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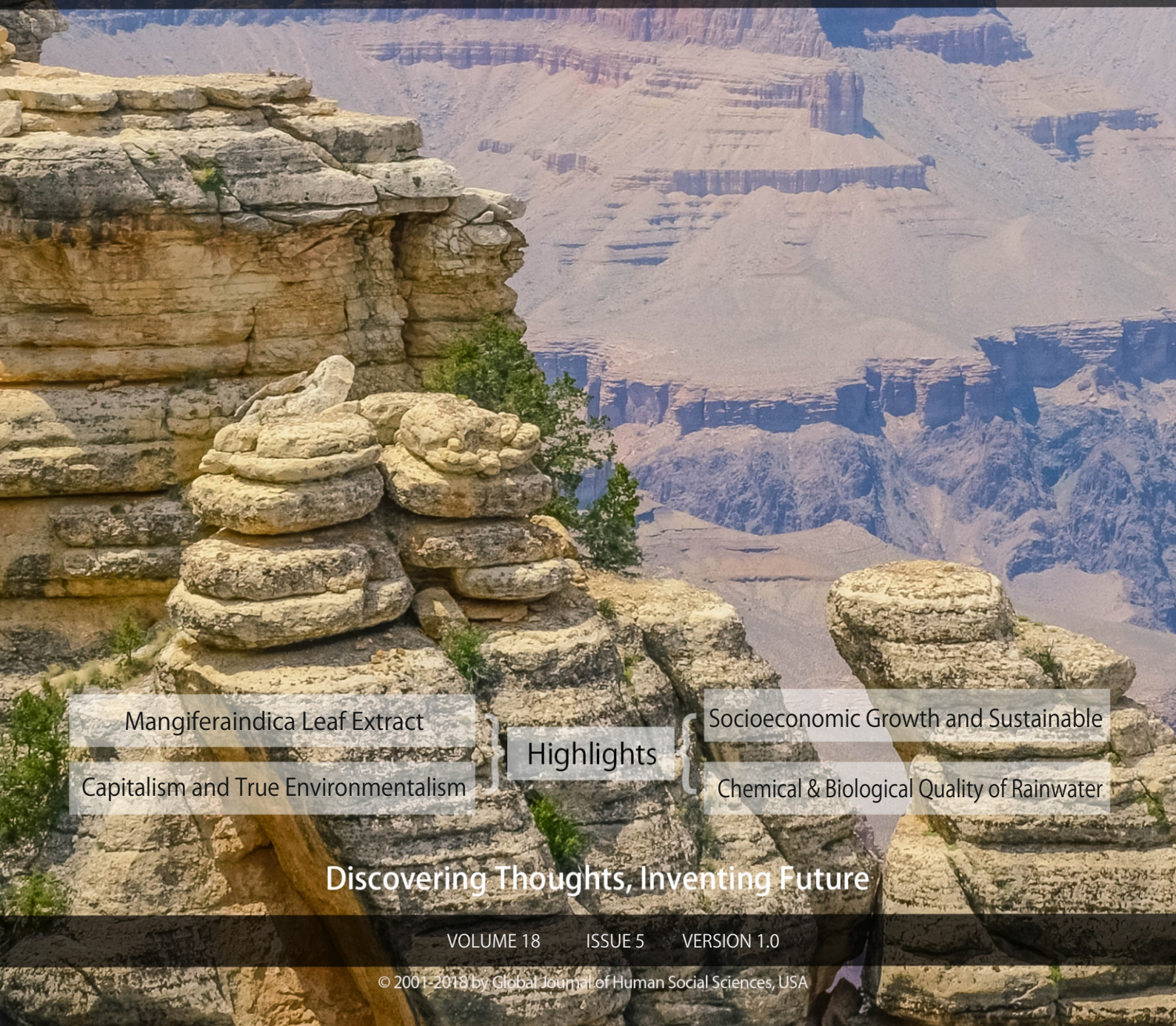

Highlights

- Mangiferaindica Leaf Extract
- Capitalism and True Environmentalism
- Socioeconomic Growth and Sustainable
- Chemical & Biological Quality of Rainwater

Discovering Thoughts, Inventing Future

VOLUME 18 ISSUE 5 VERSION 1.0

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Climate Changes Not Carbon, and Evaporation

By Oleg Khalidullin

Introduction- Millions of years formed a water circuit between the atmosphere and soil, built a dynamic equilibrium. A certain amount of evaporation from the earth created such a mechanism of atmospheric phenomena, which sent water to the specified places of the planet by clouds. So various arid zones were formed - steppes, deserts, tropics, forests.

Civilization turned water into a working reagent. Water has become the main active body in many industrial and municipal processes - a carrier of heat, energy, means of cooling, quenching, washing, washing, wet cleaning of everything that surrounds us. All direct evaporation from these processes and evaporation after the sewage of used water is unnatural, let's call them artificial. The natural path of water is its movement and transformation in food chains in the soil and on the soil through biota - microbes, worms, plants, animals. In each of them, water undergoes numerous transformations, and in the form of exhalation, transpiration, juices and other secretions, it again turns into a vaporous state. All these organic evaporations combine in the atmosphere, and create their own, unique mechanism for the formation of clouds, which was perfected before the appearance of man. We have destroyed more than 60% of this idyll - the soil and the living creatures living on it with plants, creating arable land, reservoirs, landfills, asphalt, concrete.

