some situation. The firms also advance capital to the farmers and thus link markets for output and credits (Singh, 2003).

In this paradigm, farmers suffer since cost and inefficiencies are covered through lower farm gate prices or other manipulation against which farmers have no voice for fear of losing access to productive resources such as the inputs. Under such circumstance, farmers are not only captured labour force by the scheme, but opportunities for self-managed development are limited. Agricultural extension under this is normally confined to supervision, inspection, regulation, record-keeping and instruction with very limited inputs (participation) from the farmer. The potential of the farmer is not tapped and there is no knowledge generation since he is merely taught (Reijntes et al., 1995).

The conclusion is that the Contract Farmer scheme establishes an ‘uneven ground’ and was also export-oriented and thus not suitable for small scale farmers who are more food crop oriented, but most importantly, are the majority in developing countries and have the potential and actually do carry out farmer-to-farmer extension on their own.

### **3.3 Farmer-to-farmer extension**

It is also an approach in extension which is situated within the context of the farmer-environment and lends itself to participation. The extension of the technologies is usually done by the farmers who are village extensionists and through their experimentations findings become extended to other farmers. According to Millar (2008), the farmers’ mode of experimentation is driven by *curiosity, problem solving and adaptation* and this ought to be acknowledged and harnessed for synergy.

A farmer displays much enthusiasm for a technology when it provides impressive results such as higher yields. A neighbouring farmer knows the priorities and value system better than an extension agent. Also an outsider cannot understand what will motivate a farmer to change better than a neighbouring farmer who has just made some major changes. Nor will any professional ever have as much credibility with poor farmers as a neighbour who can show them his or her fields with their greatly improved yields (Bunch, 1990). Farmer-to-farmer advice is more successful in enhancing their capability according to Hagmann et. al, (1999).

Farmer-to-farmer extension very frequently requires very little cash expense but requires the building of facilitation skills since this greatly influences the outcome of the delivery mechanism as well as individuals’ relationships. Farmers have the capacity to develop and diffuse new technologies and techniques themselves (which is happening daily in their natural environments) even though the flow of farmers’ findings sometimes tends to be slow, especially when there are limited means to bring farmers together as is prescribed by Farmer Field School notion.

### **3.4 Farmer Field Schools (FFS)**

It deals with groups that have a common interest and evolved from the thinking that farmers learn optimally from field observation and experimentation. The group meet regularly in an informal setting in their own environment with a facilitator to study “how and why” of a particular topic. Discovery learning, farmer experimentation, and group action are characteristic of Farmer Field School and have the potential of making farmers “experts” in the management of the ecology of their fields. The learning is usually based on experiential, participatory and hands-on-work and this has shown remarkable impact in terms of pesticide reduction, increases in productivity, knowledge gain among farmers, and empowerment (Davis, 2008).

It benefits especially women and people with low literacy levels (Davis et. al, 2010). According to Pimbert (2003), FFS is a form of social learning, negotiation and effective collective action by and for farmers in their communities culminating to positive significant impact on the social wellbeing of the farming community especially in the areas of spirit of self help, decision making and confidence building (Muhammad et. al, 2013). It focuses on society’s relationship with nature and assumes that all rural people, even though poor, have assets. It is a platform for both learning and empowerment, strengthening social and political skills and apparently prompting a range of local activities and relationships (CIP-UPWARD, 2003; van den Berg, 2004). It is a participatory method of learning, technology development as well as dissemination based on adult-learning principles such as experiential learning. It is an interactive and practical method of training which empowers farmers to be their own technical experts on major aspects of their farming systems since farmers are facilitated to conduct their own research, diagnose and test problems, and come up with solutions to their problems (Davis, 2008) and thus achieving success.

Learning according to Pretty (2002), is a consequence of experience and people only become responsible when they have assumed responsibility and experience success.



It is argued that Farmer Field School as a learning process, is composite since it promotes technology generation or development, adoption and diffusion. It does meet the real needs or life situations of farmers especially those with limited access to external inputs for increased production. It draws on farmers' own knowledge and innovativeness and has the potential of bringing farmers and outsiders together in a common research process, building on farmers' own capacity to generate technologies and modify practices and complement conventional scientific forms of experimentation (Coleman, 1990). The involvement of the farmer is quite high as in participatory extension and accords him or her, the position to deliver his or her skills. These effects however, have been generally confined or limited to the most directly-engaged farmers to the neglect of adequate capacity for scaling-up for greater impact and also limits sharing with less advantaged individuals (Nathaniels, 2005; Davis, 2008).

### **3.5 Participatory Agricultural Extension**

Development until recently consisted of telling target beneficiaries especially farmers and communities what to do by development actors. This was development without due recognition of the real needs of these people and thus, result tended to be very poor due to the imposition; efforts of target beneficiaries to improve their economic and social well-being was disregarded. It is the negative effects of this thinking which dawn on development actors to appreciate and increasingly recognize the need to move away from instructions as solutions to support communities especially rural people in their capacity buildings; a recognition that target beneficiaries are the owners and shapers of their own course of development.

This approach means learning to interact closely, becoming a better listeners and a facilitator as well as developing a responsive communication process with the target beneficiaries. It is only by this (participatory extension) that the effectiveness of (agricultural) extension could be improved. Thus, participatory agricultural extension is joint learning, an equal partnership between stakeholders e.g farmer and agricultural extension agent who learn from each other and contribute their knowledge and skills (Hagmann et. al, 1999).

It is an approach that aims at developing and spreading improved farming practices. It recognizes the importance of all stakeholders in the generation and dissemination of knowledge and in removing systems constraints which hinder effectiveness (Ajeigbe and Dashiell, 2010). In participatory extension, collaboration is core and implies giving a central role to the farmer, the rural development agent to define the development agenda, plan, implement and evaluate the activities. It specifically increases the capacities of the farmer. Thus, successful technology development requires that farmers need to experiment with techniques and ideas, and adapt, evaluate and determine the practices that are most appropriate for their own situation.

It departs from commands to mutual understanding and personal motivation creating a balance between rules and regulations with freedom for creativity and room for manoeuvres (Wettasinha, Veldhuizen and Waters-Bayer, 2003). It is not a transfer of content from a knowledgeable and authoritative source (the change agent) to a passive receiver (the farmer). In this form, it does nothing to the receiver's growth as a person with autonomous and critical conscience who is capable of contributing to and influencing his/her society (Bordenave, 1977). In participatory extension, both the farmer and the extensionists are learners and thus freely dialogue. They tap potentials of each other ending up being transformed as a result of the knowledge-exchange.

### **4. Conclusion**

Earlier interventions in an effort to promote agricultural development by both government and donor agencies through the implementing agencies and farmers did not produce the desired results. This was due to the fact that the focus of the interventions as end results were the targets without regard to the farmer especially who has the potential of influencing the outcome.

Even though tremendous efforts had been made to improve agricultural development, the expertise of the farmer had not been recognizes attributable to the neglect of the process and thus, the

“doorways” of rural development agent who are the target beneficiaries had not been made use of until lately. This is reaffirmed by the need to embark on strategies such as participatory extension, farmer-field schools etc, a shift from instructions as solution to ensuring that the target beneficiaries are in the driving seat since it is they who know the situation better and thus should take a centre stage.

Hence the review started with the conceptual models of various authors which gave a perspective of notions of agricultural extension services and their underpinning objectives. The various authorities saw agricultural extension primarily as a process culminating in knowledge-exchange. This process is made up of parties or agents who in this case are distinguished as the farmer and extension agent; who are supposed to have a common interest and thus a common reference point – increase in agricultural output only. The process approach that emphasises peoples’ empowerment form an endogenous development paradigm, building on the indigenous knowledges of farmers (including the strengths of their institutions, structures, and systems) is not well harnessed and articulated in a synergic manner.

## **5. Recommendation**

Change is a necessity and is greatly enhanced if the outcomes of this change are favourable to the persons concern. When this happens the direction of the change is also never an issue. In the light of this, efforts should be made to improve the situation by increasing the level of interaction/involvement/participation of the parties especially the farmers and the frontline staff with regards to these interventions.

The differences of parties (interventionist and the farmer) and the ways of doing things should be acknowledged as well as equally recognizing the potential of the farmer not only as a party but one who has been on the ground and thus knows the situation better. It is this admission which will influence interventionists to open up to the contribution of farmers as in participation culminating to synergy.

Rural people are knowledgeable for instance in agricultural productivity and thus by all standards are researchers who follows processes identical to formal research procedures in addition to following "logical" processes (Millar, 2008). This is abundant in communities especially in Africa where majority of them are smallholder farmers. These people have pursued development and survived, without depending on external experts and major inflows of external inputs. They have acquired sophisticated indigenous knowledge and this has shaped their world views as peoples and evident in their cultural survival (Haverkort, Hooft and Hiemstra, 2003).

This potential can be harnessed through Endogenous Agricultural Development as an approach and hence it recommendation since this approach recognizes and acknowledges the potentials of smallholder farmers. This is because even though organizations e.g NGOs developed participatory approaches e.g participatory action and learning (PAL), participatory technology/innovation development (PT/ID) in an effort to take into account local knowledges of people, these local knowledges are disregarded when it comes to the design and implementation for solutions since the methods rarely seek to build on local peoples’ knowledges and strategies (Apusigah and Boonzaijer, 2008)). Endogenous agricultural development approach overcomes this because it will be based on the local peoples’ own criteria of agricultural development since this will take into account the material, cultural, social and spiritual well-being of the peoples. It will also draw from and harnesses local resources, builds on and evokes local action for change from within and also retains benefits within the locality. Endogenous agricultural development approach will work towards agricultural development which is sustainable, functional and people-centered with selective external influences which are relevance to, and can help augment and enforce, local initiatives since its focus will be on the local peoples’ worldviews, values, knowledge, institutions, initiatives, and locally available resources.

## Reference

- Ajeigbe H. A and Dashiell K., (2010). Participatory research extension approach: N2Africa extension method. Putting nitrogen fixation to work for smallholder farmers in Africa (N2Africa)
- Amezah K. And Hesse J. (2002). Reforms in the Ghanaian Extension System. Extension and Rural Development: A Convergence of Views on International Approaches? A workshop paper. Washington D.C
- Anderson J. R., Feder G. and Ganguly S. (2006). The Rise and Fall of Training and Visit Extension: An Asian Mini-drama with an African Epilogue. World Bank Policy Research Working Paper.
- Apusigah A. A. Boonzaijer C. (2008). Reasons for Supporting Endogenous Development. In: Endogenous Development in Africa Towards a Systematisation of Experiences (Millar D, Apusigah A. A. and Boonzaijer C (eds). COMPAS/UDS. The Netherlands
- Ashraf I., Muhammad S., Mahmood K., Idrees M. and Shah N., (2009). Strength and weaknesses of extension system as perceived extension field staff. *Sarhad J. Agric.* 25(1): 131-134.
- Benor D. and Baxter M. (1984). *Training and visit Extension*. Washington D.C. USA: The World Bank. Pages 4-5
- Bordenave, D., E., J., (1977). Communication theory and rural development a brief review In: Communication theory and rural development. Unesco, Belgium. Page 21.
- Bunch, R., (1990). Low Input Soil Restoration in Honduras: The Cantarranas Farmer-to-farmer Extension Programme. Page 7
- Charmaz K. (2012). The Power and Potential of Grounded Theory. A Journal of the BSA MedSoc Group (online). Available: [www.medicalsociologyonline.org](http://www.medicalsociologyonline.org) DA: 28<sup>th</sup> august, 2013.
- CIP-UWARD (2003). Farmer field schools: From IPM to Platform for learning and empowerment. International Potato Centre-Users' Perspective With Agricultural Research and Development, Los Banos, Laguna, Philippines. Page 87.
- Coleman, J. (1990). Foundation of social theory. Cambridge: Harvard university press.
- Davis K. E., (2008). Extension in Sub-Saharan Africa: Overview and Assessment of Past and Current Models, and Future Prospects. *Journal of International Agricultural and Extension Education*. Volume 15, Number 3
- Davis K., Nkonya E., Kato E., Mekonnen D. A., Odendo M., Miiro R., Nkuba J., (2010). Impact of farmer field school and agricultural productivity and poverty reduction in East Africa. International Food Policy Research Institute discussion paper.
- Hagmann J., Chuma E., Murwira K., and Connolly M., (1999). Putting process into practice: Operationalising participatory extension. Odi Agricultural Research & Extension Network. Network Paper No. 94
- Haverkort B., van't Hooft K. and Hiemstra W. (2003). cultures, knowledges and development a historical perspective. In: *Ancients Roots New Shoot*. Endogenous development in practice (Haverkort B., van't Hooft K. and Hiemstra W (eds). ETC/COMPAS: Leusden
- Ilevbaoje I. E., (2004). Training and Visit Extension System Flourishes in Nigeria. *BeraterInnen News* 1.
- Ison, R. L., (1990). Teaching threatens sustainable agriculture. International Institute For Environment and Development (IIED). Gatekeepers series number 21. Page 6.

- Jodha, N.S., (1990). Drought management: The farmers' strategies and their policy implications. Page 3.
- Leeuwis, C. (2004). From extension to communication for innovation. In: Communication for rural innovation rethinking agricultural extension.
- Lingard L., Albert M. and Levinson W. (2008). Qualitative research. Grounded theory, mixed methods, and action research. (Online). Availability: [www.bmj.com](http://www.bmj.com). DA: 28<sup>th</sup> August, 2013.
- Mazur, R.E. and Titiolola, S.T.,(1992). Social and economic dimension of local knowledge systems in African sustainable agriculture. P266. In: Sociologia Ruralis vol. xxxii N0 213.
- Millar D., (2008). Farmers' Experimentation: An Alternative Logic. GILLBT Printing Press. Tamale
- Muhammad S., Chaudhry K. M., Khatam A., and Ashraf I., (2013). Impact of farmer field schools on social wellbeing of farming community in khyber pakhtunkhwa, Pakistan. The Journal of Animal & Plant Sciences, 23(1):319-323
- Nathaniels N. Q. R., (2005). cowpea, farmer field schools and farmer-to-farmer extension: A Benin case study. Odi Agricultural Research & Extension Network. Network Paper No. 148.
- Pimbert, M. (2003). Social Learning for Ecological Literacy and Democracy: Emerging Issues and Challenges.
- Pretty, J. (2002). Regenerating Agriculture In: Ten Years of IPM Training in Asia. FAO. Page 6
- Pye-Smith, C. (2012). Agricultural extension a time for change Linking knowledge to policy and action for food and livelihoods. CTA. The Netherlands.
- Reijntes, C., Harvertkort B. and Water-Bayer, A. (1995). Agriculture and sustainability in: Farming for the future an introduction to low-external-input and sustainable agriculture. Micmillan, Netherlands. Page 11 and 24.
- Rivera, M. W. and Corning, S. L. (1990). Empowering women through agricultural extension: A global perspective in: Winter 1990. Volume 28, N0.4. Page 4.
- Roling, N. (1995). Changing role of agricultural extension In: Agricultural extension in Africa, proceedings of an international workshop. Yaoundé, Cameroon. CTA. Page 13
- Roling, N., (1990). Changing issues in extension science: an overview In: Extension Science. Information systems in agricultural development. Cambridge University Press. Cambridge.
- Sene, D., (1995). The role of research and training in agricultural extension in: Agricultural extension in Africa, proceedings of an international workshop. Yaoundé, Cameroon. CTA. Page 21.
- Singh, S., (2003). Contract farming in India: Impact on women and child worker. Page 3.
- Spore (2003). Agricultural extension: End of the line? N0. 108. Page 3.
- Spore, (2004). Agricultural training: Farmers in the front line. N0.113, pg.1
- Spore, (2004). Farmers' organizations influencing agricultural policy. N0.114, Page 2.
- Spore, (2005). Regional integration, a revival dictated by necessity: Number 118. Pages 2,4,5.
- Titiolola T., (1994). Indigenous knowledge system and sustainable agricultural development in Africa: essential linkages In: Indigenous knowledge and development monitor Vol.2 N0. 2. Page 19.
- Van den Berg H. (2004). IPM Farmer Field Schools: A synthesis of 25 impact evaluations. The Global IPM Facility.

Wettasinha, C., Veldhuizen van, L., and Waters-Bayer, A (2003). Advancing PTD: Making our way towards institutional integration In: Advancing Participatory Technology Development. Twin A printing. Page 5.

World Bank. (1998). Overview. *Indigenous Knowledge for Development A framework for action*. Page iv.

# A Knowledge Management Processes Driving Performance is Unlikely to Succeed without a Knowledge Audit

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## **Abstract**

Knowledge Management (KM) recognizes as an important driver of performance. And one of the first important steps in the KM programs is to conduct knowledge audit. This paper explains the importance of knowledge audit in enhancing the knowledge management processes. The paper then illustrates the knowledge audit framework to explain the components of knowledge management factors, knowledge audit, knowledge management processes, and performance in the examination. By utilising the knowledge audit framework, organisation will understand the basic contents of knowledge audit and implement an effective knowledge audit to help improve performance. This study was undertaken that utilised data collected from 318 survey participants. The results of the analysis supported the hypothesis that knowledge audit impact on KM processes. KM processes also influence performance

**Key words:** Knowledge Management, KM, Knowledge Audit, Performance.

## **Introduction**

We live and work in a global knowledge society, where organisations have to improve their knowledge assets to innovate and respond to a changing society. In business world, knowledge has become more critical than ever. Organisations are recognising how important knowledge is and thus becoming more knowledge intensive, weighing the value of people when hiring. Individuals and organisations are obliged to focus on maintaining and enhancing their knowledge capital in order to innovate, learn, and adapt to become a core competency for survival (Metaxiotis, Ergazakis & Psarras 2005).

As a result, many organisations are exploring the field of knowledge management (KM) which is the primary way an organisation can determine "what they know and what they do not know", the need to share, retain and reuse the knowledge (Cheung et al. 2007). Evidence is provided by a variety of studies on effective knowledge management which can gain and sustain competitive advantage in business (Anantatmula & Kanungo 2010); improve organisational performance (Ishaq & Dominic 2010); enhanced organisation learning (Buckley & Carter 2000). In order to be able to manage knowledge assets, organisations have to recognise where this value is coming from and how it is created in an organisation (Cheung et al. 2007).

Unfortunately, there are more KM failures within organisations than success (Hylton 2002). One of them, the most quoted reason, is that the organisations had lack of the knowledge on KM and their organisation's knowledge (Guptara 2000). The failure of KM initiatives over the past years has been the focus of much discussion among KM professionals and business analysts (Storey & Barneet 2000; Braganza & Mollenkramer 2002; Hylton 2002) For instance, KM professional Thomas A Stewart in his paper "The Case against Knowledge Management" (2002) pointed out that companies waste billions of dollars on KM because they failed to determine what knowledge they need, or how to manage it. Due to high risk of losing funds, it is difficult and risky for the organisation to implement KM programs. Importantly, organisations may not be equally predisposed for successful launch and maintenance of KM initiatives (Gold, Malhotra & Segars 2001)

To fill this gap, a key to accepting the success and failure of KM within organisation is a knowledge audit which is an important step for any KM programs or any KM processes because a knowledge audit can help to provide accurate identification, qualification, measurement and assessment of the tacit and explicit knowledge in the organisation (Hylton 2002). The purpose of this paper is to look deeply into the concepts of knowledge audit which have an influence on KM processes and to analyse the previous studies and attempts to find the relationships among KM factors such as enablers, processes, organisational performance and knowledge audit, in order to explain why KM programs need knowledge audit to help improve performance and also guide the successful and effective KM programs that directly impact performance.

## **Why knowledge management programs fail?**

Many organisations are launching KM initiatives and programs to improve their organisational performance and gain competitiveness. Furthermore, the outcome of implementing KM has been reported to be remarkably successful either in terms of financial savings, revenues generated or the level of customer acceptance (Chua & Lam 2005). For these reason, knowledge management has received growing interest and attention from practitioners, researchers and organisations. However, there were many more knowledge management programs that proved to be failures. Due to the complex nature of knowledge management, about 84 percent of the KM programs failed worldwide because an inability to cope with the many factors that contribute to the success of KM program implementations (Alhamoudi 2010). Moreover, the cases of KM programs failure rarely reveal the actual identities of the organisations involved (Chua & Lam 2005).

Malhotra (2004) explained the reason of KM programs fail because of two main reasons. First reason, KM programs are often defined in term of inputs such as data, information, technology, best practices, etc., that by themselves may be inadequate for effective business performance. For these inputs to result in business performance, the influence of intervening and moderating variables

such as attention, motivation, commitment, creativity, and innovation, has to be better understood and accounted for in design of business models. The second reason, the efficacy of inputs and how they are strategically deployed are important issues often left unquestioned. "Expected" performance outcomes are achieved, but the value of such performance outcomes may be eroded by the dynamic shifts in the business and competitive environments.

Liebowitz (2001) further addressed more KM failures, there are generally three major reasons. The first is the KM strategy was not tied to the business/mission of the organisation. Second, there may have been a lack of strong and active top management support and involvement. Third, the KM plan/program may have been poorly designed. Interestingly, these reasons are also typical of most information system project failures.

From the explanations given above, there are some mistakes of both earlier and more recent adopters of KM can be traced to the serious oversight of not including the knowledge audit in their overall KM programs and initiatives (Peres-Soltero et al. 2007). If the organisation examines closely the reasons outlined above, it becomes evident that a knowledge audit would have minimised, and perhaps even completely avoided, the pitfalls which precipitated failure (Hylton 2002). Then, it is important for the organisation to know what knowledge audit does.

### **What is a knowledge audit?**

Knowledge audit is the most important first step prior to the launching of any KM initiative or program, and is used to examine the organisation's knowledge health and status (Choy et al. 2004). The knowledge audit is a discovery, verification and validation tool, providing fact-finding, analysis, interpretation, and reports. Knowledge audit includes a study of corporate information, knowledge policies and practices, and the flow of information and knowledge structure (Paramasivan 2003). Knowledge audit investigates knowledge sources and its use. Included in this is how people in the organisation acquire, access, share, disseminate, and use their knowledge. The knowledge audit will seek to give qualified insight as to whether the organisation is ready, especially socially and politically, to become knowledge-based or knowledge-center (Perez-Soltero et al. 2007).

From the reasons of KM failures given in the above section, it is showed that knowledge audit offers a detailed examination, review, assessment and evaluation of the organisation's knowledge abilities, its existing knowledge assets and resources, and of its KM activities (Hylton 2002). And at the most detailed level, a knowledge audit investigates and evaluates the organisation's information systems, its processes and its knowledge enabling technology (Hylton 2002). Conducting a knowledge audit will give the organisation a better solution to manage their information systems and technology by using knowledge audit instruments.

Moreover, Liebowitz et al. (2000) and Andrew (2005) have pointed out that the knowledge audit process plays a key role in identifying a KM strategy for the organisation. In addition, knowledge processes can also effectively analysis the environment, which relates to knowledge and information, within an organisation, department, group or section. The purposes of the knowledge audit are explaining status, effects, and priorities of knowledge in the organisation for the KM initiative, which considers the organisation's knowledge need. The knowledge audit should lead to successfully implementing KM of the organisation. This will help answer the question of how KM helps organisations achieve their business goal.

Knowledge audit is the business needs assessment, cultural assessment, and an examination of what knowledge is needed, available, missing, applied, and contained (Liebowitz et al. 2000). In Robertson (2005), it is stated that: "The term knowledge audit is used in wrong purpose, since the traditional concept of an audit is to check performance against a standard, as in financial auditing. A knowledge audit, however, is a more of qualitative evaluation. It is essentially a sound investigation into an organisation's knowledge health". Debenham and Clark (1994) further explained the objectives of a knowledge audit as several key points. A knowledge audit aims to give an overall view of the specifics of knowledge in a specific section such as extent, nature, and structure. The



knowledge audit will also provide data input to the strategic plan for knowledge processing. If successful, the knowledge audit can point out the most important knowledge repositories within an organisation. It can summarise information such information from the organisation's knowledge repository. Finally, it can provide estimates for the characteristics of the knowledge within a particular knowledge repository.

As a result, Paramasivan (2003) concluded that the implementation of knowledge audit can be a successful tool in understanding an organisation's knowledge. Doing knowledge audit effectively will help minimise the duties of the management and avoid the failures of the process. The knowledge audit provides to help an organisation to determine if they' "know what they know" and "know what they do not know" about their own knowledge structure. Conducting a knowledge audit will also give the organisation a competitive advantage in determining the strengths and flaws in their pursuit and perfection of knowledge.

### **Why carry out a knowledge audit?**

KM has been described as a possible role in creating sustained competitive advantages for organisations and also customer satisfaction through efficiency, innovation and effective decision making (Chuang 2004; Yeh 2005). That is why the organisation should apply knowledge audit as a practical way of getting to grips with "knowing what you know". Knowledge audit identifies owners, users, uses and key attributes or core knowledge assets. Knowledge audit is often carried out in conjunction with a KM assessment as a baseline on which to develop a KM programs (Paramasivan 2003).

Davenport and Prusak (1998) stated that knowledge audit is a process which creates plenty of knowledge-related data for an organisation. Taking into account that in a knowledge economy, competitive advantages will increasingly be based on knowledge, this data needs to be properly analysed so that managers can investigate gaps in the organisation's knowledge strategy. Knowledge audit helps an organisation to evaluate and design R&D and innovation programs and policies, while also helping the organisation to support all knowledge processes more effectively. In re-engineering a firm, it provides the knowledge necessary to ensure the retention of valuable capability and know-how. It can be used to plan education and training programs mutually beneficial to both the employees and the organisation. It provides information on assets not previously recorded in traditional business models to ascertain the value of the organisation (Davenport and Prusak 1998).

A knowledge audit can have multiple purposes for a company or an organisation. The most common goal for this audit is to provide tangible evidence of what knowledge an organisation need, where that knowledge is, how it is being used, what problems and difficulties exist, and what improvement can be made (Asian Develop Bank 2008). A knowledge audit is the appropriate tool for monitoring the KM effectiveness. Knowledge audit aims to investigate the company status at a given moment regarding the knowledge availability and needs, its flow and usage in processes, by employees, etc (Gourova et al. 2010). In fact, knowledge audit is an important process aiming to clarify whether knowledge resources are properly managed in organisation and what KM strategy, tools and solutions could contribute to gaining maximum benefits for organisation.

### **A knowledge audit framework**

There is a general recognition in the literature that KM is a cross-functional and multifaceted discipline. As candidates of something to be managed, various factors have been identified in the KM literature (Liampreecha 2010). This paper deployed Choi and Lee's (2000) KM framework to understand the relationships among influencing KM factors, KM processes and organisational performance.

The interests in KM have grown rapidly and various researchers have investigated KM factors to explore which of them is important for managing knowledge effectively. According to Lee and Choi (2003), Lee and Yang (2000) and Teece (2000), most studies have focused on the

relationships between KM and organisational performance. However, there is no systematic framework in the literature to examine the relationship among knowledge audit, influencing KM factors, KM processes and organisational performance. From the literature reviews, it shows that a knowledge audit is supposed to be one of supporting KM factors to help KM processes more effective. Therefore, this paper intends to explain these relationships, which knowledge audit expected to be influenced on the KM processes.

The four main building blocks of the framework are presented as shown in figure 1. The following sections explore these relationships to identify specific variable within the overall framework.

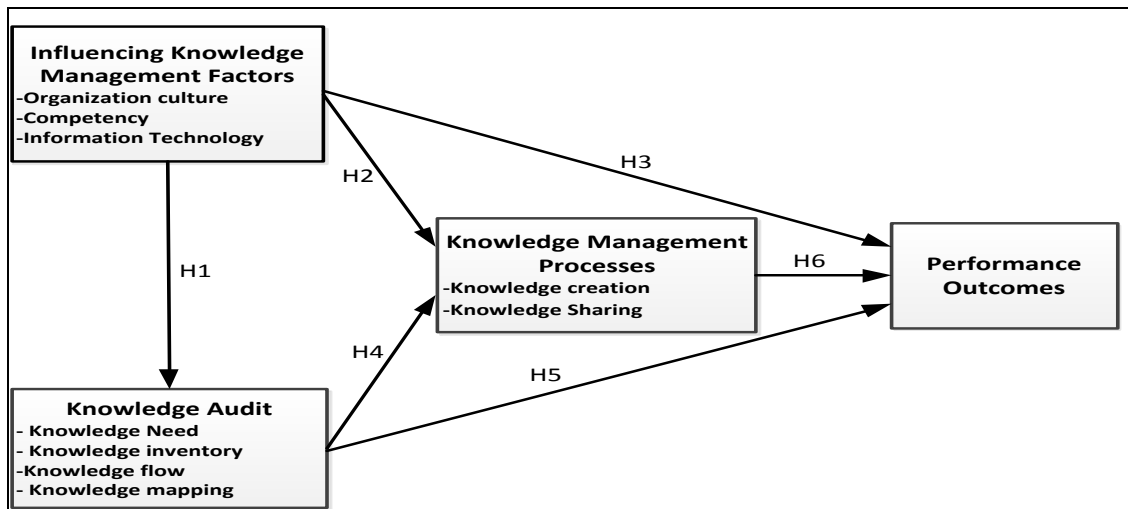


Figure 1: Knowledge Audit Framework (Adopted from Choi & Lee, 2000)

### Influencing KM factors

A variety of influencing KM factors has been addressed in the literature (Lee & Choi 2003). Among these factors, organisation structure, organisation culture, competency, and information technology are integrated into this framework.

### Organisation culture

Organisation culture is an important factor relating to the success of KM (Figallo 2002). Culture defines not only what knowledge is valued, but also what knowledge must be kept inside the organisation for sustained innovation advantage (Long 1997). Organisations should build an appropriate culture that encourages people to create and share knowledge within an organisation (Holsapple & Joshi 2001). Ruppel and Harrington (2001) stated that one important dimension needed for the sharing required by KM is trusting culture. Moreover, Choi and Lee (2000) noted that trust is critical in a cross-functional or an inter-organisational team, because the withholding of information by the lack of trust can be especially harmful to the processes of knowledge articulation, internalisation, and reflection.

Politis (2003) stated that interpersonal trust or trust between co-workers is an extremely essential attribute in organisation culture, which is believed to have a strong influence over knowledge sharing. Interpersonal trust is known as an individual or a group's expectancy in the reliability of the promise or actions of their individuals or group. According to Jan and Prasarnphanich (2003), organisation culture is believed to be the most significant input to effective KM and organisational learning, in that corporate culture determines values, beliefs, and work systems that could encourage or impede knowledge creation and sharing.

### **Competency**

People are one of the most important influencing factors in KM (Lee & Choi 2003). KM is about people, using technology to enable more efficient processes so that they are better able to capture, store, retrieve, use, re-use, and share knowledge (Hylton 2002). In fact, competence in people is often tacit and dependent on other interpersonal relationships, which may take years to develop, and tend to be highly local or organisation specific (Chase 1997). Therefore, people are at the heart of creating and sharing organisational knowledge (Lee & Choi 2003). Moreover, managing people who are willing to create and share knowledge is vital (O'Dell & Grayson 1998). Knowledge and competence can be acquired by admitting new people with desirable skills (Stonehouse & Pemberton 1999). Among the components related with people, skills and knowledge embodied in employees are the dimensions most often associated with KM (Lee & Choi 2003).

### **Information technology**

There is a debate about how the information technology can play an important role for KM (Borghoff & Pareschi 1997). A study from the American Productivity and Quality Center showed that organisations embarking in KM efforts generally rely, for accomplishing business goals, on the setting up of a suitable information technology infrastructure (AP&QC 1997). Hasanali (2002) stated that without a solid information technology infrastructure, an organisation cannot enable its employees to share information all over the organisation. Lee and Choi (2003) noted that technology contributes to KM. This technology infrastructure includes information technology and its capabilities. Information technology is widely employed to connect people with reusable codified knowledge, and it facilitates conversations to create new knowledge. Ruggles (1997) pointed out that KM tools are technologies. They help organisation to generate access, store and analyse data. According to Alavi and Leider (1999), the significant potential role of information technology of organisation KM is through the coordination and integration of KM processes. Information technology is a very important component of any KM programs. They are very useful for transmitting and exchanging information.

### **Knowledge audit**

According to Paramasivan (2003), knowledge audit identifies the core information and knowledge needs and uses in an organisation. Knowledge audit investigates gaps, duplications, flows, and how they contribute to business goals. Knowledge audit helps an organisation to make sure their KM processes lead to the desired performance. Gourova et al. (2010) pointed out that knowledge audit focuses on knowledge availability and the further needs among employees in KM processes which are used for adding value to the organisation. Moreover, Hylton (2002) stated that the knowledge audit concludes with recommendation for improved KM processes, elimination of unnecessary practices, and new resource suggestions. Knowledge audit examines how well current processes support knowledge capture, dissemination, use and sharing.

Ultimately, the knowledge audit reveals the company's KM strengths, weaknesses, opportunities, threats and risks, using scientific knowledge auditing methods and tools such as knowledge needs analysis, knowledge inventory, knowledge mapping, knowledge flow and gap analysis. Paramasivan (2003) has developed a knowledge audit instruments that is used to conduct a knowledge audit, with varying levels of coverage and detail. As a general rule, most knowledge audits will involve some or all of the following:

### **Knowledge need**

The major goal of knowledge need analysis is to identify precisely what organisational knowledge they have including people, team and possesses. Also to determine what knowledge they would require in the future in order to meet their objectives and goals (Chowdhury 2006). By identifying knowledge needs, the people in organisation then create learning activities to acquire this knowledge (Hawryszkiewicz 2005). In Skyrme (2002), he proposed that a process of identifying core knowledge needs is one part of the knowledge sharing cycle because an organisation will be

able to identify some key gaps and duplication of effort which help organisation becomes better understood about managing knowledge. Moreover, knowledge need analysis can draw attention to staff skills and competency enhancement needs; opportunities for staff learning and development; organisational culture practices concerning leadership, collaboration, team work, and the performance management and rewards system; and staff relationship with management, peers, and subordinates (Asian Develop Bank 2008).

### **Knowledge inventory**

The objective of knowledge inventory is to create a source of knowledge asset, so that the explicit and tacit knowledge and the current status of the existing corporate knowledge can be quantified, measured and valued (Cheung et al. 2007). In Dataware Technologies (1998), it is stated that “The audit begins by breaking that information into two categories: what knowledge currently exists and what is missing. Once the location or source of the missing information is identified, they can begin to structure the relevant information so that it can be easily found”

Huber (1991) explained that organisations do not know what they know and have weak programs for locating and retrieving knowledge that they own, by discovering the sources of knowledge in organisation, it is possible to find the most effective method of storage and share. Knowledge inventory involves counting, indexing, and categorising explicit and tacit knowledge (Serrat 2008). For explicit knowledge, the knowledge inventory analysis includes numbers, types and categories of documents, databases, libraries, intranets, websites, links and subscriptions to external resources. Also included would be knowledge locations, the organisation and access of knowledge, the purpose, relevance, and quality of knowledge, and use of knowledge. For tacit knowledge, the knowledge inventory analysis focuses on people such as how many people they have; where they are; what they do; what they know; and where they are learning (Paramasivan 2003). An organisation will be able to identify knowledge gaps and areas of duplication by comparing the results of the knowledge inventory analysis with those of the knowledge needs analysis (Serrat 2008).

Most of all, drawing up a knowledge inventory can help an organisation to develop a KM processes (Tiwana 2002) by identifying where knowledge exists and where it is needed to support decisions and actions.

### **Knowledge flow**

Analysing knowledge flow is used to investigate how knowledge within the organisation flows (Perez-Soltero 2007). In other words, it is to determine how people in an organisation find the knowledge they need, and how they share the knowledge they have (Tiwana 2002). After the people know where the knowledge they need is located, they will be able to acquire and share those knowledge with much more ease. Analysing knowledge flow examines how a person or people process information that will ultimately determine how well an organisation uses and shares its knowledge (Stevens 2000).

The knowledge flow analysis looks at people, processes and the system they use (Gourova, Antonova & Todorova 2009). For people, the analysis examines people’s attitude towards habits, experience, behaviors, and skills in knowledge sharing. For the process, the analysis looks at how people go about their daily business and the extent to which identification, creation, storage, sharing, and use of knowledge forms part of that; policies and practices concerning knowledge flows, for instance, on data and information handling, management of records, or web publishing. For the system, the analysis focuses on technical infrastructure. For example, information technology systems, portals, content management, accessibility and ease of use, and current levels of usage are all examined (Chowdhury 2006).

### **Knowledge mapping**

An important tool of the knowledge audit process is the knowledge mapping for providing insight for improving business and organisational processes (Liebowitz 2005). Creating knowledge mapping helps to visually represent organisational knowledge, this effort is primarily technological and usually prepares the way for creating a knowledge database (Perez-Soltero 2007). A knowledge map shows the sources, flows, constraints, and sinks of knowledge within an organisation (Liebowitz 2005). Knowledge mapping can be a powerful tool in capturing and integrating the knowledge collected in an initial KM identification process (Liebowitz 2003), socialise new members, and enhance organisational learning (Wexler 2001). Grey (1999) explained that an organisation should map its knowledge to build bridges to increase knowledge sharing and to discover effective and emergent communities of practice where learning is happening. The map includes knowledge inventory and knowledge flow within the organisation. The knowledge map is a navigation aid to explicit information and tacit knowledge, showing the importance and the relationships between knowledge stores and dynamics, for example, within social networks (Tiwana 2002). Knowledge mapping can flip perspectives on knowledge from bottom-up to top-down, and focus KM initiatives on the highest potential opportunities (Asian Develop Bank 2008).

From the literature review above, knowledge audit tools relate to KM processes. They help the organisation utilise what they know and what they have. First, to identify knowledge needs, people create learning activities to acquire that knowledge they want. Then, building knowledge inventory helps discovery the sources of knowledge in organisation. It is more convenience for people to store and share that knowledge they have in an organisation. Next, analysing knowledge flow makes people know how knowledge moving in the organisation from where to who. Therefore, people can be able to learn and share that knowledge a lot easier and more effective. Last, creating knowledge mapping is the most powerful tool for knowledge audit process; it helps the organisation to visually represent all the knowledge they have. People would be able to find out what knowledge they need and how to acquire and share that knowledge. As a result, knowledge audit tools are related to KM processes because they support KM processes and they help organisation to manage knowledge more effective and the most useful.

### **KM processes**

Alavi and Leidner (1999) stated that KM is mostly considered as a process. A number of studies have addressed KM processes by dividing it into several processes. A comparative analysis of KM framework in the literature indicates that these are various KM processes (Alavi & Leidner 1999). Davenport et al. (1996) presented four key processes: finding existing knowledge, creation new knowledge, packaging the knowledge created, and externally using existing knowledge. Alavi and Leidner (1999) considered the process of creating the knowledge, the process of storing and retrieving the knowledge, the process of transferring (sharing) knowledge, and the process of applying the knowledge.

For KM processes, this paper adopted and modified the Choi and Lee (2000) model for measure knowledge creation process and knowledge sharing process.

### **Knowledge creation**

Knowledge creation is a continuous process which individuals and teams or groups within an organisation and between organisations share tacit and explicit knowledge (Bloodgood & Salisbury 2001). Knowledge creation is the most important source for an organisation to sustain their competitive advantage (Nonaka et al. 2000) Lee and Choi (2003) followed the work by Nonaka and Takeuchi (1995) for the following reasons. First, their work has become widely accepted in a variety of management fields such as organisation learning, joint ventures, new product development, and information technology (Nonaka et al. 2000). Second, their model includes not only creation but also knowledge transfer. The reason for this being that the transfer of existing knowledge and creation of

new knowledge have become two major management tasks and both should be considered together (Nonaka et al. 2000).

### **Knowledge sharing**

Knowledge sharing is an important process of KM, as it helps in codifying the source of available knowledge in an organisation (Liebowitz 1999). For example, Alavi and Leidner (2001) pointed out that knowledge transfer (sharing) occurs at various levels between individuals, from individuals to explicit sources, from individuals to groups, between groups, across groups, and from the group to the organisation. The knowledge sharing process helps people in organisation to share knowledge they have to co-workers (Tannenbaum & Alliger 2000). Moreover, Davenport et al. (1998) proposed that successful knowledge programs usually address knowledge transfer (sharing) through various channels, recognising that each adds value in a different way and that their synergy enhances use, for example, internet, lotus notes, and global communications systems.

### **Performance**

The important of KM processes for performance is now well considered. However, measuring the organisation benefits of KM is difficult (Gooijer 2000). Performance comprises the actual output or result of an organisation as measured against its intended outputs. Effectiveness and efficiency is an indicator to perform the result of focus work or effort that achieves the objective that produces value (Flynn et al. 1990). The theory has been complemented with several studies that have found positive effects of KM on measures of performance such as cost saving, productivity and customer's satisfaction etc. (Darroch 2005; Afiouni 2007; Fugate et al. 2009).

Moreover, Lee and Choi (2003) explained that performance may be defined as the degree to which organisations achieved its business objectives. It may be measured in terms of organisation learning, profitability, or the financial benefits in knowledge. Methods for measuring organisational performance in KM can be categorised into four groups: financial measures; intellectual capital; tangible and intangible benefits; and a balance scorecard (Lee and Choi 2003).

This paper addresses this problem by investigating aspects of the relationship amongst knowledge work, communities of practice, KM activities supported by IT and in particular those factors that affect individual, team and organisational performance in higher education institutions. The research questions are listed.

### **Research Questions**

RQ1: To what extent do influencing KM factors and knowledge audit have a positive relationship with KM processes?

RQ2: To what extent does KM processes have a positive relationship with the performance?

RQ3: To what extent do influencing KM factors and knowledge audit have a positive relationship with the performance?

### **Research design**

This study was designed to explore a practical conceptual link between influencing KM factors, knowledge audit, KM processes, and the performance of the organisation in which these concepts are utilised. Thus, the study presented is concerned with the identification of knowledge audit and performance that will offer business both strategic positions and effectiveness to leverage their knowledge for improved performance.

A set of hypotheses is proposed based on an integrative research model incorporating influencing KM factors, KM processes, and performance outcome. This study employs an empirical investigation into the relationship between influencing KM factors, knowledge audit, KM processes and performance outcome. The hypothesis performs.

H1: There is a positive relationship between the influencing KM factors and KM audit.

H2: There is a positive relationship between the influencing KM factors and the KM processes.

H3: There is a positive relationship between KM processes and performance outcome.

H4: There is a positive relationship between the influencing knowledge audit and KM processes

H5: There is a positive relationship between the knowledge audit and the performance outcome.

H6: There is a positive relationship between the KM processes and the performance outcome.

The data collection approach is passive using questionnaires. The instrument used in this research was developed from previously published research instruments. The target population is management staff from SCG Paper Co.,Ltd (Public), a list of 1,390 randomly selected in November 2012. After the survey was collected, all file is imported to a dataset file in digital format to get ready for statistical analysis. A total number of 318 completes were obtained to provide a response rate of 27.41% (318 out of 1,390 sample of the populations). This response rate is considered reasonably high since the questionnaire is relatively long and the participants were management staff who normally have busy work schedule. Therefore, it was determined that the sample is sufficient to conduct the regression analysis since it is more than 100 responses.

## Results

### Testing the Hypothesis

#### The Influencing KM Factors and KM Audit

For the influencing of KM factors, we found that knowledge need, knowledge inventory, knowledge flow and knowledge map were a significant predictor of knowledge audit ( $\beta = .843$ ,  $p < .01$ ), which support H1.

**Table 1 Influencing of KM Factors and Knowledge Audit**

Relationship	Knowledge need		Knowledge inventory		Knowledge flow		Knowledge map	
	t-value	p-value	t-value	p-value	t-value	p-value	t-value	p-value
Organisation culture and knowledge audit	5.526	.000	4.186	.000	4.68	.000	4.587	.000
Competency and knowledge audit	4.425	.000	5.169	.000	2.804	.005	3.465	.001
IT and knowledge audit	6.535	.000	7.947	.000	8.145	.000	6.395	.000

#### The Influencing KM Factors and KM Processes

For the influencing of KM factors, we found that knowledge creation and knowledge sharing were a significant predictor of knowledge management processes ( $\beta = .800$ ,  $p < .001$ ), which support H2.

**Table 2 Influencing of KM Factors and KM processes**

Relationship	Knowledge creation		Knowledge sharing	
	t-value	p-value	t-value	p-value
Organisation culture and KM processes	9.717	.000	6.654	.000
Competency and KM processes	4.265	.000	5.525	.000
IT and KM processes	4.091	.000	4.636	.000

**The Influencing KM Factors and Performance Outcome**

For the performance outcome, we found that organisation culture, competency and IT were a significant predictor of performance outcome ( $\beta = .707$ ,  $p < .001$ ), which supported H3.

**Table 3 The Influencing KM Factors and KM processes**

Relationship	Performance outcome	
	t-value	p-value
Organisation culture and performance outcome	7.525	.000
Competency and performance outcome	5.527	.000
IT and performance outcome	3.854	.000

**Knowledge audit and KM processes**

For the knowledge audit, we found that knowledge need, knowledge inventory, knowledge flow, and knowledge were a significant factor of knowledge management processes ( $\beta = .798$ ,  $p < .001$ ), which support H4.

**Table 4 Knowledge audit and KM processes**

Relationship	Knowledge creation		Knowledge sharing	
	t-value	p-value	t-value	p-value
Knowledge need and KM processes	6.149	.000	3.876	.000
Knowledge inventory and KM processes	5.555	.000	3.810	.000
Knowledge flow and KM processes	3.552	.000	5.020	.000
Knowledge map and KM processes	3.633	.000	4.299	.000

**Knowledge audit and Performance Outcome**

For the performance outcome, we found that knowledge need, knowledge inventory, knowledge flow, and knowledge were a significant factor of performance outcome ( $\beta = .723$ ,  $p < .05$ ), which support H5.

**Table 5 Knowledge audit and KM processes**

Relationship	Performance outcome	
	t-value	p-value
Knowledge need and performance outcome	6.008	.000
Knowledge inventory and performance outcome	2.852	.042
Knowledge flow and performance outcome	3.562	.000
Knowledge map and performance outcome	2.842	.005

**KM Processes and Performance Outcome**

As proposed in Hypothesis 6, KM processes showed a strong relationship with performance outcome ( $\beta = .788$ ,  $p < .001$ ). The strength of this association indicated a very significant relationship between KM processes and performance outcome.



**Table 5 KM Processes and Performance Outcome**

Relationship	Performance outcome	
	t-value	p-value
<b>Knowledge creation and performance outcome</b>	8.549	.000
<b>Knowledge sharing and performance outcome</b>	10.290	.000

From the above discussion, it can be concluded that influencing KM factors and knowledge audit affect KM processes, influencing KM factors and knowledge audit affect performance and KM processes affect performance outcome, thus the 6 hypotheses are supported.

### 9. Conclusion and future recommendations

Of the theoretical models, Figure 1 model is one of the most comprehensive models as it received the most support from subsequent empirical studies. As a result, the current study used this model as the conceptual foundation for this research. The study's research question was: to what extent is the model applicable in organisation. 1,390 respondents in SCG Paper Co.,Ltd. were selected as the study's sample. A survey questionnaire was chosen to collect data. A total of 318 usable questionnaires were obtained. Correlation analysis and regression analysis were used to analyse the study's model due to the applied nature of the research.

The correlation analysis was first used to analyse the model. Findings indicated that there were significant direct associations among influencing KM factors, knowledge audit, KM processes and performance.

Contribution of this study is analysing and applying a model, a set of instruments, and a research process from the United States in an Eastern country (Thailand). This study arrived at the applicability of the use of the model in Thai industry sector.

This study has several implications for future research suggested by the findings. First, future research may analyse the applicability of the model in different types of organisations and other societies. Second, the sample in this study was small. The data analysis was based on a total of 318 usable questionnaires. Organisation impact had to be dropped due to the small sample in this study. Confirmatory factor analysis and structural equation modeling cannot be used due to the small sample size and we could attempt only an application of the model using correlation and regression analyses. Finally, future research could employ qualitative methods to obtain the benefits of triangulation. For example, actual observation of the use of knowledge audit or interviewing knowledge audit users may give valuable insights regarding their satisfactions with KM systems.

## References

- Afiouni, F 2007, 'Human Resource Management and Knowledge Management: A Road Map Towards Improving Organisational Performance', *Journal of American Academy of Business*, Cambridge, vol. 11, no. 2, p.124.
- Asian Develop Bank 2008, *Auditing the Lessons Architecture*, Manila, viewed 18 May 2012, <http://www.adb.org/document/studies/auditing-lessons-architecture/IN371-07.asp>
- Alavi, M & Leidner, D** 1999, 'Knowledge Management Systems: Issues, Challenges, Benefits', *Communications of the AIS*, vol. 1, pp. 2-41.
- Alhamoudi, S 2010, *Strategic knowledge management system in public sector in Saudi Arabia: an adaptation of the Balance Scorecard*, PhD thesis, University of Portsmouth.
- Andrew, K 2005, *Conducting a Knowledge Audit Masterclass*. Workshop organised by Ark Group Asia, Singapore, 11 – 12 January 2005, J.W. Marriott Kuala Lumpur, Malaysia.
- Bloodgood, J. M & Salisbury, Wm, D 2001, *Understanding the influence of organisational change strategies on information technology and knowledge management strategies*, *Decision Support Systems*, vol. 31, pp. 55-69.
- Borghoff, Uwe M & Pareschi, R 1997, 'Information Technology for Knowledge Management', *Journal of Universal Computer Science*, vol. 3, no. 8.
- Braganza, A & Mollenkramer, G.J. 2002, 'Anatomy of a failed knowledge management initiative: lessons from PharmaCorp's Experiences', *Knowledge and Process Management*, vol. 9, no. 1, pp. 23-33.
- Buckley, P.J & Carter, M.J 2000, 'Knowledge management in global technology markets: applying theory to practice', *Long-Range Planning*, vol. 33, no. 1, pp. 55-71.
- Chase, R 1997, 'The knowledge-based organisation: An international survey', *Journal of Knowledge Management*, vol. 1, no. 1, pp. 38-49.
- Cheung, C.F., Li, M.L., Shek, W.Y., Lee, W.B. & Tsang, T.S 2007, 'A Systematic Approach for Knowledge Auditing: A Case Study in Transportation Sector', *Journal of Knowledge Management*, vol. 11, no. 4, pp. 140-158.
- Choi, B & Lee, H 2000, *Knowledge Management and Organisational Performance*, INFORM-KORMS, 2000.
- Chua, A & Lam, W 2005, 'Why KM projects fail: a multi-case analysis', *Journal of knowledge management*, vol. 9, no. 3, pp. 6-17.
- Chowdhury, N 2006, *Knowledge audit: overview and sample questionnaire*, viewed 3 May 2012, [http://www.kmtalk.net/k\\_audit\\_KMtalk.doc](http://www.kmtalk.net/k_audit_KMtalk.doc)
- Chuang, S 2004, 'A resource-based perspective on knowledge management capability and competitive advantage: an empirical investigation', *Expert Systems with Applications*, viewed 16 March 2012, <http://www.Elsevier.com/locate/eswa>
- Darroch, J 2005, 'Knowledge Management, Innovation and Firm Performance', *Journal of Knowledge Management*, vol. 9, no. 3, pp. 101-115.
- Davenport, H., De Long, D.W & Beers, M.C 1998, 'Successful Knowledge Management Project', *Sloan Management Review*, pp. 43-57.
- Davenport, T. H & Prusak, L 1998, *How Organisations Manage What They Know*, Harvard Business School Press, Boston.

- Figallo, C 2002, *Building the Knowledge Management Network—best Practices: Tools and Techniques for Putting Conversation to Work*, John Wiley & Sons, Inc, New York.
- Flynn, M., Hoverd, T & Brazier, D 1990, *Formaliser - an interactive support tool for Z*, In Nicholls 1990, pp. 128-141.
- Fugate, B.S., Stank, T. P & Mentzer, J.T 2009, 'Linking Improved Knowledge Management to Operational and Organisational Performance'. *Journal of Operations Management*, vol. 27, no. 3, pp. 247-264.
- Gooijer, D. J 2000, 'Designing a knowledge management performance framework'. *Journal of Knowledge Management*, vol. 4, no. 4, pp. 303 – 310.
- Gold, A. H., Malhotra, A., & Segars, A. H. 2001, 'Knowledge management: An organisational capabilities perspective', *Journal of Management Information Systems*, vol. 18, no. 1, pp. 185–214.
- Gourova, E., Antonova, A & Todorova, Y. 2009, 'Knowledge Audit Concepts, Processes and Practise', *WSEAS Transactions of Business and Economics*, vol. 6, no. 12, pp. 605- 619.
- Gourova, E., Popov T & Todorova, Y 2010, *Technology Platform for Knowledge Audit*, TELE-INFO'10 Proceedings of the 9th WSEAS international conference on Telecommunications and informatics.
- Guptara, P 2000, 'Why knowledge management fails: how to avoid the common pitfalls', *Knowledge Management Review*, vol. 9, pp. 26-9.
- Hasanali, F 2002, *The Critical Success Factors of Knowledge Management*, viewed 9 May 2012, <http://www.apqc.org/portal/apqc/ksn>
- Holsapple, C. W., & Joshi, K. D 2001, *Organisational knowledge resources*, *Decision Support Systems*, vol. 31, no. 1, pp. 39–54.
- Hylton, A 2002, *A KM Initiative is Unlikely to Succeed without a Knowledge Audit*, viewed 2 March 2012, <http://www.ann@annHylton.com>
- Ishaq, O & Dominic, P 2010, *Conceptualisation of the Antecedents and Impacts of KMS Utilisation: A Preliminary framework*, in International Symposium on Information Technology 2010, ITSIm, June 2010, Kuala Lumpur.
- Janz, B.D & Prasarnphanich, P 2003, *Understanding the antecedents of effective knowledge management: The importance of a knowledge-centered culture*, *Decision Sciences*, vol. 34, no. 2, pp. 351–384.
- Kinney, T 1998, *Knowledge Management, intellectual capital and adult learning*, *Adult Learning*, vol. 10, no. 2, pp. 2-5.
- Koulopoulos, T & Frappaolo, C 1999, *Smart things to know about knowledge management*, Capstone, Milford Connecticut.
- Lee, C & Yang, J 2000, 'Knowledge Value Chain', *Journal of Management Development*, vol. 19, no. 9, pp. 783-793.
- Lee, H & Choi, B 2003, 'Knowledge management enablers, processes, and organisational Performance: an integrative view and empirical examination'. *Journal of Management Information Systems*, vol. 20, no. 1, pp. 179-228.
- Liampreecha, W 2010, *Managing Knowledge Work and Work Performance: An Empirical Study of Higher Education in Thailand*, A thesis submitted in fulfillment of the requirements for the degree of Doctor of Philosophy.
- Liebowitz, J 1999, *Knowledge Management Handbook*. Boca Raton, CRC Press, Florida.

- Liebowitz J., Rubenstein-Montano B., McCaw D., Buchwalter J & Browning C 2000, 'The Knowledge Audit'. *Knowledge and Process Management*, vol. 7, no. 1, pp. 3-11.
- Long, D.D 1997, *Building the knowledge-based organisations: How culture drives knowledge behaviors. Working Paper of the Center for Business Innovation*, Ernst & Young LLP, Cambridge, MA.
- Malhotra, Y 2004, *Why knowledge management system fail? Enablers and constraints of knowledge management in human enterprises*, in Holsapple, C.W. (Ed.), *Handbook of knowledge management*, Springer-Berlag, Berlin, pp. 577-599.
- Metaxiotis, K., Ergazakis, K & Psarras, J 2005, 'Exploring the world of knowledge management: agreement and disagreement in the academic/practioner community', *Journal of knowledge management*, vol. 9, no. 2, pp. 6-18.
- Nonaka, I & Takeuchi, H 1995, *The Knowledge-Creating Company: How Japanese Companies Created the Dynamics of Innovation?* Oxford University Press, New York.
- Nonaka, I., Toyama, R & Nagata, A 2000, *A firm as a knowledge-creating entity: a new perspective on the theory of the firm*, *Industrial and Corporate Change* 9, pp. 1-20.
- O'Dell, C & Grayson, J 1998, 'If only we knew what we know: Identification and transfer of internal best practices', *California Management Review*, vol. 40, no. 3, pp. 154-175.
- Paramasivan, T 2003, *Knowledge Audit*, *The Chartered Accountant*. vol. 5, pp. 498-506.
- Perez-Soltero, A., Barcelo-Valenzuela, M., G.Sanchez-Schmitz, F., Martin-Rubio, J., Palma-Mendez, T & Vanti, A, A 2007, 'A Model and Methodology to Knowledge Auditing Considering Core Processes', *ICFAI Journal on Knowledge Management*, vol. 5, no. 1, pp. 7-23.
- Politis, J 2003, 'The connection between trust and knowledge management: what are its implications for team performance', *Journal of Knowledge Management*, vol. 7, no. 5, pp. 55-66.
- Robertson, S 2005, *Knowledge audit*, viewed 23 May 2012, [http://www. Library.nhs.uk](http://www.Library.nhs.uk)
- Ruggles, R.L, 1997, *Knowledge tools: using technology to manage knowledge better*, Camb ridge, MA: Cap Gemini Ernst & Young, Center for Business Innovation, viewed 15 March 2012, <http://www.cbi.cgey.com/pub/docs/KnowledgeTools.PDF>
- Ruppel, C.P & Harrington, S.J 2001, *Sharing Knowledge through Internet: A Study of Organisational Culture and Internet Implementation*, *IEEE Transactions on Professional Communication*, New York, vol. 44, no. 1, pp. 37-49.
- Serrat, O 2008, *Auditing Knowledge*, Knowledge Solutions, viewed 2 June 2012, [www.adb.org/.../Knowledge.../Auditing-Knowledge.pdf](http://www.adb.org/.../Knowledge.../Auditing-Knowledge.pdf), Stonehouse, G.H & Pemberton
- J.D 1999, *Learning and knowledge management in the intelligent organisation*, vol.7, no.5, pp.131-139.
- Storey, J & Barnett, E 2000, 'Knowledge management initiative learning from failure', *Journal of knowledge management*, vol. 4, no. 2, pp. 145-150.
- Tannenbaum, S.I & G.M. Alliger 2000, *Knowledge Management*, The International for Human Resource Information Management, USA.
- Teece, D.J 2000, 'Strategies for Managing Knowledge Asset: The Role of Firm Structure and Industrial Context', *Long Range Planning*, vol. 33, no. 1, pp. 35-54.

- Tiwana, A 2002, *The Knowledge Management Toolkit: Orchestrating IT, Strategy, and Knowledge Platforms*, Prentice-Hall, Upper Saddle River, NJ.
- Vittal, S. A & Shivraj, K 2010, 'Modeling enablers for successful KM implementation', *Journal of knowledge management*, vol. 14, no. 1, pp. 100-113.
- Yeh, YMC 2005, 'The Implementation of Knowledge Management System in Taiwan's Higher Education'. *Journal of College Teaching & Learning*, vol. 2, no. 9.

# Industrial Applications of the Analytic Hierarchy Process in Developing Countries.

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## **Abstract:**

The use of qualitative judgements in multicriteria decision models is receiving increasing attention and a variety of approaches have been developed which cover a wide range of techniques. One method which has received increasing attention in the literature is the relatively recently developed Analytic Hierarchy Process. This method has been widely documented in a variety of problem areas. With the exception of a few cases, this qualitative decision making technique has not been used extensively in industrial decisions in developing countries. This paper briefly reviews the Analytic Hierarchy Process and suggests potential applications in industrial decisions in developing countries.

**Key words:** Industrial decisions, Analytic Hierarchy Process, Developing Countries.

## Introduction

Industrial decision problems in developing countries are usually complex; many factors may be of importance: international relations, the role of the state, price policy, land ownership, credit systems, investment of capital, new methods of production, transportation and storage facilities, traditional experiences, risk perceptions, etc. These problems are faced on various levels: whole industry, Department, section and individual level. Decision makers who rely on traditional operations research models risk ignoring important qualitative factors in their decisions, and decision makers who attempt to take into account these qualitative factors must use intuitive or ad hoc methods. Another factor which limits the use of traditional operations research models in industrial decision problems in developing countries is the problem of data availability and their precision. Many developing countries lack the means of maintaining high quality industrial statistics collection. As for official statistics, these suffer from lack of precision and reliability.

One major contribution of the Analytic Hierarchy Process is its focus on overcoming these drawbacks. The Analytic Hierarchy processing models presented in this paper are qualitative techniques which rely on judgement and experience of decision makers to prioritise information for better decisions.

Since Saaty's initial development of the Analytic Hierarchy Process in the 1970s and the publication of his first book on the subject [Saaty (1980)] the method has been applied in highly diverse areas [Golden et al (1989)]. Unfortunately this novel technique has not been widely applied in industrial decisions in developing countries. A brief review of The Analytic Hierarchy Process is given next.

## The Analytic Hierarchy Process (Ahp) A Review.

The Analytic Hierarchy Process (AHP) developed by Thomas Saaty [Saaty, 1992] is a multicriteria decision making technique which decomposes a complex problem into a hierarchy, in which each level is composed of specific elements. The overall objective of the decision lies at the top of the hierarchy, and the criteria, sub criteria and decision alternatives are on descending levels of this hierarchy. The hierarchy does not need to be complete, i. e., an element in a given level does not have to function as a criterion for all the elements in the level below. Thus a hierarchy can be divided into sub hierarchies sharing only a common topmost element.

Once the hierarchical model has been structured for the problem, the participating decision makers provide pairwise comparisons for each level of the hierarchy in order to obtain the weight factor of each element on that level with respect to one element in the next higher level. This weight factor provides a measure of the relative importance of this element for the decision maker.

To compute the weight factor of  $n$  elements, the input consists of comparing each pair of the elements using a scale set of:

$$S = \left\{ \frac{1}{9}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, 1, 2, 3, 4, 5, 6, 7, 8, 9 \right\}$$

The pairwise comparison of element  $i$  with element  $j$  is placed in the position of  $a_{ij}$  of the pairwise comparisons matrix  $A$  as shown below:

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdot & \cdot & \cdot & a_{1n} \\ a_{21} & a_{22} & \cdot & \cdot & \cdot & a_{2n} \\ \cdot & & & & & \cdot \\ \cdot & & & & & \cdot \\ \cdot & & & & & \cdot \\ a_{n1} & a_{n2} & \cdot & \cdot & \cdot & a_{nn} \end{bmatrix}$$

The reciprocal value of this comparison is placed in the position  $a_{ji}$  of matrix A in order to preserve consistency of judgement. Thus, given n elements, the participating decision maker compares the relative importance of one element with respect to a second element, using the 9 point scale shown in Table 1 below:

**Table 1: The 9 point scale for pairwise comparisons:**

Importance	Definition	Explanation
1	Equal importance	Two elements contribute identically to the objective
3	Weak dominance	Experience or judgement slightly favours one element over another
5	Strong Dominance	Experience or judgement strongly favours one element over another
7	Demonstrated Dominance	An element's dominance is demonstrated in practice
9	Absolute Dominance	The evidence favouring an element over another is affirmed to the highest possible order
2,4,6,8	Intermediate values	Further subdivision or compromise is needed

Hence, if element one was strongly favoured over element two, for example, then  $a_{12} = 5$ .

If the converse was true, element two was strongly favoured over element one,  $a_{12}$  is the reciprocal

value  $\frac{1}{5}$ .

The pairwise comparison matrix is called a reciprocal matrix for obvious reasons. Matrix A is accepted or rejected depending on whether or not it satisfies the consistency measure. [Alphonse, 1997].

The degree of importance of element i relative to all elements in the level with respect to a governing element k is given by  $w_{ik}$  which is obtained as follows [Barzilai et al, 1987]

$$w_{ik} = \left[ \prod_{j=1}^n a_{ij} \right]^{\frac{1}{n}}, \quad \text{where} \quad \prod_{i=1}^n w_{ik} = 1 \tag{1}$$

where n is the number of elements in the level governed by element k.



The overall degree of importance of element  $i$  in a level relative to all elements in that level with respect to the overall goal is given by  $W_i$  which is computed as [Barzilai et al, 1992]

$$W_i = \prod_{k=1}^n (W_{ik})^{w_k} \quad (2)$$

Where  $W_k$  is the overall degree of importance of the governing element  $k$ .

### Advantages of Using Analytic Hierarchy Process

Narasimhan (1983), identified the following three advantages of using the Analytic Hierarchy Process:

- a) It formalises and renders systematic what is largely a subjective decision process and as a result facilitates “accurate” judgements;
- b) As a by product of the method, decision makers receives information about the implicit weights that are placed on the evaluation criteria; and
- c) The use of computers makes it possible to conduct sensitivity analysis on the results.

Another advantage of using the Analytic Hierarchy Process is that it results in better communication, leading to a clearer understanding and consensus among members of decision making groups so that they are likely to become more committed to the alternatives selected [Harker, 1987].

The Analytic Hierarchy Process also has the ability to identify and to take into consideration the decision maker’s personal inconsistencies. Decision makers are rarely consistent in their judgements with respect to qualitative aspects. The Analytic Hierarchy Process incorporates such inconsistencies into the model and provides the decision maker with the measure of these inconsistencies.

A consistency ratio being taken as the ratio of consistency of the results being tested to the consistency of the same problem evaluated with random numbers. This ratio provides the user with a value that that can be used to judge the relative quality of the results. If a consistency ratio of less than 0.10 is obtained, then the results are sufficiently accurate, and further evaluation is not needed. However, if the consistency ratio is greater than 0.10, the results may be arbitrary and the preferences should be re-evaluated or discarded.

The great advantages of the Analytic Hierarchy Process lies in its ability to handle complex real life problems and its ease of use. Compared with five different utility models for determining weights and priorities. Analytic Hierarchy Process was found to produce the most credible results of all the models tested. [Schoemaker, 1982]

The ability of the Analytic Hierarchy Process to analyse different decision factors without the need for a common numerate, other than the decision makers assessments, makes it one of the favourable multicriteria decision support tool when dealing with complex social –economic problems in developing countries. This is because it enables social cultural considerations to be incorporated in the decision making process.

Next we illustrate the procedure of the Analytic Hierarchy Process with an example from industrial decisions in developing countries.

### Example

A beverage industry want to decide which of the seven types of containers to use in packing its beverages. The container types are:

1. Refillable glass, no recycle (GRNR)

2. Refillable glass, recycle (GRR)
3. Throw away glass, no recycle (TGNR)
4. Throw away glass, recycle (TGR)
5. Bimetallic can, no recycle (BCNR)
6. Aluminium can, no recycle (ACNR)
7. Aluminium can, recycle (ACR)

The evaluation of these types of containers is done based on the following four criteria: energy consumption, cost, environmental friendliness, and customer convenience.

The first step in the Analytic Hierarchy Procedure is to develop a graphical representation of the problem in terms of the overall goal, criteria and decision alternatives. Figure 1 below shows the hierarchy for the beverage industry decision problem.

The top level of the hierarchy is the overall goal; selection of the best container type for use. The second level shows the four criteria stated above that contribute to the achievement of the overall goal. The decision alternatives are shown in the third level.

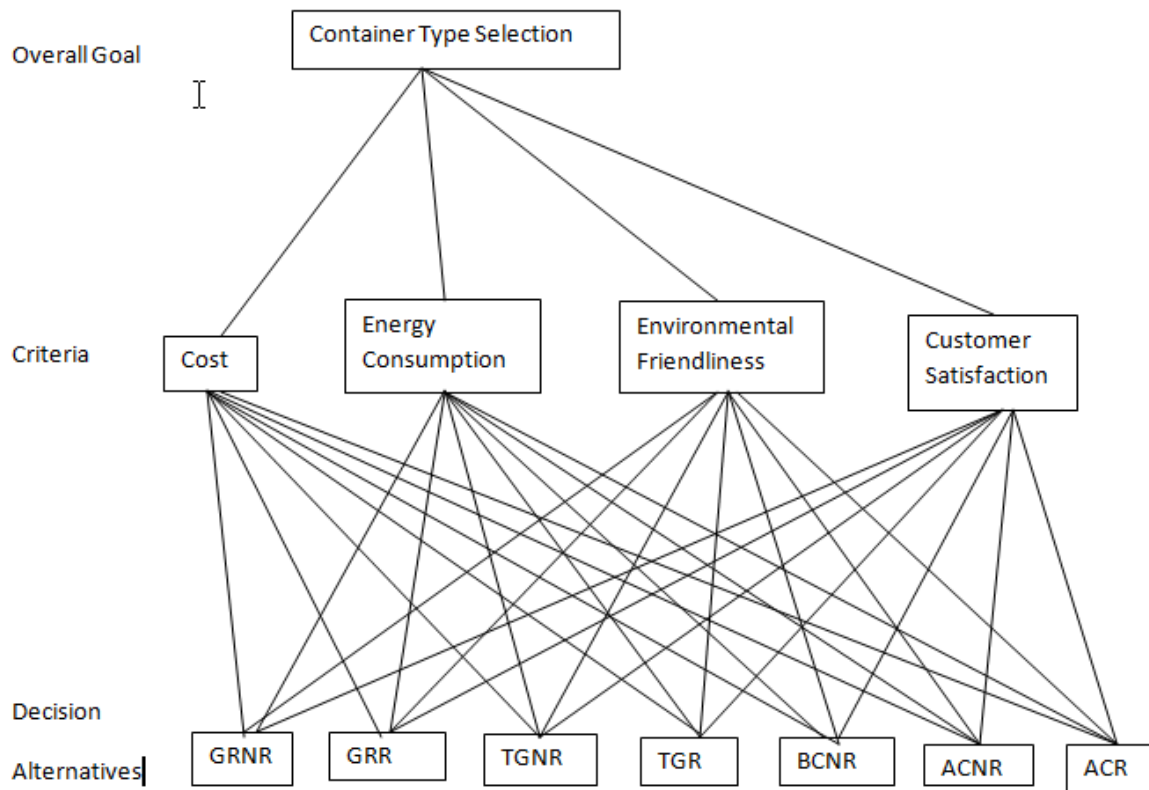


Figure 1: Hierarchy of the beverage industry container types selection problem

To use the Analytic Hierarchy Process, the decision maker must specify his judgements of the relative importance of each criteria's contribution towards achieving the overall goal.

The evaluation will be elicited using questions such as "Given the two criteria energy consumption and production costs, which one is more important in selecting the best container type to use? How important? Similar pairwise comparisons for other criteria can be done to generate the pairwise comparison matrix. [Saaty, 1986].

For the above example this will generate a matrix such as:

	<i>Energy</i>	<i>Cost</i>	<i>Environment</i>	<i>Customer</i>
<i>Energy</i>	1	5	3	9
<i>Cost</i>	$\frac{1}{5}$	1	$\frac{1}{4}$	8
<i>Environment</i>	$\frac{1}{3}$	4	1	9
<i>Customer</i>	$\frac{1}{9}$	$\frac{1}{8}$	$\frac{1}{9}$	1

From this pairwise comparison matrix a corresponding set of weights (the vector  $\mathbf{w}$ ) and a consistency ratio (CR), are determined by a computer program such as the Expert Choice [Forman, 1991], as shown below.

$$CR=0.14 \quad \mathbf{w} = \begin{bmatrix} 3.41 \\ 0.81 \\ 1.86 \\ 0.20 \end{bmatrix}$$

The decision maker believes, for example, that environmental friendliness is three times as important as energy consumption. As a result energy consumption is  $\frac{1}{3}$  as important as environmental friendliness, as shown above. The rest of the matrix is filled in a similar fashion.

The next step is to make pairwise comparisons of each container type alternative with respect to each of the criteria. We illustrate this with respect to the second criterion, production cost.

<i>GRNR</i>	1	5	7	2	3	7	6
<i>GRR</i>	$\frac{1}{5}$	1	2	$\frac{1}{3}$	$\frac{1}{2}$	2	4
<i>TGNR</i>	$\frac{1}{7}$	$\frac{1}{2}$	1	$\frac{1}{5}$	$\frac{1}{2}$	1	5
<i>TGR</i>	$\frac{1}{2}$	3	5	1	2	5	8
<i>BCNR</i>	$\frac{1}{3}$	2	2	$\frac{1}{2}$	1	1	3
<i>ACNR</i>	$\frac{1}{7}$	$\frac{1}{2}$	1	$\frac{1}{5}$	1	1	7
<i>ACR</i>	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{8}$	$\frac{1}{3}$	$\frac{1}{7}$	1

$$CR=0.016 \quad \mathbf{w} = \begin{bmatrix} 3.66 \\ 0.91 \\ 0.62 \\ 2.49 \\ 1.10 \\ 0.72 \\ 0.24 \end{bmatrix}$$

Here, the decision maker believes, for example, that GRNR is three times costly to produce as BCNR. Similar pairwise comparisons must be made with respect to each of the other three attributes. This gives a set of weights for each of the alternatives with respect to each criteria, which can be combined using formula (2) to give the overall weights of each decision alternative.

The computations presented here are not intended to be an “answer” to the beverage industry decision problem but just to illustrate the steps involved when using the Analytic Hierarchy Process.

### **Conclusion**

This article has presented the use of the Analytic Hierarchy Process in industrial decisions in developing countries. The Analytic Hierarchy Process offers a unique and valuable method for integrating judgements with the traditional quantitative methods used in industrial decisions. This integration will facilitate the application of quantitative techniques in developing countries.

Several interesting questions remain to be explored in future research. First, the evaluation of the Analytic Hierarchy Process models using field studies is desirable. Secondly, the extent to which the Analytic Hierarchy Process Models would offer a better procedure than ad hoc or other existing approaches is an empirical question that needs field or laboratory testing. What we have attempted to provide here is an introductory framework to serve as a foundation for further refinements and additions.

## References

- Alphonse, C. B. (1997) A Measure of Consistency in the Analytic Hierarchy Process: an Extension of Golden and Wang Method, *Uhandisi Journal*, vol. 21 no. 2, pp. 72 – 84.
- Barzilai, J.; Cook, W. D. And Golany, B. Consistent Weights for Judgements Matrices of the Relative Importance of Alternatives, *Operations Research Letters*, vol. 6 no. 3, pp 131 – 134.
- Forman, E. H. And Saaty, T. L. (1991) *Expert Choice Software Package for IBM PC.*, Pittsburgh, PA.
- Golden, B.; Wasil, E. and Harker, P. T. (1989) *The Analytic Hierarchy Process: Applications and Studies*, Springer-Verlag, Berlin.
- Harker, P. T. And Vargas, L. G. (1987) The Theory of Ratio Scale Estimation: Saaty's Analytic Hierarchy Process, *Management Science* 33(11) pp. 1383 – 1403.
- Narasimhan, R. (1983) An Analytical Approach to Supplier Selection, *Journal of Purchasing and Materials Management*, 19(1), pp. 27 -32.
- Saaty, T. L. (1992) *Decision Making for Leaders*, RWS Publications Pittsburgh.
- Saaty, T. L. (1986) Axiomatic Foundation of the Analytic Hierarchy Process, *Management Science*, 32(7) pp. 841 – 855.
- Saaty, T. L. (1980) *The Analytic Hierarchy Process*, MacGraw-Hill, New York.
- Schoemaker, P. J. And Waid, C. C. (1982) An Experimental Composition of Different Approaches to Determining Weights in Additive Utility Models, *Management science*, 28(2) pp. 182 - 196.

# Aesthetic Analysis In The Study Of Graphic Designs Visual Perception In Advertisement Of Products In South Western Nigeria: A Case Study Of Akure Consumer Of Products

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## **Abstract**

Aesthetic is the area of artistic visual designs that seek to communicate primarily through the eyes, mind, brain and thoughts of the consumers of products. It appeals to both the intellect and visual senses not only the expression of feelings but also a means of communication through lines, colours, forms and visuals. Despite its centrality to human thought and feelings, it has some part to play in advertisement of products. Aesthetic Theorists have proposed different accounts that all works of designs share what gives product advertisement value and beauty. Other aspects of aesthetic principles take into account complex judgement, classical and expressive in aesthetics, based on the human psychology of visual perception and influence that would raise one's ideas of taste and appreciation for products. The study explored the visual perception of aesthetic operatives of product advertisements as it affects the consumers and the impacts of design aesthetic analysis on consumer of products advertised. It discusses a number of related topics on the role of aesthetics in advertisement of products, its impact, purpose and justification in purchasing of products. The study concludes that aesthetic analysis in visual perception is a subject that attracts consumers in search for beauty in products advertised.

**Keywords:** Aesthetic, Advertisement, Beauty, Perception, Products, Value, Visual, balance, *Texts, Emphasis, Graphics.*

## **1.0 Introduction**

Historically aesthetic perception appeared as a reformation of ideals about beauty in a competitive market. In some ancient traditions, beauty and perception of beauty were of cosmic importance (Feagin and Maynard, 1997). The word is commonly applied to things that are pleasing either to the senses, to the imagination or to our understanding. The words of Thomas Aquinas reveal the roots of the standard meaning of beauty that made the beautiful to be defined as the very apprehension which pleases the mind and eye (Sparshott, 1963). Beauty's abiding meaning in advertisement associate with order, but in the more modern readings the aesthetic interpretation of beauty is associated with delight and visual perception.

A number of studies have been carried out on the role of aesthetic in visual perception in product advertisement in countries like Asia, United States of America, United Kingdom and Germany (Kortler and Rath1984, Nator1988, Russell1988, Whitney1988, Rusell and Pratt 1989,Porteous 1996, Oladumiye 2011). Most of the studies indicate that aesthetic analysis in the study of graphic visual perception play an important role in new product development, advertisement, marketing strategies and the retail environment. Bloch (1995) concludes in his study that the physical form of design of a product is an unquestioned determination of its market success that is aesthetic in advertisement of product is commonly known as the study of the mind emotions in relation to the sense of beauty and the success of the products.

Aesthetic analysis in the study of visual perception is the judgements that involve many issues. They can be culturally conditioned, linked to emotions partly intellectual and interpretative. It is difficult to measure the relationship between aesthetic and emotions as far as advertisement of products is concerned because of their abstract nature. Cognitively, it is unclear whether the concept of beauty is due to pre-attentive processing or to cognitive judgement in product advertisement per the awareness created by aesthetic or beauty about a product to a consumer of goods. According to Doghudje (2003) and Schenkman and Johnsson (2000) describes the total design on a product packages as the term that covers, typography, designs, pictures, video clips, flash animation and that visual perception is a reality as soon as a word is typed, a colour is chosen or a text displayed on the screen and any visual expressions is used in advertisement.

The study of aesthetic in the visual perception of graphic design is the construction of forms and colours and the combination and functionality; this is typical of all design process in product advertisement. (Oladumiye 2012) The designer of advertisement visuals works with symbolic materials which are closely bound to the cultural context and creates meaningful emotion that forces the consumer to purchase any products advertised. As a result aesthetic perception is the degree of power to attract public attention or consumer emotions to product advertised.

Broadly speaking aesthetics in product advertisement has been studied in different ways and methods, some view it from the perception of artefacts as autonomous appreciated. In eighteenth century, the 'word' aesthetics was introduced into philosophical terminology by (Saw and Osborne, 1968). It was argued that sensory awareness is to be found in the perception of beauty.

The rest of this paper is organised as follows Section 2 reviews literature on various aspects of aesthetics in general area of product advertisement and the conceptual frame work of advertisement of products. Section 3 of the study presents the materials and methods employed in the research. In section 4, the data analysis and discussion are presented while section 5 draws some conclusion and recommendation for further study.

## **2.0 Literature Review**

### **2.1 Perception of Product Advertisement.**

The term product advertisement has evolved through the years; it has been studied from different viewpoint and with different meanings for different schools of thoughts. Product advertisement appeared as communication relayed from companies to persuade an audience to

purchase their products. During the renaissance products advertisement was classified as promotion of company products and services carried out primarily to drive up sales of products. Oladumiye (2011) stresses that product advertisement is meant to build a brand identity and communicate changes in old products or introduce new products and services to the customers. Amifor (1997) provides a theoretical analysis of product advertisement in visual perception as a mass communication that is meant for effectiveness of group activities of group actions in passing information about products and services to the audience. Product advertisements is generally agreed to have began with electronic and print media. Given the technological limitation of the tone, early advertisements were simply descriptions of the products and lists of prices, not until mid-nineteenth century that advertising agencies realized that trademarks could be loaded with meaningful aesthetics visuals there by taking products advertisement to the high level.

Contemporary product advertisement according to Oladumiye (2011) relies on a wide variety of possible aesthetic approaches depending on the nature of the product and the target audience. Viewers' perception on the advertisement of products can evoke a wide range of emotions and attitudes these emotions and perceptions impact the user's attitude towards the products content, company credibility and product usability. The design and presentation of the advertisement of this product is strongly visual as a result users are known to make aesthetic judgement of the advert. The likeability and credibility of the advert increases so does the likelihood of purchasing the products.

## **2.2 Role of Aesthetical Graphics in products advertisement**

As mentioned earlier aesthetics in the ancient world were married almost by definition since judgements of the products' usefulness and beauty were one and the same. The tension between aesthetic qualities of graphic in products has become more pronounced during the industrial revolution as emphasis was placed on product advertisements. Lowy and Dreyfuss two industrial design pioneers began introducing aesthetic considerations to mass production of products, partially because they recognised its capacity as a marketing instrument (Petroski, 1993). An important function of aesthetical graphics quality can make products more readily acceptable and can improve products commercial values.

Aesthetic and visual graphics perception involve the proper use of design elements and principles and these help to give a clear information about products; also the proper management of space, illustration, colours, lines balance, harmony in advertisement media, posters, handbills e.g. billboards, poster, handbills, that help to spread a complete and sensible information about product advertisement that creates an attraction to the public. The use of bright colours, illustrations and illuminations in advertisements has helped in conveying direct meaningful information to various people. Through the use of these elements according to Yamamoto and Lambert (1994) information about products are being conveyed to the public psychologically and emotionally. Simplicity of ideas, cleanliness and beauty from television adverts make a pleasant impression on the eyes and leave a very pleasant feeling in the heart and mind of customers. The ability of an advertisement to the scene from a far could promote products aesthetically; this could be achieved through the good use of contrasting colours, good illustration and the good layout plans in graphic designs. Aesthetic features of an advert help to bring functionality to the advertised product (Swede 1994). As a matter of facts advertisement perception in aesthetic are in three major domains

- i. Visual richness that is ornamental, colourfulness and complexity.
- ii. Openness deal with closeness and
- iii. Clarity which is ambiguity.

## **2.3 Visual elements of Aesthetics in Advertisements of Products.**

Philosophically, visual elements in aesthetics of products advertisement are the study of mind and emotion in relation to the sense of beauty which is basically applied to advertisement of products graphically. Philosophers and scholars like Oladumiye (2011) define aesthetic as "critical



reflection on visual arts and nature in advertisements. That is advertisements of products depend on the beauty of visual elements of aesthetics. From late 17<sup>th</sup> to the early 20<sup>th</sup> century in Western world aesthetic underwent a slow revolution into what is often called modernism. German and British thinkers emphasized beauty as the key compound of art and advertisement. Aesthetic experiences saw art as necessary, aiming at absolute beauty in advertisement of products. The elements of aesthetic in products advertised deals with five components of human nature and psychology e.g. vision, hearing, touching, taste and smell. In order to study these psychological effects an understanding of vision and perception must be analysed. This allows one to observe the neuroscience of aesthetics.

Visual perception plays a huge role in the aesthetic experience of advertisement of products. Visual element is a function of eyes and brain. Images are broken down into visual elements line, shape, texture and colour. For instance colour is one of the most powerful design elements and it creates effect on the viewer's emotions. Colour can affect moods in product advertisement. Some colours are uplifting and exciting while others are depressing and draining. Lines can be found to be straight, angular or curve and it can be in horizontal, vertical or diagonal etc. The combination of all in visual design in product advertisement result to aesthetic perception of the consumers. Texture is used by designers to create an illusion in advertisement and balance is the arrangement of the elements within an area that it will promote a harmonious response. The combinations of all are visual elements in product advertisements.(Oladumiye and Ogunduyile 2006)

#### 2.4 Aim of the Study

The study is aimed at exploring visual perception of aesthetic graphics operatives of product advertisements as it affects the consumers and the impact of aesthetic on consumers of products advertised. The study is especially important considering the high role of beauty in purchasing of commodities by the consumers.