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CLIMATECHANGESNOTCARBONANDEVAPORATION

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Climate Changes Not Carbon, and Evaporation

Oleg Khalidullin

I. Introduction

Millions of years formed a water circuit between the atmosphere and soil, built a dynamic equilibrium. A certain amount of evaporation from the earth created such a mechanism of atmospheric phenomena, which sent water to the specified places of the planet by clouds. So various arid zones were formed - steppes, deserts, tropics, forests.

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The volume and speed of artificial vapor increases with increasing acceleration in accordance with the development of technology. Approaching their limits, they began to exceed organic values in terms of quality, volume and turnover rate. The mechanism of the formation of atmospheric phenomena broke. Megatons of new-quality water began to be shed by precipitation not in places specified by nature, not in prescribed volumes, not at a specified time, but according to other laws and rules unknown to nature. Quantity goes into quality. That is why in some places of precipitation excess with floods, in others - drought and fires. Arid zones are crumbling, species of plants and animals disappear, the level of the oceans rises - water does not reach the polar and mountain glaciers in clouds, falling along the way. Glaciers are not replenished - the everlasting process of transformation, storage and renewal of water is being destroyed. Glaciers are disappearing, the planet is changing.

All the efforts of mankind, directed by the Paris Agreements, lead to a catastrophe, because it is not carbon that affects the atmosphere, but evaporation. Spending funds on microscopic effects - reducing CO2 emissions, we do not pay attention to the main, source of natural disasters, the climate destroyer.

According to UN experts, [1], "the increase in CO2 emissions ranged from 0.5 to 5% per year. As a result, over the past hundred years, 400 billion tons of carbon dioxide has just entered the atmosphere due to the burning of fuel. " Or 4 billion tons per year.

According to [2], annually mankind extracts up to 20 thousand cubic kilometers of groundwater for its needs. Plus, according to [3], people irrevocably take away about 2 thousand cubic kilometers of fresh water from rivers and lakes. Annually. Almost all of this water is extracted from natural circulation, is used in agriculture, industry, utilities, and through sewage and evaporation goes into the atmosphere without organic changes. 22,000 cu. kilometers is 22 trillion cubic meters. meters or tons of water. In the composition of the fumes, the emission of 4 billion tons of CO2 is just 0.018% - an imperceptible drop. Can this drop, which is 5,500 times less than artificial evaporation alone, influence something? The ratio can be safely doubled by adding organic evaporation, with the remaining half of the land in its natural state.

One of the elements of the Paris Agreement is to reduce the burning of all types of fuel and the transition to alternative energy sources. Among these sources are hydropower plants. For example, in China, according to: [4] 500 billion yuan will go to hydropower. Hydropower is hydroelectric. The most powerful Three Gorges HPP in the world is being completed, followed by several other projects. Thousands of hectares of fertile land are flooded by reservoirs. New hydropower plants are planned in many other countries. For example, Rogun in Tajikistan. This is a new artificial vapor. Reducing CO2 emissions by thousandths of a percent, we increase artificial emissions by tens of percent and reduce organic evaporation.

We plowed up even larger areas, 9% of all land, by deep plowing: [5]. Water precipitation falling on arable land does not find underground natural inhabitants and immediately goes back into the atmosphere without any changes.

We fill up large territories with garbage and dumps of the mining industry. Under multimeter layers of such dumps, underground life is dying out, organic evaporation disappears.

The area of world forest has decreased to 30%. Trees evaporate purely organic fumes. The hectare of the forest near Moscow evaporates over the summer

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through the leaves ofabout 44 tons of water. This means that from the soil plants absorb moisture much more. In total, the plants of the planet for a year absorb 650 trillion waters, and champions - tropical forests. It is estimated that in a million years the plants of the planet would have been able to dry all the seas and oceans. - [6] In total in the world more than 3 billion hectares of land are subject to desertification - [7] - this is 30 million km2 or 20% of the total land area - 149 million km2. According to other sources - 63%. In any case, they have become commensurate with the total territory and continue to grow. If we want to save the lives of our descendants and life on the planet in general, we must adopt a new concept of returning its natural functions to water. The scientific proof of this hypothesis is fairly simple and lies on the surface. Proponents and specialists who organize research with solid forces are needed. In more detail: http://ethnopharmacology-asia.com/index.php?page=Abstract&Abstractid=MTA3

Sources of Information

1. http://www.refsru.com/referat-17732 -3.html
2. http://jkg\portal.com.ua/en/publication/one/globalna -posuha-abo-problemi-vodospozhivannja-32688
3. http://www.kursach.com/geografiya-ekonomiches kaya-geografiya / 816-referat-gidrosfera-v-sostave-biosferi / view-details.html
4. https://www.dw.com/en/china-to-invest-360-bln-in-renewable -power-in-2016-2020 / a-37031957
5. https://ru.wikipedia.org/wiki/Powerland
6. http://sitekid.ru/biologiya/interesnye_fakty_o_rasteni yah/skolko_vody_potreblyayut_derevya.html[7] http ://referatwork.ru/lectionbase/ekologiya/view/80689_ opustynivanie_i_otchuzhdenie_zemel

a) Оригинал

i. *КЛИМАТ МЕНЯЕТ НЕ КАРБОН, А ИСПАРЕНИЯ*

Миллионы лет формировался кругооборот воды между атмосферой и почвой, строилось динамическое равновесие. Определенное количество испарений с земли создавало такой механизм атмосферных явлений, который направлял воду облаками в заданные места планеты. Так образовались различные аридные зоны - степи, пустыни, тропики, леса.

Цивилизация превратила воду в рабочий реагент. Вода стала основным действующим телом во многих производственных и коммунальных процессах - носителем тепла, энергии, средством охлаждения, закалки,мойки, стирки, влажной уборки всего, что нас окружает. Все непосредственные испарениях этих процессов и испарений после канализациииспользованной воды неестественны, назовем их искусственными. Природный путь воды – это ее движение и преобразования в пищевых цепочках в почве и на почве через биоту - микробы, черви, растения, животные. В каждом из них вода проходит многочисленные преобразования ив виде выдоха, транспирации, соков и других выделений вновь превращается в парообразное состояние. Всеэти органи-ческиеи-спарениябъединяетсяв атмосфере, и создают свой, уникальный механизм образования облаков, который совершенствовался до появ ления человека. Мы уничтожили более 60% этой идиллии – почвы и обитающей на ней живности с растениями, создав пашни, водохранилища, свалки, асфальт, бетон.

Объемы и скорость искусственных испарений нарастают с увеличивающимся ускорением в соответствии с развитием технологий. Приближаясь к своим предельным значениям,они начали превышать органические по качеству, объемам и скорости оборота. Сломался механизм формирования атмосферных явлений. Мегатонны воды нового качества стали проливаться осадками не в заданных природой местах, не в заданных объемах, не в заданное время, а по другим - неведомым природе законам и правилам. Количество переходит в качество. Именно поэтому в одних местах превышения осадков с наводнениями, в других - засуха и пожары. Рушатся аридные зоны, исчезают виды растений и животных, повышается уровень океанов –вода облаками не доходят до полярных и горных ледников, выпадая в пути следования.Не пополняются ледники – разрушается вековечный процесс преобразования, хранения и обновления воды. Исчезают ледники, меняется планета.

Все усилия человечества, направляемые Париж-скими соглашениями, ведут к катастрофе, потому что не углерод воздействует на атмосферу, а испарения. Затрачивая средства на микроскопическое воздействие – снижение эмиссии CO2, мы не обращаем внимания на главный, источник стихийных бедствий, разрушитель климата.

По оценкам экспертов ООН, [1], «увеличение выбросов CO2 составляло от 0,5 до 5% в год. В результате, за последние сто лет только за счет сжигания топлива в атмосферу поступило 400 млрд. тонн углекислого газа». Или 4 млрд. тонн в год.

По данным [2], ежегодно человечеством для своих потребностей извлекается до 20 тыс. кубических километров подземных вод. Плюс к этому, по [3] люди безвозвратно забирают из рек и озер приблизительно 2 тыс. кубических километров пресной воды. Ежегодно. Почти вся эта вода извлекается из природного оборота, используется в земледелии, промышленности, коммунальном хозяйстве и через канализацию и испарения уходит в атмосферу без органических изменений. 22000 куб. километров – это 22 триллиона куб. метров или тонн воды. В составе испарений эмиссия 4 миллиарда тонн CO2 – это всего лишь

0,018 % - незаметная капля. Может ли эта капля, которая в 5500 раз меньше одних только искусственных испарений на что-то воздейст вовать? Соотношение можно смело удвоить, если добавить и органические испарения, с сохранившейся половины суши в природном состоянии. Одним из элементов Парижского соглашения является сокращение сжигания всех видов топлива и переход к альтернативным источникам энергии. В числе этих источниеов апедусма триваются гидроэлектростанции. Например, в Китае по данным:[4] 500 миллиардов юаней пойдет на гидроэнергетику. Гидроэнергетика - это гидроэлектростанции. Достраивается самая мощная в мире ГЭС «Три ущелья», следом еще несколько проектов. Затапливаются тысячи гектаров плодородных земель водохранилищами. Новые ГЭС планируются и во многих других странах. Например, Рогунская в Таджикистане. Это новые искусственные испарения. Снижая на тысячные доли процента эмиссию CO2, мы на десятки процентов повышаем искусственные и снижаем органические испарения

Еще большие территории, 9% всей суши, мы распахали под земледелие глубокой вспашкой: [5] . Вода осадками, выпадающая на пашню не находит подземных природных обитателей и без изменений сразу уходит обратно в атмосферу.