**Plate 1:**Graphical Picture of Alagbaka area, Akure, Nigeria (Author's collection 2012)

### 3.0 The Study Area

The study area is the city of Akure, Ondo State, Nigeria where the research population could easily be located and it is one of the major commercial centres in Nigeria. The state is located in the South-Western part of Nigeria and it lies between latitude 40- 20 and 60 east of the Greenwich Meridian. The state is carved into 18 local government areas and three senatorial district namely, Ondo North, Ondo Central and Ondo South. It enjoys high rainfall that varies from 2000 mm in the southern areas to 1150 mm in the Northern Fringes. Its temperature ranges between 21<sup>0</sup>c and 29<sup>0</sup>c Humidity, however, is relatively high. The current population of the state is 3, 441,024 with growth rate of 2.8% per annum. 1, 761, 263 of the population are male while the remaining 1, 679, 761 are females (National Population Census 2006) Akure is a medium-sized urban centre and became the provincial headquarters of Ondo Province in 1939. It also became the capital city of Ondo state in 1976. It is located approximately 700 Kilometres south west of Abuja the Federal Capital Territory of Nigeria and about 350 Kilometres to Lagos the former capital city of Nigeria. Plate 1&2:



**Plate 2: Graphical Panoramic picture of the Study Area (Akure) with consumers (Authors collection 2012)**

### 3.1 Research Methodology

For the purpose of data analysis descriptive statistics such as frequency distribution percentage and means scores were used to identify public view on the role of aesthetic in the advertisement of products to the consumers in the area of study.

### 3.2 Method of Data Collection

Structured questionnaire was used to obtain the data. The collected data includes socio-economic characteristics of billboards, age, gender, religion and occupation and response of the respondents to the questions asked. Purpose sampling technique was used to select the study area. Which was Oba Adesida road? It was purposely selected because of the prevalence of billboards, banners, signage and mobile adverts on vehicles along this study area and its location is the major and central road in Akure business district which includes Oja Oba market and Alagbaka a major location of all financial corporate headquarters in the state. A total of one hundred and twenty (120) billboards, one hundred signage (100) and eighty mobile vehicle adverts (80) were selected as sample and as the sample size and a total of three hundred and eighty five (385) questionnaires were distributed to (385) respondents of which 370 respondents responded. These were randomly selected from the study based on their ages, gender and occupation

### 3.4 Method of Data Analysis

Data obtained from the study were analyzed using descriptive statistics analysis. Descriptive statistics such as frequency distribution, percentages and means were used to identify public view of the effect of product advert ideas and placement on the public in the study area. Friedman test was used to detect differences in treatments across multiple tests

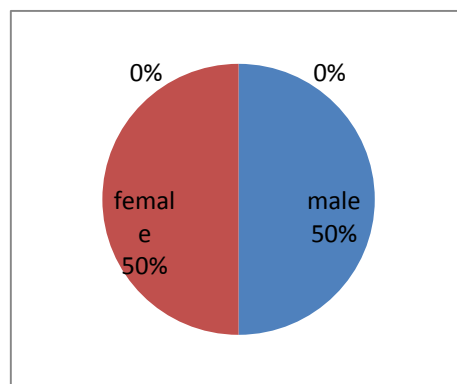
### 3.5 Socio-Economic Characteristics Of The Respondents

This section presents the discussion of the analysis of the socio-economic background of the respondents these include the age, gender, religion and occupation

### 3.6 Gender Distribution of The Respondents

In Table 1 below, 50 % of the respondents were observed to be males while 50% were observed to be females. This revealed that neither males nor females dominated in the sighting of product adverts along the Oba Adesida road in Akure.

**Fig 1** Gender Distribution of the Respondents

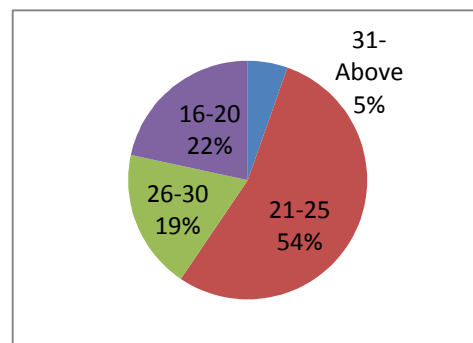


**Source:** Field survey (2012)

### 3.7 Age Distribution of The Respondents

As contained in Table 2, greater proportion of the respondents (54%) are between twenty one to twenty five years of age, 22% are between sixteen to twenty years of age, 19% are between twenty six to thirty years of age and the least proportion of the respondents from thirty one years of age and above. The implication of this is that most of the respondents are still very young, productive and are within active labour force age range. Therefore most of the respondents are youths

**Fig 2:** Age Distribution of the Respondents

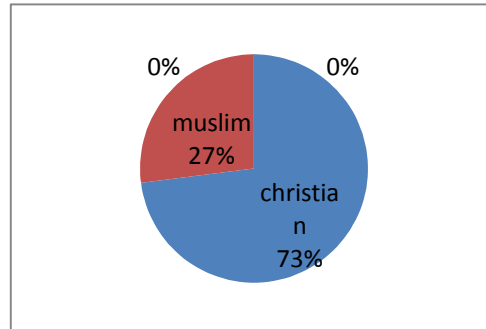


**Source:** Field survey (2012)

### 3.8 Religious Status of the Respondents

Table 3 shows that 73 % of the respondents are Christians and 27% are Muslims. The implication is that majority of the people found along the Oba Adesida road are Christians.

**Fig 3:** religious Distribution of the Respondents



**Source:** Field Survey (2012)

### 4.0 Results and Discussions

For the purpose of this study the following six hypotheses was tested

#### Hypothesis 1

4.1 There is significant relationship between colour aesthetic of a product and consumer's degree of interest in the advertised product.

**Table 1.1 Degree of Interest and Colour Aesthetics of Products**

VALUE LABEL	S.A	A	S.D	D	I.C.S
VALUE	5	4	3	2	1
Product colours attract attention of consumers.	200	70	50	30	20
Colours aesthetic make the public buy what they don't need.	270	45	20	28	7
Colourful product advertisement beautifies the environment.	150	110	50	60	0
All product adverts are aesthetic colourful.	100	145	40	78	7
Adverts with more colours communicate better aesthetically.	270	60	10	25	5
Adverts must reflect the colour of a product.	100	222	2	40	6

Since it is a frequency distribution and not a continuous distribution; then we appeal to a typical non parametric test like FRIEDMAN'S TWO-WAY ANOVA to analyze the data above.

VALUE LABEL	S.A	R <sub>1</sub>	A	R <sub>2</sub>	S.D	R <sub>3</sub>	D	R <sub>4</sub>	I.C.S	R <sub>5</sub>
VALUE	5		4		3		2		1	
Product advertised colours attract attention of passersby.	200	5	70	4	50	3	30	2	20	1
Colours aesthetic make the public buy what they don't need.	270	5	45	4	20	3	28	2	7	1
Colourful product advertisement beautifies the environment.	150	5	110	4	50	2	60	3	0	1
All product adverts are colourful.	100	4	145	5	40	2	78	3	7	1
Adverts with more colours Communicate better aesthetically.	270	5	60	4	10	2	25	3	5	1
Adverts must reflect the colour of a product.	100	4	222	5	2	1	40	3	6	2

<b>Total</b>	28	21	13	18	7
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Source: Field survey (2012)

**N.B: (The ranking was done across the rows.)**

**H<sub>0</sub>** = there is significant relationship between colours aesthetic of a product and consumer's degree of interest in the advertised product. **Vs**

**H<sub>1</sub>** = there is no significant relationship between colours aesthetic of a product and consumer's degree of interest in the advertised product.

@  $\alpha = 0.05$

Test statistics:  $F_r \frac{12}{NK(K+1)} \sum_{i=1}^k R_i^2 - 3N(k-1)$  were N = 6 and k =5

$$F_r = F_r \frac{12}{6(5)(6)} [28+21+13+18+7]^2 - 3(6)(4)$$

$$F_r = 499.8$$

**Decision Rule:** reject H<sub>1</sub> if  $F_r > \chi^2_{(0.05)}$  with 4 degree of freedom (499.8 > 9.490 )

Since the computed value of the test statistics  $F_r = 499.8$  exceeds  $\chi^2_{(0.05)} = 9.490$  ,there is sufficient evidence to reject H<sub>1</sub> and conclude that there is significant relationship between colour aesthetic of a product and consumer's degree of interest in the advertised product.

**Table 1** revealed that colour aesthetic of products advertised can cause irrational purchase of product as a result in advertisement of product, colour enhances advert in print, electronic and outdoor media, and the production of these can be said to be successful or effective only if the choice of colour is carefully made aesthetically because colour can make or destroy a design of advertisement and thereby alter the purpose which the message is meant to serve. Example is Plate 3. A billboard advert



**Plate 3:** Graphical Billboard advert with consumers around it Akure Nigeria (**Authors collection 2012**)

**Hypothesis 2**

4.2 There is significant relationship between the shape of a product aesthetically and public perception of the product.



**Table; 1. 2, Shape of products, the effect on public perception**

VALUE LABEL	S.A	A	S.D	D	I.C.S
VALUE	5	4	3	2	1
Big products advertised attract more attention.	200	150	5	10	5
Landscape product adverts are more attractive than portrait adverts	130	100	20	70	50
Specially shaped product advertised beautify the environment than regular shaped ones.	190	80	30	60	10
All product adverts have monotonous shapes.	250	70	20	20	10
The shapes of product advertised should be determined by the product advertised.	230	40	20	20	30
Bigger products advertised communicate better with their audience.	230	100	15	25	0
Shapes of product advertised enhance passers-by ability to understand the information on it.	160	130	20	40	20

Since it is a frequency distribution and not a continuous distribution; then we appeal to a typical non parametric test like FRIEDMAN'S TWO-WAY ANOVA to analyze the data above

VALUE LABEL	S.A	R <sub>1</sub>	A	R <sub>2</sub>	S.D	R <sub>3</sub>	D	R <sub>4</sub>	I.C.S	R <sub>5</sub>
VALUE	5		4		3		2		1	
Big products advertised attract more Attention.	200	5	150	4	5	2	10	3	5	2
Landscape product adverts Are more attractive than portrait adverts	130	5	100	4	20	1	70	3	50	2
Specially shaped product adverts beautify the environment than regular shaped ones.	190	5	80	4	30	2	60	3	10	1
All products advertised have monotonous shapes.	250	5	70	4	20	3	20	3	10	2
The shapes of product adverts should be determined by the product advertised.	230	5	40	4	20	2	20	2	30	3
Bigger product adverts communicate better with their audience.	230	5	100	4	15	2	25	3	0	1
Shapes of product adverts enhance passers-by ability to understand the information on it.	160	5	130	4	20	2	40	3	20	2
<b>TOTAL</b>		35		28		14		20		13

**Source: Field Survey (2012)**

**N.B:(The ranking was done across the rows.)**

**H<sub>0</sub>** = There is significant relationship between the shape of a product and public perception of the product

**H<sub>1</sub>** = There is no significant relationship between the shape of a product and public perception of the product.

@  $\alpha = 0.05$

Test statistics:  $F_r = \frac{12}{NK(K+1)} \sum_{i=1}^k R_i^2 - 3N(k-1)$  were N = 7 and k =5

$$F_r = F_r \frac{12}{7(5)(6)} \frac{[35+28+14+20+13]^2}{-3(7)(4)}$$

$$F_r = 686.6$$

**Decision Rule:** reject H<sub>1</sub> if  $F_r > \chi^2_{(0.05)}$  with 4 degree of freedom (686.6 > 9.490)

The computed value of the test statistics  $F_r = 686.6$  exceeds  $\chi^2_{(0.05)} = 9.490$ , there is sufficient evidence to reject  $H_1$  and conclude that There is significant relationship between the shape of a product and public perception of the product.

Majority of the respondent were more of the opinion that there is significant relationship between the shape of a product and the public perception. For a product to be sold in the market it must have appealing shape that will attract the consumers or the target audience according to Oladumiye (2012) aesthetic validity of shapes on product advertisement is predicted on the psychobiological, sociological origin and fundamental origin of human behaviour as far as perception of advertisement of products is concern.

**Hypothesis 3**

4.3 There is significant relationship between balance in product advert designs and public choices.

**Table: 1.3, Design balancing matters in products advertisement**

VALUE LABEL	S.A	A	S.D	D	I.C.S
VALUE	5	4	3	2	1
Balance in product advertised is very necessary	300	20	30	0	20
All products advertised everywhere In the City of Akure are balanced.	200	70	50	30	20
Balanced product adverts communicate very well.	300	20	30	20	20

Since it is a frequency distribution and not a continuous distribution; then we appeal to a typical non parametric test like FRIEDMAN’S TWO-WAY ANOVA to analyze the data above.

VALUE LABEL	S.A	R <sub>1</sub>	A	R <sub>2</sub>	S.D	R <sub>3</sub>	D	R <sub>4</sub>	I.C.S	R <sub>5</sub>
VALUE	5		4		3		2		1	
Balance in product advertisement is very necessary	300	5	20	3	30	4	0	2	20	3
All products advertised everywhere In the City of Akure are balanced.	200	5	70	4	50	3	30	2	20	1
Balanced product advertised communicate very well.	300	5	20	3	30	4	20	3	20	3
<b>TOTAL</b>		15		10		10		7		7

**N.B :( The ranking was done across the rows.)**

$H_0 =$  There is significant relationship between balance in product advert designs and public choices. Vs

$H_1 =$  There is no significant relationship between balance in product advert designs and public choices.

@  $\alpha = 0.05$

Test statistics:  $F_r \frac{12}{NK(K+1)} \sum_{i=1}^k R_i^2 - 3N(k-1)$  were N =3 and k =5

$$F_r = F_r \frac{12}{3(5)(6)} \frac{[15+10+10+7+7]^2}{-3(3)(4)}$$

$$F_r = 315.3$$

**Decision Rule:** reject  $H_0$  if  $F_r > \chi^2_{(0.05)}$  with 4 degree of freedom ( $315.3 > 9.490$ )

Since the computed value of the test statistics  $F_r = 315.3$  exceeds  $\chi^2_{(0.05)} = 9.490$ , there is sufficient evidence to reject  $H_1$  and conclude that there is significant relationship between balance in product advert designs and public choices

On the hypothesis of whether there is significant relationship between balance in product advertised aesthetically and the public choice. The Null hypothesis which stated that no significant relationship between balanced in product design was rejected while it was concluded that there is significant relationship between balances in product advertisement was adopted because balance is equilibrium of opposing forces in advertisement of products.

**Hypothesis 4**

There is significant relationship between emphasis in product adverts and public interest.

**Table: 4 Roles of emphasis of visuals the influences on the consumer’s choice of product?**

VALUE LABEL	S.A	A	S.D	D	I.C.S
VALUE	5	4	3	2	1
Emphasis is effective in displaying of graphic design ideas.	300	20	0	30	20
Customers make product choices based on emphasis on advertisement.	120	60	80	100	40
All advertisement with emphasis forces public to buy their products.	100	210	40	10	10
Design ideas with emphasis helps sell a product.	210	120	10	20	10
Design ideas with strong emphasis attract the public.	300	20	0	30	20
Adverts with special effects attract More Attention.	160	130	20	40	20
Emphasized advert ideas can easily be captured by commuters.	150	50	50	100	20

Since it is a frequency distribution and not a continuous distribution; then we appeal to a typical non parametric test like FRIEDMAN’S TWO-WAY ANOVA to analyze the data above.

VALUE LABEL	S.A	R <sub>1</sub>	A	R <sub>2</sub>	S.D	R <sub>3</sub>	D	R <sub>4</sub>	I.C.S	R <sub>5</sub>
VALUE	5		4		3		2		1	
Emphasis Is effective In displaying of graphic design ideas.	300	5	20	3	0	2	30	4	20	3
Customers make product choices based on emphasis advert.	120	5	60	2	80	3	100	4	40	1
All advert with emphasis forces public to buy their products.	100	4	210	5	40	3	10	2	10	2
Design ideas with emphasis Helps Sell A Product.	210	5	120	4	10	2	20	3	10	2
Design ideas with strong emphasis attract the public.	300	5	20	3	0	2	30	4	20	3
Adverts with special effects attract more attention.	160	5	130	4	20	2	40	3	20	2
Emphasized advert ideas can easily be captured by commuters.	150	5	50	3	50	3	100	4	20	2
<b>TOTAL</b>		34		24		17		24		16

**Source:** Field Survey (2012)

**N.B:(The ranking was done across the rows.)**

H<sub>0</sub> = There is significant relationship between emphasis in product adverts and public interest  
V<sub>s</sub>

H<sub>1</sub> = There is no significant relationship between emphasis in product adverts and public interest.

@ α = 0.05

Test statistics:  $F_r \frac{12}{NK(K+1)} \sum_{i=1}^k R_i^2 - 3N(k - 1)$

were N =7 and k =5



$$F_r = F_r \frac{12}{7(5)(6)} [34+24+17+24+16]^2 - 3(7)(4)$$

$$F_r = 750.9$$

**Decision Rule:** reject  $H_1$  if  $F_r > \chi^2_{(0.05)}$  with 4 degree of freedom ( $750.9 > 9.490$ )

Since the computed value of the test statistics  $F_r = 750.9$  exceeds  $\chi^2_{(0.05)} = 9.490$ , there is sufficient evidence to reject  $H_1$  and conclude that there is significant relationship between emphasis in product adverts and public interest.

The result presented in Table 4 above showed that there is significant relationship between emphasis of products advertised and the public interest. The respondents agree that all adverts with emphasis, force public to buy the advertised products. 50 of the respondents disagree while 330 of the respondents agree to the point that design ideas aesthetically with high perception and emphasis helps to sell a product. As a result from the result of the tested hypothesis one would agree that there is significant relationship between emphasis of product advertised and the public interest.

### Hypothesis 5

4.4 There is significant relationship between pictures in product adverts and public choices.

**Table: 1. 5, Role of Aesthetics Pictures in Adverts**

VALUE LABEL	S.A	A	S.D	D	I.C.S
VALUE	5	4	3	2	1
Electronic product adverts are more effective than still adverts	200	70	50	30	20
Celebrities advertised with products strongly influence the public.	200	70	50	30	20
Picture dominant adverts are effective when it comes to product display.	150	50	50	100	20
All products advert contain pictures.	100	210	40	10	10
Pictures on adverts are always real.	160	130	20	40	20
Product adverts are deceptive.	200	70	50	30	20

Since it is a frequency distribution and not a continuous distribution; then we appeal to a typical non parametric test like FRIEDMAN'S TWO-WAY ANOVA to analyze the data above.

VALUE LABEL	S.A	R <sub>1</sub>	A	R <sub>2</sub>	S.	R <sub>3</sub>	D	R <sub>4</sub>	I.	R <sub>5</sub>
					D				C.	
									S	
VALUE	5		4		3		2		1	
Electronic product adverts are more effective than still adverts	200	5	70	4	50	3	30	2	20	1
Celebrities advertised with products strongly influence the public.	200	5	70	4	50	3	30	2	20	1
Picture dominant adverts are effective when it comes to product display.	150	5	50	3	50	3	100	4	20	2
All products advert contain pictures.	100	5	21	3	40	4	10	2	10	2
			0							
Pictures on adverts are always real.	160	5	13	2	20	3	40	4	20	3
			0							
Product adverts are deceptive.	200	5	70	4	50	3	30	2	20	1
<b>TOTAL</b>		30		20		19		16		10

Source: Field Survey (2012)

**N.B:(The ranking was done across the rows.)**

$H_0$  = There is significant relationship between pictures in product adverts and public choices.

Vs

$H_1$  = There is no significant relationship between pictures in product adverts and public choices.

@  $\alpha = 0.05$

Test statistics:  $F_r \frac{12}{NK(K+1)} \sum_{i=1}^k R_i^2 - 3N(k-1)$  were  $N=6$  and  $k=5$

$$F_r = F_r \frac{12}{6(5)(6)} [30+20+19+16+10]^2 - 3(6)(4)$$

$F_r = 596.9$

**Decision Rule:** reject  $H_0$  if  $F_r > \chi^2_{(0.05)}$  with 4 degree of freedom ( $596.9 > 9.490$ )

Since the computed value of the test statistics  $F_r = 596.9$  exceeds  $\chi^2_{(0.05)} = 9.490$ , there is sufficient evidence to reject  $H_1$  and conclude that there is significant relationship between pictures in product adverts and public choices.

Pictures are one of the most expressive elements which arouse universal appreciation in advertisement of products. It plays an important role in the choice of goods and materials advertised by advertisers. Pictures make advertisement linger on in our memory Jacob (2009) emphasis that pictures influence most strikingly and are generally considered the most potent device available to advertising practitioners or graphic designers in aesthetic composition. As a result, the majority of the respondents agreed that there is significant relationship between pictures in product adverts and public choice. Plate 4 is an example of a picture advert.



Plate 4: Picture advert (Authors collection 2012)

**Hypothesis 6**

4.5 There is significant relationship between text used in product adverts and consumer perception of an advertised product.

**Table: 1.6, Consumers Perception about the used text on Advertisements Billboards.**

VALUE LABEL	S.A	A	S.D	D	I.C.S
VALUE	5	4	3	2	1
Text style affects the audience perception of the product.	100	210	20	40	5
Adverts with big text are easily remembered.	100	210	40	10	10
Words pass more information than pictures.	150	50	50	100	20
All statements on product adverts are true.	120	60	80	100	40
Slangs help to promote adverts better.	210	120	10	20	10
It is good for product advert messages to be precise.	300	20	30	20	0

Since it is a frequency distribution and not a continuous distribution; then we appeal to a typical non parametric test like FRIEDMAN'S TWO-WAY ANOVA to analyze the data above.

VALUE LABEL	S.A	R <sub>1</sub>	A	R <sub>2</sub>	S.D	R <sub>3</sub>	D	R <sub>4</sub>	I.C.S	R <sub>5</sub>
VALUE	5		4		3		2		1	
Text style affects the audience perception of the product.	100	4	210	5	20	2	40	3	5	1
Adverts with big text are easily remembered.	100	4	210	5	40	3	10	2	10	2
Words pass more information than pictures.	150	5	50	3	50	3	100	4	20	2
All statements on product adverts are true.	120	5	60	2	80	3	100	4	40	1
Slangs helps to promote adverts better	210	5	120	4	10	2	20	3	10	2
It is good for product advert messages to be precise.	300	5	20	3	30	4	20	3	0	2
<b>TOTAL</b>		28		22		17		19		10

**Source: Field Survey (2012)**

**N.B:(The ranking was done across the rows.)**

H<sub>0</sub> = There is significant relationship between text used in product adverts and consumer perception of an advertised products V<sub>s</sub>

H<sub>1</sub> = There is no significant relationship between text used in product adverts and consumer perception of an advertised product.

@ α = 0.05      Test statistics:  $F_r$        $\bar{N}$       were N =6 and k =5

$$F_r = F_r \frac{12}{6(5)(6)} \frac{[28+22+17+19+10]^2}{-3(6)(4)}$$

$F_r = 609.6$

**Decision Rule:** reject H<sub>0</sub> if  $F_r > \chi^2_{(0.05)}$  with 4 degree of freedom ( $609.6 > 9.490$ )

Since the computed value of the test statistics  $F_r = 609.6$  exceeds  $\chi^2_{(0.05)} = 9.490$ , there is sufficient evidence to reject H<sub>1</sub> and conclude that there is significant relationship between text used in product adverts and consumer perception of an advertised product.

Majority of the respondents agreed that poor knowledge of the choice of psychology of typography and texts used in graphic advertisement of products are at times not in agreement with the advert as a result, the hypothesis that stated that there should be significant relationship between text used in product adverts for, these will give the consumers a good perception of the product.

According to Amifor (2001), local designs have associated conflicts with text and images. Such crisis of unbalances clearly suggests that there is the need to use correct text and typography in order to give the advertisement and the product a place in the market.

## **5.0 Summary, Conclusion and Recommendations**

### **5.1 Summary**

The study examined the effect of the use of elements of aesthetics in product advertisement on the public in the city of Akure, Ondo State, Nigeria. A sample size of three hundred and eighty five was selected from the population using a purposive sampling technique. Data were collected using a well structured questionnaire. Descriptive analysis, frequencies, mean, percentages and parametric test like FRIEDMAN'S TWO-WAY ANOVA were used to analyze the collected data.

The Results of analysis indicated that 50 % of the respondents are male while 50% are females, (54%) are between twenty one to twenty five years of age, 22% are between sixteen to twenty years of age, 19% are between twenty six to thirty years of age and the least proportion of the respondents are from thirty one years of age and above. Analysis of the religion background of the respondent revealed that 73 % of the respondents are Christians and 27% are Muslims, these shows that the people found along the study area are Christians and some of the respondents are set of people who understand the role of advertisement communications. 270 of the respondents agree that product advertisements in colours attract attention of passersby, 80 disagree, 315 of the respondents agree that colours make the public buy what they don't need., 48 disagree. 360 of the respondents agree that colourful product adverts beautify the environment. 110 disagree. 245 of the respondents agree that all product adverts are colourful. 118 disagree. 330 of the respondents agree that adverts with more colours communicate are better, 35 disagree. 322 of the respondents agree that adverts must reflect the colour of a product.

Colour speaks louder than voice in product advertisements. 42 disagrees. 350 of the respondents agree that big products advertised attract more attention. 15 disagree. 230 of the respondents agree that landscape product adverts are more attractive than portrait adverts, 90 disagree. 270 of the respondents agree that specially shaped product adverts beautify the environment than regular shaped ones. 90 disagree. 320 of the respondents agree that all product adverts have monotonous shapes, 40 disagree. 270 of the respondents agree that the shapes of product adverts should be determined by the product advertised. 40 disagree. 330 of the respondents agree that bigger product adverts communicate better to the audience, and that shapes of product advertised enhance passers-by ability to understand the information on it. 310 of the respondents agree that text style affects the audience perception of the product, 60 disagree. 310 of the respondents agree that adverts with big text are easily remembered, 50 disagree. 200 of the respondents agree that words pass more information than pictures, 150 disagree. 180 of the respondents agree that all statements on product adverts are true, 180 disagree.

The respondents agree that slangs helps to promote advertisement better and that it is good for product advertised to have precise messages. 320 of the respondents agree that emphasis is effective in displaying of graphic design ideas, 50 disagree. 180 of the respondents agree that customers make product choices based on emphasis in advert, 180 disagree. 310 of the respondents agree that all advert with emphasis forces public to buy their products, 50 disagree. 330 of the respondents agree that design ideas with emphasis helps sell a product, 30 disagree. The respondents were of the opinion that design ideas with strong emphasis attract the public, and that adverts with special effects attract more attention, also emphasized advert with good ideas easily captured consumers 320 of the respondents agree balance in product adverts is very necessary, 30 disagree. 270 of the respondents agree that all product adverts everywhere in the city of Akure are balanced, 70 disagree. 320 of the respondents agree that balanced product adverts communicate very well, 50 disagree. 270 of the respondents agree that electronic product adverts are more effective than still advert, 80 disagree. 270 of the respondents agree that celebrities advertised with products strongly

influence the public, 80 disagree. 200 of the respondents agree that celebrities advertised with products strongly influence the public, 150 disagree. 310 of the respondents agree that picture dominant adverts are effective when it comes to product display.

## **5.2 Conclusion**

The study revealed that aesthetics in product advertisement has a significant effect on the public in the city of Akure, Ondo state, Nigeria. Colour, Shape, balance, Text, Emphasis and Pictures used in product adverts were found to be the major criteria that influenced public perception of advertised products.

## **5.3 Recommendations**

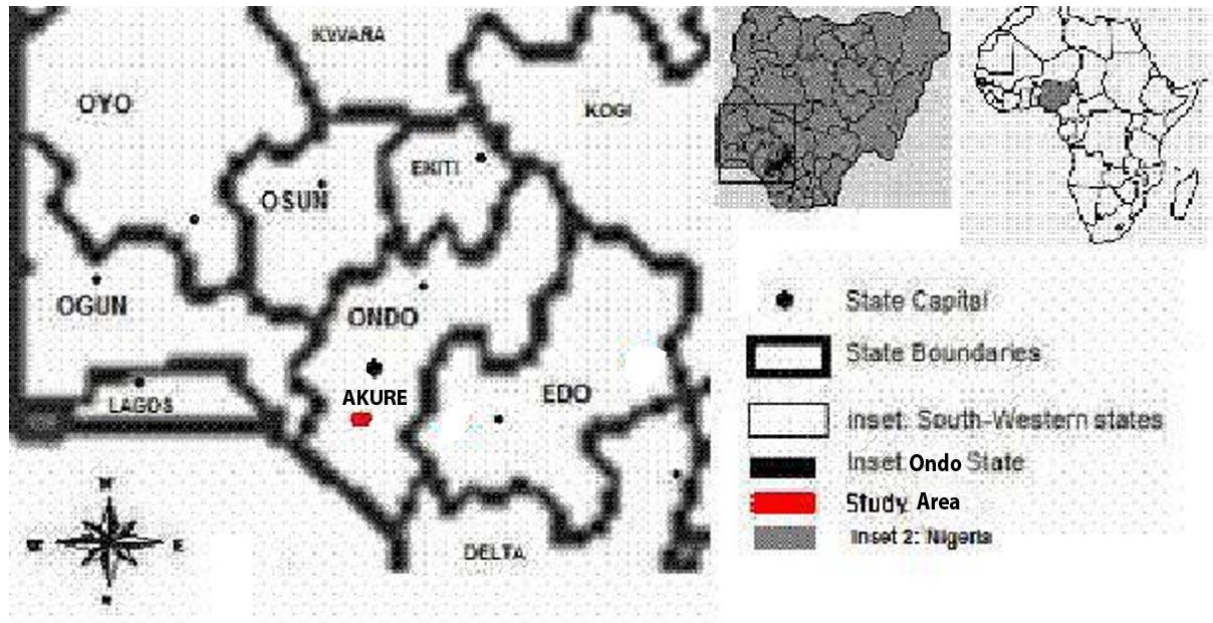
Taking cognizance of the findings in the study it is recommended that, advertisers should use sensual colours that will properly represent their products, make use of catchy slangs, appropriate typefaces, emphasis and professionally photographed images that are real and not over edited for their product advertisements also, they should be more sensitive in the placement of the various elements in the product advertisement so as to create a balance in the design so as to pass effectively messages to the proper audience and to boost sales. It is also recommended that consumers or the general public should make more enquiries about a product advertised before patronizing.

## References

- Amifor, S.N. (2001) Graphics Design in Reflection: A case for Creative Depth, PortHarcourt Nigeria Journal of Creative Arts 2,(1&2),117-120.
- Bloch, P.H. (1995) Seeking the ideal form: product design and consumer response. Journal of Marketing 59, 16 – 29.
- Doghudje, C.A. (2003) The effective advertising Manager Lagos. Journal of the Association of Advertising Practitioners in Nigeria, (9), 11.
- Feagin, S, and Maynard, P (1997) Aesthetics. Oxford University Press, Oxford.
- Jacob,C.(2009) Graphic Design Trend: Retrieved from <http://justcreativedesign.com2008/09/top-7-most-overused-techniques-elements-used-in-graphic-design/september2008>
- Kotler, P, and Rath, A.G (1984). Design a powerful but neglected strategic tool. Journal of Business Strategy 5,16-29.
- Nasar, J.L, (1988) Environmental Aesthetics. Theory, Research, and Application. Cambridge University Press, Cambridge.333-335,
- Oladumiye, E.B. and Ogunduyile, S.R. (2006) An Aesthetic Perception of the Study of Graphic Design in Modern African Art: Journal of Nigerian Art Reflection 6,(6 ). 198-200
- Oladumiye E.B. (2011) Graphic Design: A Developmental Tool for Eliciting Ethical Values and Human Rights; Journal of Science and Technology Johannesburg, 1, (1). 76 - 80
- Oladumiye E.B. (2012) Effect of Graphic Design on Advertisement of Consumer Goods in Lagos Nigeria Unpublished Ph.D, Thesis. Federal University of Technology Akure Nigeria.
- Petroski: H, (1993). The Evolution of Useful Things. Alfred A. Knopf. New York.
- Porteous, J.D, (1996) Environmental Aesthetics: Ideas politics and Planning. Routledge, London.
- Russell, J.A., (1988) Affective appraisals of environments. In: Nasar, J.L(Ed), Environmental Research, and Applications. Cambridge University Press, Cambridge. 89-93.
- Russell, J.A., Pratt, G., (1980). A description of the affective quality attributed to environments. Journal of Personality and Social Psychology 38 (2), 311 – 322.
- Saw, R, Osborne, H. (1968) Aesthetics as a branch of philosophy. In. Osborn. H. (Ed.) Aesthetics in the Modern World. Weybright and Talley, New York.
- Schenkman, B.N. and Johnson, F.U (2000) Aesthetics and Preferences of web pages. Behaviour and Information Technology. 19 (5), 367 – 377.
- Sparshott, F.E., (1963) The Structure of Aesthetics University of Toronto Press, Toronto, 222-225.
- Swede, G. (1994) Basic Theoretical Issues. In: Swede, G. (Ed.) The Psychology of Art: An Experimental approach Canadian Scholar, Press Inc, Toronto.
- Whitney, D.E., (1988) Manufacturing by design, Harvard Business Review 66. (4), 83 – 90.
- Yamamoto, M., Lambert, DR, (1994) The Impact of product aesthetics on the evaluation of industrial products. Journal of Product Innovation Management 11, 309 – 323

## APPENDIX





# An examination of housing and environmental health of a heterogeneous community of Agege, Lagos, Nigeria

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## **Abstract**

Housing as one of the most important basic necessities of mankind is known to tremendously affect human health and well-being. This study examines housing and Environmental health in Agege Local Government Area of Lagos State. Data were collected from randomly sampled 330 household in the Local Government and data analysis carried out with the aid of Computer Aided Statistical Package for Social Science (SPSS) Version 16. The technique used was univariate analysis which is a single variable analysis that describes the necessary features of the sets of data. The result of the analysis revealed that male households head were prominent among sampled respondents. The economic status of respondents was discovered to determine the type of apartments, utility of housing facilities and healthiness of the environment. The Brazilian types of houses known as 'face to face' or rooming apartments were prominent among respondents. The sources of water for drinking in the study area were discovered to come from well and buying from water vendors Pit latrine was discovered to be the dominant means of faecal waste disposal. It was also discovered that there exist large household size which is tantamount to overcrowding. Sources of energy for cooking among the sampled households were discovered to be predominated with smoke emitting contrivances. The Chi-square analysis was used to test the hypotheses and the outcome revealed that there is a statistical significant relationship between the tested hypotheses. The study concluded that, high level of urbanization in Lagos coupled with economic deprivation has made its citizenry to seek for place of abode and not housing in its totality. This creates a city of low quality of life and transfer socio-economic and environmental health problems. The study recommended that the state and local government should endeavour to make towns and cities well organized with paved-tarred roads, good drainage system in appropriate places, electricity and water supply, green areas and aesthetically pleasing environment that will enhance environmental health and should placed stronger and higher commitment on the implementation, compliance, and enforcement efforts among governments at the three tiers of governance in Nigeria so as to create bearable and livable urban development.

**Keywords:** Housing, environmental health, economic status, Agege, Nigeria.



## 1.1 Introduction

Housing is one of the most important basic necessities of mankind. It has tremendous affects on human's health and well-being. It is widely acknowledged that adequate housing is essential for good life; it is a key requirement for an efficient and satisfied labour force and the foundation of satisfactory community life. Researchers have shown that housing can affect mental and physical health, both positively and negatively (Fanning, 1967; Macpherson, 1979; Riaz, 1987). According to Domanski, et al (2006), housing is the largest component of many households' expenditures and is central to people's ability to meet basic needs. In addition, poor housing conditions can affect people's health status (both mental and physical), family functioning (e.g. relations between household members and the development of children) and the conduct of basic social activities such as inviting people at home.

The study by Page (2002) established linkages between poor housing and its detrimental effects on health with particular emphasis on the mental health of residents. The same study also provides evidence to support the view that poor housing can exacerbate existing health problems. In the Nigerian situation, Oluwande, back in 1983, concluded that children's progress is stunted by damp, overcrowded, ill-ventilated and poorly lit accommodation. Most Nigerian cities, with the exception of the newly developed Federal capital city of Abuja, have experienced decay in both housing and physical infrastructural facilities over the past few decades, possibly due to economic downturn in the Nation. Unlike developed nations, the mortgage industry is still in its infancy in Nigeria with the real estate sector contributing less than one percent to the nation's GDP (Punch Newspapers, 5th September 2007).

The zoning regulations in many of these cities arbitrarily determine the quality of land supplied to the urban land market and not by the laws of supply and demand, which Egbu et al (2006) found out fails to meet the demand. Normally, a property developer in a Nigerian city first has to secure a 'location permit' (land right) and then a development right (planning permission). This is a process that has been made very cumbersome by government bureaucrats who, it is claimed, use it to gain some personal financial advantage. Most housing developments are executed by private developers, taking the form of flats and rooming-accommodation, which are popularly called 'face me, I face you'. These account for between 60 and 80 percent of urban housing in Nigeria (Ogu and Ogbuozobe, 2001). Egbu et al. (2007) devised a model for three Nigerian cities and concluded that properly monitored land use planning has a positive bandwagon effect on housing quality. Research by UN-Habitat (2003) has shown that 924 million people, or 31.6% of the world's urban population, are living under unacceptable conditions. The quality of a residential area not only mirrors the city development, planning and allocation mechanisms between socio-economic groups, but also shows the quality of life of the urbanites. The realization of a decent home in a suitable living environment requires the availability of clean air, potable water, adequate shelter and other basic services and facilities (Bashir, 2002). This study is aimed at examining the extent of housing quality as well as environmental health in the study area with a view of suggesting the improvement strategies. The followings came out as the research questions of this study, these are;

- i. how are the socio-economic status of the sampled population in the study area
- ii. how are the physical conditions of prevailing houses in the study area
- iii. how are the prevailing environmental conditions of the study area; and
- iv. how are the likely health implications of prevailing housing and environmental conditions of the study area

## 2 Scope of the Study

This research study looked at physical assessment of housing and environmental conditions. The housing conditions is based on physical assessment of materials used for building, age of building, structural condition of building, type of housing, wall material, roofing material, etc while

environmental conditions of sampled houses and its surroundings considered level of household facilities and infrastructure available within the neighbourhood. Variables such as sources of water, type of toilets, uses of toilets, location of kitchen and bath facility, waste disposal methods, drainage facilities, etc and health implications were deduced from prevailing conditions as implied by literature on the subject matter. To effectively carry out this assessment, the various components of the buildings were examined in terms of materials used for construction, age of building. Socio-economic status of respondents examined variables such as sex and marital status, educational status, household size, average monthly income of sampled respondents, etc. The survey covered notable areas in Agege, Lagos State like Agbotikuyo Dopemu area, Capitol-Alfa Nla area, Pen-cinema area, Ipaja, Oko-Oba and Stadium-Akilo area. Figure 1 shows the area.

### 3 The Study Area

Lagos is one of the mega cities in Africa which is located in South Western Nigeria on the west coast of Africa, within latitudes 6°23' N and 6° 41' N and longitudes 2° 42' E and 3°42' E. Although Lagos state is the smallest state in Nigeria, with an area of 356,861 hectares of which 75,755 hectares are wetlands, yet it has the second highest population, which is over 5% of the national estimate. However, a parallel population count by the Lagos State government put the population at about 17 million, the state's population according to the 2006 census was 9,013,534 out of a national estimate of 140 million (National Population Commission, 2007).

From this population, metropolitan Lagos, an area covering 37% of the land area of Lagos State is home to over 85% of the state's population. The rate of population growth is about 275,000 persons per annum with a population density of 2,594 persons per square km. In a United Nation's study of 1999, the city of Lagos was expected to hit the 24.5 million population mark by the year 2015 and thus be among the ten most populous cities in the world (Lagos State Government, 2006).

Lagos' share of Nigeria's GDP is 12% valued at USD 29 Billion from USD 18 Billion in 2005. It has 80% of country's industrial / commercial activities, 45% of national electricity consumption and 50% of petroleum products consumption (Lagos State Vision 20:2020 First Implementation 2010-2013). Agege Local Government was adopted as the study area due to its dense population. Within Agege Local Government are Local Council Development Areas making Agege one of the biggest and most populated LGA in Lagos. Agege Local Government is one of the 20 constitutionally recognized Local Governments of Lagos in Nigeria. It has a population of 461,743 comprising of 238, 456 males and 23,287 females (National Census, 2006). This population is heterogeneous in nature in that it consists of diverse ethnic groups in Nigeria and outside Nigeria, cutting across different income levels.

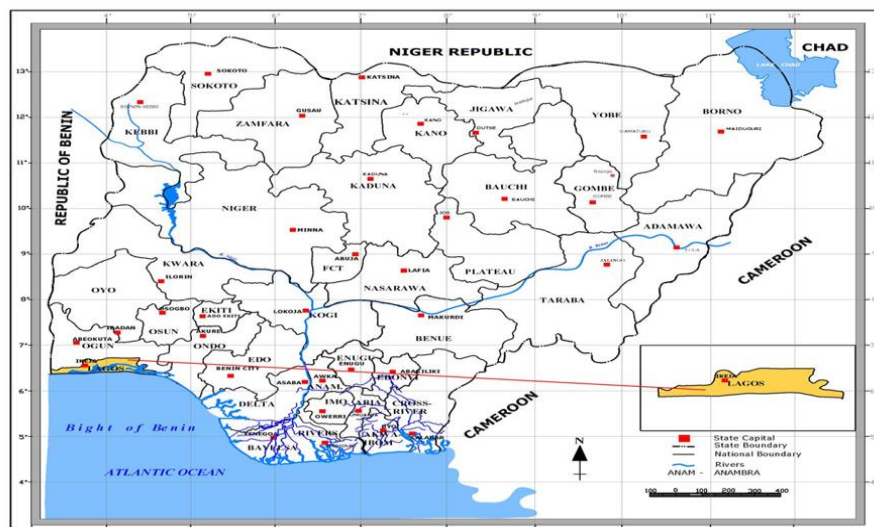


Figure 1: Map of Nigeria Showing Lagos State

Source: Federal Government of Nigeria, 2008

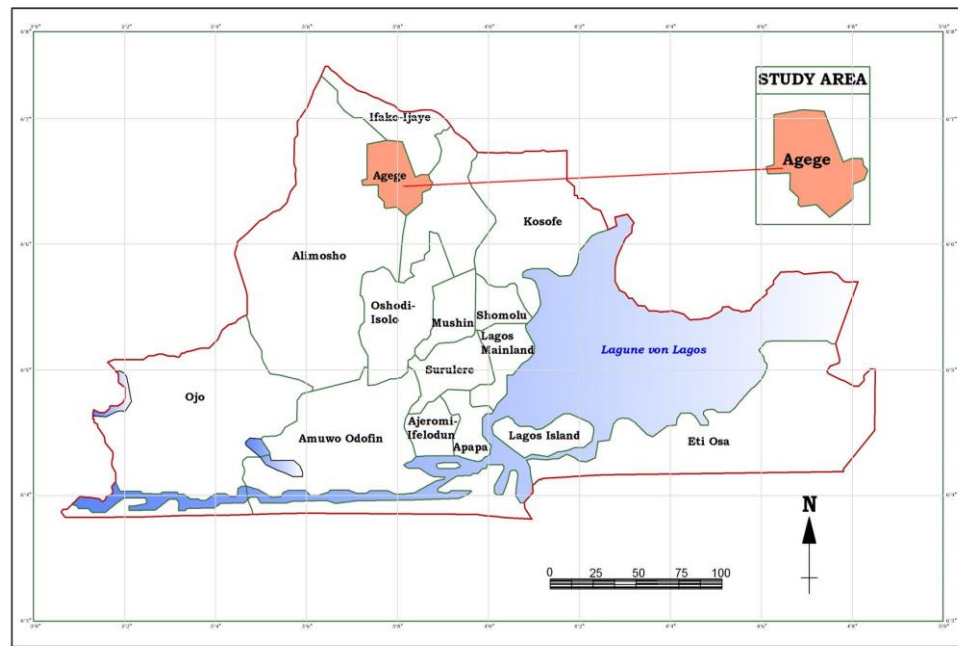


Figure 2: Map of Lagos State Showing Agege the Study Area

Source: Ministry of Physical Planning and Urban Development, 2007

### 3 Literature Review and Conceptual Framework

As an increasing proportion of the world's population live in the urban areas, adequate shelter for all has been articulated as one of the two main themes of Habitat II. Habitat (1996) pointed out that the serious problems facing cities in the world over, especially those in Sub Saharan Africa, increasing homelessness, expansion of sub standard housing, inadequate infrastructure and increasing poverty, posed as a challenge to policy makers.

Housing of an adequate standard that enhances health and well-being is a basic human right enshrined in Article 25 of the United Nations Declaration of Human Rights of 1948. Housing which meets the needs of household provides stability and opportunities for positive interactions outside the home (Ajayi and Omole 2012; Tipple et al 1991; Ellaway et al 2003; UN-Habitat 2003). A wide variety of research has investigated the effect of poor quality, inappropriate, or no housing on health outcomes. While results have been conflicting, the majority of authors believe this is due to methodological problems, rather than lack of an effect attributable to housing improvement (Evans, Chan, Wells and Saltzman (2000); Thomson, Peticicrew and Morrison, 2000).

Several studies have investigated the effect of improvements in housing quality on non clinical mental health ratings and found that psychological distress is decreased following housing improvement (Evans, et al., 2000; Thomson, et al., 2002). Thomson and colleagues (2002) found, in their review of studies, that housing improvement was followed by reductions in health service use and improvement in broad indicators of social inclusion. Other studies have examined the effect of housing problems for people with mental illness. Johnson (2005) found that people with mental health problems were more likely than the general population to report dissatisfaction with housing and attribute it to worsening health problems, while Johnson (2005) has suggested that 20 housing problems are a common reason for psychiatric hospital admissions. These studies provide evidence that housing quality influences mental health. Poor quality housing and poverty are inextricably linked, and as such, the long-term effects of these types of social exclusion have serious implications in terms of life course disadvantage (Blane, 2006).

The importance of housing as a basic need for human existence cannot be overemphasized. The aspiration for home ownership is a phenomenon that is as old as the history of man himself

(Alagbe, 2010). There is a broad consensus that housing has a central importance to everyone's quality of life and health with considerable economic, social, cultural and personal significance (Ergruden, 2001). Housing is also seen as one of the best indicators of a person's standard of living and of his or her place in society (UNCHS, 1993). By extension, (Venkatarama, 2004) is of the view that housing and building conditions also reflect the living standards of a society. In the Nigerian context, housing transcends the border of the views as captured in its various definitions, but more of a worthy legacy that individuals aspire to own and bequeath to their successors (Alagbe, 2010).

The World Health Organization (2004) reckons that 'it is the home, not the clinic that is the key to a better health delivery system'. Observation by Nwaka, 2005 shows that only about 25% to 30% of Nigerians, mainly top government officials and other rich and privileged people enjoy a decent quality of urban life. The vast majority of households, especially those in informal settlements, live in overcrowded conditions, within defective physical dwellings, sometimes located in areas which do not provide adequate defenses against disease and other health hazards (Nwaka, 2005). Because many people do not have secure tenure with respect to the land and houses they occupy, they have little inclination to improve the quality of the houses and the general environment because of constant threats of forced eviction. Government officials often argue that the practical difficulties of upgrading irregular settlements and connecting them to urban infrastructure and services tend to reinforce social exclusion.

According to Nwaka (2005), for a long time successive post-colonial administrations appeared to see the growing urban problems "with the jaundiced eye of defenders of a colonial legacy". The Nigerian Town and Country Planning Ordinance of 1946 remained essentially unchanged until 1992, not because it was working satisfactorily but because it was largely ignored and by-passed by rapid growth and spontaneous development. Most of the laws and regulations guiding environmental health and sanitation appear to be reminders of colonial segregation and oppression, and have very little current relevance. For instance, residential areas are also now widely used for small businesses, in complete disregard of the zoning arrangements which require separate areas for presumed incompatible activities.

Nigeria experimented with virtually all of the approaches that were fashionable in the 1960s, 1970s, and 1980s — slum clearance schemes which caused much distress and social dislocation, sites-and-services schemes which tried to open up new land and have it subdivided into serviced residential plots for distribution, and slum or squatter upgrading which tried to fit new infrastructure and services into already disorderly and crowded settlements, sometimes with the participation of local residents. Also, following Habitat I in 1976 and the oil boom of the 1970s and early 1980s, Nigeria embarked on an ambitious program of public housing construction. The federal government planned to add over 200,000 housing units to the existing housing stock, while the 20 or so state governments at the time would each build an additional 4,000 housing units. Mortgage facilities were established and a new government ministry was created for Housing, Urban Development, and the Environment, called the Federal Ministry of Housing, Urban Development and Environment (FMHUDE). Typically, only about 12% of the projected housing targets for 1970-74, and 24% for 1975-1980 was actually achieved. The enormous resources earmarked for the purpose were misappropriated or otherwise diverted to the construction of military barracks and other projects of doubtful priority. None of the housing programs advanced the housing conditions or needs of the poor in irregular settlements, but instead provided subsidized housing for middle-income groups, high-income people, and other well-connected individuals.

The statutory standard of fitness was first introduced as a concept in the UK around 1919 and remains in use as the key legal standard for the assessment of housing conditions. Stewart (2002) identified the main defect of fitness standard as merely providing for a pass or fail checklist for some housing parameters. Part 1 of the UK Housing Act of 2004 now provides for the Housing Health and Safety Rating System (HHSRS), a health and safety based system for local authorities to adopt as the basis for enforcement against poor housing conditions (ODPM, 2004).

Housing standards vary from one nation to another and also within a particular country; variations in climate, culture, degree of urbanization, and socio-economic progress affect standards. The UNO (1969) stated that standards derive from a people's cultural level of attainment. It has been argued that standards should combine the best features of traditional practice with the economy and rationality of modern techniques. The Nigeria's Federal Ministry of Housing and Environment has yet to come up with a definite housing standard for the country. However, in a study on Benin City, Onokerhoraye (1985) empirically classified housing standards in Nigeria into two categories: first, space standard, which defines housing intensity development in terms of plot sizes, number of buildings per unit area of land and occupancy sizes. The second relates to performance standard, which describes the quality of the environment. This approach is a modified form of the housing standard specified by the American Public Health Association (APHA) in 1945, 1946 and 1950. The APHA method minimizes individual opinions so as to arrive at numerical values of the quality of housing that are comparable with results from other cities and can be reproduced in the same city by different evaluators using the same system. The APHA method, used in the present study, measures the quality of the dwelling units and the environment in which they are located. The method uses a system of penalty scoring rather than positive scoring, that is, the higher the arithmetic score of a condition being judged, the more substandard is the situation.

Housing affects health in many ways. Deficient housing can compromise the most basic needs of water, sanitation, and safe food preparation and storage, allowing the rapid spread of communicable and food borne diseases. Other problems, such as poor temperature and humidity regulation, can lead to respiratory disease. Overcrowding brings both physical and psychological dangers (Nwaka, 2005). Many of the available housing in cities is substandard, housing is unaffordable for many poor families. Substandard housing is clearly bad for health, posing risk like respiratory diseases (Bashir, 2002). Children who live in substandard housing, with such features as rat infestations, leaks, holes in walls and floors, poor water sources and unimproved toilets are at increased risk of emotional disorders (Sharfstein et al. 2001). Poor people disproportionately reside in substandard housing, witnessing different forms of housing discomfort in the built environment.

Omole 2009 opines that the environment which one lives determines to some extent his behaviour. Several other studies have suggested that sordid environments beget sordid behaviors (Sampson and Groves 1989). Neighborhood of residence is an important predictor of mortality, an observation that cannot be fully explained by demographic, socio-economic, lifestyle, and psychosocial factors (Shaw et al. 2000). Part of this effect may well be due to the disorder and squalor of the environment. According to Lawanson (2011) lack of basic infrastructure and neighborhood facilities also tend to exacerbate this situation. Lawanson (2011) further stated that situation in places like Shitta and Isale Eko lend credence to this as they are the haven of destitute, area boys and criminals because residences are squalid and hence vulnerable to violence. From the literature above, one can infer that housing and environmental health have close relationships.

#### **4 Research Methodology**

The population of Agege according to NPC (2006) is 1,033,064. However, the projected population of Agege for 2012 at a growth rate of 3.2% by Lagos State Bureau of Statistics (2011) is 1,247,974. This represents the research population of the study area. The sampling frame of this research covered the total numbers of buildings in the study area. According to Lagos State Government Bureau of statistics (2011), there are 17,290 buildings in Agege. This represents the sample frame of this research.

The sampling size for the purpose of this study is 2% of 17,290 which amount to 346 buildings. Hence each selected building of 346 represented a proxy population which produced 346 questionnaires randomly administered.

Previous research studies using Agege as a case study resulted in different sample sizes. The work of Osinubi (2003) who researched on Urban Poverty in Agege arrived at a sample size of 140. Omirin, et al (2011) researched on outsourcing of sustainable waste disposal in Lagos conducted in

Agege used a sample size of 250. Hence the sample size of 346 for this research is reasonably a manageable size and showed progression.

The sampling techniques were based on some scientific approaches to prevent bias and ensure that the sample is a representative of the population. The sampling technique process ensured that all the elements in the study population have equal chance of being selected and to achieve this, a simple random sampling technique was employed in the research. The questionnaires were randomly administered to selected household head across Agege geographical extent. Okoko (2001) explained that a simple random technique aims at eliminating bias in the choice of respondents or items. It is used for data that are either spatially or non-spatially oriented or distributed.

The questionnaires served as the major instrument used for the collection of data. The research questionnaires were administered using a simple random sampling technique that ensured that interested household heads were given questionnaire to elicit responses based on their opinion regarding the questions. The questionnaires was given out and collected on the spot. This ensured a hundred percent (100%) returns of questionnaires.

For the purpose of this study and to achieve accuracy in processing collected data, the use of computer aided Statistical Package for Social Science (SPSS) 16.0 version is used. Two broad techniques of data analyses were carried out in order to comprehend and explain the result of the findings. The first of the techniques is the univariate analyses in form of tables. It is a single factor analysis which describes the necessary features of the sets of data. The second technique is the bivariate analysis which is used to measure the relationship between two variables. In this case, the statistical tool used was Chi Square( $X^2$ ). This helped to determine the type and strength of relationship between tested variables.

The Chi-square ( $X^2$ ) Test is given as;

$$\text{Chi-square } X^2 = \frac{\sum E^n (O_i - E_j)^2}{E_j}$$

Where,  $O$  = Observed

$E$  = Expected frequency

$N$  = Number of Categories

The use of  $X^2$  requires the formulation of the null -hypothesis  $H_0$  and calculation of a test of a T-Test Statistics to get the value of  $X^2$ . The  $X^2$  values is then compared with the critical value (CV), that is ( $X^2CV$ ) at = 0.001 or 0.05 with appropriate degree of freedom and then a decision is made as to either accept or reject the  $H_0$ ( Okoko, 2000).

The following hypotheses were tested in this research work:

- 1  $H_0$ : There is no significant relationship between economic status and housing condition  
 $H_1$ : There is a significant relationship between economic status and housing condition.
- 2  $H_0$ : There is no significant relationship between environmental conditions and health status.  
 $H_1$ : There is a significant relationship between environmental conditions and health status.

## 5 Data Presentation, Analysis and Discussion of Finding

The total number of questionnaires administered was 346 but 330 were analysed. The remaining 16 were uncompleted and its data deemed unreliable. Some variables considered germane are hereby analysed as follows.

### 1. Sex and Marital Status of Respondents

The table 1 shows that male household head interviewed out-numbered the opposite sex. The male accounted for 64% while female accounted for 36%. The table further reveals that married respondents dominated, accounting for 65% and follow by single respondents which accounts for 21% of the 230 sampled respondents. This showed that male and married respondents dominated the sampled households and an indication of reliability of elicited information.

**Table 1: Sex, Marital Status and Age Structure**

Sex	No of Respondents	% of Respondents
Male	212	64
Female	118	36
Total	330	100

#### Marital Status

Single	69	21
Married	215	65
Divorced	14	4
Widowed	32	10
Total	330	100

#### Age Structure of Respondents

Age	No of Respondents	Percentage of Respondents
18-25	21	6%
26-35	65	20%
36-45	92	28%
46-55	87	26%
56 and above	65	20%
Total	330	100%

Source: Author's Field Work, 2012

### 2. Age Distribution of Respondents

The age brackets of respondents are depicted also in table 1. From the age distribution in the table, it shows that 80% of the respondents are youth and adults, falling within the working age bracket of 18 to 55. The age bracket of 18-25 is inferred to be among the secondary school leavers and form the bulk of unmarried respondents. They are also among the unemployed respondents. The age brackets of 56 and above fall among the retirees who also said they are unemployed. This shows that environmental health and housing cut across all the classes or groups of ages.

### 3. Occupational Distribution of Respondents

Table 2 shows the occupational distribution of sampled respondents in the study area. There were 21% (44) Artisans and Professionals who engaged in their private work, 27% were either trading or doing their business while 26% are civil servant either working in the Local Government, Ministries or Agencies of Lagos State Government. The remaining 26% are unemployed traceable to retirees and students of the age bracket of 56 and above and 18-25 respectively.

### 4. Educational Status of Respondents

Table 2 also depicts the educational status of sampled respondents across Agege (the study area). Insight from the table revealed that 5% admitted that they have no formal education, 15% managed to finish the primary school, 52% were secondary school leavers while 28% attended

polytechnics and universities. At least, 80% can be said to be literate and hence information supplied can be reliable.

**Table 2: Educational Status, Occupational and Income distribution.**

Educational Qualification	No. of Respondents	% of Respondents
No School	17	5
Primary School	49	15
Secondary School	172	52
Tertiary Institution	92	28
Total	330	100

**Occupational Distribution of Respondents**

Artisan/Professional	69	21%
Trading/Business	89	27%
Civil Servant	86	26%
Unemployed	86	26%
Total	330	100%

**Monthly Income distribution**

Less than ₦10, 000	93	28
₦10, 000-₦30, 000	138	42
₦31, 000-₦50, 000	34	10
₦51, 000-₦100, 000	65	20
Total	330	100

Source: Author's Field Work, 2012

Table 2 depicts the average monthly income of sampled respondents. Analysis from the table below indicates that 28% fall short of the minimum wage, earning less than ₦10, 000 monthly income while 42% are within the minimum wage bracket, earning between ₦10,000 - ₦30,000 monthly income. Deductive reasoning from these two sets of earners suggested that they are the occupants of face-face rooming apartments and boys quarters in the study area.

**5 Types of Apartment and household size**

The survey shows that respondents occupying *face-to-face* rooming apartments, boys' quarters and room and parlour dominated the study area. This accounted for 87% (60%, 11% and 16% respectively) It can also be inferred from the study area that the bulk of the accommodation in the area were rented buildings occupied by residents with meager income with the average monthly income as shown in table 2; that 10% earn between ₦31, 000-₦50, 000 while 20% earn between ₦51, 000-₦100, 000 accounted for 13% of the 230 sampled residents occupied flats apartment. It has been argued that income is a determinant of type of apartment and this study attests to that via table 3.

**Table 3: Apartment and house hold size**

House Types	No. of Respondents	% of Respondents
Flats	43	13
Room and Parlour	52	16
Face-face Rooms	199	60
Boys Quarters	36	11
Total	330	100

Showing Household Size of Respondents



1-2	29	9
3-4	54	16
5-6	132	40
7 and above	115	35
Total	330	100

Source: Author's Field Work, 2012

The household size of sampled respondents in the study area showed a high incidence of large family size. Table 3 infers that only 9% are within 1-2 household size, 16% for 3-4 household size, 40% which is the dominant household size in the study area were people within 5-6 persons per household and 35% accounts for household size of 7 and above. This study assumes that more than 2 persons in a room is overcrowding. Overcrowding has its numerous health implications from poor air quality, easy spread of communicable illness like cough, measles, lack of privacy and stress are but a few of the health implications of overcrowding.

## 6. Housing Amenities

Majority of the sampled household depends on well-water and buying water for water vendor. The sources of drinking water as shown in table 4 depicts that only 20% have access to acceptable source of drinking water. The public tap water source is erratic in its supply and in most cases the laid pipes have been broken thereby allowing un-filtered waste water to mix with it. The source of drinking water by 'well' which accounts for 41% were 'shared' by different neighbours and the public thereby allowing for unhygienic use. The remaining 32% buy their water from either through water vendors or by fetching from the well and borehole water vendors. These un-treated and shared water sources create avenues for the transmission of water borne diseases and have significant health implications.

There is a predominant use of the pit latrine among the sampled households in the study area. The pit toilet accounted for 68% while the flush toilet accounted for 32%. The popularity of pit latrines may be due to the irregularity of water supply, which makes it difficult to maintain a flush toilet, especially in large households. Moreover, many households especially the children use 'chamber pot' to urinate and defecate after which the waste is emptied into the pit latrine. These unsanitary handlings of faecal waste portent health threats as there are many faecal related diseases and sickness.

Concerning the sources of cooking energy, majority of the respondents used Kerosene Stove for cooking. Respondents that used Kerosene Stove accounted for 59% while those that used fire wood and charcoal accounted for 17% (see table 4). These sets of cooking energies were prominent among the occupants of *face-to-face* rooming apartments, boys' quarter and room and parlour apartments. The amount of carbons released by these sources of energy coupled with smokes of generators in already crowded households affect the quality of air, quality of life and the health of the households.

**Table 4: Sources of Drinking Water, type of toilet and cooking energy**

Water Source	No. of Respondents	% of Respondents
Borehole	63	19
Public Tap	23	7
Well	136	41
Buying	108	33
Total	330	100

### Type of Toilet used by Respondents

Toilet Type	No. of Respondents	% of Respondent
Water Closet	105	32
Pit Latrine	225	68
Bucket	-	-
Open Defecation	-	-
Total	330	100

### Source of Cooking Energy

Cooking Source	No. of Respondents	% of Respondents
Electric Source	30	9
Cooking Gas	49	15
Kerosene Stove	194	59
Fire Wood	24	7
Charcoal	33	10
Total	330	100

Source: Author's Field Work, 2012

## 6. Physical Conditions of Buildings

The physical assessment of the general conditions of buildings in the study area revealed that 43% of them were in 'poor' condition, 30% in 'fair' condition while those classified as 'good', 'very good' and 'excellent' condition amounted to 27%. The percentage variation of building shows that there is significant presence of poor housing and this has aided the poor environmental condition in the area.

**Table 5: General rating of Physical Conditions of Sampled Buildings**

Rating of Buildings	No. of Respondents	% of Respondents
Excellent	21	6
Very Good	33	10
Good	35	11
Fair	98	30
Poor	143	43
Total	330	100

### Rating of Surrounding in terms of Cleanliness

Excellent	17	5
Very Good	47	14
Good	75	23
Fair	105	32
Poor	86	26
Total	330	100

Source: Author's Field Work, 2012

Apart from the rating by the authors of this work, the respondents were asked to rate the surrounding of their houses and the outcome is also shown in table 5. The table shows that only 5% rated their surrounding as 'excellent' in term of cleanliness, 14% rated the cleanliness of their surrounding 'very good' while 23% rated their surrounding as 'good'. The remaining respondents were liberal enough to have rated their surroundings 32% 'fair' and 26% 'poor'. The rating by the dwellers is an indication that the residents are aware of the condition in which they live.

## 7. Prevalent Sickness, common Insects and Rodents in the study area.

There was high incidences of malaria sickness in the study area, this accounted for 35%. The prevalent cases of malaria attest to poor waste water management, pools of stagnant water in drainages and the general unkempt nature of the surrounding. The presence of blue-black colour of some open gutters, nauseating and foul smell pervading the neighbourhood encourages breeding of mosquitoes that infect malaria sickness.

Our finding revealed the presence of typhoid, which accounted for 18%, traceable to untreated water source, diarrhea cases accounted for 30% among the households, traceable to unsanitary handling of faecal waste, reported cases of cough accounted for 8% traceable to inhaling of impure air emanating from Kerosene Stoves, the use of charcoal, firewood and generator smokes. The above scenarios are pointers to poor housing and environment health risks.

**Table 6: Showing Prevalent Sickness, common Insects and Rodents**

Sickness	No. of Respondents	% of Respondents
Malaria	115	35
Typhoid	60	18
Diarrhea	100	30
Cough	26	8
Others	29	9
Total	330	100

### Showing Common Insects and Rodents

Mosquitoes	99	30
Bed Bugs	18	5
Cockroaches	56	17
Rats and Mice	25	8
All of the above	132	40
Total	330	100

Source: Author's Field Work, 2012

The presence of all form of insects and rodents were evident in the study area. This was an indication of poor housing and dirty environment. The presence of blood sucking insects like mosquitoes and bedbugs accounted for 35% traceable to dirty households and the environment. The presence of cockroaches accounted for of 17%, traceable to the predominant use of pit toilets and dirty environment which aid their breeding. Also, the presence of rats and mice accounted for 8% of the causes of ill-health and sickness (see table 6).

It is pertinent to state that the presence of cockroaches, rats and mice within the households and neighbourhood portent calamitous health risks. These insects and rodents transmit communicable diseases and sickness. Table 6 further shows that 40% of the surveyed households admitted the presence of all the listed insects and rodents in existence in the study area. In other words, the entire sampled households and environment are characterized with poor housing and dirty environment, hence the prevalence of sickness.

## 10. Analysis of Tested Hypotheses

### i. Hypothesis One

H<sub>0</sub>: There is a no significant relationship between economic status and housing condition

H<sub>1</sub>: There is a significant relationship between economic status and housing condition

Table 7: Cross-Tabulation of Housing Condition and Economic Status.

Housing Condition			Economic status				Total
			N10,000	N30,000	N50,000	N51,000 100,000	
poor	Count		93	50	0	0	143
	% within Housing condition		65.0%	35.0%	.0%	.0%	100.0%
fair	% of Total		28.2%	15.2%	.0%	.0%	43.3%
	Count		0	88	10	0	98
good	% within Housing condition		.0%	89.8%	10.2%	.0%	100.0%
	% of Total		.0%	26.7%	3.0%	.0%	29.7%
Very good	Count		0	0	24	11	35
	% within Housing condition		.0%	.0%	68.6%	31.4%	100.0%
excellent	% of Total		.0%	.0%	7.3%	3.3%	10.6%
	Count		0	0	0	33	33
Total	% within Housing condition		.0%	.0%	.0%	100.0%	100.0%
	% of Total		.0%	.0%	.0%	10.0%	10.0%
Total	Count		93	138	34	65	330
	% within Housing condition		28.2%	41.8%	10.3%	19.7%	100.0%
		% of Total	28.2%	41.8%	10.3%	19.7%	100.0%

Source: Author's computation, 2012

Table 8: Showing Chi-Square Test correlation between economic status and housing condition

	Number of Valid Cases	Calculated Value	Df	Tabulated Value
Chi-square	330	576.724	12	5.23

Source: Field survey, 2012.

Note that:  $\alpha = 0.05$

Table 7 above shows the result of the cross-tabulation between housing condition and economic status. The table shows that 43.3% of the total respondents have poor housing condition, 29.7% have fair housing condition, 10.6% have good housing condition, 10.0% have very good housing condition, while 6.4% have excellent housing condition as shown in the table 7. It was also revealed that 93 respondents constituting 65.0% of the total respondents that have poor housing condition earn less than ₦ 10, 000 as income per month while 35% of them earn between ₦ 10, 000 and ₦ 30, 000 a month. Out of all the respondents that have fair housing condition, 89.8% earn

between ₦ 10, 000 and ₦ 30, 000 per month while 10.2% earn between ₦ 31, 000 and ₦ 50, 000 per month. This finding clearly shows that per capital income of the residents in the study area is low. This is not unconnected with the status of their environment.

Table 7 further reveals that in the category of the respondents that have good housing condition, 68.6% earn between ₦ 31, 000 and ₦ 50, 000 per month while 31.4% of them earn ₦ 51, 000 and ₦ 100, 000 per month. However, for the category that has excellent housing condition, all of them earn between ₦ 51, 000 and ₦ 100, 000 per month. The two sets of income earners i.e, ₦31, 000-₦ 50,000 and 51,000-₦100, 000 enjoyed 100% ‘very good’ and ‘excellent housing’ conditions respectively which an indication that economic status is a determinate of quality is housing.

Table 8 shows that the calculated Chi-square value is greater than the tabulated value when  $\alpha = 0.05$ . Therefore, the  $H_0$  hypothesis was hereby rejected while the  $H_1$  hypothesis was accepted, confirming that there is statistically significant relationship between economic status and housing condition. This finding agrees with the work of Domanski et al (2006) which asserted that ‘household with lower incomes are more likely to face poorer housing conditions’.

**(ii) Hypothesis Two**

$H_0$ : There is no significant relationship between environmental conditions and health status

$H_1$ : There is a significant relationship between environmental conditions and health status

**Table 9: Cross-Tabulation of Environmental Condition and Health Status**

Environmental Condition		Health status					Total
		Malaria	Typhoid	diarrhea	Cough	Others	
Poor	Count % within Environmental condition	86	9	75	18	7	195
	% of Total	44.1%	4.6%	38.5%	9.2%	3.6%	100.0%
	Count % within Environmental condition	26.1%	2.7%	22.7%	5.5%	2.1%	59.1%
Fair	Count % within Environmental condition	29	18	16	5	0	68
	% of Total	42.6%	26.5%	23.5%	7.4%	0%	100.0%
	Count % within Environmental condition	8.8%	5.5%	4.8%	1.5%	.0%	20.6%
Good	Count % within Environmental condition	0	15	6	18	6	45
	% of Total	.0%	33.4%	13.3%	40%	13.3%	100.0%
	Count % within Environmental condition	.0%	4.5%	1.8%	5.5%	1.8%	13.6%
Very good	Count % within Environmental condition	0	0	3	8	4	15
	% of Total	.0%	.0%	20%	53.3%	26.7%	100.0%
	Count % within Environmental condition	.0%	.0%	0.9%	2.4%	1.2%	4.5%
Excellent	Count % within Environmental Condition	0	0	0	0	7	7
	% of Total	.0%	.0%	.0%	.0%	100.0%	100.0%
	Count % within Environmental condition	.0%	.0%	.0%	.0%	2.1%	2.1%
Total	Count % within Environmental condition	115	42	100	47	26	330
	% of Total	34.8%	18.2%	30.3%	7.9%	8.8%	100.0%
	% of Total	34.9%	12.7%	30.2%	14.9%	7.2%	100.0%

Source: Author’s field work, 2012

**Table 10: Chi-Square Test Correlation between Environmental Condition and Health Status**

	Number of Valid Cases	Calculated Value	Df	Tabulated Value
Chi-square	330	800.437	16	7.96

**Source: Field survey, 2012. Note that:  $\alpha = 0.05$**

Table 9 presents the result of the cross-tabulation and the statistical analysis between environmental condition and health status of the respondents. Statistical analysis emanating from the correlation between environmental condition and health status of respondents revealed the following; those with poor environmental condition had 26.1% of malaria, 2.7% of typhoid, 22.7% of diarrhea, 5.5% of cough and 2.1% of other sickness culminating to 59.1% of total prevailing sickness in the study area. The 'fair' rated environmental condition had 8.8% malaria, 5.5% for typhoid, 4.8% for diarrhea and 1.5% for cough, culminating to 20.6% of the listed prevailing sickness. 'Good' rated environmental condition had 4.5% typhoid, 1.8% diarrhea, 5.5% cough and 1.8% for others, totaling 13.6% of the prevailing sickness. The 'very good' environmental condition recorded 0.9% for diarrhea, 2.4% cough and 1.2% for other sickness amounting to 4.5% of total prevailing sickness. Interestingly, the 'excellently rate' environmental condition recorded none of the mentioned sickness.

Table 10 shows that the calculated Chi-square value is greater than the tabulated value when  $\alpha = 0.05$ . Therefore, the  $H_0$  hypothesis is hereby rejected while the  $H_1$  hypothesis is accepted thereby confirming that there is statistically significant relationship between environmental condition and health status.

### 11. Conclusion and Policy Guidelines

The study had established statistically an intricate relationship between economic status and housing conditions in which income status is a determinant of quality of housing apartment and its maintenance. It also established a significant relationship between environmental condition and health status of households. The safer and healthy an environment is, the better it is for the residents in terms of productivity and livability.

However, the high level of urbanization in Lagos coupled with economic deprivation has made its citizenry to seek for place of 'abode' or mere shelter and not housing in its totality. This has created a city in which the population enjoys a low quality of life, low level of socio-economic and environmental health problems. The basic challenges of the above scenario include urban pollution, poor management of urban waste sewage and refuse, poor conditions of urban infrastructures-water supply, electricity supply, poor road and drainage system.

The above scenarios call for sustainable urban planning based on inter-sectoral approaches that incorporate spatial and environmental aspects as well as health, social and economic elements. This becomes imperative so that urban centres could strike a balance between various urban needs, the challenges from these needs and how to sustain a modern city with quality housing and environmental healthiness. Based on these, the following recommendations become imperative:

- The state and local government on their parts should endeavour to make physical planning of towns and cities in the area priority with well organized open spaces, paved and tarred roads, good drainage system in appropriate places, electricity and water supply put in place. They should as well create green areas and aesthetically pleasing environment that will enhance environmental health.
- Stronger and higher commitment should be paid to strengthening focus on compliance, implementation and enforcement efforts among government at the three tiers of governance in Nigeria towards bearable and livable urban development.
- An extensive mobilization of the private sector to partner with Government and public (property owners) within the study area in rehabilitation of all infrastructure and derelict

buildings in order to create more housing and improvement of environmental quality and standards in terms of improved sanitation.

- Economically feasible neighbourhoods and communities should be created for the people to get employment. This will offer the people the opportunities of taking care of their dwellings, this can only be done when they eat well and think well of other things.
- The general lack of a sound maintenance culture among residents needs to be addressed. There is a need for all the stakeholders to collaborate towards enforceable standards for houses already built and those that will be built in future.
- This paper also recommends a vigorous health and sanitation education programme possibly through the mass media and other locally accessible forum for all the residents in the city. Punitive measures that will serve as deterrents to offenders should also be enforced.

## References

- Adejumo, A. (2009). Some thoughts on affordable and social housing in Nigeria  
<http://www.nigeriavillagesquare.com> accessed on 23/07/2012.
- (35) Ajayi, M.A and Omole, (2012): Sustainable housing development and communnial provision of in frastructures in Asuwami residential estsate, Akure, Nigeria. *West Africa Built Environment Research* (WABER). <http://www.waber conference.com> .pages 191-202
- Alagbe, O.A. (2010). Knowledge as a determinant of acceptability of compressed stabilized laterite bricks for affordable housing in Nigeria.XXXVIII LAHS, World Congress on Housing Standard, Spain, October 26-29.
- American Public Health Association (APHA) (1945). An appraisal method for measuring the quality of housing: a yardstick for health officers, housing officials and planners. Part I: Nature and uses of the method. Committee on the Hygiene of Housing. APHA, New York.
- American Public Health Association (APHA) (1946). An appraisal method for measuring the quality of housing: a yardstick for health officers, housing officials and planners. Part II: appraisal of dwelling conditions. Committee on the hygiene of housing, APHA, New York.
- American Public Health Association (APHA) (1950). An appraisal method for measuring the quality of housing: a yardstick for health officers, housing officials and planners. Part III: Appraisal of neighbourhood environment. Committee on the hygiene of housing, (APHA) New York.
- Bashir, S.A. (2002). Home is where the harm is: Inadequate housing as a public health crisis. *Am J Public Health* 92(5):733–738.
- Blane, D (2006). The life course, the social gradient and Health. In M.Marmot and R.G Wilkinson (Eds). *Social Determinants of Health*.(2<sup>nd</sup> Ed. pp 54-77) Oxford: Oxford University Press.
- Daramola, S.A., Alagbe, O.A., Aduwo, B. and Ogiye, S. A. (2005). Public-private partnership and housing delivery in Nigeria. *Proceedings of African Union of Architects Congress*, Abuja, Nigeria. 23 – 28 May.
- Domanski, H. et al., (2006), “First European Quality of Life Survey: Social dimensions of housing”, *European Foundation for the Improvement of Living and Working Conditions*, Luxembourg.
- Egbu , A., Antwi, A. and Olomolaiye, P. (2006). An economic assessment of the Institution of Land Use Planning in the cities of Sub-Saharan Africa. RICS Research Paper Series, Volume 6, No. 9, pp.1-36.
- Egbu A. U, Olomolaiye P. and Gameson R. (2007). A quantitative model for assessing the impact of land use planning on urban housing development in Nigeria. *IDPR*, 29 (2), 215 – 239.
- Ellaway, A; Macintyre, S; Hiscock, R; Keans, A; Der, G. and MCKay, L (2003). What features of home and area might help to explain observed relationship between housing tenure and health? Evidence from the West Scotland. *Health and Place*, 9(3) 207-218
- Erguden, S. (2001). Low-cost housing: policies and constraints in developing countries. *Proceedings of the International Conference on Spatial Information for Sustainable Development*, Nairobi, Kenya. 2 – 5 October.
- Evans, G; Chan, H; Wells, N and Saltzman, H. (2000) Housing quality and mental health. *Journal of Consulting and Clinical Psychology*, 68(3) 526-530
- Fanning, D.M (1967). Families in flats. *British Medical Journal*, 18, 382 – 386.



- Granerud, A., & Severinsson, E. (2003). Preserving Integrity: Experiences of people with mental health problems living in their own home in a new neighbourhood. *Nursing Ethics*, 10(6), 602-613.
- Jera, M.(2005).Housing, health and wellbeing: A Phenomenological exploration of life in subsidised housing. University of Otago,Wellington.
- Johnson, R. (2005).Mental health and housing; making the links in policy, research and practice. *Journal of Public Mental Health*,4(4), 21-28.
- Lawanson, T.O. (2011). Poverty and Environmental Conditions in the Lagos Megacity: Consequences for Environmental Health. Department of Urban and Regional Planning, University of Lagos. Nigeria.
- Macpherson R (1979). Housing and health: Some basic principles. In: Marrison, H. S and Lea, J. P. (eds.), *Housing in Third World Countries: Perspectives on policy and practice*, Macmillan, London, pp. 67 -73.
- National Population Commission Census Report (2007) Government Official Gazette.  
[www.nigerianstat.gov.ng](http://www.nigerianstat.gov.ng)
- NPC (2006). National Population Census of Nigeria. Federal Republic. Nigeria.
- Nwaka, G.I. (2005). The urban Informal Sector in Nigeria: Towards economic development, Environmental health and social harmony. *Global Urban Development Magazine*, Vol.1, Issue 1, May
- Ogu, V. I and Ogbuozogbe, J .E (2001). Housing Policy in Nigeria: Towards enablement of private housing development, *Habitat International*, 25, 473 – 492.
- Okoko, E.E. (2000). Rental housing and evictions in low income neighbourhoods in Nigeria: A case of Akure; *Ife Social Science Review* (18)1:12-20
- Osinubi, T.S (2003). Urban Poverty in Nigeria: A Case of Agege Area of Lagos State, Nigeria. University of Ibadan Nigeria.
- Oluwande, P. A (1983). Guide to tropical environmental health engineering, NISER, Ibadan, Nigeria.
- Omirin, M.M and Osagie, J.U (2011). Outsourcing for sustainable waste disposal in Lagos Metropolis: Case study of Agege Local Government, *Lagos Journal of Sustainable Development* Vol. 4, No. 6; December 2011. [www.ccsenet.org/jsd](http://www.ccsenet.org/jsd) access on 18/07/12.
- Omole, F.K (2009): An Assessment of Housing Condition and Socio-economic life-style of Slum dwellers: the case study of Oja Oshodi – Odokoyi Isolo Districts of Akure, Nigeria. *Contemporary Management Research*(CMR) Taipai National University. 1(1)
- Onokerhoraye A. G (1985). Benin, a traditional African city in transition, Ahmadu Bello University Press, Zaria, Nigeria.
- Page, A. (2002). Poor housing and mental health in the United Kingdom: Changing the focus for intervention. *Journal of Environmental Health Research*, 1, (1), 31 – 40.
- Punch Newspaper (2007). Mortgage industry in Nigeria is still in its infancy, 5th September.
- Riaz H (1987). Singapore children in high rise flats. *Ekistics* 272, 374 – 375.
- Sampson R.J, Groves W.B. (1989). Community structure and crime: testing social-disorganization theory. *Am J Sociol* 94:774–802.
- Sampson, R., Morenoff, J., & Gannon-Rowley, T. (2002). Assessing "neighbourhood effects": Social processes and new directions in research. *Annual Review of Sociology*, 28, 443-480.

- Shaw, M., David, G., Danny, D., Richard, M., Davey, S.G. (2000). Increasing mortality differentials by residential area level of poverty: Britain 1981–1997. *Soc Sci Med* 51:151–153.
- Stewart, J. (2002). The housing health and safety rating system – a new method of assessing housing standards reviewed. *Journal of Environmental Health Research*, 1, (2), 35 – 41.
- Thomson, M; Petticrew, M. and Morrison, D. (2002). Housing improvement and health gain: A summary and systematic review, Glasgow. University of Glasgow.
- Thorns, D. (2004). Home, housing, health and wellbeing. In P. Howden-Chapman and P Carroll(Eds), *Housing and health research, policy and innovation* . Wellington Steele Roberts Ltd. (pp 40-48)
- Tipple, A.G. and Willis, K. G. (1991): *Housing the poor in the developing world: methods of analysis, case studies and policy*. London: Routledge.
- UNCHS (1993). National trends in housing production practices Nigeria, Nairobi, Kenya. Volume 4, 4-18
- UNDP (1999). *Human development report*. Oxford University Press, Oxford.
- UN-Habitat (1996): *The human settlement conditions of the World's urban poor*.
- UN-Habitat (2003). *The challenge of slums: Global report on human settlements*, Earthscan, London.
- Venkatarama, R. B.V. (2004). Sustainable building technologies. *Current Science*. Vol. 87/7.
- Vision 2020 Official website. <http://www.nv2020.org/>

# Biological Observations on the Elephantsnout Fish *Mormyrus Rume* (Mormyridae) From Ose River, Southwestern Nigeria

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## **Abstract**

The sex ratio, size-at-maturity, gonadosomatic index, fecundity and breeding season of *Mormyrus rume* (Valenciennes 1846) were investigated. Sex ratio was 1:1.25 (males: females ratio) and females attained sexual maturity earlier than males with a mean length and mass 26.5 cm, 155.0 g and 31.5 cm, 180.0 g, respectively. Sizes of ovary and ova diameter were higher during wet season when *M. rume* breeds in the river than during dry season. Absolute fecundity was  $34741 \pm 16537$  ova per gonad, and mean relative fecundity was  $83.22 \pm 24.67$  ova per gram fish mass. The gonadosomatic index (GSI) of female ranged between 8.05 and 20.73. This study revealed the reproductive potential of this fish which is required for its management and conservation.

**Keywords:** sexual maturation, fecundity, gonadosomatic index, *Mormyrus rume*, Ose River, Nigeria.

## Introduction

Aquatic resources in African countries have been poorly developed and exploited. This can be attributed to little information on the biology of several species of seasonally breeding fish endemic to Africa. Knowledge of the reproductive biology is essential in establishing the production potential of fish species and consequently their exploitation and management rationale in the wild and for the purpose of culture. Tropical freshwater fishes reproduce during the rainy season and regressed gonads are found during the dry season (Lowe McConnell 1975). The ovaries of *Marcusenius senegalensis* (Mormyridae) in Baoule River, Mali start to mature in May and by August reproduction seems to be over (Paugy 2002). However, *Mormyrus kannume* in Lake Victoria, Uganda spawn throughout the year (Sott 1974), suggesting the influence of both environmental and biotic factors.