Большие территории мы заваливаем мусором и отвалами горнорудной промышленности. Под многометровыми слоями таких отвалов вымирает подземная жизнь, исчезают органические испарения.

Площадь мирового леса уменьшилась до 30 %. Деревья испаряют чисто органические пары. Гектар подмосковного леса испаряет за лето через листья до 44 тонн воды. Это значит, что из почвы растения впитывают влаги намного больше. Всего же растения планеты за год поглощают 650 триллионов воды, причём рекордсмены — тропические леса. Подсчитано, что за миллион лет растения планеты были бы способны иссушить все моря и океаны. –[6]

Всего в мире опустыниванию подвержено более 3 млрд. га земель – [7] – это 30 млн. км2 или 20 % от всей суши - 149 млн. км2. По другим данным – 63%. В любом случае стали соизмеримыми с общей территориейи продолжают нарастать.

Если мы хотим спасти жизнь нашим потомкам и вообще жизнь на планете, мы должны принять новую концепцию возвращения воде ее природных функций.

Научное доказательство этой гипотезы достаточно несложно и лежит на поверхности. Необходимы сторонники и специалисты, организующие исследование солидными силами.

Более подробно: http://ethnopharmacology-asia.com/index.php?page=Abstract&Abstractid=MTA3

Источники информации

1. http://www.refsru.com/referat-17732-3.html
2. http://jkg-portal.com.ua/ru/publication/one/globalna-posuha-abo-problemi-vodospozhivannja-32688
3. http://www.kursach.com/geografiya-ekonomicheskaya-geografiya/816-referat-gidrosfera-v-sostave-biosferi/view-details.html
4. https://www.dw.com/en/china-to-invest-360-bln-in-renewable-power-in-2016-2020/a-37031957
5. https://ru.wikipedia.org/wiki/Пашня
6. http://sitekid.ru/biologiya/interesnye_fakty_o_rasteniyah/skolko_vody_potreblyayut_derevya.html
7. http://referatwork.ru/lectionbase/ekologiya/view/80689_opustynivanie_i_otchuzhdenie_zemel

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Corrosion Inhibition for Aluminum Alloy in HNO_3 Solution using *Mangiferaindica* leaf Extract

By Anyamele Uzochukwu P Peter Chibuike C & Anyaehie Stanislaus I
Nigeria Maritime University

Abstract- Corrosion inhibition of copper alloy in 0.3 M HNO_3 and KOH at room temperature using Mangiferaindica leaf extract in different concentrations was studied. A Gravimetric technique was employed. The result obtained showed that Mangiferaindica leaf extract is a good inhibitor for 0.3 M HNO_3 and KOH solution. The weight loss, corrosion rate, and inhibition efficiency were deduced. The inhibition efficiency showed a good percentage result with the optimum value of 85.60% and 90.91% in HNO_3 and KOH respectively. Generally, it was observed that the rate of inhibition increased with the concentration of the inhibitor decreased in corrosion rate.

Keywords: corrosion, copper alloy, mangiferaindica, gravimetric, HNo_3, KOH.

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Corrosion Inhibition for Aluminum Alloy in HNO_3 Solution using *Mangiferaindica* leaf Extract

Anyamele Uzochukwu P [α], Peter Chibuike C [σ] & Anyaehie Stanislaus I [ρ]

Abstract- Corrosion inhibition of copper alloy in 0.3 M HNO_3 and KOH at room temperature using *Mangiferaindica* leaf extract in different concentrations was studied. A Gravimetric technique was employed. The result obtained showed that *Mangiferaindica* leaf extract is a good inhibitor for 0.3 M HNO_3 and KOH solution. The weight loss, corrosion rate, and inhibition efficiency were deduced. The inhibition efficiency showed a good percentage result with the optimum value of 85.60% and 90.91% in HNO_3 and KOH respectively. Generally, it was observed that the rate of inhibition increased with the concentration of the inhibitor decreased in corrosion rate.

Keywords: corrosion, copper alloy, mangiferaindica, gravimetric, HNo_3, KOH.

I. Introduction

Corrosion is the disintegration of engineering and industrial materials into its constituent atoms due to chemical reactions with its surroundings. Furthermore, corrosion is the wearing away of metals due to a chemical reaction (Fontana, 1986).

Aluminum is a durable, soft, lightweight, malleable metal with appearance ranging from silvery to dull grey. Aluminum is a very reactive metal with a high affinity for oxygen; the metal is highly resistant to most environments and a great variety of chemical agents. The resistance is due to the inert and protective character of aluminum oxide film which forms on the metal surface. In most environments, the rate of corrosion of aluminum decreases rapidly with time. In only a few cases, e.g. caustic soda does the corrosion rate approximate to linear (David and James, 2000). The oxide film is stable in aqueous media when the pH is between about 4.0 and 8.5 the oxide film is naturally self-renewing, and accidental abrasion or other mechanical damage of the surface film is rapidly repaired. The acidity or alkalinity of the environment significantly affects the corrosion behavior of the aluminum alloys. At lower and higher pH of 4 and 8.5, aluminum is more likely to corrode. Below and above theses values, acid dissolution yields Al^{+3} ions and the alkaline dissolution lead to the formation of AlO_2 ions (Pourbaix, 1974).

To be realistic, corrosion can only be reduced significantly or delayed to a reasonable extent. Controlling of the pH or ion concentration of the solution or controlling the metal solution interface had some of ways to achieve the reduction in the rate of corrosion over the years. The above is achieved through the addition of small quantity of chemicals called inhibitors, that either encourage film formation or form a barrier like a layer on the metal surface and by so doing stop or slow down the rate of metal decomposition (Obot *et al.,* 2011).Corrosion inhibitors are chemicals either synthetic or natural which when added in small quantity to an environment decrease the rate of attack by the environment on metals (Lebrini *et al.,* 2011).Therefore, the present study aims at investigating the corrosion inhibition effect and adsorption properties of *Mangifera indica*leaves extract on Al alloy corrosion in 0.3 M and 0.8 M nitric acid using gravimetric techniques.*Mangifera indica* was considered for the study due to its medicinal value and phytochemical composition. *Mangifera indica* leaf contains steroids, flavonoid, reducing sugar and cardiac glycosides in the hexane extract; anthraquinone, tannin and reducing sugar in the ethyl acetate extracts and saponin, steroids, tannin, flavonoid, reducing sugars and cardiac glycosides in the methanolic extracts (Aiyeluagbe and Paul, 2009).

II. Materials and Method

a) Coupon Preparation

The aluminum alloy used for the study was obtained from Steel Village in Port Harcourt Rivers State, Nigeria. It consist the following element (in % Composition): Al(99.84), Fe(0.144), Co(0.001), Mn(0.000), Zn(0.008), Cr(0.000), Ni(0.001), Mo(0.000) Cu(0.000). The metal sheet was cut in to samples of dimension 40 x 20 x 2 mm and used for corrosion studies.

b) Preparation of Mangiferaindica leaf Extract

The extract was prepared according to (Oka for *et al*., 2008). *Mangiferaindica* leaves was collected from University of Port Harcourt, River State, Nigeria. They were washed with plenty of water, dried and ground to powder form. The extraction was done in reflux setup for 3 h at a constant temperature of 75°C using 10 g of air dried *Mangiferaindica* leaf in 300 ml of 0.3 M and 0.8 M HNO_3solution. The solution was cooled. The filtrate measured. Different concentrations of the inhibitor were prepared from the filtrate and the corrosive environment in the range 0.1, 0.2, 0.3, and 0.4 g/L.

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c) Gravimetric technique

The gravimetric technique used was according to the description by (ASTM G1-72, 1990). All reagents used were BDH grade. Before measurement, each coupon was degreased in ethanol, the surface smoothened using sic emery paper (of grades 400, 600, 800 and 1000) and then double washed with distilled water and air dried after dipping in acetone. The coupons were weighed using FA2104A analytical electronic digital weighing balance (sensitivity of 0.0001). The specimen were immersed in 250 ml beaker containing 240 ml of 0.3 M and 0.8 M HNO_3 solutions of different concentrations (0.1, 0.2, 0.3, and 0.4 g/L) of the prepared inhibitor at room temperature (303°K). The set up was exposed for seven (7) days after which the specimen was taken out, washed, dried and weighed accurately.

III. Results and Discussion

a) Weight loss

The variation of weight loss against (7) days exposure time of Al alloy in different concentrations of the investigated inhibitors and without the inhibitor in 0.3 M and 0.8M HNO_3 at room temperature.

Figures one and two below depict the weight losses of Al alloy in different concentrations of the inhibitor and without inhibitor in 0.3 M and 0.8 M HNO_3 respectively. The result shows that weight loss is higher in the blank system than the inhibited and also increases as the exposure time increases and reduces as the concentration of the inhibitor increases in both 0.3 M and 0.8 M HNO_3. Figure 2 had higher weight loss than figure 1 which may be due to the increase in the concentration of the corrosive environment (HNO_3).