De Silva et al. (1985) reported that there was increase of fecundity with body weight or gonad weight of six *Barbus* species indigenous to Sri Lanka. Certain reproductive characteristics of the catfish, *Clarias gariepinus*, living in the river Asi, Turkey was documented by Yalcin et al. (2001). The gonadosomatic index (GSI) is generally higher for females than for males (Munro et al. 1990). *Clarias gariepinus* in Lake Sibaya, South Africa have 5000-163000 eggs per female (Bruton 1979). The maximum GSI for females and males of *Mormyrus rume* and *Petrocephalus bovei* (Mormyridae) were 11.8, 21.4 and 0.2, 0.4, respectively (Paugy 2002).

Oben et al. (2000) worked on aspects of the reproductive biology of the Mormyrid, *Heperopisus bebe* in the Lekki Lagoon, Nigeria, while Ugwumba et al. (1991) studied the gonads of the Mormyrids of Lekki Lagoon, Lagos. Fagbenro et al. (1991) reported that catfish *Heterobranchus bidorsalis* spawned during the wet season (April – September) in Ogbese River, Nigeria. Tsadu et al. (2003) worked on the sexual maturity, fecundity and egg size of wild and cultured *Bagrus bayad macropterus* and reported that the cultured specimens matured earlier and had more eggs than the wild ones. Fawole (2002) reported that fecundity of *M. rume* in the Lekki, Lagoon, Nigeria ranged from 741 – 6,000 eggs with an average of 2,991 eggs per female.

Information on the general biology of *Mormyrus rume* and in particular its reproductive biology, is scarce, even though the species is a major food and commercial fish in West Africa. It is also a major component of the fish fauna in the Nigerian inland water system. Members of the family Mormyridae inhabit freshwaters of tropical Africa and they constitute a sizeable part of the commercial catch from these water bodies (Ugwumba et al. 1991). The production of stocking material under controlled conditions can prevent a dramatic decline in the number of fish in the ecosystem and increase the number of endangered fish species in the open waters (Cejko et al. 2010). The reproductive potential of a population depends on the fecundity of females and the development of gonads is an important prerequisite for the continuation of the race in fishes. The aim of the present study was to provide information on some aspects of the reproductive biology such as sex ratio, size at maturity, size of ova, fecundity, breeding season, relationship of fecundity to body parameters (length and weight) of *M. rume* in Ose River.

## Materials and methods

### The Study Area

The study was carried out in Ose River, a major and perennial river in the Southwestern part of Nigeria (Figure 1). The river took its source from Apata hills and flows through the Savanna, the rainforest down to the mangrove forest and discharges into the Atlantic Ocean through a series of creeks and lagoons. The river lies between longitudes 5<sup>0</sup>20'E to 6<sup>0</sup>10'E and latitude 6<sup>0</sup>20'N to 8<sup>0</sup>00'N. It flows approximately 300km from its source before breaking into series of creeks and lagoons.

### Specimen Collection

*Mormyrus rume* specimens were collected weekly from artisanal fishermen from Ose River. A total of 791 specimens, consisting 439 females and 352 males were collected over a period of 24 months. Cast nets, set nets and various traps were the major gears used by the fishermen in the collection. The specimens were chilled in an ice chest during transportation to the laboratory for investigations and analyses. The standard length (cm) and the mass (g) measurements of specimens were taken. The specimens were dissected, sexes were noted, and gonads were removed, weighed and kept (for further analysis) in separately labelled plastic tubes. Matured gonads preserved in formal-saline (Tsadu et al. 2003) prior to fecundity studies.

Sex of fish was determined by both external features (shape of belly) and internal features. The male to female sex ratio was calculated. Gonad stages of development were assessed and classified according to Clay (1979) as follows:

I – Immature, II – Maturing, III – Partially matured, IV – Mature, V – Running Ripe, VI – Spent.

The diameters of 50 randomly selected ova from each specimen were estimated using Olympus binocular microscope (Magnification X 40) fitted with a micrometer eyepiece. The gonad developments of 157 females were examined and 38 gravid females in stages (iv) and (v) were used for fecundity studies. The gravimetric method (Abidin 1986) was employed for the estimation of fecundity, whereby each preserved ovary was weight individually and the number of ova from three 10 g sub-samples was counted. The means of the total number of ova in the sub-samples were determined. The total number of ova per ovary was estimated by extrapolation. Linear regression analysis was done to find the relationship of fecundity to the length and mass. The length at sexual maturity was recorded for both sexes. The absolute fecundity, relative fecundity, gonadosomatic indices (GSI) were calculated using the formulae:

$$\text{Absolute fecundity} = \frac{\text{Total mass of ovary}}{\text{Mass of sub – sample}} \times \frac{\text{No of ova in sub – sample}}{1}$$

$$\text{Relative fecundity} = \frac{\text{No of ova}}{\text{Mass of fish}}$$

$$\text{GSI} = \frac{\text{Gonad mass (g)}}{\text{Mass of fish (g)}} \times 100$$

### Results

The result showed that, of the 791 specimens examined 439 (55.50%) were females and 352 (44.50%) were males giving a sex ratio of 1:1.25. Sex ratio of different size ranges of *M.rume* are as shown in Table 1.

**Table 1: Sex ratio of different size ranges of *Mormyrus rume* from Ose River in 2007-2009**

Size(cm)	Sex ratio
Small(0-20)	1: 2.32 (male: female)
Medium(21-35)	1: 1.09 (male: female)
Large(36- 50)	1: 1.73(male: female)

Minimum size at which females became sexually mature was found to be 26.5 cm standard length and mass of 155.0 g while the corresponding size for males was 31.5 cm standard length and mass of 155.0 g while the corresponding size for males was 31.5 cm and mass of 180.0 g, respectively. Size differences between both sexes were evident; females were slightly heavier than males of the same standard length. Females and males *M. rume* have one ovary and testis, respectively. The gonad mass expressed as a percentage of the fish somatic mass was used as the gonadosomatic index (GSI). It gives an indication of the percentage of the fish's mass that is used in egg production at the mature stage (when the eggs are to be shed). The GSI ranged from 8.05 to 20.73. Absolute fecundity ranged from 1800 to 70400 ova. The fish specimen with the lowest absolute fecundity had a standard length of 27.5 cm and a mass of 149.5 g while that with the highest absolute fecundity had a standard length of 42.9 cm and a mass of 608.5 g. The mean absolute and relative fecundity of 38 gravid *M.rume* from Ose River were recorded as  $34741 \pm 16537$  and  $83.22 \pm 24.67$  respectively in Table 2

**Table 2: Standard length, fish mass, mean diameter of ova, gonado somatic index, absolute and relative fecundity of 38 gravid females of *Mormyrus rume* from the Ose River in 2007-2009**

Standard length (cm)	Fish mass (g)	Gonad mass (g)	Mean diameter of ova (cm)	Gonadosomatic index	Absolute fecundity (number of ova)	Relative fecundity
27.5	419.50	12.06	0.85	8.05	1800	12.08
27.5	152.00	18.00	0.90	11.84	2100	13.82
28.0	180.00	25.00	0.85	13.89	3000	44.44
29.0	195.00	26.00	0.88	13.33	13110	67.23
29.5	195.00	28.00	0.90	14.35	18500	94.84
30.0	198.00	28.00	0.95	14.14	10050	50.76
30.5	198.50	29.00	0.85	14.57	17000	85.43
31.0	300.00	30.00	0.80	10.00	17150	57.17
31.5	330.00	50.00	0.85	15.15	17050	51.67
32.0	300.00	48.00	0.85	16.00	18000	60.00
32.0	350.00	50.00	0.90	14.29	24100	80.29
32.5	355.00	54.00	0.95	15.21	24300	68.45
32.5	375.00	60.00	1.00	16.00	28000	74.67
33.0	380.00	61.00	0.90	16.05	29100	76.58
33.5	390.00	65.00	1.10	16.67	33050	84.74
33.5	390.00	65.00	1.00	16.67	34000	87.18
34.0	390.00	70.00	0.90	17.95	35000	85.74
34.0	390.00	65.00	0.85	16.50	36000	91.37
34.5	395.00	68.00	0.90	17.22	39000	98.73
35.0	446.00	80.00	0.95	17.94	39500	88.57
35.5	460.00	88.00	1.00	19.13	48100	104.56
35.5	460.00	85.00	0.90	18.47	44000	95.65
36.0	470.00	80.00	0.85	17.02	44050	93.72
36.5	380.00	70.00	0.90	18.42	42800	112.63
37.0	390.00	75.00	0.85	19.23	44000	112.80
37.0	410.00	85.00	0.90	20.73	42000	102.44
38.0	440.00	88.00	1.10	20.00	43100	97.96
39.5	425.00	80.00	0.90	18.82	44000	103.53
39.0	480.00	90.00	1.00	18.75	44100	91.88
39.5	560.00	100.00	1.50	17.88	46000	82.14
40.0	540.00	98.00	1.30	18.15	46500	86.11

40.0	450.00	80.00	1.20	17.17	44000	97.78
41.0	500.00	85.00	1.20	17.00	48000	96.00
41.0	530.00	90.00	1.10	16.98	46100	86.98
41.0	500.00	95.00	1.20	19.00	49000	98.00
41.5	540.00	90.00	1.30	16.67	59200	109.63
42.0	980.00	110.00	1.20	18.97	64000	110.34
42.90	608.50	109.00	1.00	17.92	70400	115.60
34.84	388	66.82	0.98	16.48	34741	83.22
± 4.60	±123.95	±29.95	±0.18	±2.67	±16537	± 24.67

Size of ova ranged from 0.8 to 1.5 mm. The relationships between fecundity and fish length, fecundity and fish mass are presented in Table 3.

**Table 3: Intercepts (a), regression coefficients (b) and coefficients of determination ( $r^2$ ) in AF/SL, AF/FM relationships of *Mormyrus rume* from Ose River in 2007-2009**

Parameters	a	b	$r^2$	n
Absolute Fecundity and standard length	-9509	3550.4	0.88	38
Absolute Fecundity and fish mass	-1460	128.45	0.94	38

Six stages of gonad development {(i) Immature (ii) Maturing (iii) Partially matured (iv) Mature (v) Running ripe (vi) Spent} were observed in the specimens examined during the wet season while stages (i), (ii) and (vi) only were observed in the dry season. The seasonal development of the gonads is shown in Table 4.

**Table 4: Seasonal development of the gonads of female *Mormyrus rume* from Ose River in 2007-2009**

Season	Month/ Year	Total number of fish examined	Number of females with eggs	Females with eggs (%)	Stage of gonad development
Dry	October,2007- March, 2008	190	11	5.79	vi, i, ii
Wet	April,2008- September,2008	212	71	33.49	i, ii, iii, iv, v, iv
Dry	October,2008- March, 2009	186	12	6.45	vi, i, ii
Wet	April,2009- September,2009	203	63	31.03	i, ii, iii, iv, v, iv

## Discussion

The sex-ratio of *M. rume* in this study was similar to 1:1 males: females recorded by Nikolsky (1963) who attributed it to lack of difference in the longevity of the sexes. However, this differs from that of Fawole (2002) who reported that the population of males *M. rume* was significantly higher than that of females in Lekki Lagoon with a ratio of 1:0.55. This may be attributed to size, age and condition of the habitat. This different situation may also be caused by fishing gear and genetics structures of the populations (Guclu and Kucuk 2011).

The time of gonad maturation revealed that the reproductive cycle of *M. rume* is distinctively annual because gonad development in the six stages were found in the wet season while stages (iii), (iv) and (v) were not encountered in the dry months, this confirmed the report of Lowe McConnell (1975) that tropical freshwater fishes reproduce during the rainy season at which time both physical and chemical conditions of the habitat become favourable.

*M. rume* spawned during the wet season (April-September) with peak in the month of July. This result also agrees with the report of Fagbenro et al. (1991) that *Heterobranchus bidorsalis* in Ogbese River breeds during the rainy season. This also corroborates the report of Paugy (2002) who grouped *M. rume* in Baoule River into the species with a short annual spawning period just before the flood. The author also reported that for all the species in this category, reproduction seems to be over in August. However, this was not in line with the findings of Scott (1974) that most of the species of the family Mormyridae spawn more or less, throughout the year in Lake Victoria, Uganda. This implies that abiotic and biotic factors of lentic and lotic water bodies are not the same.

The gonadosomatic (GSI) indices obtained were higher during the peak of spawning period (June – July) which coincided with the wet season. The GSI values indicated that the fish species uses  $16.48 \pm 2.67\%$  of its body weight for egg production. This value was higher than 7.89% reported for *M. rume* in Lekki Lagoon by Fawole (2002). This may be attributed to combination of physical, chemical and biological factors, such as changes in water level, chemistry, pH, temperature, clarity and flow velocity, flooding of marginal plants and associated chemical changes in Lekki Lagoon. The gonadosomatic index of *M. rume* in Ose River was similar to that of Baoule River where 10% and above was reported for all the fishes in the river and 11.8% for *M. rume* (Paugy 2002). Adebisi (1987) also reported 10.95% for *Mormyrops deliciosus* from Ogun River.

Reed et al. (1967) stated that the diameter of the eggs of large species of mormyrids, in Northern Nigeria, were 1.0 mm, this was similar to the result of this study. The results also revealed that the ova diameter of *M. rume* increased with increase in gonad development. ever, Adebisi (1987) noted that the mean egg diameter of *M. rume* and *Mormyrops deliciosus* from Ogun River were 2.16 mm and 2.40 mm, respectively but the mean ova diameter of *M. rume* in this study was relatively smaller. Large egg sizes in some African fish species like *Chrysichthys auratus* and *Sarotherodon galilaeus* may be related to some degrees of parental care. The small eggs size of *M. rume* from Ose River implied that parental care may be absent. Mean ova diameter were higher in July and August of each year, which might be due to favourable environmental conditions in the river. Mean ova diameter dropped in October, November, December, January and February. The size of the ovary increased gradually as the fish is maturing and reached a maximum size when the fish is fully matured.

In this study, there were wide variations in fecundity of *M. rume*. This might be attributed to differential feeding success within members of the fish population. The fecundity in this mormyrid was relatively high to account for the losses to predators and adverse external factors.

In general, heavier fish have heavier gonads, which produce more ova per fish gonad.



## References

- Abidin, A.Z. (1986). The reproductive biology of a tropical cyprinid, *Hampala macrolepidota* (Van Hasselt), from Zoo Negara Lake, Kuala Lumpur, Malaysia. *Journal of Fish Biology* 29: 381-391.
- Adebisi, A.A. (1987). The relationship between the fecundities, gonadosomatic indices and egg sizes of some fishes of Ogun River, Nigeria. *Archiv fuer Hydrobiologie*. 3: 151-156.
- Bruton, M.N. (1979). The breeding biology and early development of *Clarias gariepinus* (Pisces: Clariidae) in Lake Sibaya, South Africa, with a review of breeding in species of the subgenus *Clarias* (*clarias*). *Transactions of the Zoological Society of London*. 35:1-45.
- Cejko, B.I., Kowalski, R.K., Kucharczyk, D., Targonska, K., Krejszef, S., Zarski, D. and Glogowski, J. (2010). Influence of the length of time after hormonal stimulation on selected parameters of milt of *Leuciscus idus* L. *Aquaculture Research* 41:804 – 813.
- Clay, D. (1979). Sexual maturity and fecundity of the African catfish *Clarias gariepinus* with an observation on the spawning behaviour of the Nile catfish (*Clarias lazera*). *Zoological Journal of the Linnean Society*. 65: 351- 365.
- De Silva, S.S., Schut, J. and Kortmulder, K. (1985). Reproductive biology of six *Barbus* species indigenous to Sri Lanka. *Environmental Biology of Fishes* 12: 201-218
- Fagbenro, O.A., Olaniran, T.S. and Esan, A.O. (1991). Some aspects of the biology of the catfish, *Heterobranchus bidorsalis* Geoffroy Saint-Hilaire, 1809 (Clariidae) in River Ogbese, Nigeria. *Journal of African Zoology* 105: 363-372.
- Fawole, O.O. (2002). Morphometry and diet of *Mormyrus rume* in the Lekki Lagoon, Nigeria. *Reviews in Tropical Biology* 50: 689-694.
- Guclu, S.S., Kucuk, F. (2011). Reproductive biology of *Aphanius mento* (Heckel in: Russeger, 1843) Osteichthyes: Cyprinodontidae) in Kirkgoz Spring (Antalya-Turkey). *Turkish Journal of Fisheries and Aquatic Sciences* 11:323-327.
- Lowe McConnell, R.H. (1975). *Fish communities in tropical fresh waters: their distribution, ecology and evolution*. Longman London. 337pp.
- Munro, A.D., Scott, A.P. and Lam, T.J. (1990). *Reproductive seasonality in teleosts: environmental influences*. CRC Press, Boca Raton, Florida. 254pp
- Nikolsky, G.V. (1963). *The Ecology of fishes*. Academic Press, London. 352pp.
- Oben, P.M., Ugwumba, O.A. and Oben, B.O. (2000). Aspects of the reproductive biology of the Mormyrid, *Hyperopisus bebe* (Lacepede) in the Lekki Lagoon, Nigeria. *Nigerian Journal of Science*. 34: 305-316.
- Odedeyi, D.O. (2006). Survey of fishing gears in River Ose, Southwestern Nigeria. *Science Research Annals* 2:1-4.
- Paugy, D. (2002). Reproductive strategies of fishes in a tropical temporary stream of the upper Senegal basin: Baoule River in Mali. *Aquatic Living Resources* 15: 25-35.
- Reed, W., Burchard, J., Hopson, A.J., Jenness, J. and Yaro, I. (1967). *Fish and Fisheries of Northern Nigeria*. Ministry of Agriculture, Zaria. 262pp.
- Scott, D.B.C. (1974). The reproductive cycle of *Mormyrus kannume* (Forsk) in Lake Victoria, Uganda. *Journal of Fish Biology* 5: 447-454.
- Tsadu, S.M., Lamai, S.L. and Oladimeji, A.A. (2003). Sexual maturity, fecundity and egg size of

- wild and cultured samples of *Bagrus bayad macropterus*, In: Eyo, A.A. and Ajao E.A. Edition, Proceedings of the 16<sup>th</sup> Annual conference of the Fisheries Society of Nigeria. 317pp
- Ugwumba, A., Ugwumba, A. and Ebochuo, V. (1991). Studies on the gonads of the Mormyrids of Lekki Lagoon, Lagos. Nigerian Journal of Natural Sciences 6: 28-33
- Yalcin, S., Solak, K. and Akyurt, I. (2001). Certain reproductive characteristics of the Catfish (*Clarias gariepinus* Burchell), 1822 living in the River Asi, Turkey. Turkish Journal of Zoology 25: 453-460.

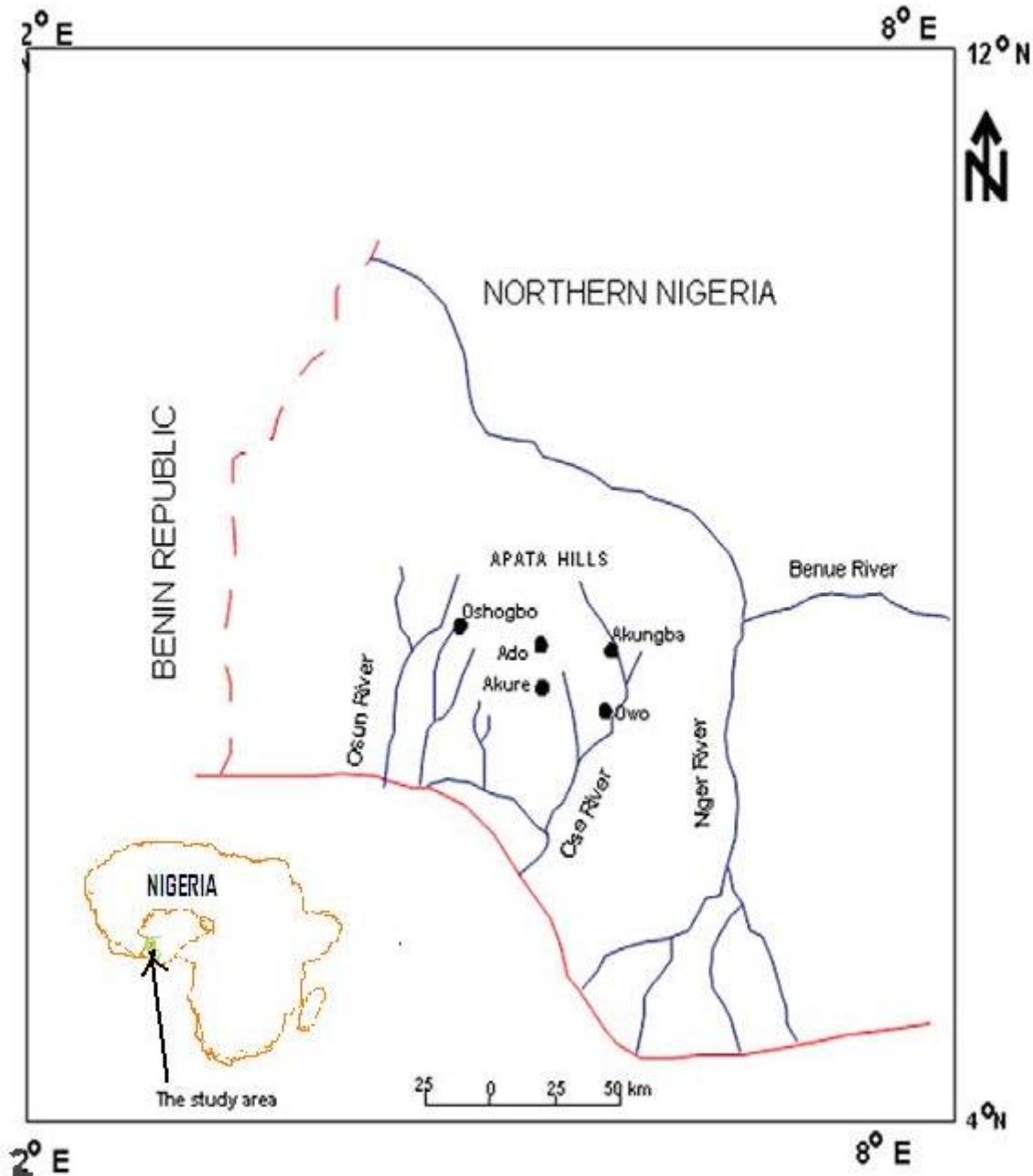


Figure: 1 Location of Ose River, Southwest, Nigeria.

# Effect of Landscaping on Residential Property Values in Akure, Nigeria

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## Abstract

With the recent challenges on the natural environment, there is no better time to consider the issue of landscaping, not only for its mitigating benefits to the environment but also for its impact on the property itself. This paper examines the reasons for landscaping residential properties and its effect on rental values. It also examines the attitudes of property owners and tenants to landscaping. Methodology includes administration of three sets of questionnaires to Firms of Estate Surveyors and Valuers, tenants and residential property owners selected from Ijapo Housing Estate, Akure. Findings reveal that 60% of tenants who live in landscaped properties will not consider living in property without landscaping even if the rents are lower while 65% are willing to pay for the maintenance of landscape features. This means higher rents and this fact is further confirmed by 100% of the property owners that landscaping definitely increases the value of their property. The paper recommends that there should be public awareness on the importance of landscaping backed up with a government policy to incorporate landscaping into building approvals requirement.

**Keywords:** Environment, Landscaping, Property, Rental Values, Tenants.

## Introduction

Landscaping can be defined from different perspectives depending on the area of interest and background. Landscaping reflects the interaction of the built environment and nature. It is the interaction between man as an individual or part of human society on one hand and nature on the other. It deals with the process of shaping, modifying and creating attractive outdoor scenes in order to effectively express the functional and supportive attributes of the environment of human habitation to enhance the dynamism in city development. (Fadamiro 1998; 2001). Landscaping is an expression of the lifestyle and value of the residents which reflects their personality and their attitudes towards the environment.

Landscape design and landscape architecture are used interchangeably when describing landscaping. Landscape Architecture is the science and art of modifying land areas by organizing natural, cultivated, or constructed elements according to a comprehensive, aesthetic plan. These elements include topographical features such as hills, valleys, rivers, and ponds; growing things such as trees, shrubbery, grass, and flowers; and constructions such as buildings, terraces, roads, bridges, fountains, and statuary ('Landscape', 2008). Furthermore, Ingels (1992) differentiated between landscape design and landscape architecture, the former focuses more on the artistic merit of the design while the latter encompasses the artistic design as well as structural engineering. However, they both take into account soil, drainage, climate and other issues.

Landscaping is not very common in residential properties in Nigeria property markets when compared to what is obtainable in developed countries. Property owners seem not to be inclined towards various functional values of landscaping which include architectural, aesthetic and economic values because of the additional costs of maintenance. Most property owners often prefer not to include landscape designs in their building plan as most Nigerians see it as not necessary. Landscaping of property is an aspect in architecture that is given little or no concern; it is seen as a waste of land and resources. The concern and love of nature is very low in developing countries as people prefer to use the whole land to build without creating space for the green environment. The poor quality of the Nigerian urban environment has been attributed partly to the inadequate, misuse and mismanagement of the urban open spaces. These factors according to Fadamiro (2002) have also exerted a major strain on the physical outlook of the environment and a negative effect on the welfare and productivity of the residents. There is however a growing awareness on the importance of landscaping in both open spaces and residential properties in several Nigerian urban cities including Abuja, Lagos, Port Harcourt and Akure.

The search for a qualitative, well landscaped environment, proper use of land and its resources are crucial issues for residential development. Planting of trees and shrubs also contribute to ameliorate climatic conditions of living environment by providing wind shelter and curtailment of desertification (Fadamiro, 1995). Trees block unpleasant views, lower noise levels, lower heating and cooling in the atmosphere among others (Chepesiuk, no date). Ground covers and grasses protect the ground and disallow heat emission as well as withstand the effect of human traffic in the environment (Egunjobi, 1999). Absorption of pollutants like carbon dioxide and the release of fresh oxygen for human lives, provision of sweet fragrance to counteract air pollution caused by sewage and decayed materials is another importance of landscaping in a residential environment. Generally, landscaping improves home appearance, optimizes the use of land and outdoor space, reduces usage of chemicals on property and allows for the imaginative use of styles, features, plants and ornaments (Chepesiuk, no date). Constant improvement in the landscape quality of the outdoor environment in housing neighborhoods has direct improvement in resident's perceived quality of living (Fadamiro et al, 2004). With the recent challenge of global warming, the need for maintaining the natural environment in the residential built environment cannot be overemphasized. This paper therefore examines the attitudes of property owners and tenants of a low density government housing estate in Akure, Nigeria to landscaping and the reasons for landscaping residential properties. The specific objectives are to:

1. Identify the reasons for and benefits derived from landscaping residential properties;
2. Investigate the attitudes of tenants and property owners to landscaping; and
3. Examine the effect of landscaping on residential rental values.

### **Perspectives on Landscaping and Property Values**

Previous researches have shown that assessment of the impact of vegetation and environmental quality on house values can be done using hedonic price modeling. This model reveals the implicit prices of property characteristics from the overall property values. Neighbourhood characteristics are taken into consideration to assess the marginal contribution of property attributes such as tree cover to the sale price, hence assessing the open market value of a property (Cotteleer et al, 2008; Freeman, 1979). Rosen (1974) was of the view that the value of heterogeneous products such as a house consists of the value of different (homogeneous) attributes of that house. The value of these different attributes can be estimated by what people are willing to pay for them (Clark and Dieleman, 1996). The hedonic approach provides through regression technique a methodology for identifying the contribution to the price by different homogeneous attributes (Sheppard, 1999). Another method for assessing the contributory value of landscaping to property price is the contingent valuation in which people's willingness to pay for neighbourhood features are considered. Using survey research methods, contingent valuation measures the total monetary value of the utility change caused by a policy or project that affects the environment. The method is termed contingent because information sought from survey respondent is conditional upon a particular hypothetical situation (Bishop et al, 1995).

There has been considerable attention over the years on the various ways of assessing the effect of landscaping on the property values. Property values or house prices are usually affected by the quality of landscaping in the neighborhood, on lot adjacent to the house in question and on the house itself. A well designed landscape of property invites customers to the door, producing higher occupancy rates, increased rentals and lower vacancies. Landscaping not only can add as much as 14% to the resale value of a building, but it also speeds the sale of a building by as much as six weeks (Chepesiuk, no date). A variety of studies reveal that landscaping can increase the value of residential and commercial property from five to as much as 20%. A study of homes in Lubbock, Texas, indicated that quality landscapes have a substantial effect on sale price (Gillman, 2009).

Consumers value a landscaped home up to 11.3 percent higher than its base price, according to a Clemson University and University of Michigan study. A study by the Clemson University, Department of Agriculture and Applied Economics reached a similar conclusion. Clemson, which did the study to provide homeowners with reliable information on landscaping investments, concluded that landscaping could increase the resale price of a home by as much as 10 percent, depending on its quality. While most (but not all) research carried out by various organizations over the years tends to support the widespread opinion that money spent on the garden can offer a good return on investment, market conditions as well as the quality and style of the garden all are going to have a huge influence (Ewing no date). Des Rosiers et al (1999) reported that landscaping contributed 19% to the total appraisal value while Abayomi (2002) using conventional valuation techniques to find the effect of landscaping on the price of a property concludes that the market value of a property increases 5 to 15 % due to landscaping.

Sommer et al (1994b) assess the social benefits of residents' involvement in landscaping and tree planting. The result shows that residents were satisfied with the environment because of the presence of trees. Dwyer et al (1992) viewed tree-planting in relation to the contribution it can make in influencing good sense of community, the empowerment of residents in improving their own neighbourhoods' and the promotion of the quality of their environment.

Landscaping with trees shade give the neighbourhoods good look. For instance, an area which is fast becoming an eyesore can be made habitable with trees, flower beds and mulched pathways (Summit, et al, 1998; Lorenzo, et al, 2000).

The attractiveness of the residential property and the environment is vested in the hands of residents/occupiers and many people embark on landscaping to enhance that attractiveness. This view was supported by Sommer et al (1994b) where the study found out that residents were more satisfied with trees planted themselves than those not planted by them. The reasons for landscaping and tree planting stemmed from the satisfaction with the friendliness and attractiveness of neighbourhood. The amount of greenery, privacy and level of satisfaction with landscaped residential neighbourhood encourages such places to raise children.

Empirical evidence of the destructive consequence of environmental neglect has lent more credence to the scientific relation of climate change. Landscaping and trees planting have been found to reduce the problems of global warming on the environment (Miller, 1997). Some fundamental problems had been created in the process of indiscriminate massive deforestation, extensive desertification, unusual flooding, extinction of Wildlife and forests habitats and the displacement of other viable environmental agents (Uchehgbu, 1998; Adebayo 2007). From the studies of Uchehgbu (1998), Adebayo (2007) above, the result is that where there are trees in a neighbourhood they help to reduce the aforementioned problems that have bedeviled the entire eco-system. Tree shade is very auspicious in providing a healthy ambience for the successful existence of humans, flora and fauna. One cannot underestimate the values inherent in tree shade at different levels, be it aesthetic, economic, protection, buffer, carbon sink, medicinal and others. Evidence are abound to show that landscaping and trees boost the city's image and can serve as tourists' attraction and encourages investors (Wolf, 2001). Trees can make value of real estate appreciate significantly and in no small measure improves air quality (Morales, 1980; and Nowak, 1991).

The contribution of landscaping to the habitability / beauty of the ambient urban environment are well documented (Schroeder 1989; Sommer et al, 1994a ;), but their influence on urbanites goes deeper than visual aesthetics. Trees and vegetation can have strong, relaxing effects on people. Four-fifths of the respondents in the study of Morton Arboretum users above described their favourite settings as "quite," "peaceful," and "restful" (Schroeder 1988).

Dwyer, et al (1991) argued that landscaping and trees are natural air conditioners: they release moisture from their leaves which cools the air when it evaporates. Cities are "heat islands" that are 5-6 degrees hotter than surrounding areas. Trees cool the air by providing shade and reducing the solar energy absorbed by asphalt and building. Trees in schoolyards and parks protect children from harmful Ultra Violet Rays and skin cancer. The environmental problem intoned by the northern depletion of the ozone therefore resulting in ultra violet rays which could be combated through a massive tree planting programme. The trees provided adequate protection to the people from the effects of the ultra violet rays. Information reveals that with the availability of trees in different location of the city, there will be a drastic reduction in the need for air conditioning in the hot season.

The study of Anderson and Cordell (1988); Morales (1980); Marius et al (2003); and Luttik (2000) said landscape with trees add beauty and grace to any community setting. They make life more enjoyable, peaceful, relaxing, and often a rich inheritance for future generations. Through their marvelous variety of shape, size, colours, flowers and shade patterns, they add visual interest in every season and beautify a property or neighborhood. Good landscape can increase the residential property value by 15% or more. Similarly, homes in well-treed communities tend to sell more quickly, have higher occupancy rates, and tenants stay longer. These studies also found out that trees can enhance the value of property.

Again, contact with nature affects work satisfaction and well-being (Kaplan, 1993), lessens mental fatigue (Kaplan & Kaplan, 1989; Sorte, 1995; Ulrich & Simon, 1986), changes moods and reduces pressure (Hull, 1992). Landscaping contributes to the aesthetic quality of urban streets and communal parks and also provides important emotional and spiritual experiences in the life of the population, strengthening our roots to particular place (Schroeder, 1989; Chenoweth & Goster,

1990). Trees, shrubs and herbs have an intrinsic interest to human existence, they attract attention and enable both physically and mentally rest (Schroeder & Lewis, 1991; Rohde & Kendle, 1994).

There has been considerable attention over the years on the various ways of assessing the impact of landscaping on property prices (Des Rosiers et al, 1999). These studies used different methods ranging from the simple conventional valuation techniques such as hedonic models. Peter (1971) reported that trees shade contributed 19% to the total appraised value of 2.8% to the property value. Payne (1973) using conventional valuation techniques to find the effect of trees and landscape on the price of a home, concludes that the market value of a residential property increases between 5% and 15% due to the presence. Of landscape and trees but that excessive trees cover had a negative effect on residential property value. Payne and Strom (1975) estimate the value of seven simulated combinations of amount and distribution of tree cover for a twelve acre parcel of unimproved residential land in Amherst Massachusetts. Arrangements with trees are found to be valued 30% higher than those without trees, the value of land is maximized with a 67% tree cover. According to Seila and Anderson (1982), newly built houses command prices that are 7% higher when located on tree-planted lots rather than on bare ones. Anderson and Cordell (1985) carryout a study of some 800 single-family houses sold over the 1978-1980 period in Athens, Georgia and found out that the presence of landscaping and trees adds a 3% to 5% premium to sale price. Although other lot and building features associated with tree cover could explain part of this residential properties were surveyed in Athens, Georgia, U.S.A and found that the rise in market value is associated with the presence of trees which is within 3.5% and 4.5%. Dombrow, et al (2000) using the presence of mature trees, established the fact that market-value of property increase considerably. The findings go to suggest that matured trees contribute about 2% of home values in that specific market segment. Theriault, et al (2002) assess the influence of landscaping and matured trees on house value and location choices in Quebec and found out that the appreciation of benefit\value of real property is about 3%. The study also found out that, trees can have adverse effect on house value in poorer neighbourhoods and could increase by about 15% in high socio-economic status neighbourhood.

Evidence is bound to show that residents are desirous to pay for property with trees shield and landscape because of the satisfaction they derive from landscaping and trees. For instance, the study of Lorenzo et al (2000) on gender biased and income level and 'willingness to pay' discovered that on average, users were willing to pay \$4.54 for a visit to an Arboretum and \$8.68 and \$12.71 for visit to two conservatories.

Apart from studies on willingness to pay for landscape environment and property, there are other studies on willingness to pay for goods and services such as better housing using the predictive and logistic modeling techniques to asses tenants willingness to pay for better housing in Hong Kong and targeted core area neighbourhoods in Akure, Nigeria. The studies found out that the factors that significantly influenced tenants' willingness to pay for better housing are income of the tenants and the number of wage-earning workers in the families of the tenants (Hui, 1999; Okoko 2003). With the studies above, there are clear indications that relationship exist between landscaped environment and properties value.

## **Methodology**

### **The Study Area**

Akure is a city in southwestern Nigeria and the capital of Ondo State. Akure belongs to the Yoruba cultural region. Agricultural products include palm oil, cocoa, cassava, and wood products. The city is surrounded by extensive tracts of tropical forest reserves and supports a large timber industry (Stock, 2007). The population of the city according to the 2006 Population Census is 353,211 (Federal Republic of Nigeria, 2007). The choice of Akure as one of the Millennium Cities by the United Nations has probably been one of the attraction of various investors and property developers into the town. This has also led to many developmental projects by the state government

in terms of road construction and dualization and beautification projects through landscaping. The population increase in Akure in the past three decades could be attributed to its administrative function as the state capital, location of tertiary institutions of learning, and increased banking and commercial activities. There are many residential housing estates in Akure out of which Ijapo Housing Estate has been purposively selected being a low density housing estate owned by the state government. It is selected because it is occupied by the high income class and landscaped properties are mostly prevalent there.

### Sampling Technique and Data Collection

Out of the landscaped property in Ijapo Housing Estate, sixty were purposively selected to form the sample size. Sixty residential property owners and forty tenants in the selected buildings were reached using systematic random sampling technique. Also, twelve firms of Estate Surveyors and Valuers who are involved in property transactions in the study area were reached. Residential rental values of properties were used instead of sales prices due to the fact that lettings are more frequent than selling. In fact, in traditional settings in Nigeria, the sale of residential properties is not culturally acceptable as houses are viewed as asset for future generations. The research instrument employed was three sets of structured questionnaires which were administered on the target population namely tenants, property owners and Estate Surveyors and Valuers. In all, a total of 112 questionnaires were administered to elicit information on attitudes of respondents to landscaping, reasons for landscaping houses by property owners, willingness to pay for landscaped houses by tenants and the effect of landscaping on rental values of residential properties. This is presented in the table below.

**Table I.**

**Sample size of respondents.**

Respondents	Frequency
Tenants	40
Property owners	60
Estate Surveyors and Valuers	12
Total	112

Source: Field Survey, 2011.

## Results and Discussion

### Attitudes to Landscaping and Willingness to Pay For Landscaped Property

The results of the questionnaires administered to Estate Surveyors reveal that 75% of them have landscaped properties in their management portfolio. The general attitudes of prospective clients towards landscaping of residential property were sampled from Estate Surveyors and Valuers, 36.4% revealed partial interest while 63.6% was very interested in landscaping. From the Estate Valuers' viewpoint, 54.5% responded that tenants were not willing to pay any extra money for property with landscaping. However, 73% of tenants responded that they liked the idea of landscaping properties and 65% of them were willing to pay for the maintenance of landscape features. Also, 60% of the tenants will not consider living in any property without landscaping in the neighborhood even if the rental price is lower. The findings also revealed that 65.5% of the property owners had the initial plan to landscape their properties while 34.5% did not plan for it originally. All the property owners wanted landscape design to be incorporated into building plans. This shows that those who never had initial plan to landscape now see the benefit derivable from landscaping.

It is interesting to note that 30% of the property owners did the landscape design personally. 26.7% contracted it to Horticulturists, 16.7% to Architects, 16.6% to both Architect and Horticulturists and 10% did it personally and with the aid of Horticulturists. The dominant landscape materials used in the study area were trees, shrubs, flowers and grasses. The findings revealed that



59.3% carried out the maintenance of the landscaping personally while 40.7 % did through paid labor. The cost of maintenance of landscaping was not exorbitant as 51.7% respondents spent less than \$360 per annum when not contracted out.

### Reasons for Landscaping

The reasons for landscaping residential properties were due to the benefits derivable from it, which range from the scent and texture of flowers, enjoyment of fruits of the trees, enhancement of climatic conditions such as provision of wind shelter and curtailment of desertification, blocking of unpleasant views, lowering noise and temperature levels, controlling of the effect of human traffic on the environment, absorption of pollutants like carbon dioxide and the release of fresh oxygen for human lives. Others include enhancing the beauty or aesthetics of the residential properties, improving home appearance and optimizing the use of land and outdoor space. All property owners sampled in the housing estate, were of the opinion that the major benefits derived from landscaping include erosion control, wind break, beautification, while other benefits include tree shade, fruits and medicinal uses.

### Effect of Landscaping on Property Values

5% of the tenants that were sampled in various landscaped buildings in the housing estate live in bungalows, those that live in semi-detached bungalows accounted for 20%, those in duplexes (30%) and those in blocks of flats (45%). The annual rent for the least building which was a 3 bedroom flat ranged from \$1,285-\$1,645, whereas the most expensive ranged from \$2,140-\$3,570. These values reflected the incorporation of landscaping when compared with other properties which were not landscaped in the neighborhood that attracted less value as revealed in the table below.

**Table II.**

Comparison of the annual rental values of landscaped and Non-landscaped properties.

Building Type	Landscaped Rent(\$)	Average Rent (\$)	Non-landscaped Rent (\$)	Average Rent(\$)	Average Rent Differential (\$)	Landscape effect %
Duplex	2140-3570	2885	2000-3215	2607.5	277.5	10.6
Bungalow	1430-1785	1607.5	1285-1645	1465	142.5	9.7
Semi-detached Bungalow	1430-1785	1607.5	1285-1645	1465	142.5	9.7
Block of Flat (3B/R)	1285-1645	1465	1145-1430	1287.5	177.5	13.8
Overall effect						11

Source: Field Survey, 2011.

Most building designs except duplexes usually consist of three bedrooms and so, the bungalows and semi-detached bungalows were taken to have the same number of bedrooms with the block of flats. Table II reveals that the difference in average of rents for landscaped and non-landscaped property is highest in duplex, that is, \$277.5 while it is lowest in bungalows and semi-detached bungalows, being \$177.5. The effect of landscaping is derived to be 10.6% increase in duplexes, 9.7% in bungalows and semi-detached bungalows and 13.8% in block of flats. On the overall, the effect of landscaping on rental values in the study area is 11%.