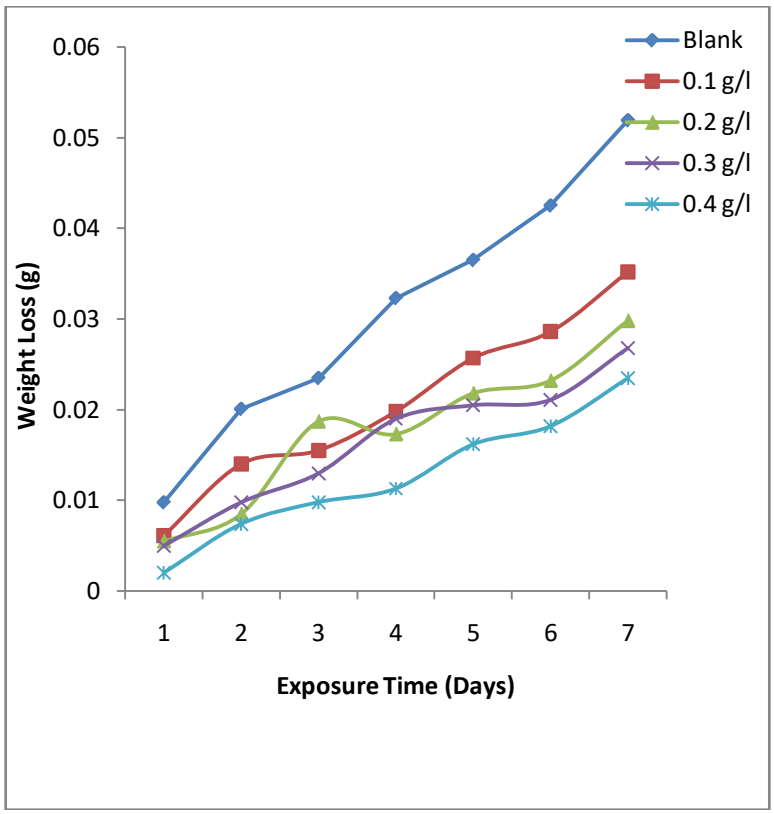

Fig.1: Weight Loss against Exposure Time of Al alloy in different concentrations of *Mangiferaindica* leaf extract in 0.3 M HNO_3

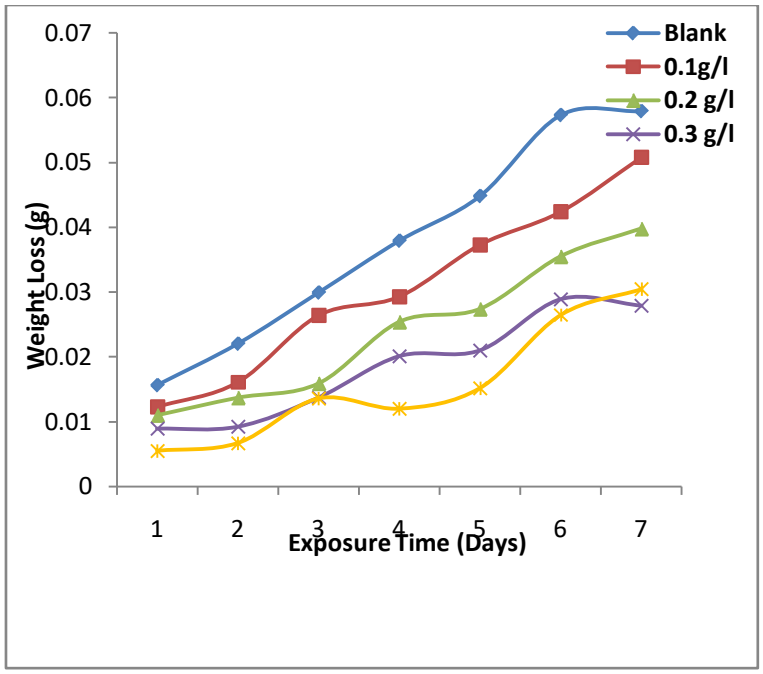

Fig.2: Weight Loss Against Exposure Time of Al alloy in Different Concentrations of *Mangiferindica* leaf Extract in 0.8 M HNO_3

b) Corrosion rate

The corrosion rates of Al alloy were calculated using eq.1.

Where ΔW is the weight lost (in grams), 87.6 is a constant; A is the surface area of the coupon (in cm^2), ρ is the density (in g/cm^3), t is the period of exposure (in days). The calculated corrosion rate fits into the range (less than 0.50 mm/yr.) at which the application is acceptable (William, 2007).

Corrosion rate decreases with increase in exposure time and increase in inhibitor concentration which indicates that the presence of the additive reduces the corrosion rate of Al alloy in 0.3 M and 0.8 M in HNO_3 as shown in figures 3 and 4. Figure 4 showed higher corrosion rate than figure 3, which maybe as a result of increase in nitric acid concentration.

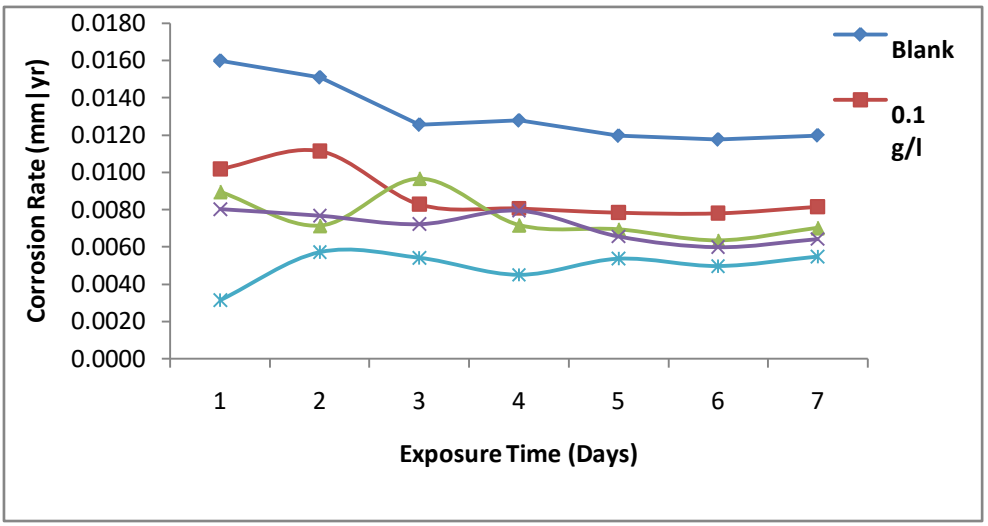

Fig.3: Corrosion Rate Against Exposure Time of Al alloy in Different concentrations of *Mangiferaindica* leaf Extract in 0.3M HNO_3

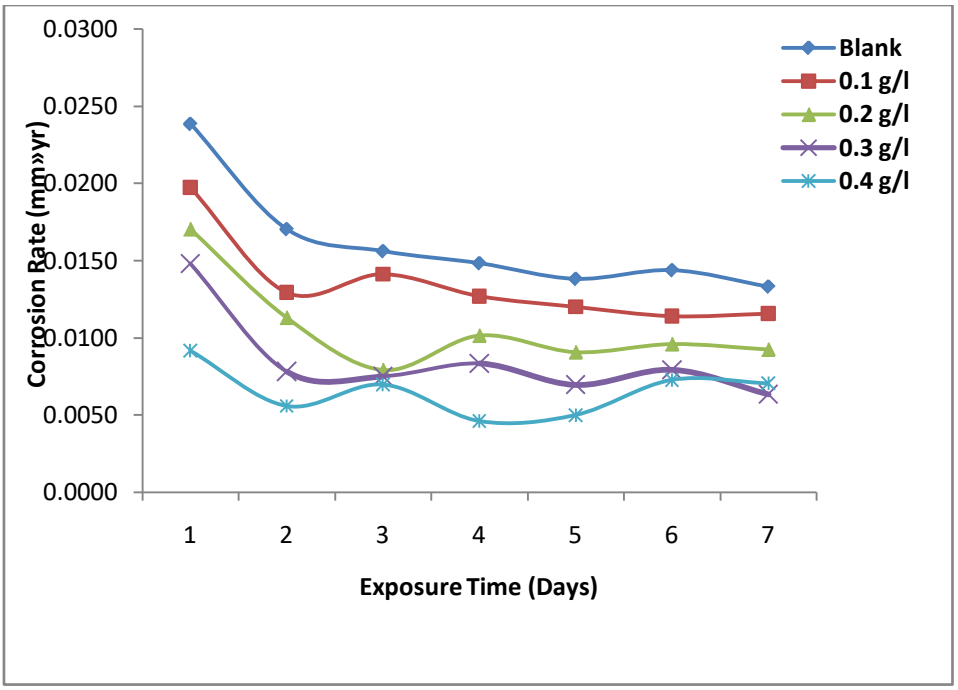

Fig.4: Corrosion Rate against Exposure Time of Al alloy in different concentrations of *Mangiferaindica* leaf extract in 0.8 M HNO_3

c) *Corrosion Inhibition Efficiency*

Inhibition efficiencies (%IE) of *Mangiferaindica* were calculated using Eq. 2 below eq. 2.

Where W_{blank} = weight loss in the control corrosion.

W_{inh} = weight loss in the inhibited environment

The plots of Figure 5 and 6 depict that inhibition efficiency increases as the inhibitor concentrations increases. It is also observed that the inhibition efficiency increased as the corrosion rate decreases. *Mangiferaindica* leaf extract could be considered as an inhibitor of Al alloy in 0.3 M HNO_3 having a maximum value of inhibition efficiency 79.59% while in 0.8 M HNO_3 recorded optimum value of 69.55%.