From the survey, virtually all of property owners affirmed that the presence of landscape increased the value of their property. Also, 90.9% of Estate Surveyors and Valuers agreed that landscaping increases property values although the actual rate of increase could not be given by them. This has however been calculated in table II to be 11%. All of tenants also confirmed that landscaping still have incremental effect on the property value, the location of the property notwithstanding.

### **Conclusion**

The study has shown that landscaping offers immense benefits to the occupants of landscaped properties such that tenants will not consider living in a property without landscaping even if the rent is lower. Tenants' willingness- to- pay for landscaped property is a pointer to the value of landscaping on residential properties. Property owners receive more returns on their investment through the incremental effect of landscaping which was calculated to be 11% in the study.

### **Recommendation**

There is need to encourage existing property owners to incorporate landscaping in their buildings. Landscaping should be made compulsory as one of the requirements for granting building approvals, especially for houses in government housing estates. Also, architects should advice their clients on the benefits of landscaping at the design stage of building.

The Town Planning Authorities should encourage exhibitions on horticulture, landscaping and tree planting. This will in no small ways encourage developers to inculcate the concept of landscaping into physical development.

There should be an establishment of a separate unit to take care of matters relating to neighbourhood landscaping and open space beautification and maintenance. These are all opportunities towards increasing residential property values.

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## References

- Abayomi A, 2002, "An assessment of residential willingness to pay for property with trees and gardens" *Journal of Environmental Development*, **37(3)** 21-29
- Adebayo M. A, 2007, "Land Use and Resource Conservation for Sustainable Friendly Environment in Nigeria" *Journal of Environmental Conservation and Research* **1 (1)** 1-11.
- Anderson L. M, and Cordell H.K, 1965, "Residential Property Values Improved by Landscaping with Trees", *Southern Journal of Applied Forestry* **(9)** 162-66
- Bishop R, Champ P, Mullarkey D, 1995, "Contingent valuation", in *The Handbook of Environmental Economics* Eds D Bromley (Basil Blackwell Ltd, Oxford) pp21-23
- Chepesiuk R, no date, "How landscaping increases property value"  
[http://www.teamgreenll.com/landscape\\_increase.htm](http://www.teamgreenll.com/landscape_increase.htm)
- Clark W, Dieleman F, 1996, "Households and housing: choice and outcomes" *The Housing Market* (Rutgers University, Centre for Urban Policy Research, New Brunswick)
- Cotteleer G, Peerlings J, 2008, "Externalities imposed on residential properties in highly urbanized areas", paper presented at 12<sup>th</sup> Congress of European Association of Agricultural Economics – EAAE
- Des Rosiers Bolouc, Theriault, 1999, "Landscape and house value: an empirical investigation" *Journal of Real Estate Research* **23(2)** 136-161
- Dombrow J.M, Rodriguez and Sirmans C.F, 2000, "The market value of matured trees in single family housing markets". *The Appraisal Journal* **(68)** 39-43.
- Dwyer J. F, 1984, "Looking at the economic value of urban plants". *America Nursery*. **159 (12)** 69-79.
- Dwyer J. F, 1991, "Economic benefits and cost of urban forestry", pp58-58. in alliance for community trees: proceedings of the fifth national urban forest conference ; American forestry Association, Washington,D.C
- Dwyer J. R, Peterson G. L and Darragh A. J 1983 "Estimating the value of the urban forest using the travel cost method". *Journal of Arboriculture*, **(9)**182-185.
- Egunjobi L, 1999, "Our gasping cities" inaugural lecture delivered at the University of Ibadan, Nigeria
- Ewing B, no date, "Landscape add value to your property" <http://hubpages.com/hub/Landscape-Add-value-to-Your-Property>
- Fadamiro J, 1995, "The impact of landscape architecture on environmental protection and management" *UnescoMab Regional Training Workshop*, Federal University of Technology, Akure, pp240-243
- Fadamiro J, 1998, "Landscape design and the environment" (Alfad Publications Limited, Akure) p116
- Fadamiro J, 2001, "The urban open space management in Akure, Nigeria: an assessment of the roles of the professionals in the built environment" *International Journal of Environment and Development* **5(1)** 39-46
- Fadamiro J, Bobadoye S, Adams J, 2004, "Environmental quality and landscaping: a comparative analysis of public and private housing estates in lagos, Nigeria", *International Journal of Biological and Physical Sciences* **9** 48-56

- Fadamiro J, 2010, "Landscape architecture: dynamics of city development" inaugural lecture series 58, Federal University of Technology, Akure, Nigeria
- Federal Republic of Nigeria, 2007, "Legal notice on publication of the details of the breakdown of the national and state provisional totals 2006 census" (Federal Government Printer: Lagos, Nigeria).
- Freeman A, 1979, "Hedonic price, property values and measuring environmental benefits: a survey of the issues" *Scandinavian Journal of Economics* 88
- Gillman J, 2009, "New horticultural research that gardeners can use" <http://www.sustainable-gardening.com/>
- Hui E.C.M, 1999, "Willingness to pay for better housing in Hong Kong: theory and Evidence (of dwelling space)" *Urban Studies* **36(2)** 289-304
- Hull R.B, 1992, "How the public values trees". *Journal of Arboriculture*. **18 (2)** 41-45.
- Ingels J, 1992, "Landscaping principles and practices" (Delmar Publishers Inc, New York) 4<sup>th</sup> edition.
- Kaplan R, 1993, "Urban forestry and the workplace" in Gobster P H, (ed.)1993. Managing urban and high use recreation settings. 41-45.
- Kaplan R, and Kaplan S, 1989, "The experience of nature: a Psychological perspective". Cambridge University Press. New York.
- "Landscape Architecture" Microsoft Encarta® 2009 [DVD] Microsoft Corporation: Redmond WA
- Lorenzo A. F, Blanche C.A, Qi Y, Guidry M.M, 2000, "Assessing residents' willingness to pay to preserve the community urban forest : a small city case study". *Journal of Arboriculture* **26(6)**65-91
- Luttick J, 2000, "The values of tree, water and open space as reflected by house prices in the Netherlands". *Landscape and Urban Planning* **48**:161-67.
- Miller R.W, 1997, "Urban forestry: planning and managing urban green spaces". (2<sup>nd</sup>Ed.) Prentice Hall Upper Saddle River, New Jersey.
- Morales D, 1980, "The contribution of trees to residential property value", *Journal of Arboriculture* **6** 305-308.
- Nowak D. J, Crane D. E & Stevens J.C, 2001, "Syracuse urban forest: guilding the city's forest resource into the 21<sup>st</sup> century". Gen. Tech. Rep.NE-287. Newtown Square, PA.
- Okoko E, 2003, "Tenants' willingness to pay for better housing in targeted core area Neighbourhoods in Akure, Nigeria". *Habitat International* **28(4)** 317-332.
- Omole F. K, 2001, "Basic issues in housing development". FemoBless Publications, Ondo, Nigeria.
- Payne B . R, 1973, "The twenty-nine trees home improvement plan". *Natural History* (82)74-5
- Payne B . R, and Strom S, 1975, "The contribution of trees to the appraised value of unimproved residential land". *Valuation* **22(2)** 36-45
- Peter L, 1971, "Shade and ornamental tree evaluation". *Journal of Forestry* (**69**) 411-413
- Rosen S, 1974, "Hedonic prices and implicit markets: product differentiation in pure competition" *Journal of Political Economy* **82** 32-45
- Schroeder H.W, 1989, "Environment, behavior and design research on forest" In E.H. Zube and G.T. Moore (eds.) advances in environment, behavior and design (vol.2) Plenum.

- Seila, A. F, and Anderson L.M, 1982, ‘‘Estimating cost of tree preservation on residential lots’’  
*Journal of Arboriculture* (8) 182-85.
- Sheppard S, 1999, ‘‘Hedonic analysis of housing markets’’ in *Handbook of Regional and Urban Economics* Eds P Cheshire, E Mill (McGraw Hill, New York).
- Sommer R, Ledrey F, Summit J, and Timell M, 1994b, ‘‘Social benefits of residential involvement in tree planting’’, *Journal of Arboriculture* 20(3) 170-175
- Sommer R, Ledrey F, Summit J, and Timell M, 1994b, ‘‘Social benefits of residents involvement in tree planting: comparison with developer-planted trees’’ *Journal of Arboriculture* 20(26) 323-328
- Sorte G, 1995, ‘‘The value of nature and green spaces to the urban residents’’, In IFPRA World Congress, Antwerp, Sept. 3-8. Ecological aspect of green areas in urban environments. Brugge, Vereniging Voor openbaar Groen. (5) 43- 46.
- Stock R, 2007, ‘‘Nigeria’’ Microsoft Student 2008 (DVD). Microsoft Corporation: Redmond WA
- Therriault M. Y, Kestens F, Rosiers, 2002, ‘‘Impact of mature trees on house values and on residential location choices in Quebec City’’,  
[www.iemss.org/iess2002/proceedings/pdf/volume%20due/191.pdf](http://www.iemss.org/iess2002/proceedings/pdf/volume%20due/191.pdf).(20<sup>th</sup> October, 2008)
- Uchegbu S, 1998, ‘‘Environmental management and protection’’. Precision Printers and Publishers, Enugu, Nigeria.
- Ulrich R S & Simons R, 1986, ‘‘Recovery from stress during exposure to everyday outdoor environments’’. In Wineman J, Ranes R & Zimring C (eds). The cost of not knowing: Proceeding of the seventeenth annual conference of the environment design research association, Washington

# Adult Education in Nigeria: Effects of Food Security, Women and Youth Development

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## **Abstract**

Education generally plays a crucial role in the transformation and empowerment of individuals and society. This paper examined Adult Education; effects on food security, women and youths development in Nigeria. The study administered a semi-structured questionnaire to sample the opinions of four hundred and three respondents purposefully selected from three local government areas in Bayelsa State. The findings revealed that despite the limited adult education programmes in Bayelsa State, Adult Education still had a positive effect on food security and the life patterns of women and youths in the state. It recommended that more strategies should be introduced in the grassroots to sensitise indigenes on the need to participate in adult education programmes in their immediate environment.

**Key words:** Adult Education, Bayelsa State, Food Security, Nigeria, Women and Youth Development

## Introduction

Education generally plays a critical role in the life of individuals. As an agent of change, education presents a solid vehicle for transformation and empowerment of individuals and society. Pant (2005) for instance had observed that an educated person is one who is morally good and properly adapted to his society and who contributes meaningfully to the growth and development of the society.

However, the ability to utilise natural and human resources to improve skills and living patterns depends on the type, quality and depth of education received. While relationship between education and wealth creation is complex, knowledge remains an important driver for sustainability and food security. The rural women and youths in Nigeria require specific kind of education to address their peculiar situation. This would enable them participate meaningfully in both personal and societal affairs. Such participation can only become effective through Adult Education.

Adult education is defined throughout the world in different contexts influenced by historical and cultural circumstances in which it originated. As such, an exact definition for adult education may be nebulous because of the plethora of opinions regarding the concepts of 'Adult' and 'education'. Irrespective of the difficulties that may arise from attempting to provide an absolute definition of Adult Education, Hava and Erturgut (2010) utilised various examples to conclude that adult education refers to different types of education activities carried out by different department or unit, to increase everyone's knowledge in a society after their formal education. It is an education for those mature in their age, emotion, thinking or career and usually occurs outside formal schooling settings.

Ezimah (2004) and Ani (2003) identified adult education programmes to include literacy education, remedial education, vocational education, civil and political education, community development, family life education, liberal education, life-long education and women education among others. This study perceived adult education as any educational programme designed for adult and youths in order to improve and accommodate their varying abilities for overall wellbeing and better living.

The study focused on Bayelsa State in Nigeria; Bayelsa State is one of the thirty-six states of the Nigerian federation. It was created on October 1, 1996 out of the old Rivers State. The name, Bayelsa, is an acronym of three former Local Government areas: Brass, Yenagoa and Sagbama. The major occupations in the state are fishing, farming, palm oil milling, lumbering, palm wine tapping, local gin making, trading, carving and weaving (Bayelsa State Government 2013). The *State Agency for Mass Education (SAME)* (2011) report indicated that a good number of women and youths participated in adult education programmes in Bayelsa State; while at the same time, also engage in other forms of livelihood. Essentially, all beings are sustained by nutrients derived from food. Food therefore is a basic human need. Food security indicates the availability of and access to food. *The International Conference on Nutrition* (1992) had noted that food security is a state of affairs where all people are sustained by nutrients derived from food. It also added that food security is a state of affairs where all people at all times have access to safe and nutritious food to maintain a healthy and active life.

Invariably, the availability of adult education programmes and the presence of adult education centres are indicators that the women and youths in Bayelsa State have opportunities of benefitting from adult education programmes. It is in view of this that this study examined the effect of adult education on food security, women, and youth development in Bayelsa State.

## Research Problems/Study Rationale

The relevance of food cannot be over stressed; a state or nation that cannot provide and sustain adequate food security can be considered to be poor. Thus, food is an essential for state and national security however; there is evidence to show that Bayelsa State cannot boast of having enough food for her populace. According to the *National Food Reserve Agency (NFRA)*, Bayelsa

State was the least producer of agricultural products in all the states of the Nigerian federation (NFRA 2007, 2008). This is supported with the fact that many food products are actually supplied by the neighbouring states.

The high level of illiteracy among rural women and youths, who play vital role in development is also alarming. This is also among the challenges of agricultural production in the rural areas, since education in whatever form is linked to food security and improved quality of life for women and youths.

The restiveness among youths in Nigeria especially Bayelsa State is a source of concern to all and sundry. This study therefore seeks to address the following questions;

- What are the effects of adult education programmes on food security in Bayelsa State?
- What specific adult education programme would improve the activities and living pattern of rural women and youths in Bayelsa State?
- What are the effects of adult education programmes on the development of women and youths in Bayelsa State?

### **Research Aim and Objectives**

The main aim of this study was to examine adult education effects on food security, women and youths development in Bayelsa State. The following objectives were used to achieve the study aim:

- Examine the effect of adult education programmes on food security in Bayelsa State;
- Identify adult education programmes which could improve the activities and living pattern of the rural women and youths in Bayelsa State;
- Examine the effect of adult education programmes on the development of rural women and youths in Bayelsa State.

### **Formulation of Hypotheses**

**H0<sub>1</sub>:** There is no significant difference in the mean ratings of rural women and youths with regards to the effect of adult education programmes on food security in Bayelsa State.

**H0<sub>2</sub>:** There is no significant difference in the mean ratings of respondents from Kolokuma/Opokuma, Yenagoa and Nembe Local Government Areas with regard to how specific adult education programmes would enhance the activities and living pattern of rural women and youths in Bayelsa State.

**H0<sub>3</sub>:** There is no significant difference in the mean ratings of rural women and youths with regards to the effect of adult education programmes in the development of rural women and youths in Bayelsa State.

### **Theoretical Basis of Research**

This study was based on transformational learning theory. Mezirow (2008) defines transformational theory as the process by which we transform our taken for granted frames of reference (meaning perspectives, habits of mind, mind sets) to make inclusive, discriminating, open emotionally capable of change and reflective so that we may generate beliefs and opinions that prove more true or justifies to guide actions.

According to Taylor (1998), one of the attributes to adult education is that establishment of horizontal student-teacher relationship is possible through transformational learning. This implies that the student and teacher work on the same level. This is the practice in adult education and most adult education concepts surround it. This creates an atmosphere that people feel comfortable to share and communicate in, which is very important in adult education. O'Sullivan (2003) for instance, explained that transformation learning involves experiencing a deep, structural shift in the basic premises of thought, feelings and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world. Such a shift involves our understanding of



ourselves and our self-locations, our relationship with other humans and with the natural world. From every indication, the rural women and the youths need change in attitude, values and skills in order to be more productive and make meaningful contribution in the development of Bayelsa State and Nigeria in general.

### **Literature Review**

The meaning and role of adult education has been defined in several ways. For instance, the *United Nations Education Scientific and Cultural Organisation (UNESCO)* (2009), Nzeneri (2008), Anowor, Ezema and Umezulike (2001) all see adult education as the body of ongoing learning process, formal or otherwise, whereby people regarded as adults by the society to which they belong develop their abilities, enrich their knowledge and improve their technical or professional qualifications or turn them in a new direction to meet their own needs and those of their society. This implies that adult education can shape identity, and give meaning to life. Also, Nyerere (2006), Okedara (1981), Bhola, Muller and Dijkstra (1983), Darkenwald and Merrian (1982) noted that adult education contributes meaningfully to the growth and development of individuals and the society. This goes to show that adult education can be directed at helping individuals develop themselves. It has the ability to contribute to an enlargement of man's ability in everyway. It is against this background that this study identified adult education as an instrument that could provide the desired change in food security, women and youth development or empowerment. As corroborated by UNESCO (2009) and Ocho (2005) education is an essential prerequisite for reducing poverty, improving agriculture and living condition of rural people and building a sustainable and food secured world, in order to address the challenges and bad practices of the society.

The *National Food Reserve Agency (NFRA)* (2006), *Food and Agricultural Organisation (FAO)* (2007) agree that food security is the capacity at all times to provide the world with staple products to support increased food consumption, while controlling price fluctuations. *World Bank* (2002) and *United States Department of Agriculture (USDA)* (2008) observed that food security is access at all times by all people to the food they need for an active and healthy life. This implies that food security includes at a minimum the ready availability of nutritionally adequate and safe foods. It also depicts assured ability to acquire acceptable food in socially acceptable ways. Nafukho (1998), Adekambi and Modise (2000) maintain that grassroot development (which concerns women and youths) in the third world must be tied to education. The education they require is adult education which Simpson (1973) posits that it cuts across all ages, sexes and level. Zuofa (2006) also asserts that the first function of adult education is to inspire a desire for a change and motivate an understanding that change is possible. Undoubtedly, adult education has the capacity to facilitate women and youth development in Bayelsa State if adequately utilised.

### **Methodology**

To gather rich data required for the study, a well-designed self-completion questionnaire was used for the study. According to Trochim (2000) the self-completion questionnaire provides researchers with a cheaper and quicker means of gathering rich data.

The questionnaire entitled "*Adult Education Effects on Food Security, Rural Women and Youths Questionnaire (AEEFSRWYQ)*" comprised of two sections. Section A was used to gather general information about the respondents for purely demographic purposes. In line with ethical research, all identifying information were excluded at the analysis phase while Section B contained items that reflected the research questions.

The area of study was three selected local government areas in Bayelsa State. These Local Government Areas are Nembe, Kolokuma/Opokuma and Yenagoa. The population for the study was made up of all rural women and youths in these three selected local government areas. The sample comprised of four hundred and three respondents (male and female) from the three Local Government Areas.

Data analysis was performed using SPSS. The SPSS 17.0 software was selected because it enabled the researcher to eliminate long hours which would have been previously used for carrying out manual quantitative data analysis. Additionally, it introduced additional rigour during the analysis since it allowed the researcher to accomplish several advanced statistical tests. Several descriptive analyses were performed while the hypotheses were tested for significance using Analysis of Variance (ANOVA).

Prior to the commencement of the main study, a validation of the instrument was performed by experts in the fields of Measurement and Evaluation, Adult Education and Agriculture to critically examine and determine the questionnaire in terms of relevance, comprehensiveness of content, appropriateness, clarity of statements, possible ambiguities and errors as well as omissions. Reliability was achieved by administering the questionnaire to rural women and youths in Ogbia Local Government Area in Bayelsa State, which was not one of the local government areas for this study. To ensure the internal consistency of the instrument, Cronbach Alpha was used to calculate the reliability coefficient. A Cronbach Alpha of .73 was obtained after the computation. The Cronbach's Alpha was adequate since the questionnaire items were polychotomously scored as there was no right or wrong answers (Uzoagulu, 1998).

### Presentation of Results

The findings of the study are presented below; where appropriate, tabular representations have been used to highlight the respondent's opinions.

#### Demographic Characteristics of Respondents:

**Table 1: Distribution of Respondents by Gender**

Gender	Number	Percentage
Male	197	48.90
Female	204	50.60
Unknown	2	.50
Total	403	100

Data from Table 2 revealed that greater percentage of participants were female (50.60%) as against the male who had 48.90%. This is in consonance with the report of SAME (2011) that identified good number of female to be involved in Adult Education.

**Table 2: Distribution of Marital Status of Respondents**

Gender	Number	Percentage
Married	253	62.80
Single	126	31.30
Separated	15	3.70
Unknown	9	2.20

Table 2 indicated that 253 respondents representing 62.80% were married, while 126(31.30%) were single. 15(3.70%) are separated and 9(2.20) unknown. The table therefore showed that majority of those who participated in the programme were married

**Table 3: Distribution of Respondents by AGE**

Age (in years) of Respondents	Number of Respondents	Percentage
20 – 29	105	26.1
30 – 39	150	37.2
40 – 49	67	16.2
50 and above	77	19.1
Unknown	4	1.0

In Table 3, data showed that 105 respondents (26.1%) are within the age bracket of 20-29 years, 150(37.2%) within 30-39, 67(16.2%) between 40-49 and 77(19.1%) are 50 years and above. Consequently, respondents within the age bracket of 30-39 were found to be more active in the programme and were followed by those within the age bracket of 20-29 representing 26.1%.

**Table 4: Distribution of Respondents by their Educational Qualifications**

Educational Qualifications	Number of Respondents	Percentage
Below FSLC	86	21.30
FSLC	89	22.10
Below JSSC	37	9.20
JSSC	95	23.60
Others	46	11.40
Unknown	50	12.40

With regard to educational qualifications, 86(21.30%) respondents were found to have attained below first school leaving certificate (FSLC), 89(22.10%) had FSLC, 37(9.20%) below JSSC, while 95(23.60%) were JSSC. 46(11.40%) respondents were classified under others, while 50 (12.40%) were unknown. The table therefore revealed that the educational level of those who were actively involved in the programme ranged from JSSC, FSLC to below FSLC.

**Table 5: Distribution of Respondents by Local Government Area**

Local Govt. Area	Number of Respondents	Percentage
Kolokuma/Opokuma (Kolga)	92	22.80
Yenagoa (Yelga)	212	52.60
Nembe	98	24.30
Unknown	1	.20

Table 5 showed that 92 respondents representing 22.80% were from Kolokuma/Opokuma, while Yenagoa has 212 respondents (52.20%) and Nembe local government area were 98 respondents representing 24.30%. The table therefore revealed that majority of the participants were from Yenagoa local government area, the headquarters of Bayelsa State.

**Table 6: Distribution of Respondents according to Adult Education Programmes**

Programme	Number of Respondents	Percentage
Basic literacy	125	31.00
Post literacy	106	26.30
Skill Acquisition	60	14.90
Others	4	1.00
Unknown	108	26.80

In terms of adult education programmes undertaken, 125 respondents representing 31% were involved in basic literacy, 106 respondents (26.3%) in post literacy, while 60(14.90%) were involved in skill acquisition and 108 respondents representing (26.80%) unidentified. The table therefore showed that respondents were mainly involved in both basic and post literacy adult education programmes.

**Table 7: Mean ratings of respondents on the effect of adult education programmes on food security in Bayelsa State.**

S/N	Items	$\bar{x}$ Kolga	$\bar{x}$ Yelga	$\bar{x}$ Nembe	Decision
	I have better understanding of the use of fertilizers to improve my produce due to the training received in adult education programme.	3.30	2.81	2.86	Agreed
	Adult education programmes provide me with the knowledge on when best to plant as to have better yield.	3.33	2.88	2.79	Agreed
	Adult education programmes have improved the level of women participation in food production in my community.	3.14	2.48	2.71	Agreed, Disagreed, Agreed
	The impact of trainings received by women in adult education programmes have made food more affordable.	2.84	2.27	2.68	Agreed, Disagreed, Agreed
	Trainings received in adult education programmes have improved farming activities.	3.04	2.68	2.74	Agreed
	Knowledge acquired through adult education programmes has provided me with opportunities to embark on medium scale farming in crop production towards ensuring food sufficiency.	2.93	2.61	2.77	Agreed
	Skills obtained from adult education programmes have improved the quality of food crops produced by farmers in the community.	2.96	2.58	2.66	Agreed
	My contribution has improved in terms of food production in my locality due to the training received in adult education programmes.	2.99	2.48	2.80	Agreed, Disagreed, Agreed
	Food is more affordable for all families in my community due to adult education.	2.98	2.12	2.48	Agreed, Disagreed, Disagreed
	Food is more available now in my community due to adult education	2.90	2.18	2.38	Agreed, Disagreed, Disagreed

Data in Table 7 indicated that items 1, 2, 5, 6 and 7 with varying mean scores above 2.50 were agreed for all the respondents in the local governments. Items 3, 4, and 8 were regarded as agreed for both Kolokuma/Opokuma and Nembe local government areas, while Yenagoa was disagreed. Items 9 and 10 have the mean score for Kolokuma/Opokuma as agreed, and the other local government areas as disagreed. With over 50% of the responses as agreed, the table showed that the effects of adult education on food security in Bayelsa State were positive.

**Table 8: Mean ratings of respondents on adult education programmes that could improve living pattern of both rural women and youths in Bayelsa State.**

S/N	Items	$\bar{x}$ Kolga	$\bar{x}$ Yelga	$\bar{x}$ Nembe	Decision
	Adult education programmes that enhance my skills to solve day to day issues are available in my community adult learning centres.	2.73	2.71	2.63	Agreed
	Adult education programmes for youths are available for self-employment.	2.42	2.46	2.35	Disagreed
	Adult education programme are strictly for rural women alone.	2.51	1.98	2.03	Agreed, Disagreed, Disagreed
	Adult education programme which focuses on the eradication of harmful cultural practices in my community is available.	2.54	2.23	2.20	Agreed, Disagreed, Disagreed
	Use of mother tongue in the teaching and learning has enhanced participation in adult education programmes.	3.20	2.63	3.38	Agreed
	The adult education programmes to sensitise the people on their political obligations and participation are available.	2.53	2.57	2.61	Agreed
	Adult education programmes that could help the people understand current issues and challenges in the society are available.	2.63	2.48	2.62	Agreed, Disagreed, Agreed
	Adult education programmes capable of curbing youth restiveness are provided in my community.	2.46	2.30	2.48	Disagreed
	Adult education programmes to improve the life of women are provided in my community.	2.57	2.49	2.60	Agreed, Disagreed, Agreed
	Adult education programmes to improve the life of youths are provided in my community.	2.47	2.43	2.29	Disagreed
	Adult education programme to equip the youths in skills acquisition are provided in my community.	2.64	2.55	2.28	Agreed, Agreed, Disagreed
	Only literacy education programme is mostly available in my community.	2.69	2.81	3.09	Agreed
	Adult education programme designed to enable women acquire relevant skills are provided in my community.	2.71	2.39	2.49	Agreed, Disagreed, Disagreed

Table 8 showed that items 1(2.73; 2.71, 2.63), 5(3.20, 2.63, 3.38), 6(2.53, 2.57, 2.61) and 12(2.69, 2.81, 3.09) were regarded as agreed for all the respondents in the three local government areas. Items 2, 8, and 10 have varying mean score for the local government as disagreed, while items 3, 4, and 13 were regarded as agreed for Kolokuma/Opokuma and disagreed on the other local government areas. The table further has the mean score of items 7 and 8 for Kolokuma/Opokuma and Nembe Local Government Areas as agreed but disagreed for Yenagoa, while item 11 has the mean score for both Kolokuma/Opokuma and Yenagoa as agreed and disagreed for Nembe. Consequently, the table showed that limited adult education programmes were available and as such, has not significantly improved the living pattern of rural women and youths in Bayelsa State.

**Table 9: Mean ratings of respondents on effect of adult education programmes on the development of women and youths in Bayelsa State.**

S/N	Items	$\bar{x}$ Kolga	$\bar{x}$ Yelga	$\bar{x}$ Nembe	Decision
	I engage in other economic activities as a means of ensuring the availability of food due to the training received in adult education programme.	3.03	2.91	2.61	Agreed
	My keeping of business transaction records have improved due to adult education programme.	3.05	3.05	3.14	Agreed
	I can now project the amount of profit am capable of making in my business due to adult education programme received.	3.22	3.00	3.16	Agreed
	Adult education programmes have provided women opportunity to be self-employed.	3.02	2.73	2.88	Agreed
	Adult education programmes have provided youths self-reliant jobs.	2.89	2.56	2.69	Agreed
	I have better understanding of utilizing loan to improve my economic activities due to adult education programmes.	3.05	2.71	2.76	Agreed
	My acquisition of basic literacy skills of reading, writing and computing contribute to the improvement of my living pattern.	3.35	3.12	3.19	Agreed
	Adult education training has made me self-reliant and I am self-employed.	3.12	2.71	2.94	Agreed
	I can now appreciate the importance of education in my life due to my participation in adult education programmes.	3.38	3.30	3.47	Agreed
	Adult education programmes have offered me opportunity to engage in rural development activities.	3.31	2.92	3.10	Agreed
	Training received in adult education programmes has provided me with opportunities to organise my business better.	3.20	2.91	3.26	Agreed

	Adult education programmes have provided more income generating activities for me.	3.21	2.93	2.95	Agreed
	The protection of life and property is now being appreciated due to the knowledge I acquired in adult education programme.	3.14	2.85	3.16	Agreed
	The quality of food consumption for my family has improved due to my understanding of basic food hygiene.	3.25	2.90	3.11	Agreed
	My relationship with others has improved due to adult education programmes.	3.29	3.08	3.23	Agreed
	Adult education programme has improved my knowledge of sanitary standard in basic health.	3.19	2.90	3.18	Agreed
	Technological changes no longer pose problems due to adult education programmes.	3.22	2.82	3.16	Agreed
	My participation in communal activities has improved due to adult education programme.	3.31	2.79	3.15	Agreed

Items 1 – 18 in table 9 showed that all the items were all agreed. The 100% positive responses of the respondents is a demonstration that adult education programmes have a positive effect in the development of rural women and youths in Bayelsa State.

**Table 10: Analysis of Variance on the effect of adult education programmes on food security in Bayelsa State**

Source of variance	Sum of squares (SS)	Mean square (MS)	df	f <sub>cal</sub>	f <sub>crit</sub>	Decision
Between Groups	18.75	9.38	2	21.51	3.00	Rejected
Within Groups	174.39	.44	400			

The null hypothesis that significant difference is not found in the mean ratings of respondents with regard to effect of adult education programmes on food security in Bayelsa State was rejected. This is because the calculated f-ratio (21.51) was greater than the f-critical value (3.00) at .05 level of significance as shown in table 10.

**Table 11: Analysis of Variance with regard to how adult education programmes would enhance the living pattern of rural women and youths in Bayelsa State**

Source of variance	Sum of squares (SS)	Mean square (MS)	df	f <sub>cal</sub>	f <sub>crit</sub>	Decision
Between Groups	1.49	.74	2	1.94	3.00	Accepted
Within Groups	153.28	.38	400			

Significant difference in table 11 is not found as the null hypothesis was accepted, since the calculated f-ratio (1.94) is less than the critical f-value (3.00) at .05 level of significance. This implies that there was no significant difference found in the mean ratings of respondents from Kolokuma/Opokuma, Yenagoa and Nembe Local Government Areas on how adult education programmes would enhance the living pattern of rural women and youths in Bayelsa State.

**Table 12: Analysis of Variance on the effect of adult education programmes on women and youths development in Bayelsa State**

Source of variance	Sum of squares (SS)	Mean square (MS)	df	f <sub>cal</sub>	f <sub>crit</sub>	Decision
Between Groups	4.02	2.01	2	8.27	3.00	Rejected
Within Groups	97.09	.24	400			

Table 12 showed that significant difference was found in the mean ratings of respondents on the effects of adult education programmes on women and youths development in Bayelsa State since the calculated f-ratio (8.27) is greater than the critical f-value (3.00) at .05 level of significance.

### Discussion of Findings

The result of the data analysis from Table 7 highlighted that adult education has a positive effect on both rural women and youths in terms of food security in Bayelsa State. The study indicated that respondents were equipped with better understanding of the use of fertilizer to improve their produce and knowledge on when best to plant. This finding is in consonance with previous studies like UNESCO (2009), and Ocho (2005) where it was concluded that education is a prerequisite for reducing poverty, improving agriculture and living condition of the rural people.

The study further revealed that the knowledge acquired through adult education provides recipients with the opportunity to embark on medium scale farming in crop production and food. This is also true as the report of National Food Reserve Agency (2007) and (2008) indicated that Bayelsa State was the least producer of Agricultural products in all the states of the federation.

The findings equally showed that limited adult education programmes were available in Bayelsa State. Prominent among these programmes was the adult literacy education programme which respondents demonstrated was mostly available in all the local government areas. This obviously revealed that these programmes have not significantly improved the living pattern of both rural women and youths in the state. According to , Zuofa (2006) the first function of adult education is to inspire a desire for a change, and motivate an understanding that change is possible. This change is most achievable when the use of mother tongue is promoted in adult education programmes as evidenced by the respondents.

Data in Table 9 indicated a positive effect of adult education programmes in the development of both rural women and youths in Bayelsa State. The study affirmed this in the improvement of economic activities of learners who have got better understanding of utilising loan taken, because of their ability to read, write and compute. In line with this, Nyerere (2006), Darkenwald and Merrian (1982) posited that adult education contributes meaningfully to the growth and development of individual and the society.

Analysis of data in Table 10 showed that significant difference was found in the mean ratings of respondents with regard to the effect of adult education programmes on food security in Bayelsa State. This may however be true as table 5 rightly pointed out that more learners were found in Yenagoa, the headquarters of Bayelsa State than those of the other local government areas. This has also provided opportunity for more learners unlike those in the rural areas; hence, discrepancies over its effect on food security.



In Table 11, the result of findings revealed the acceptance of the null hypothesis, as significant difference was not found in the mean ratings of respondents from Kolokuma/Opokuma, Yenagoa and Nembe Local Government Areas with regards to how adult education programmes would enhance the living pattern of rural women and youths in Bayelsa State. This is also true of the fact that learners in all the local government areas affirmed the benefits of adult education programmes in the improvement of their living pattern in Bayelsa State, even though, there were limited programmes found in the areas.

Data analysis in Table 12 showed the non-acceptance of the significant difference in the mean ratings of respondents from Kolokuma/Opokuma, Yenagoa and Nembe Local Government Areas regarding the effects of adult education programmes on women and youth development in Bayelsa State. The study revealed that despite the contributions of adult education programmes on the enhancement of living pattern of the people, in terms of its effect on individual's development, a diverse view was held, hence denoting its rejection.

### **Conclusion and Recommendations**

Education generally plays a crucial role in the transformation and empowerment of individuals and society. The findings of this study revealed that despite the limited adult education programmes in Bayelsa State, Adult Education still had a positive effect on food security in the state. This was evidenced on learners' accessibility to food, maintenance of healthy and active life of the people in Bayelsa State

Few adult education programmes were found in Bayelsa State. Prominent among them was the adult literacy education programme. This has also inhibited the enhancement of the living pattern of both rural women and youths in Bayelsa State. Adult education programmes have a positive effect in the development of women and youths in Bayelsa State. This is because; it exposes the learners to variety of things to do in order to achieve positive change in the individuals as well as the society.

The presence of significant difference in the mean rating of respondents on the effect of adult education programmes on food security is an indication of diverse interpretations of its effects in various local government areas. Significant difference was not found in the mean ratings on how adult education programmes would enhance the living pattern of rural women and youths because respondents do not have divergent views over the role of adult education programmes in Bayelsa State.

There was significant difference found in terms of the effect of adult education on the development of women and youths in Bayelsa State. This is because there were more participation of the women in the various adult education programmes than the youths.

In view of these findings, the following recommendations were made;

- More sensitization programmes to the grassroots on the need to embrace adult education programme in their immediate environment should be made by the government.
- Government should ensure more adult education programmes are provided to accommodate the changing trends.
- The use of mother-tongue in adult literacy classes should be encouraged more by the providers of adult education programmes.
- The agency should be supported in terms of human and material resources to effectively run and organise different adult education programmes to meet the need of the people since SAME report reveals that government presently does not adequately support the agency.
- More facilitators should be provided opportunity for professional development training by the government.

More facilitators should be trained and engaged as a way of ensuring that the adult education learning centres are adequately catered for.

### **Implications for Practitioners**

The outcome of the research has the following implications for practitioners:

- Sensitising more youths to participate in adult education programme.
- Encouraging wider participation in adult education programme for acquisition of more life skills in Bayelsa State.
- Monitoring and supervision of activities in adult education centres in Bayelsa State.
- Continuous research for improved adult education programmes in Bayelsa State.

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## References

- Adekambi, G. & Modise, O. (2000). The State of Adult and Continuing in Botswana. In S.A. Indabawa, A. Oduaran, T. Afrik and S. Walters (eds.). *The State of Adult and Continuing Education in Africa*. Windhoek: Department of Adult and Non-formal Education, University of Namibia.
- Ani, R.O. (2003). *An Introductory Approach to the Study of Adult Education*. Enugu: Donsibad Communications.
- Anowor, O.O., Ezema, J.O. & Umezulike, N. (2001). *Fundamentals of Adult Education: A Handbook for Facilitators of Learning*. Enugu: CECTA Nig. Ltd.
- Bayelsa State Government available online <http://bayelsa.gov.ng/portal/bayelsa/about-bayelsa> [Accessed 21 September 2013].
- Bhola, H.S., Mullers, J. & Dijkstra, P. (1983). *The Promise of Literacy: Campaigns, Programmes and Projects*, International Council for Adult Education. German Foundation for International Development DSE.
- Darkenwald, G.G. & Merriam, S.B. (1982). *Adult Education: Foundations of Practice*. New York: Harper and Row.
- Ezimah, M.O.A. (2004). *Knowing Adult Education: its Nature, Scope and Process*: Owerri: Springfield Publishers.
- Hava, H.T. and Erturgut, R. (2010). Function of planning in adult education. *Procedia Social and Behavioral Sciences* 2(2) pp. 3324–3328
- Mac'Odo, D.S. (1999). *Statistics for Decision Making*. Port Harcourt: Linnet Paul Publishers.
- Mezirow, J. (2008). Understanding Transformation Theory. *Adult Education Quarterly*. 44(4): 22-232.
- Nafukho, F.M. (1998). Entrepreneurial Skills Programmes for Unemployed Youths in Africa: A Second Look. *Journal of Small Business Management*. 36(1), 10-103.
- National Food Reserve Agency (NFRA) (2007). *Report of the 2007 Agricultural Production Survey*.
- National Food Reserve Agency (NFRA) (2008). *National Food Security Programme*: Federal Ministry of Agriculture and Water Resources.
- Nwana, O.C. (2007). *Introduction to Education Research*. Ibadan: Heinemann Educational Books.
- Nyerere, J.K. (2006). *Adult Education*. In *Adult Education and Development IIZ DVV*. Bonn: Institute for International Cooperation of the Human Adult Education Association.
- Nzeneri, I.S. (2008). *Handbook on Adult Education: Principles and Practice*. (New Edition). Uyo: ABIGAB Associates Ltd.
- O'Sullivan, E. (2001). Bringing a Perspective of Transformative Learning to Globalised Consumption. *International Journal of Consumer Studies*, 27(4), 326-330.
- Ocho, L.O. (2005). *Issues and Concerns in Education and Life*. Enugu: institute for Development Studies.
- Okedara, J.T. (1981). Terminologies and Concepts in Adult Education. In L. Bown and J.T.Okedara (eds.). *An Introduction to the Study of Adult Education*. Ibadan: University Press.

- Okeke, E.A.C. (1995). Women Empowerment and Rural Development. E.C. Eboh, C.U.Okoye and D.Ayichi (eds.). *Rural Development in Nigeria Concepts, Process and Prospects*. Enugu: Auto Century Publishers.
- Pant, M. (2005). *Adult Education and Poverty Reduction: A Glionural Organisational Priority*. Bonne: International Cooperation of German Adult Education Association (11/12/DVV).
- Simpson, S. (1973). *Today and Tomorrow in European Adult Education*. Strasbourg.
- Taylor, E.W. (1998). *The Theory and Practice of Transformative Learning: A Critical Review Informative Series No 374*, Columbus Eric Clearing House on Adult Career and Vocational Education. Centre on Education and Training for Employment. College of Education. Ohio State University.
- Trochim, W. M. (2000). The Research Methods Knowledge Base, [2nd Edition. <http://trochim.human.cornell.edu/kb/index.htm> [Accessed 11th August 2013].
- United Nations Educational Scientific and Cultural Organisation (UNESCO) (2009). *Education for All 2000 Assessment*. World Education.
- United States Department of Agriculture (USDA) (2008). *Food Security in the United States: Measuring Household Food Security*. Retrieved on 25th1 Feb. 2010 from [http://www.ers.usda.gov/Briefing/food security/measurement.htm](http://www.ers.usda.gov/Briefing/food%20security/measurement.htm).
- Uzoagwu, A.E. (198). *Practical Guide to Writing Research Project Report in Tertiary Institution*. Enugu: John Jacobs Classic Publishers.
- World Bank (2002). *World Development Report*. Washington, D.C.: The World Bank.
- Zuofa, C.C. (2006). *Modern Perspectives on Adult Education in Nigeria*. Port Harcourt: Pre-Joe Publishers.

# Using Reflection Journal to Evaluate Students's Responses to Problem-Based Learning for First Year Chemical Engineering Students

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## **Abstract**

Introduction to Engineering (ITE) is a first year course in the Faculty of Chemical Engineering, Universiti Teknologi Malaysia that fully implements problem-based learning (PBL) approach since the past four years. For year 2012, the problem for the course was designed by Iskandar Regional Development Authority on Low Carbon Society. It is a real case study based on one of the main agendas of the IRDA, which is to decrease carbon emission in Iskandar Malaysia region through resources conservation. In PBL, besides case study design, one of the most important elements is the assessment part. Students' assessment in PBL is more challenging compared to conventional lecture in which examination is the sole indicator of students' performance. In PBL, students' involvement in the learning process itself is also evaluated through i.e. presentation, peer teaching as well as reflection journal. This paper discusses the role of reflection journal and how it helps students' learning in PBL environment. Analysis of reflection journals prepared by 32 students throughout the ITE course found that reflection journal is a powerful assessment tool as it allows lecturers to get into what the students have been through throughout the course deeply. The students are not only reflecting the technical content of the course, but also willing to share their thoughts emotionally from different perspectives – as student, team member, group leader, member of society etc. Also through reflection journal, students are able to develop a lot of skills including communication, problem solving, critical thinking and life-long learning.

**Keywords**—reflection journal; problem-based learning; low carbon society; chemical engineering; engineering education

## Introduction

The Department of Chemical Engineering, Universiti Teknologi Malaysia implements problem-based learning (PBL) as the exclusive pedagogical approach in Introduction to Engineering course. For year 2012, the case study for the course was designed based on the real national agenda of reducing carbon emission in Iskandar Malaysia region. The case study was prepared in collaboration with the Iskandar Regional Development Authority (IRDA). The case study contains three stages; all are gearing towards the same direction, which is to instill the awareness on Low Carbon Society among students. At the end of the course, students need to showcase their proposed solutions on how to tackle the problems through engineering means in a form of presentation. The solutions must not only innovative but also practical and economically feasible. To make the students become more focused and excited of the whole project, a competition called as the Low Carbon Society (LCS) 2012 was organized for them to exhibit their piece of work. The competition was judged by experts from both the department as well as IRDA.

PBL is the best approach to be implemented in a course like the Introduction to Engineering. Through PBL, students are not only exposed to frontier chemical engineering related issues, but are also equipped with other important skills such as communication, critical thinking, problem solving and life-long learning. Since engineering class is normally large, using the typical PBL is not practical. Therefore a new approach called the cooperative problem-based learning (CPBL) was introduced to deal with large class size (Mohd-Yusof, Helmi et al. 2011). Working in group nurtures good leadership skill as well as positive interdependence among students (team members). The CPBL model consists of three phases. In Phase 1, students receive a problem as a trigger for learning activity. In Phase 2, students examine the problem, identify learning issues and employ research strategies, before sharing it with team mates during peer teaching session. In Phase 3, the consensus of the learning issues and findings are presented and discussed in class in order to form a learning community. Such learning environment is more effective in getting students engaged in the learning process compared to conventional lecture. As a result, students will feel more satisfied with the learning experiences they went through, which in turn foster academic persistence and success. In addition, course outcomes are enriched and deepened when students' learning is more engaging, active and relevant.

## Literature Riview

Reflection is an indication of thinking and learning process. Reflective thinking based on experiential learning is a key skill required for the students to learn. It also provides direction to students on how they learn and how they can use their knowledge (Selfe and Arbabi 1983; Rumpf 1988). Reflection activity can help to make challenging experience less overwhelming and facilitates the exploration of the relationship between past learning, current experience, and future action (Pennebaker 1990). According to Andrusyszyn and Davie (Andrusyszyn and Davie 1997), reflection is a conscious cognitive activity where students connect thought, feelings, and experiences related to the learning activity in which they are involved in. Reflections activities engage students in critical thinking (Wheeler and McDonald 1998) and assist them in articulate their thoughts and their understanding (Larkin-Hein and Joyner 2001). Hence, the activities will provide enormous potential for the students to broaden and deepen in academic, social and moral development.

Writing is an indication of thinking process, and the written piece is the artifact that reveals the thinking. Writing enable students transform knowledge that was gathered in a different form. Writing process involve manipulation and clarification of knowledge, which can facilitate new understanding and learning. Writing is also a path for students to construct meaning, enhance problem understanding and develop new ways of organizing experience (Pennebaker 1990).

The above arguments impart confidence in the power of using reflection journals in bringing out the best out of students in a problem-solving framework environment. Reflection journals can serve as evidence from which conclusions can be drawn on a student's progress that is associated with problem solving skills. Students can get caught up in the process of finding a resolution to the

problem posed and they can be overwhelmed by the mass of information and processes that they employed. Therefore, reflection journal enable students to understand learning issues, by bridging between old and new knowledge, and further extend it by reflecting how they can subsequently use the skill in the other courses and in their everyday life.

Although reflection journals are recommended as a form of closure in a constructivist problem solving framework, limited literature is available on how reflection foster problem solving skills and increases the effectiveness of learning in a constructivist environment, especially for first year engineering students. This is important in a PBL set up where the students are often facing with the process of having to explore concepts and knowledge within new and unique problem situations.

### **Methodology**

This study was conducted using qualitative approach by analyzing the reflection journals submitted by 32 students in the course. Throughout the semester, each student needs to write three reflection journals, as a closure to what they have learnt and went through at the end of each stage of the case study. The reflective journals were collected through e-learning, which the students have individual access to their own account. The students submitted their reflective journals through e-learning where the lecturers can access to the submitted documents. For each submission, the lecturers went through the reflective journals to find out problems and issues faced by the students. This helped the lecturers in taking the necessary actions to improve the learning. This is a part of the strengths of CPBL. In this paper, the use of reflective journals as a tool for teaching and learning will be discussed. The journals were carefully analyzed in order to observe the trend of students' learning experiences, both technically and emotionally, over a period of a semester.

### **Results and Discussion**

This paper explores the role of reflection journals in contributing towards achieving learning outcomes among first year students in the Introduction to Engineering course, which implements problem-based learning environment. Reflection journals are compulsory as a form of closure in every phase of problem solving framework. Students need to filter, construct, organize, gather, process, and feel the experiences that they have undergone in form of writing.

In this course, reflection journal has been used as an integral part of assessment to measure the students' ability to demonstrate an increasing awareness of their own learning towards a low carbon society concept. Students will directly develop their self-directed learning skills by relating new knowledge to prior knowledge and hence aiding in students' knowledge construction. Reflection journal also has been used as an instrument to measure students' analytical and critical thinking, which are very important elements in developing and enhancing problem solving skills. Reflection journal has the ability to track changes in cognitive strategies and meta-cognitive abilities of students, which are essential for life-long learning.

In this study, the reflection journal allowed the students to demonstrate their own learning ability toward a sustainability concept at a deeper and more complex level using a new learning method of the PBL. The students expressed different emotions i.e. resistant, fearful and nervousness to cope with a different way of learning. Among students' feedbacks on the new learning approach written in the reflection journals are as follows:

*I felt quite shocked because this is our first case study and yet we were given the actual case study and it is a competition (Student A).*

*At first, I do not know what low carbon society was, how to build low carbon society and what is Iskandar Malaysia. I think this case study is beyond my expectation and beyond my knowledge. It never come across my mind that first year students like us; have the ability and capability to do this entire thing (Student B).*

As mentioned earlier, in PBL approaches, students are engaged in deep learning and develop problem solving skill (Strobel and Pan 2011). This is because students are forced to think critically and creatively when exploring new ideas and integrating them with the existing knowledge.

Furthermore, reflection journal that have been written at the end of each learning phase showed that the students are able to construct a personal understanding of the knowledge and become more aware of their own learning. From the reflection journals that have been analyzed, it can be observed that students showed efforts on how they tried to rationalize their situations to cope with the new learning style and to make proper planning in solving the problems given. Among the feedbacks related to this issue are as follows:

*I have learnt that before conducting a research, we have to be clear about the objectives of the study. This is to prevent a lot of time wasted in doing unnecessary work (Student C).*

*The more we look for information, the more we felt like our jobs are far from completion. We have to come out with a set of questionnaire to be answered by a sample of population. Indeed, to analyze a questionnaire was really difficult as we also need to analyze it quantitatively (Student D).*

*The process of doing research is quite tough. Although there is a lot of information to be found on the net, it becomes complicated as there is too much information to process and analyze. Thus, one should emphasize on what he or she should do and find, and not just finding a lot of information without correctly filtering it. By doing this, time will be saved, without causing mental stress to student (Student E).*

The reflection journal also allows students to bridge the gap between the old and new knowledge, both content and own experience and to make it meaningful to themselves, especially in the problem solving framework. From this study, it was found that these first year students also showed a progression of increasing awareness and deepen their understanding on the information that they received. Students' entries in the journals become more affirmative, able to clarify their thoughts and able to see things differently. Students demonstrated the ability to gain insight and clarify their thoughts, which subsequently lead to a useful outcome. Among the related expressions by students related to this issue are:

*I felt impressed with Japan on how they reduce carbon emission and apply LCS in their daily life. I kept wondering if Malaysia can stand on the same par as Japan regarding this LCS issue. Therefore, we as the future engineer hope that we could come out with the innovative sustainable solutions to reduce the carbon emission not only in Malaysia itself but hopefully worldwide (Student F).*

*I myself actually reflect what I did for the past few years, which have not helping the country towards developing a sustainable region. There are lots of small matters which we tend to overlook that can deteriorate the environment (Student G).*

*I believe that the first phase of the case study has taught me a lot on what this LCS is and now I realize sustainable lifestyle is very challenging to attain if there is lack of awareness and actions taken by the community itself (Student H).*

In the PBL process, the student is presented with numerous opportunities to develop and practice meta-cognition. Meta-cognition, often describes as “thinking about thinking” in the problem solving framework. It is about consciously making connections between what is known and what is



new, as well as the process that they went through to develop their skills (Mohd-Yusof, Hassan et al. 2011). Meta-cognition skills also involve structuring and storing the knowledge for later retrieval, which are essential for life-long learning. As the students progressed through the semester, the reflection demonstrated increased complexity of the students' cognitive skills. Among the reflections made by students on this aspect are:

*I finally realized that this new method of learning is vital for future engineers as it helps on developing new skills and building our confidence to present in front of the others (Student I).*

*In the second stage, I realized that our team had improved in the aspects of team working. This can be seen from every discussion session we had as well as work contribution among members. Everyone was playing their role well and also cooperating well such as proposing a lot of ideas and sharing their experiences when doing the case study (Student J).*

*I agree that this project has built up my level of self-confidence. I bravely stand in front of many people and present what I have studied and also argued about the learning issue with my team members during discussion to achieve a conclusion (Student K).*

*I have realized the importance of time management. Everything is so fast-paced in this university life that you can hardly keep track of time and only an excellent management of time could answer our problems of fatigue and restless nights (Student L).*

*Even though we were facing some problem we still managed to overcome it by finding other alternatives. This is because of the team's strong understanding. Thus, this shows that our team's determination was high and we don't easily give up on tensed situations but we do realize that there is still room for improvement in our work (Student M).*

It is interesting to find out from this study that there were quite a lot of reflections made by the students on the social dimension of learning, especially on how social experience was created and give meaning. Students showed strong commitment to be an effective team member, developed leadership characteristics and learnt more about the behavioral aspects of effective team working. Students demonstrated valuable meaning of team spirit, as each member is accountable and have positive interdependency among them. Another aspect that surface out through the reflection journal is on communication skills. Communication with team members leads not only to educational growth but also to social and moral development. Among the reflections associated with this aspect are:

*The social linkage should have been broadened by making new friends, to get rid of the awkwardness of working with those whom we don't know. Therefore, try to make friends with everyone so that we would be able to pull our strength into fruition of our tasks (Student N).*

*Language barrier seem to be main problem I encountered because our team members come from various races. Therefore it is a little bit awkward to*

*communicate with each other. But this problem was solved as we always meet for a discussion and our communication has improved from time to time (Student O).*

*I think this competition is a platform for me and others to improve ourselves in communicating skills and critical thinking in creating the best solution to solve any problems given. Almost every day we have to make group discussion about the task and give idea and opinions and share with other team mates (Student P).*

From this study, it appears that by analyzing the reflection journals, students showed increased awareness and interest on their own learning process, as evident through their ability to adjust and cope with the demands of the problem-based learning system. Secondly, students also demonstrated an enhanced ability to integrate and process knowledge. This was evident through the increased complexity of their cognitive processes. The reflection journals also enabled students to articulate the importance of learning as a social process.

This paper explores the role of reflection journals in contributing towards achieving learning outcomes among first year students in the Introduction to Engineering course, which implements problem-based learning environment. Reflection journals are compulsory as a form of closure in every phase of problem solving framework. Students need to filter, construct, organize, gather, process, and feel the experiences that they have undergone in form of writing.

## **Conclusion**

Reflection journal as assessment tool is not something new, but is seldom used in an engineering course, particularly for the first year undergraduate students. It is clearly showed that the reflection journal poses great possibilities for students to articulate their thinking and hence engage students in their own learning. Reflection journal is valued as one of the main avenues for self-development and consolidation of knowledge based on the experiences shared by the students. Students reflected on the way they learnt and recorded their learning experiences in online reflection journals. Most of the entries in the reflection journals are insightful, thoughtful, and well written. Writing reflection journal needs to become a common practice habit and should be cultivated in other engineering classes as well.

## References

- Andrusyszyn, M. A. and L. Davie (1997). "Facilitating Reflection through Interactive Journal Writing in an Online Graduate Course : A Qualitative Study." Journal of Distance Education.
- Larkin-Hein, T. and P. K. Joyner (2001). Physics+writing=enhanced learning? Frontiers in Education Conference, 2001. 31st Annual.
- Mohd-Yusof, K., S. A. H. S. Hassan, et al. (2011). Cooperative Problem-Based Learning (CPBL): A practical PBL model for engineering courses. Global Engineering Education Conference (EDUCON), 2011 IEEE.
- Mohd-Yusof, K., S. A. Helmi, et al. (2011). "Cooperative problem-based learning (CPBL)." International Journal of Emerging Technologies in Learning 6(3): 12-20.
- Pennebaker, J. W. (1990). Opening Up: The Healing Power of Expressing Emotions. New York, Guilford Press.
- Rumpf, D. L. (1988). "Student Journals in Engineering Education: Do They Work?" Engineering Education 78(5): 313.
- Selfe, C. L. and F. Arbabi (1983). "Writing to Learn: Engineering Student Journals." Engineering Education(2): 86-90.
- Strobel, J. and R. Pan (2011). "Compound problem solving: Workplace lessons for engineering education." Journal of Professional Issues in Engineering Education and Practice 137(4): 215-222.
- Wheeler, E. and R. L. McDonald (1998). Using writing to enhance collaborative learning in engineering courses. Frontiers in Education Conference, 1998. FIE '98. 28th Annual.

# Application of Geographic Information Systems to Management of Municipal Solid Waste Depots in Lagos Island Local Government Area of Lagos State

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## **Abstract**

The nature of socio-economic transactions taking place in Lagos Island every day makes solid waste management challenges more acute. These transactions generate large volume of waste which has become an environmental challenge because of poor refuse management strategies which do not match the rate of refuse generation. This study examines the underlying factors militating against efficient control of solid waste collection in Lagos Island by applying geographic information systems and conventional qualitative and quantitative research techniques to proffer possible solutions. A set of structured questionnaire was administered on 240 households in the six wards in Lagos Island that had waste depots to collect information on the mode of storage, transportation to communal waste depots and methods of disposal of solid waste in the area. However, only 215 copies (89%) of the questionnaire were retrieved for analysis. Digital analyses such as nearest neighbour, buffering, overlay and distance measurement were carried out with the aid of ArcMap 9.3 to reveal the geographical locations of solid waste depots, the spatial pattern of distribution, and distances covered by residents and traders to dispose solid waste. The existing 13 designated refuse depots were found to be grossly inadequate to facilitate effective evacuation of solid waste in Wards A, B, and C, while D, E, and F and G did not have waste bins. In the three wards where waste bins were provided, the distances of more than 200m between respondents' residences and waste depots, as well as the complete absence of waste depots in others, encouraged patronage of illegal refuse collectors who disposed refuse indiscriminately. It is recommended that public awareness campaign be heightened and sustained and additional communal solid waste depots provided in Lagos Island to facilitate accessibility and reduce the distance usually covered by residents and traders to dispose refuse. This will promote prompt and healthy disposal of solid waste in Lagos Island and prevent possible incidence of enteric ailments.

## 1.0 Introduction

Waste generation as an activity is not problematic per se, but subsequent phenomenal collection, storage, and disposal, in the face of rapid and uncontrollable urbanisation, pose challenges in many cities in Nigeria. In spite of the obvious solid waste management revolution in Lagos State, municipal solid wastes of all descriptions are on daily basis, deposited indiscriminately in public places. It is amazing that public drains, undeveloped land, verges of major roads and streets; canals, lagoon, and air spaces of residential and commercial buildings are receptacles of municipal solid wastes in many parts of Lagos City, particularly in Lagos Island.

Municipal or urban solid waste is refuse that includes predominantly household wastes, with sometimes the addition of commercial waste, collected by a municipality within a given area. They are in solid or semisolid form and generally exclude industrial hazardous wastes. Municipal solid waste is a useless or an unwanted material discharge that resulted from human or animal activities. It comprises garbage or food wastes: rubbish, including glass, tin cans, paper, and fresh / garden wastes (which include larger items like tree limbs), and old appliances among others. Most commonly, it is solids, semi solids, or liquids in containers thrown out of houses, commercial or industrial premises (Morgan, 1979).

Waste, either solid or liquid, is an integral part of human activities (Ojolowo & Wahab 2011). Its generation, regardless of the quantity involved, does not automatically breed environmental nuisance. However, sanitary storage, regular and efficient evacuation and disposal of waste that is abreast of rate of generation may help eliminate any known form of environmental harm. Environmental nuisance ensues when evacuation and disposal of waste perpetually lag behind the rate of generation. Waste management is a coordinated and systemic control of waste through a sequence of actions to mitigate public health and environmental risks associated with insanitary waste management. Functional municipal waste management cannot be achieved without deciphering the socio-economic and environmental influence underpinning waste generation, storage, collection, and disposal.

Lagos Island, though one of the smallest in terms of land area, is one of the major and oldest commercial centers in Nigeria. The commercial and domestic activities generate wastes of all descriptions (both solid and liquid). Out of these, solid waste is posing an evergreen problem because of the quantity involved. The addition of solid waste generated from commercial activities to that of the households in Lagos Island is no doubt a serious environmental problem, particularly concerning effective storage and disposal. One major cause of this challenge in Lagos Island, is the rapid rate of per capital generation of waste, which is increasing geometrically, because of the rapid rate of urbanization and subsequent population growth.

The problem is aggravated by lack of adequate communal solid waste depots in Lagos Island. Communal Solid Waste Depot (CSWD) is the first point where all types of waste are deposited by residents and traders alike (after storage in either paper, plastic, rubber or nylon containers) prior to removal and subsequent transportation to landfill sites by agents of the Lagos State Waste Management Authority. In the absence of enough CSWD, waste of all descriptions are deposited indiscriminately anywhere thereby creating nuisances that are detrimental to public health.

The state of municipal solid waste management in Lagos Island is a serious concern. The problem is even worst with respect to non-solid wastes since no city in Nigeria has a sewage system worth its name (Lagos State Ministry of Economic Planning and Budget 2004). Wastes of all descriptions find their ways into public places such as open space, drainage channels, lagoon, and road verges. Many households and business outfits do not use waste bins or bags to store and dispose wastes at designated communal waste depots; rather they throw it in the drains, canals, roadside, or in any available open spaces. In addition, and on many occasions, residents contracted cart-pushers and waste porters to discard loose wastes. The cart-pushers and waste porters themselves also, either dump the unkempt waste in illegal dumpsites or in public drains, lagoon etc. Besides the health

hazards associated with waste, solid wastes clog both the drainage systems and hydraulic structures, thereby facilitating urban flooding which sometime can ignite outbreak of diseases.

In Lagos Island, over 307.15 tons of trash, garbage, scraps and other debris were estimated to be generated in 2008 by 122,862 households alone (LAWMA, 2010). The rate of municipal solid waste generation in Lagos Island is geometric. The inadequacy of waste collection sites and the skewed location of the available ones encourage indiscriminate deposition of waste of all types onto every available space, including the rooftops in the study area. The analog methodologies in use by Lagos State Waste Management Authority (LAWMA) in capturing waste generation, deposition, removal and disposal is far loosing efficacy. This paper argues that the employment of the digital techniques of Geographic Information Systems (GIS) to locate municipal solid waste depots is capable of revealing, at a glance, the adequacy or otherwise of refuse deposition sites. The provision of sufficient refuse depots is a healthy and sustainable strategy to avert indiscriminate deposition of waste in public places.

The main thrust of this paper is to apply GIS techniques to map communal solid waste depots in Lagos Island Local Government Area of Lagos State. It also examines the present waste management strategies in Lagos Island, and analyses the urban land use in the Local Government Area using remote sensing and GIS technology. The paper finally generates the pattern of location and the distance matrix of existing communal waste depots. It recommends the provision of adequate communal solid waste depots, and suggests possible reallocation of existing ones in the study area using GIS technology.

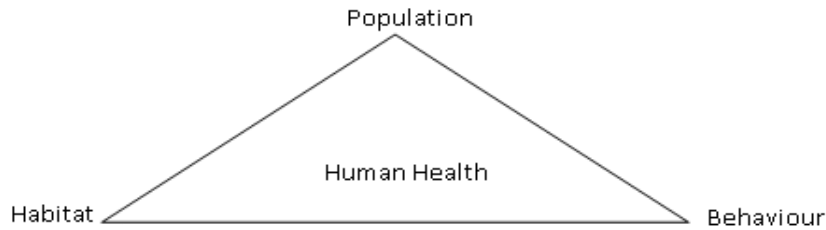
## **2. Conceptual Framework**

### **2.1 The Triangle of Human Ecology**

Melinda et al. (1998) developed the concept of triangle of human ecology. They theorized that the *human ecology* of disease is hinged on the ways human behaviour, in its cultural and socio-economic context, interacts with environmental conditions to produce or prevent diseases among susceptible people. The theory is based on a tripod that forms its triangle- habitat, population, and behaviour (see Fig. 1). This tripod determines the state of human health. The thrust of the concept is the interactions that exist among naturally occurring biotic and physical phenomena of the habitat, populations, and behaviour.

Habitat is a place or the environment within which people live, that which directly affects them (Melinda et al., 1998). Houses and workplaces, settlement patterns, naturally occurring biotic and physical phenomena, health care services, transportation systems, and government are parts of the habitat. The type of houses, the presence of domestic animals, and the kinds of pens and buildings within which they are confined are all of consequence to health. Population is concerned with humans as organisms, as the potential hosts of disease. The ability of a population to cope with health challenges depends on its genetic susceptibility or resistance, its nutritional status, its immunological status, and its immediate physiological status. Through their behaviour, people create habitat conditions, expose themselves to, or protect themselves from habitat conditions, and move elements of the habitat from place to place. The habitat presents opportunities and hazards to the population, which can modify its behaviour.

**Fig. 1: The Triangle of Human Ecology**



**Source:** Melinda et al. (1998)

## 2.2 The Concept of Geographic Information System (GIS)

Rhind, (1989:4) defines GIS as “a computer system for collecting, checking, integrating and analyzing information related to the earth surface”. Other definitions (Pickles, 1991; DeMers, 2000; and Chang 2008) give clearer insight into what GIS really is. Burrough, (1986) describes GIS as a powerful set of tools for collecting, storing, retrieving at will, transforming, and displaying spatial data from the real world. GIS is also a decision support system involving the integration of spatially referenced data in a problem-solving environment (Chang, 2008). The definition by DeMers, (2000) is adopted in this paper. He defines GIS as the “tools and procedures for gathering, collecting, storing, managing, analyzing and integrating spatially referenced data for decision making in a problem solving environment” (DeMers, 2000:3). This activity is also referred to as Spatial Decision Support System (SDSS). Geographic Information Systems can be viewed as a holistic integration of computer hardware, software, data, and people. Fabiyi (2001) identified a number of elements that are essential for an effective GIS. These include: (1) Institution, (2) People, (3) Organizational structure, (4) Software, (5) Computer hardware, (6) Graphically referenced data, and (7) Procedural techniques/analysis.

## 3.0 Literature Review

The perceived significant impacts of waste on the constituents of the environment, particularly human, have spurred a number of studies (Wahab & Sridhar, 2009; Wahab, 2004; Sridhar, 1999; UN-Habitat, 1999; Sridhar, et al. 1985; Egunjobi, 1986). There is increased solid waste generation resulting from the ever increasing urban population which exerts an overwhelming influence on the ability of municipal authorities to manage and this results in degraded environments and an increase in health risks (UN-HABITAT, 2010; Ajadike, 2001). NISER (1984) cited by Ajadike (2001), observed that most city residents dispose of their refuse either in open gutters, rivers, streets and open dumps, without regard to the environment and associated health hazards.

Of all the costs of urban environmental degradation, damage to human health is by far the highest (Wahab and Sridhar, 2009; Adelegan, 2004; Obire and Aguda, 2002; Health Stream, 1996). The report released by the World Health Organisation in May 1996, estimated that of the 51.9 million worldwide deaths in 1995, about 17.3 million (33%) were due to infectious diseases. In this group of diseases, about 22% (3.75 million deaths) were due to food, water, and soil borne agents (Health Stream, 1996). Joshi (2001) also asserted that improper waste disposal leads to human health problems, contamination of water supplies, environmental degradation, loss of livelihoods, and unsightly surroundings.

The literature suggests that countries around the world have successfully applied GIS to their urban waste management planning process. Remote sensing data can be an aid in the identification and location of garbage dumping sites and in monitoring the changes in land use within and near hazardous waste and sanitary landfills (Radhakrishnan and Adiga 1996; Amusan, 1998). As Rahman et al. (2009) inform us, an attempt has been made to assess some of the urban environmental issues which Delhi is currently facing with the help of geo-spatial tools, i.e. remote sensing (RS), geographic information system (GIS), and global positioning system (GPS). Rajeshwari (2006) and Verma et al. (2008) combined IKONOS Multi-Spectral and PAN images to analyze location of

infrastructures in Dehradun Municipality, India and determined land-use and land cover change for better management of urban environment.

Rahman and Rahman (2011) used ArcGIS 9.2 with its network analyst extension to recommend efficient waste management options through existing and proposed number of waste bins and containers in Dhaka City. In 2006, Anjonrin-Ohu used Geographic Information System to develop a methodological approach that could facilitate the selection of appropriate site for collecting city wastes in Oyo West, Oyo East, Atiba, and Afijio Local Government Areas of Oyo State, Nigeria. He found that there was significant correlation between the use of GIS and selecting appropriate site for management of municipal waste and suggested further research into the challenges likely to hinder the implementation of GIS-related programmes and policies of the concerned authorities.

Bhambulkar (2011), Kardimas (2007) and Andrukonyte (2008), employed ArcGis network analyst to optimize municipal solid waste collection routes in Nagpur City, India. Estimation and allocation of solid waste bin with the use of geographic information system were successfully carried out in Asansol municipality in West Bengal, India (Vijay, 2008). GIS is highly efficient in coordinating solid waste collection (Kyesski, 2009). The ability to effectively carry out solid waste collection rests solely on the available techniques (Indeglia, 2006).

#### 4.0 Study Area

Lagos Island is located approximately between Latitude  $6^{\circ} 24'$  and  $6^{\circ} 27'$ , and Longitude  $3^{\circ} 21'$  and  $3^{\circ} 25'$  within Lagos State (Fig. 2). It is bounded in the South by the Atlantic Ocean, in the North by Lagos Lagoon and the Lagos Mainland Local Government Area, in the East by Majidun Creeks and in the West by Apapa Local Government Area. It is one of the fifteen local governments created in November 1991. Its existence is dated back to 1660 when

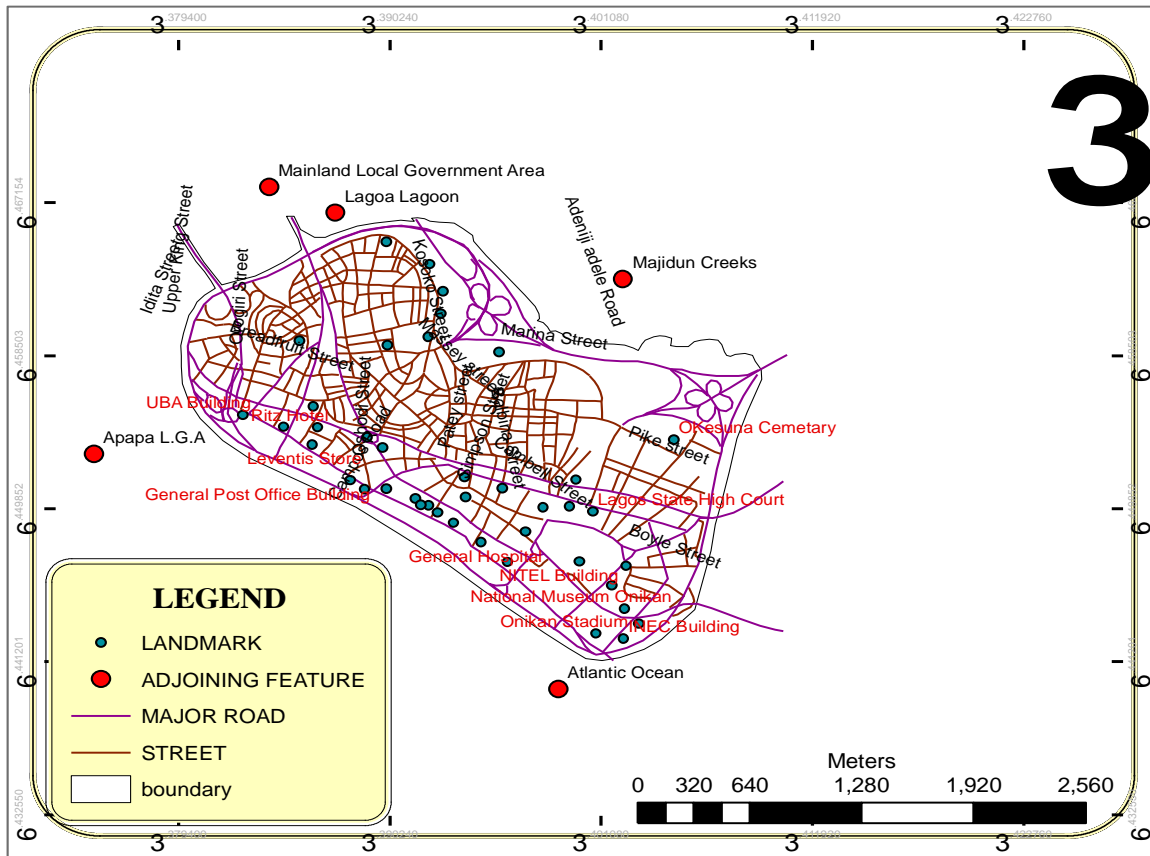
Yoruba farmers and migrants anglers from Isheri, a settlement about 16 kilometers north of Lagos Island, inhabited the settlement. It is the oldest and currently having the old colony of Lagos within its area. Its land area is  $8.7 \text{ km}^2$  with a population of 209,437 people, and density of 24,182 inhabitants per  $\text{km}^2$  (Wikipedia, 2012; Lagos State, 2004).

#### 5.0 Methodology

A combination of stratified, systematic, and random sampling techniques was adopted in this research to distribute questionnaires used for the collection of socio-economic data from inhabitants of Lagos Island. Lagos Island is re-classified into six (6) wards (A, B, C, D, E, and F&G.). The first three wards (A, B, and C) had communal waste bins located within their area of jurisdiction, while the last three (D, E, and F&G) did not have. About 48 streets (8.9% of 537) and 240 buildings were systematically sampled in the study area based on the number of streets per ward (Table 1). The two hundred and forty (240) questionnaires administered on household heads randomly selected from sampled buildings were analysed.



**Fig. 2: Lagos Island Local Government**



**Source:** Surveyor General's Office, Lagos State Secretariat, Alausa, Ikeja, 2010.

**Table 1: Sample Frame, Sample Size and Questionnaire Allocation**

WARD	NUMBER OF STREET PER WARD	NUMBER OF SELECTED STREET PER WARD	NUMBER OF SELECTED BUILDING PER STREET	NUMBER OF QUESTIONNAIRE RETRIEVED PER WARD
A	125	11	55	50
B	109	10	50	43
C	67	6	30	29
D	47	5	25	22
E	81	7	35	33
F&G	108	9	45	38
Total	537	48	240	215

Source: Author's fieldwork, 2010.

The secondary data used for this study include information about the locations, conditions and records of existing communal refuse depot sites. These were collected from Lagos Waste Management Authority (LAWMA) at Ijora. Also, topographical and land-use maps of Lagos Island were collected from the Surveyor General's Office, Lagos State Secretariat, Alausa, Ikeja, while the number of streets and buildings in each ward was collected from the Information Unit, Lagos Island Local Government Secretariat, 64, Freeman Street, Lagos. The 2010 image of Lagos Island Local government was obtained from Google Earth.

The map of Lagos Island collected from the Surveyor General's Office, Lagos State Secretariat, Alausa, Ikeja, and the image downloaded from Google Earth were geo-referenced and

digitized in ArcGis 9.3 environment. The area of interest was extracted from the Google imagery after which the digitized vector layer was overlaid on the Google imagery. Field verification was undertaken to cross-verify the Google interpretation. This facilitated aptly mapping of various land uses in the study area. Information about the locations of communal waste depots was obtained from LAWMA at Ijora. Geographic coordinates of the locations were generated with the aid of Global Positioning System (GPS) (Garmin 76) and subsequently geo-referenced. Buffering of 200m was made around the locations of the depots to reveal the distance among them. The major road networks, commercial areas, residential areas, and institutional land uses were marked.

## **6.0 Results and Discussions**

### **6.1 Existing Waste Management Strategies in Lagos Island**

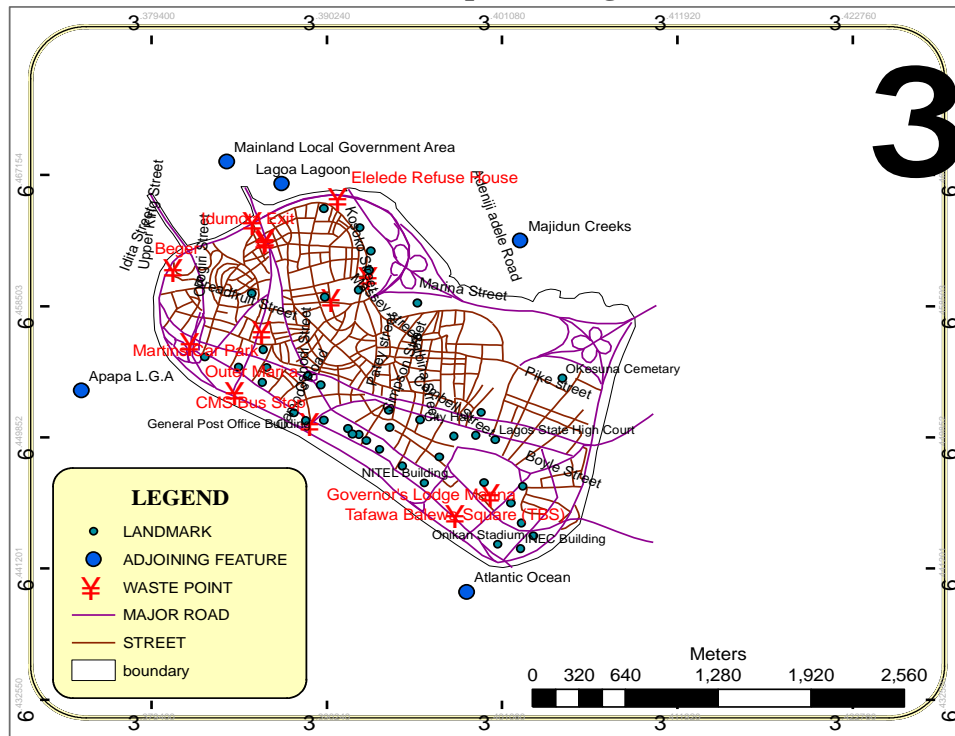
Thirteen communal solid waste depots were found in Wards A, B, and C in Lagos Island at the time of survey (see Fig. 4). The yardstick employed by the Lagos State Waste Management Authority in selecting sites for communal solid waste depots (CSWD) was the type of land use activities taking place in Lagos Island (see Fig. 5). The study found that CSWDs were located in areas where there were buying and selling of both consumable and non-consumable goods. For instance, two waste depots, with two bins that were less than 200m apart were sited under the Carter Bridge at Idumota. Another two depots with similar characteristics were located at Jankara Market and Idumagbo Avenue, while another depot at Adeniji Adele Road by Pelewura Market was more than 200m away. The refuse depots at Berger, Apongbon, and Martins Streets were more than 200m apart, and were servicing the traders, while the depots at Outer Marina and Odunlami Street very close to CMS Bus stop, were also more than 200m apart, but servicing banks and other tertiary activities. The refuse depot at Tafawa Balewa Square (TBS) was less than 200m away from the one in front of the Governor's lodge at Marina (see Fig 5) and they were both servicing government facilities in the area.

Discussions with officials of Lagos State Waste Management Authority (LAWMA) revealed that Mobile Waste Collection System (MWCS) was adopted for residential areas. Mobile Waste Collection System is a way by which itinerant refuse conveyances move from street-to-street collecting refuse from residents for onward disposal to Adeniji Adele Refuse Loading Station. About 206 (96%) of the respondents indicated that the itinerant refuse collectors had not been coming to their areas to collect refuse. Consequently, the use of cart pushers and solid waste porters for waste disposal became the last resort for the residents. Those respondents who indicated that they patronized cart pushers were 185 (86%), 20 (9%) signified the engagement of porters, while the remaining 10 (5%) traveled more than 200m to discard refuse at designated refuse

depots. All other means of waste disposal (cart pushers and refuse porters) indicated by the respondents apart from designated refuse depots had been out-lawed in Lagos State. Therefore, the cart pushers and solid waste porters can be described as illicit solid waste collectors, which is why they found it difficult to dispose waste at designated places. The consequences of this action are not farfetched; refuse of all descriptions were dumped indiscriminately in public drains, undeveloped land, in the lagoon and road verges.

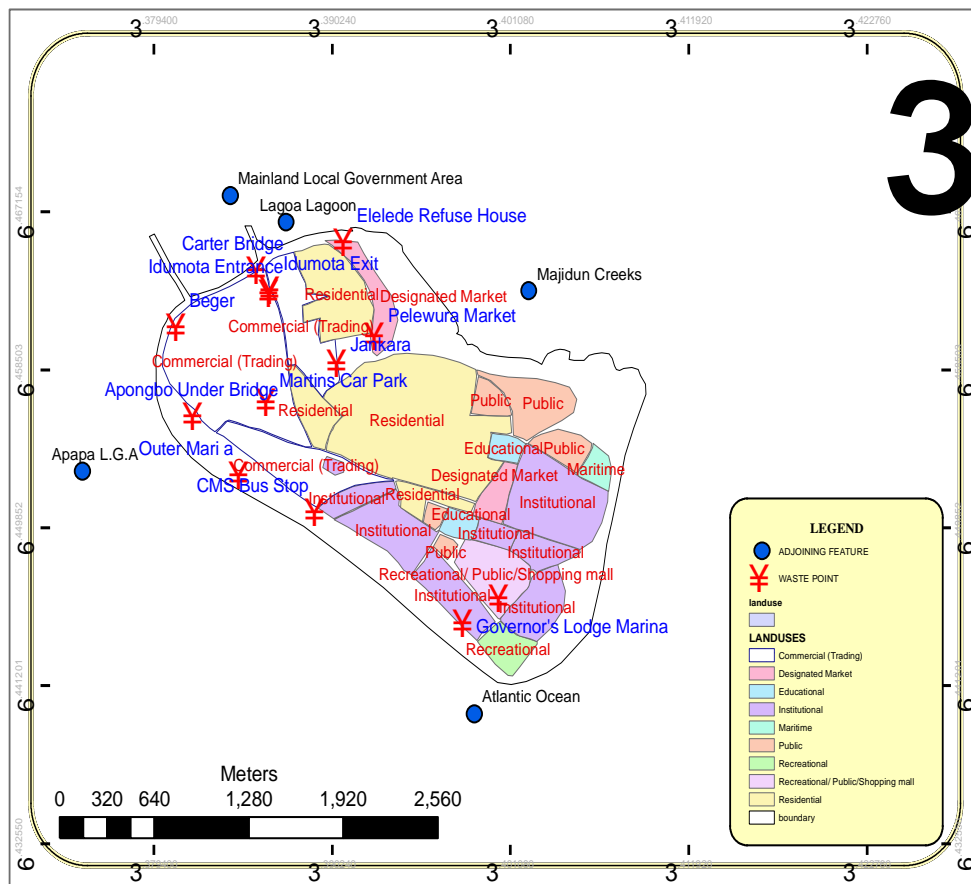
A buffer of 200m was created around the CSWDs as shown in fig.6 and overlaid on the major roads and streets layer to reveal how far the waste depots were from one another. The result showed that seven refuse depots were less than 200m away from one another (Idumota Entrance, under the Carter bridge, and Idumota Exit; Tafawa Balewa Square and Governor's Lodge Marina; Jankara and Pelewura); while the remaining six were more than 200m away from one another. These were those around Odunlami/CMS bus stop, Outer Marina, Apongbon under bridge, Berger, and Adeniji Adele Road by Pelewura Market (see Fig. 6).

**Fig.3: Locations of Communal Waste Depots in Lagos Island Local Government Area**



Source: Author's Fieldwork, 2010.

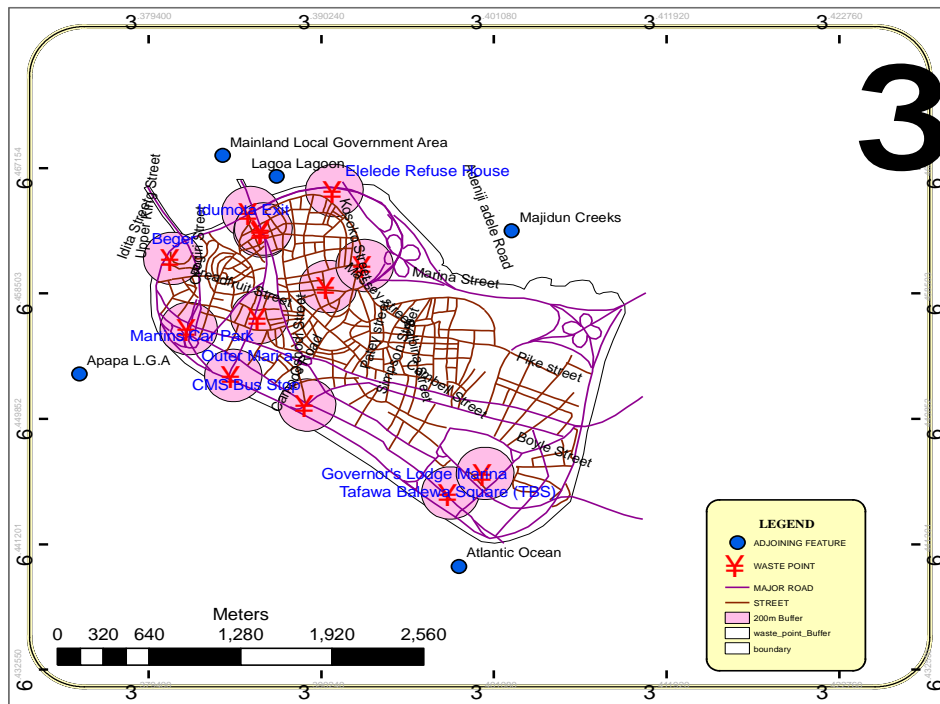
**Fig.4: Land use and Locations of Communal Solid Waste Depots in Lagos Island Local Government Area**



Source: Author's Fieldwork, 2010.

The implications of the varying distances are that each time people intended to dispose refuse, they would cover less than 200m to dispose waste in places where waste depots were less than 200m. However, in areas where refuse depots were more than 200m, residents had to trek more than 200m to discard refuse. This could make some people to want to dispose their waste anywhere nearby rather than cover the perceived “long distance” of over 200m to designated waste depot. The consequence is unhealthy and unsightly living and working environment.

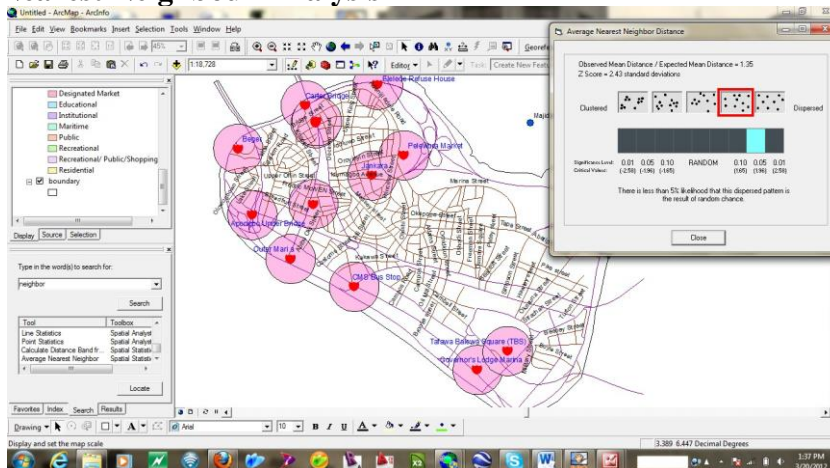
**Fig.5: 200m Buffering around Communal Solid Waste Depots in Lagos Island Local Government Area.**



Source: Author’s Fieldwork, 2010.

The result of the nearest neighbour analysis carried out in ArcGIS 9.3 environment depicted the value of **R** as 1.35 (Fig.7), that is, the spatial distribution of communal solid waste depots in Lagos Island is tending towards dispersal, which shows that CSWDs were not evenly distributed in Lagos Island. In addition, the distance matrix analysis executed in ArcGIS environment showed clearly the distance of the CSWD from one another (see Table 2).

**Fig.6: Nearest Neighbour Analysis**



Source: Authors’ Analysis, 2010.

**Table 2: Distance Matrix Analysis.**

ID	1	2	3	4	9	12	10	13	7	8	11	6	5
1	0	285.0412	1199.993	1753.287	1789.095	1835.398	1884.158	2207.034	2386.894	2395.668	2444.197	2549.524	2631.816
2	285.0412	0	1341.866	1901.259	1794.216	1793.133	1967.018	2335.457	2410.287	2417.239	2398.049	2570.766	2721.044
3	1199.993	1341.866	0	559.4406	914.8843	1137.333	745.5774	1007.177	1362.463	1375.811	1647.108	1519.349	1457.465
4	1753.287	1901.259	559.4406	0	944.5013	1239.44	479.3706	472.6067	1119.285	1135.911	1575.673	1248.375	987.532
5	2631.816	2721.044	1457.465	987.532	1102.49	1336.805	754.0694	547.0329	658.7604	671.1208	1239.314	647.125	0
6	2549.524	2570.766	1519.349	1248.375	779.6787	888.6091	801.647	984.4241	162.9043	153.9707	605.4081	0	647.125
7	2386.894	2410.287	1362.463	1119.285	622.7485	757.7345	658.0208	902.4863	0	17.30417	588.8239	162.9043	658.7604
8	2395.668	2417.239	1375.811	1135.911	627.8143	756.0184	673.7516	919.6291	17.30417	0	574.1758	153.9707	671.1208
9	1789.095	1794.216	914.8843	944.5013	0	301.2145	530.0968	1019.27	622.7485	627.8143	734.2578	779.6787	1102.49
10	1884.158	1967.018	745.5774	479.3706	530.0968	830.2009	0	499.5625	658.0208	673.7516	1098.057	801.647	754.0694
11	2444.197	2398.049	1647.108	1575.673	734.2578	608.9181	1098.057	1460.668	588.8239	574.1758	0	605.4081	1239.314
12	1835.398	1793.133	1137.333	1239.44	301.2145	0	830.2009	1313.492	757.7345	756.0184	608.9181	888.6091	1336.805
13	2207.034	2335.457	1007.177	472.6067	1019.27	1313.492	499.5625	0	902.4863	919.6291	1460.668	984.4241	547.0329

Source: Authors' Analysis, 2010.

**Note:** **CSWD 1**= Governor's Lodge at Marina. **2**= Tafawabalewa Square. **3**= CMS Bus stop. **4**= Outer Marina. **5**= Berger. **6**= Under Carter Bridge at Idumota. **7**= Idumota Entrance. **8**= Idumota exit. **9**= Jankara Market. **10**= Martins Car park. **11**= Elelede Refuse House. **12**= Pelewura Market. **13**= Apongbon under bridge.

## 6.2 Discussions

Sequel to the spatial analysis carried out on the locations of communal solid wastes depots in Lagos Island Local Government Area, the depots are considered inadequate (Fig. 4) to service the entire Island. Majority (85%) of the refuse depots were concentrated haphazardly in areas where higher proportions of commercial activities were taking place (Fig. 4.5). The result of the buffering also revealed that traders and residents alike had to trek for more than 200m to discard solid waste. On interrogation during fieldwork, the traders affirmed that due to unavailability of time and the long distance to waste depots, they patronised cart pushers and solid waste porters who, unknown to them, disposed of refuse indiscriminately and illegally in nearby public spaces and facilities. They engaged themselves in illegal waste collection and could not access or approach legally designated places to discard waste; because the State Government had barred them from collecting refuse in Lagos State.

Communal solid waste depots were conspicuously absent in Wards D, E, and F&G (fig.5). These Wards were not devoid of serious commercial activities, as each building in the Wards had at least six shops on the average. This implies that two types of solid wastes (domestic and commercial) were generated on daily bases there, yet there was no single waste depot. The result is that, rather than have LAWMA or the Private Refuse Contractors (PRCs) collecting waste in the area, the activity was being undertaken by the itinerant refuse collectors whose visitations were not regular. Therefore, the residents were susceptible to disposing refuse indiscriminately in public drains, road verges, uncompleted buildings, open spaces and within building air spaces. One of the major consequences of this attitude is flooding in Lagos arising from the blockage of drainage channels and hydraulic structures by the solid waste that people dumped indiscriminately on daily basis.

## **7. Summary, Conclusion, and Recommendations**

### **7.1. Summary**

Majority (95%) of the respondents in Lagos Island Local government area were fond of contracting refuse disposal to cart pushers and waste porters. This is contrary to the statutory waste disposal strategies adopted by Lagos State Waste Management Authority, which barred cart pushers and waste porters from disposing refuse at designated waste depots. Hiding under the self-employment and economic survival strategies, the cart pushers and waste porters found easy patronage from many residents who had no time but willing to pay little for waste collection services and, therefore, continued to collect waste and discard in any available places.

From the spatial analyses carried out, it is obvious that the thirteen communal solid waste depots provided by Lagos State Waste Management Authority are grossly inadequate to service the entire Lagos Island (Fig.4). The outcome of the nearest neighbour analysis showed that the CSWDs are dispersed ( $R=1.35$ ), which is against the principle of even distribution in space; more so, there is hardly any part of the Island where both commercial and residential chores are not being carried out on daily basis. Besides the inadequateness of the CSWDs, the thirteen depots provided are not evenly distributed over space, because six out of the twelve refuse depots are more than two hundred meters apart (Fig.5). Unarguably, this is one of the major causes of indiscriminate and unhealthy dumping of waste particularly in residential and market places where solid waste depots were not provided.

### **7.2 Conclusion**

The yardsticks employed by Lagos State Waste Management Authority in selecting locations for communal solid waste depots in Lagos Island are not scientific. Adequate communal solid waste depots are supposed to be located in all parts of Lagos Island to accommodate the volume of waste generated by mixed land use activities going on therein. There is no exclusive landuse pattern that can be assigned to a particular part of the Island because trading and residential activities are taking place concurrently and in a mixed form everywhere. Both landuses are known to rapidly generate solid waste of all descriptions that causes environmental pollution.

The indiscriminate manner in which solid wastes are dumped in Lagos Island appears to pose a high risk to public health and the environment in general. There is urgent need for the Lagos State Waste Management Authority to respond by adopting acceptable scientific methodology in siting communal solid waste depots at appropriate places in Lagos City, and Lagos Island in particular to avert indiscriminate solid waste deposition and its attendant environmental health consequences.

### **7.3 Recommendations**

Considering the landuse pattern of Lagos Island local government area, it is imperative to provide solid waste depots that are not more than two hundred meters apart. Two giant waste bins should be provided in each market place, and single bins for residential areas. Public awareness campaign on the negative consequences of insanitary disposal of solid waste needs to be heightened and sustained to correct the poor attitude of residents of Lagos Island towards organised waste dumping. Government should empower and adequately equip Environmental Health Officers to facilitate proper monitoring of the environment in order to curb indiscriminate dumping of wastes. It is strongly recommended that LAWMA should integrate Remote Sensing and GIS into waste management strategies to allow for even allocation, efficient location, and adequate and regular monitoring of performance of waste management facilities and particularly the stakeholders.



## References

- Adelegan, J. A. (2004): "The history of environmental police and pollution of water source in Nigeria (1960-2004): The way forward". [www.fu-berlin.de/ffu/akumwelt/bc2004/download/adelegan-f.pdf](http://www.fu-berlin.de/ffu/akumwelt/bc2004/download/adelegan-f.pdf). Retrieved 18<sup>th</sup> April, 2005 at 15:18Hrs.
- Ajadike, J. C. (2001): "Urban solid waste problems and management in Nigeria". In G. E. K. Ofomata and P. O. Phil-eze, (Eds.) *Geographical Perspectives on Environmental Problems and Management in Nigeria*. Enugu: Samoe Enterprise Nig., pp. 163-181.
- Amusan, C. (1998): *Use of remote sensing and GIS techniques in the selection of solid waste disposal sites in Mafraq City-Jordan*. New York: Brooks.
- Andrukonayte, K. (2008): "Route optimization application in waste collection system" Vilniaus Gedimino Techniko Universities, pp. 326-334.
- Anjonrin-Ohu, A. (2006): "GIS as a decision-making support system in site selection for city garbage collection points: A Case Study of Oyo West, Oyo East, Atiba and Afijio Local Government Areas" Unpublished M.Sc (URP) dissertation, University of Ibadan.
- Bhambulkar, A. V. (2011): "Municipal solid waste collection routes optimized with ArcGIS network analyst." (IJAEST) *International Journal of Advanced Engineering Sciences and Technologies*, Vol. 1. No. 11, 202 – 207.
- Burrough, P.A. (1986): *Principles of Geographic Information System for Land Resources Management*. Oxford: Clarendon Press.
- Chang, K. (2008): *Introduction to Geographic Information System*, 4<sup>th</sup> Edition. New York: McGraw-Hill.
- Demers, M. N. (2000): *Fundamentals of Geographic Information Systems*. New Jersey: John Wiley and Sons.
- Egunjobi, Layi (1986): "Problems of solid waste management in Nigerian urban centres". In E. O. Adeniyi, & I. B. Bello Imam, (Eds.), *Development and the Environment*, Proceedings of the 12th National Conference , NISER, Ibadan, pp. 308—318.
- Fabiya, O.O. (2001): *Geographic Information Systems: Techniques and Methods*. Ibadan: Research Support Services.
- Health Stream (1996): "Is water borne disease a myth"? [www.waterquality.crc.org.au/hs/hs4web.htm](http://www.waterquality.crc.org.au/hs/hs4web.htm) Retrieved on 28<sup>th</sup> July, 2006 at 17:08Hrs.
- Indeglia, P. (2006): *Optimized solid waste collection system for Kratovo, Macedonia*. Florida: Department of Environmental and Engineering Sciences, University of Florida.
- Joshi, V. (2001): "Coastal conflicts in urban and industrial areas." Retrieved from [www.unesco.org/esi/pub/papers2/Maps5.htm-27k](http://www.unesco.org/esi/pub/papers2/Maps5.htm-27k) on 14<sup>th</sup> March, 2007 at 15:42Hrs.
- Kardimas, N. (2007): "Municipal solid collection of large items optimized with ArcGis network analyst" Proceedings of 21<sup>st</sup> European Conference on Modelling and Simulation.
- Kyesski, A. and Mwakalinga, V. (2009): "GIS application in coordinating solid waste collection: the case of Sinza Neighbourhood in Kinondoni Municipality, Dar es Salaam City, Tanzania." FIG Working Week 2009 Proceedings, *Surveyors Key Role in Accelerated Development*. Eilat, Israel, 3-8 May, pp. 1-19  
[http://www.fig.net/pub/fig2009/papers/ts04b/ts04b\\_kyessi\\_mwakalinga\\_3219.pdf](http://www.fig.net/pub/fig2009/papers/ts04b/ts04b_kyessi_mwakalinga_3219.pdf)

- Lagos State Ministry of Economic Planning and Budget (2004): *State of Lagos Megacity and other Nigeria cities*. Lagos: Ministry of Economic Planning, and Budget.
- Lagos State Waste Management Authority (LAWMA) (2010): *Solid waste generation in Lagos State*. Lagos: LAWMA.
- Melinda, G., Baouyi, K. L., & Chang, K. (1998): *Tropical Diseases*. New York: McGraw- Hill.
- Morgan, R.W. (1979): "Migration into Lagos State Nigeria". In R. K. Udo, (Ed.), *Population Education Sources Book for sub-Sahara Africa*. London: Heinemann.
- Obire, O., & Aguda, M. (2002): "Bacterial community of leachate from a waste-dump and an adjacent stream". *Journal of Applied Sciences and Environmental Management*. Vol. 6, No. 2, pp. 71-75.
- Ojolowo, S. K., & Wahab, B. (2011): "The impact of excreta disposal into Lagos lagoon on the lagoon ecosystem at Iddo discharge point in Apapa Local Government Area of Lagos State, Nigeria. *Journal of "Sustainable Development and Environmental Protection"* Volume 1 Number 1 June.
- Pickles, J. (1991): "Geography, GIS, and the surveillant society". In J. W. Frazier, B. J. Epstein, F. A. Schoolmaster & H. Moon, (Eds.), *Paper and Proceedings of the Applied Geography Conference 14*: 80-91
- Radhakrishnan, K., and Adiga S. (1996): "Enhanced GIS application using IRS-1C Data-potential for urban utility mapping and modeling", *Current Science*, 70 (7 and 10), pp. 154-173.
- Rahman, A., Netzband, M., Singh, A., & Mallick, J. (2009): "An assessment of urban environmental issues using remote sensing and GIS techniques: an integrated approach a case study: Delhi, India" In A. de Sherbiniin, A. Rahman, A. Barbieri, J.C. Fotso, and Y. Zhu (Eds.) *Urban Population-Environment Dynamics in the Developing World: Case Studies and Lessons Learned*. Paris: Committee for International Cooperation in National Research in Demography (CICRED) (316 pages).
- <http://www.populationenvironmentresearch.org/workshops.jsp#W200> Retrieved on 28<sup>th</sup> March, 2012 at 11:18 Hrs.
- Rahman, S. and Rahman, S. H. (2011): "Application of GIS techniques in urban solid waste management in a part of Dhaka City: Mohammadpur Thana". *Journal of Sustainable Development and Environmental Protection* Vol. 1 No. 2 pp. 234-252.
- Rajeshwari, K. (2006): "Management of the urban environment using remote sensing and geographical information systems". *Ecol.*, 20(4): 269-277.
- Rhind, D. (1989): "Why GIS?" *ARC News*, Vol. 11. No. 3 (Summer), Redlands: Environmental Systems Research Institute, Inc.
- Sridhar, M. K. C., Bammeke, A. O., & Omisakin, M. A. (1985): "A study on the characteristics of refuse in Ibadan, Nigeria". *Waste Management and Research*, 3(3): 191-201.
- Sridhar, M. K. C. (1999): "You, your health, and the environment". In J. O. Abiodun, M. A. Filani, M. K. C. Sridhar & A. O. Olomola (Eds.), *Nigeria's Endangered Environment: Agenda for a Millennium*. Obafemi Awolowo Foundation, Lagos: African Press Limited pp. 185-203.
- UN-HABITAT, (1999): *Solid waste management and sewage related issues. Working paper, Chap 21, Agenda 21*. Washington, DC: Earthscan.



- UN-HABITAT, (2010): *Solid waste management in the world's cities: water and sanitation in the world's cities*. London: Earthscan.
- Verma, R. K., Kumari, S. and Tiwary, R. K. (2008): "Application of remote sensing and GIS technique for efficient urban planning in India". Retrieved on 15<sup>th</sup> February, at 01:15Hrs from <http://urban-research.blogspot.com/2011/01/application-of-remote-sensing-and-gis.html>
- Vijay, R. (2008): "Estimation and allocation of solid waste to bin through geographic information systems". *Journal of Environmental Engineering and Science*, Volume 7, Number 1, January, pp. 39-43
- Wahab, W. B. & Sridhar, M. K. C. (2009): 'Typologies and Classification of Healthcare Wastes'. In M. K. C. Sridhar, W. B. Wahab, S. B. Agbola, & A. Badiane, (Eds.), *Healthcare Waste Management -A Handbook for Developing Countries*. pp. 30-35. Ibadan: Ibadan University Press.
- Wahab, W. B. & Sridhar, M. K. C. (2009): 'Handling of Biomedical Wastes'. In M. K. C., Sridhar, W. B. Wahab, S. B. Agbola, A. Badiane, (Eds.) , *Healthcare Waste Management -A Handbook for Developing Countries*. pp. 59-70. Ibadan: Ibadan University Press.
- Wahab, B. (2004): "African traditional religions, environmental health, and sanitation in rural communities". *The Environscope. A Multidisciplinary Journal*. Vol. 1, No. 1 pp. 1-9.
- Wikipedia, (2012): "Lagos" Retrieved from <http://en.wikipedia.org/wiki/Lagos> on 19th March, 2012 at 22:15 Hrs.

# Appreciation and Enjoyment: Zhang Dai and Tourism in Late Ming China

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## Abstract

As one of the most talented and inspired gentlemen in late Ming China, Zhang Dai (1597-1679) left an extensive records of the urban life, especially the development of tourism in his book *Tao'an Mengyi* (Dream Reminiscences of Tao'an). Investigating these records on sightseeing activities, tourism business, and the interaction among tourists, this article regards *Tao'an Mengyi* not only as historical sources, but also as Zhang Dai's observation, narrative and evaluation of his world. In late Ming China, as an increasing number of urban residents could afford sightseeing, the traveling experience was enriched with entertainment and enjoyment. Driven by both the desire for traveling and the pursuit of pleasure during travel, the money-based service industry expanded along the travel routes and reached out of the cities. Zhang Dai's narratives and descriptions of various sightseeing activities sometimes presented a paradoxical attitude. Based on his acceptance and even celebration of the development of late Ming tourism, Zhang Dai expressed his compliments as an observer of popular tourism. But when he also participated in the same sightseeing activities as other ordinary travelers, Zhang Dai criticized others who only sought secular pleasure during sightseeing, while emphasizing that the truth of sightseeing was enjoying natural beauty. This article argues that Zhang Dai's complicated attitude toward the tourism and pleasure seeking could be explained by his mix of tastes: an aesthetic taste and a taste for sensual pleasure.

**Keywords:** tourism, urban life, Zhang Dai, *Tao'an Mengyi*, late Ming, taste

### Introduction:

Zhang Dai is from the place of Shu, with Tao'an as sobriquet. In my youth, I was a fop in white silk pants. I had a great love for ostentation, being fond of luxury accommodations, pretty maids, beautiful boys, fresh clothes, fine foods, fast horses, painted lanterns, firework, opera, music, antiques, and flower and bird paintings. At the same time, I was excessive about tea and ruthless over orange, was a bookworm and a poetry demon. I toiled at those pursuits for half a lifetime. All turn into a dream illusion... (Kafalas, 1995)

This is the first paragraph of the self-written tomb inscription by Zhang Dai張岱 (1597-1679), who lived in the late Ming through the early Qing. This brief biography tells us that in his youth Zhang led a life of pleasure and luxury during the late Ming. It is hard to image that he could enjoy such a life without the wealth inherited from his family, who were originally mercantilists and later became gentry through the civil service examination at the beginning of 16<sup>th</sup> century, about four generations before Zhang Dai. During the time of Zhang Dai's father, his family acquired great wealth and cultural prestige, based on their property, collections, and political status. In order to maintain the power of such a family, it was always necessary for the sons to pursue official position through the civil service examinations, but Zhang's father failed in the exam, as later did Zhang Dai. Not needing to spend time to serve in the government, and with the economic support and cultural influence of his family, Zhang Dai was able to lead a life filled with leisure and pleasure.

Although he failed in the examinations, Zhang Dai still possessed great cultural prestige in contemporary literati circles for his literary ability. In his elegant and vivid prose, Zhang Dai recorded his pleasures and taste, including clothes and foods, artistic products and antiques, drama and music, flowers and birds, festivals and market gatherings, pleasure quarter and tea house, traveling and parties, and so on. These writings pictured him as an expert, a leader, and a patron in the artistic market and world of pleasure. Among these writings, *Tao'an mengyi* (hereafter *TAMY*) was among the best. *TAMY* contains 123 short pieces, each of 200 to 300 characters, describing various leisure activities and aesthetic objects during the late Ming, especially the new developments of tourism.

This article chooses the aspect of tourism, which acquired rapid development during the late Ming and represented the most dramatic and dynamic development of urban life. The late Ming, with its highly developed culture and economy, has attracted wide attention in historical studies (Clunas, 1991; Chang, 1992; Brook, 1998; Su, 2004). As scholars have depicted it, the late Ming appeared to be a free and culturally vibrant period, permeated with "joyfulness and stylishness in an ebullient mode." (Spence, 2007, p. 3) With the development of the hierarchical market, the separation between urban and rural areas became sharper; meanwhile, with the development of travel within a certain area, the connection among different cities within the same region was enhanced. Another phenomenon produced by the prosperous market was that consumption became more common and important in people's lives, which means that the practice of "consuming" spread throughout society and people felt greater ease in conducting commercial activities. According to the standards that are brought up in studies of 18<sup>th</sup> century British history, these phenomena contributed to the formation of the consumer society (McKendrick, Brewer & Plumb, 1982). In such a society, as a consumer, one would find that money was needed everywhere and commodities that were not available before could be purchased easily. As a merchant, all one needed to do was to make a profit by satisfying one's customers. To construct a more complicated commercial web, one could combine two or more identities as consumer, commodity producer, and service provider. With more commodities floating around the market, and with money assuming much greater importance in people's lives, it is fair to say that late Ming society was a world in which various services and enjoyments were available for purchase. Meanwhile, as people had more and more leisure time and available cash, the pursuit of pleasure became an acknowledged value.

Some scholars argue that the burgeoning pursuit of indulging in pleasure was related to late Ming philosophical trends, especially Wang Yangming's concept of "individualism," as Bai

Qianshen argues (Bai, 2003, p. 7). In addition to Wang Yangming (1472-1528), Li Zhi (1527-1602) was another very influential figure who emphasized sensual pleasure and individual liberation. He once said that “it is precious for the gentleman to serve himself, and the important thing is to make himself comfortable” (Li, 1975, p. 258). It was because of this individualism and secularism that late Ming people, especially the elites, to a certain extent broke the constraint of moral rules and old Confucian regulations, which had confused a previous generation of elites in the early Ming (Brook, 1998), and devoted themselves to this aesthetic, material, and joyful world, as Zhang Dai did.

The records left by Zhang Dai provide first-hand information of how he understood late Ming society. Guided by Zhang Dai and through his perceptions, we are able to get much closer to late Ming cities than had previously been considered possible. Given Zhang’s wide communication, rich experiences, colorful interests, great literary talent and refined taste, we could hardly imagine a better guide than Zhang Dai when we want to step into that world. Through his perspective, we could make an effort to piece the information of various single facets within, behind and even beyond his language together into a more comprehensive picture of the urban life he once lived and observed. Moreover, this article not only regards *TAMY* as an important body of historical sources for late Ming urban life, but also reads the text as a literatus’ observation, narrative, and evaluation of his surrounding everyday lives.

This article mainly focuses on the development of pleasure-oriented travel in the late Ming. What were the new developments in tourism and the tourist market at that time? How were people’s attitudes toward the various kinds of “pleasure” that filled urban life in an unprecedented scope and depth? How did the tourist markets shape the way people enjoyed landscape and sensual pleasure? How did fashion come into being? How did elite culture and popular culture confront and converge with each other in daily lives? By tackling these questions, this article emphasizes the cultural theme of pursuing pleasure in late Ming urban life. More importantly, late Ming China will be presented as an interactive society, where people from different social statuses and cultural backgrounds participated in a multi-faceted and multi-functioning market and interacted with each other directly or indirectly through various commercial and informational channels. Furthermore, the question of whether or not the social hierarchies in such an interactive world were blurred will be discussed.

This article argues that Zhang Dai’s complicated and even seemingly paradoxical attitudes toward the market economy can be explained by his mixture of aesthetic taste and a taste for sensual pleasure. This could also explain the complicated urban developments during the late Ming, when various city dwellers alternated between cultural enjoyment and material pleasure, between a taste for refinements and secular happiness, as well as between the literati tradition and popular developments.

### **Development of Tourism:**

Although he was born and spent most of his life in Shaoxing, Zhang Dai frequently traveled around and outside the Jiangnan region. During the late Ming, travel was not only a fashionable activity among literati or elite, but also spread to commoners, as can be seen from Zhang Dai’s records of popular sightseeing activities in many different cities and places of interest. Some of the most popular sightseeing periods, such as the Qingming festival in Yangzhou and mid-autumn day on Tiger Hill, were emphasized in his records. Taking his description of Yangzhou sightseeing as an example, we can observe a very joyful and prosperous picture of sightseeing and the enjoyment he took in such scenery:

...On this day (Qing Ming Festival), traveling people from all over the country, merchants from the Hui region, foreign businessmen, famous prostitutes, people who cultivate a love of particular objects (some scholars refer to these people as connoisseurs) all gather here. Riding horses and setting off the eagles besides the long water pool and lush grass; cockfighting and playing soccer on high mounds and flat ridges; playing *ruan* and zither among the luxuriant forests and clear woods. Loafers wrestle with each other, children fly paper kites, old monks talk about karma, blind people tell stories. People are standing together like a forest, and people are crouching together. When the

sun goes down and red clouds appear, lots of carts and horses come and go. Ladies from the official families open the curtains of their carts, servants and concubines get tired and go back, with wild flowers in their hair; they cluster and crowd into the gate. ... This scene appears like fish following each other and wild geese flying in rows, unfolding along thirty miles, just like a hand scroll... (Zhang, 2009, p. 87).

In this passage, Zhang Dai devoted his literary talent to fully depicting the prosperous scene of sightseeing and the various amusements that tourists enjoyed. City dwellers, despite being of differing social statuses, ages, and classes, participated in and fitted into the sightseeing customs appropriately and actively. Zhang Dai's attitude, reflected in his own words, was finally very positive, especially when he compared this scene to a hand scroll painting by literati.

It was not only the interesting and prosperous scenes of commoners' sightseeing, but also the development of travel-based services that attracted Zhang Dai's attention. In *TAMY*, he recorded hotel and related services at the foot of Mt. Tai. He starts with the complimentary, "as for the inn in the Tai'an County, we cannot view it as just an 'inn'" (Zhang, 2009, p. 73). The inn, or perhaps it should be translated as "hotel," was surrounded with twenty to thirty horse lodges, over twenty lodges for the players and many houses for prostitutes, and would thus resemble a modern tourism-oriented town in today's places of interest. Services provided in the hotel could be divided into three levels: luxury, standard, and economy, differing in the standards of meals and rooms. Each service can be seen as a package, as it included accommodation, meals, snacks on the way to and at the mountain top and on return to the hotel, and colorful shows and amusements at night. Though located outside of the city and at the foot of the mountain, these hotels made it possible for the guest to enjoy whatever he could find within the cities. These hotels functioned as connecting sites for traveling and urban life. In this sense, traveling was no longer an activity that moved away from urban life and closer to nature, as previous literati had stated, but was rather a new way to enjoy urban amusement. The goal of traveling was no longer limited to finding beauty in nature or seeking peacefulness, but related closely to pleasure, such as relaxing with prostitutes, watching drama, drinking and eating. Zhang Dai was especially impressed by the professional service system, as there were separate kitchens for cooking meat and cooking vegetarian dishes, and each servant had his specified task. As with his treatment of the scenery in Yangzhou, Zhang Dai was highly complimentary of the operation of the hotels in Shandong.

### **Criteria of the tourists:**

Reading these two passages and their descriptions of the prosperous and joyful scene of traveling, as well as the professional development of the travel industry, one may ask: where was Zhang Dai in the picture he depicted? How did he place himself within this traveling world? To answer this question, another paragraph from *TAMY* is helpful and thought-provoking. In his narrative of sightseeing around West Lake on the fifteenth day of the seventh lunar month, he divided the travelers into five categories, including wealthy families, officials, famous monks, commoners, and literati, describing each in detail. His attitudes towards the first four groups of people were critical. He depicted the noisy boats owned by the wealthy families, and commented that these families "are ostensibly looking at the moon but are actually unable to see the moon at all" (Zhang, 2009, p. 111). As for the commoners, Zhang Dai criticized that they "wear neither gowns nor head cloths, but drink until drunk and eat until full," "they watch the moon, look at the people who are watching the moon, and those who are not looking at the moon, but really don't look at anyone" (Zhang, 2009, p. 111). Zhang only comprised literati's behaviors, as they were relatively very quiet and "some hiding in the shadows under the trees, some fleeing the noise at the inner lake..." (Zhang, 2009, p. 111). Zhang Dai classified himself and his friends in none of the five categories; instead, after commenting on these five groups, Zhang Dai compared himself with most of the ordinary Hangzhou travelers. He said that the commoners went out earlier and went back before the moon really came out, and their activity could therefore not be called "watching the moon." Only after these travelers went back, when West Lake became quiet again, did he and his

friends come out and enjoy the quiet moonlight. They also invited the last group of people I cited above to join them. It seems that Zhang Dai considered himself as the “inspired gentleman” who not only knew how to behavior, but also consciously distinguished himself from other lay people.

Two things are worthy of mention in this narrative. First, Zhang Dai distinguishes between visitors on the basis of their customs and interests, specifically whether they focused on natural beauty or secular pleasure. His attitude to the first two groups cited above was negative, as neither the wealthy people nor the commoners could appreciate the natural beauty as he did. Zhang Dai’s endeavor to distinguish himself from ordinary travelers was similar to the attitudes of the literati towards the merchants in the artistic world, as analyzed in Clunas’s influential book (Clunas, 1991). In this case, however, it was more complicated. Comparing these comments with his description of sightseeing in Yangzhou and Tai’an, Zhang Dai’s evaluation of popular sightseeing activities was actually a mixture: on the one hand, he enjoyed the prosperous scene of popular sightseeing and was astonished by the highly developed state of the travel-based services; on the other hand, when he started to judge these activities, his attitude was nevertheless critical and highlighted the uniqueness of his own sightseeing activities. Second, Zhang also emphasized his communication with the travelers in the last group, as they, like Zhang Dai, could appreciate the quiet and true beauty of the moonlight. Both the critical comments about ordinary people and the communication with people like himself reflected one criterion whereby Zhang Dai judged traveling activities: whether one can truly appreciate natural beauty.

#### **Zhang’s own excursion:**

According to Zhang Dai, in order to enjoy natural scenery, it is crucial to choose the right time, which is dictated by at least two standards: fewer people and a better scene. These two standards could be clearly seen in another passage in *TAMY*: “Enjoying the Snow in the Lake-Heart Pavilion.” This occurred in West Lake, during the winter, after three days of heavy snowfall. Although “on the lake the sounds of man and bird all ceased,” Zhang Dai went out alone toward Lake-Heart Pavilion to watch the snow in a small boat. In his view, the scene at that special time was wonderful:

...sky, clouds, mountains, and water were all white from top to bottom. For shadowy forms on the lake there were only the single trace of the long causeway, the single dot of the Lake-Heart Pavilion, the single mustard seed of my boat, and the two or three grains of people in boats (Zhang, 2009, p56).

From this very elegant literary description, one obtains the impression that Zhang Dai was immersed in this simple and quiet environment and was proud of his sightseeing activity on such a day. The snowy time not only provided more elegant scenery around the lake and highlighted Zhang Dai’s special and unique taste, but also allowed him to meet people who shared a similar interest and passion for sightseeing. When he arrived at the pavilion, he saw two people drinking wine there. Those two people were very happy that Zhang had the same choice of that special time and similar distinguished behavior, so they invited him to drink with them. Zhang Dai did not note the identity of these two people, and most likely he did not care about it, as their passion and craving for sightseeing alone was regarded as the only “membership card” of this elegant sightseeing circle. Without a clear boundary and definition, this circle was different from and outside of the existing traditional social structures, which were designated by political position, wealth, region, and education.

This passage about viewing the snow ends with the boatman grumbling, “I cannot call you (Zhang Dai) an infatuated guy – there are others even more infatuated than you” (Zhang, 2009, p. 56). “Infatuated” here could also be translated as “craving,” “obsession,” or “mania.” This word “chi” 癡 was frequently used in Zhang Dai’s writing to describe himself and his friends. “Chi” sometimes means not caring about potential dangers when seeking natural beauty. Taking another trip to Mt. Lufeng as an example, Zhang Dai and his friend stay in the mountain until midnight to wait for the moon, because they thought “it’s a great chance we won’t come by easily again, and

even if we come across a tiger, well, that's fate." Later that night, they did see the gorgeous moon; meanwhile, their servants believed they had encountered a tiger and so came looking for them with village men. Dangerous, cold weather and the difficulties of climbing would deter most people; but for infatuated people, like Zhang Dai, these were not able to outweigh, and actually served to enhance, the desire to enjoy the natural scene. More importantly, as Timothy Brook suggests, by labeling the pleasure of travel as a craving or obsession, the truly inspired gentleman could set himself apart from ordinary gentry (Brook, 1998).

### **Conclusion:**

From Zhang Dai's records, we can discover how late Ming urban life shaped tourism. As more and more commoners could afford sightseeing, the traveling experience was enriched with entertainment and enjoyment. Driven by both the desire for traveling and the pursuit of pleasure during travel, the money-based service industry expanded along the travel routes and reached out of the cities. Zhang Dai's narratives and descriptions of various sightseeing activities sometimes presented a paradoxical, but finally logical, attitude. Based on his acceptance and even celebration of the development of late Ming tourism, when he described the secular pleasure and material enjoyment involved in popular sightseeing activities, Zhang Dai expressed his compliments as an observer. But when he also participated in the same sightseeing activities as other ordinary travelers, Zhang Dai criticized common people who only sought secular pleasure during sightseeing, as he believed that the truth of sightseeing was enjoying natural beauty. For his own trips, he chose special times and avoided other travelers: the same group of people who contributed to the prosperous urban life came to be considered negatively in his sightseeing activity. The reason Zhang Dai paid so much attention to the enjoyment of natural beauty was due to his craving for traveling. This craving for natural scenery was certainly rooted in the literati tradition of traveling around mountains and waters, which could be traced back to at least Xie Lingyun (385-433) in the Six Dynasties, who designed a pair of mountain climbing shoes. The trend of indulging in enjoyment and the development of traveling service also contributed to this craving for travel during the late Ming.

Tourism was only one of the several topics that Zhang Dai considered in his book. Other records provide detailed information of entertainment, food and tea, etc.. These records provide a lens through which the dynamic of broader urban life can be viewed. With more leisure time and an ideological liberation from traditional and moral regulation, the pursuit of pleasure became a theme, especially in the cities. From elites like Zhang Dai down to various commoners recorded in *TAMY*, everyone relaxed, enjoyed entertainment, consumption, material amusement, and sensual enjoyment; all these appeared in people's daily schedules, as a necessary part of day to day life. If we say that in the early Ming, literati and scholars still felt confusion over pleasure, as Brook (1998) has shown in his book, by the late Ming, pleasure was considered as a natural and good desire among the literati. Money is crucial to the pursuit of pleasure, and without enough money one can hardly do anything. Although Zhang Dai never emphasized this, most of the activities he undertook depended extensively on his strong economic resources. The need for and use of money was the best boost for market development. These markets, such as the tourism market, took on an abstract form, but did spread throughout society and connect different people through numerous newly-developed relations, such as the seller-buyer relationship, service provider-service consumer relationship, and fashion leader-follower relationship.

Sometimes class divisions were even blurred for a while, when wealthy people and commoners enjoyed the same scenery and similar entertainment. However, closer analysis of this world demonstrates that social hierarchy continued to obtain there, but in another appearance: as fashion. This article has discussed the fashionable activity of sightseeing. *TAMY* also presents fashionable skilled people in the entertainment and art markets, and fashionable objects such as food and tea, similarly established a pre-eminence. It seems that in late Ming urban life, fashion became a theme and presented itself in various guises. In the consuming society, fashion extensively influenced the actions and choices of consumers and improved economic development. At first

glance, fashion seems to be something that everyone wanted to follow and could hence imply the equality of this society, but if we analyze the formation and spread of fashion, we find a new type of social hierarchy. Zhang Dai is a good example of this, being of elevated social, economic, and cultural status, and playing an important role in the formation of fashion, his enthusiasm for sightseeing set an example for ordinary people who wanted to mimic the pursuits of those of a higher status.

As a late Ming fashion icon, Zhang Dai's attitude toward tourism market and the participation of commoners was very interesting. As for the commoners who went sightseeing and enjoyed the hotel service, on the one hand his attitude was positive, but on the other hand he also criticized these people who did not know how to appreciate natural beauty. This complicated and even seemingly paradoxical attitude toward the highly developed tourism market and criteria of leisure enjoyment could be explained by his mixture of tastes. To Zhang Dai, taste was multi-leveled and contained many detailed preferences and regulations. We can roughly divide these into two categories. The first is aesthetic taste, such as the taste for natural beauty. For Zhang Dai, these aesthetic tastes involved the obsession with and appreciation for traveling, collecting, and "true" taste. At one point in *TAMY*, Zhang Dai says, "if a person has no obsessions, one shouldn't associate with him, for he has no deep emotions" (Zhang, 2009, p. 72). Obsession was considered an important quality, in both Zhang's own personality and in those who he admired and wanted to be friends with (Kafalas, 2007). The second kind of taste was the taste for sensual pleasure. He supported seeking pleasure and enjoying urban life, so he tried to satisfy his natural desires for relaxation, for comfort accommodation and entertainment. In all, Zhang Dai, like late Ming urban culture generally, embraced both cultural enjoyment and material pleasure; was attached to both the high literati tradition and popular development; and appreciated exquisite taste as well as enjoying secular happiness, both of which underwent dramatic developments within the everyday life in late Ming cities.



## References

- Bai, Q. (2003). *Fu Shan's world: The transformation of Chinese calligraphy in the seventeenth century*. Cambridge, MA: Harvard University Asia Center.
- Brook, T. (1998). *The confusions of pleasure: Commerce and culture in Ming China*. Berkeley: University of California Press.
- Chang, C., & Chang, S. H. (1992). *Crisis and transformation in seventeenth-century China: Society, culture, and modernity in Li Yu's world*. Ann Arbor: University of Michigan Press.
- Clunas, C. (2004). *Superfluous things: Material culture and social status in early modern China*. Honolulu: University of Hawai'i Press.
- Hu, Y. (2002). *Zhang Dai pingzhuan*. Nanjing: Nanjing daxue.
- Kafalas, P. A. (1995). *Nostalgia and the reading of the late Ming essay, Zhang Dai's Tao'an mengyi*.
- Kafalas, P. A. (2007). *In limpid dream: Nostalgia and Zhang Dai's reminiscences of the Ming*. Norwalk, CT: EastBridge.
- Li, Z., & Li, Z. (1975). *Fen shu: Xu Fen shu*. Beijing: Zhonghua shu ju.
- McKendrick, N., Brewer, J., & Plumb, J. H. (1982). *The birth of a consumer society: The commercialization of eighteenth-century England*. Bloomington: Indiana University Press.
- Spence, J. D. (2007). *Return to Dragon Mountain: Memories of a late Ming man*. New York: Viking.
- Su, H. (2004). *Culinary arts in late Ming China: Refinement, secularization and nourishment : a study on Gao Lian's Discourse on food and drink*. Taipei: SMC Publishing Inc.
- Zhang, D. S. (2009). *Tao'an-mengyi: Xihu-mengxun*. Shanghai: Shanghai Guji Chuan She.