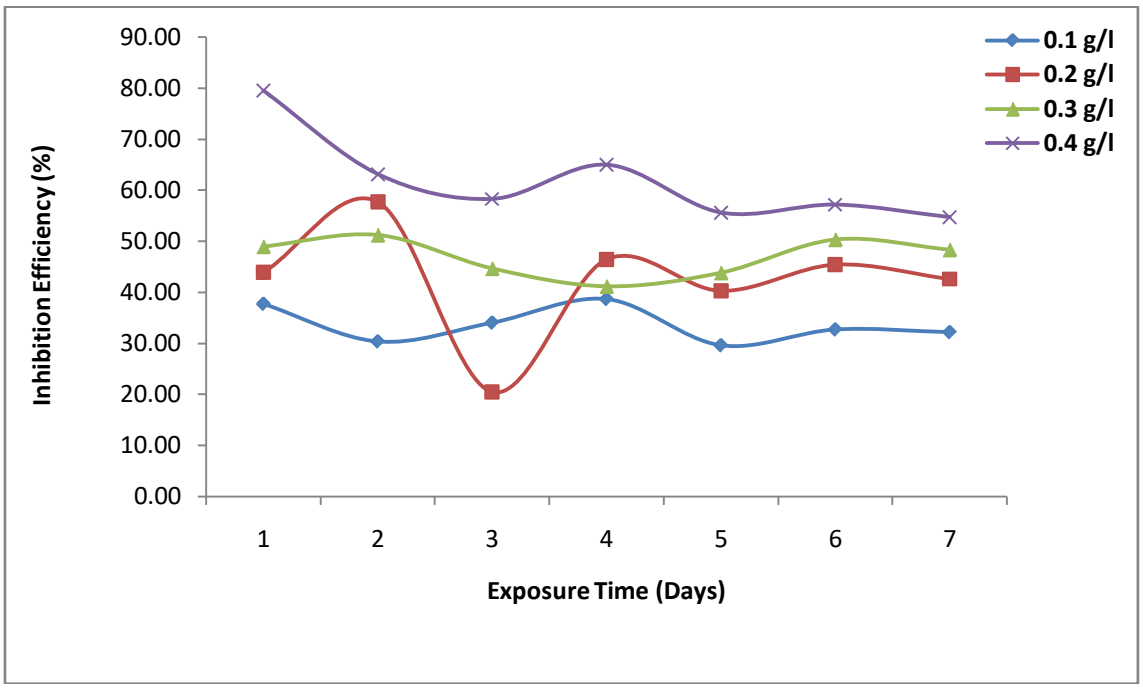

Fig.5: Corrosion Rate against Exposure Time of Al alloy in Different Concentrations of *Mangiferaindica* leaf Extract in 0.8 M HNO_3

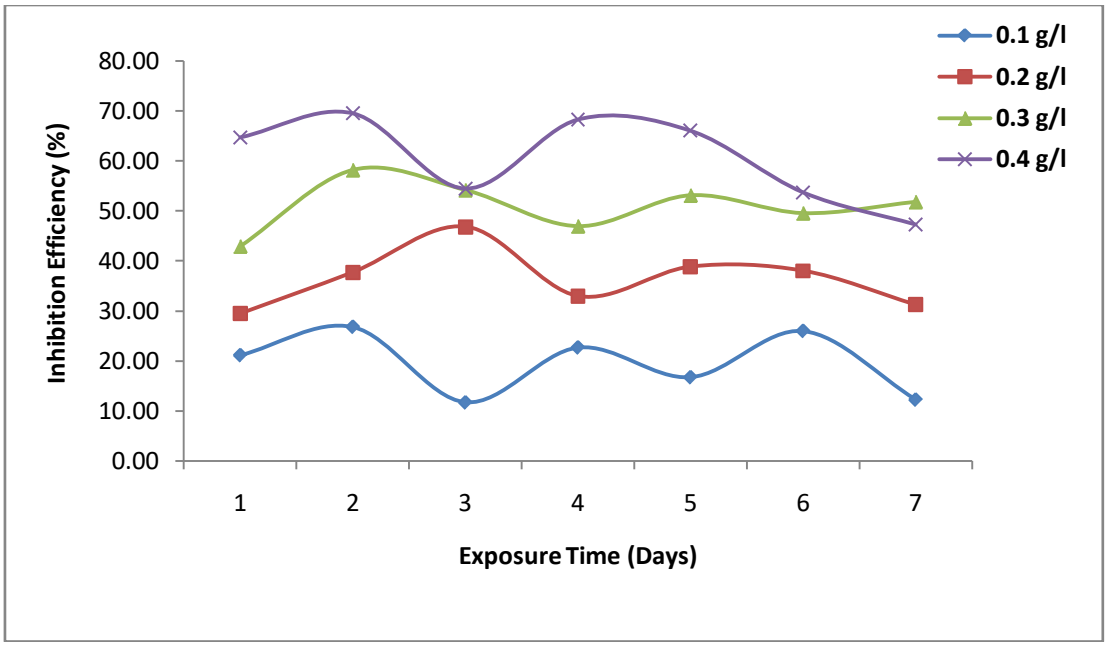

Fig.6: Inhibition Efficiency of Different Concentrations of *Mangiferaindica* leaf Extract on Al alloy in 0.8 M HNO_3

References Références Referencias

1. Fontana, M.G. (1986) Corrosion Engineering.3rd Edition, McGraw-Hill, New York.
2. David Talbot and James Talbot (2008): Corrosion Science and technology; 1. Chemical engineering-Materials Science 2.Mechanical engineering-Materials.
3. Lebrini, M., Robert, F. & Bros C. (2011). Alkaloids extract from Policoureaguinesis as corrosive inhibitor for C38 steel in 1 M hydrochloric acid medium. International Journal of Electrochemical Science, 6: 847-859.
4. Obot I.B., Obi-Egbedi N.O. and Essien K.E. (2011) Computational simulation and corrosion inhibition of alloxazine for mild steel in 1 M HCl. *J. of computational methods & molecular design.* 1(1): 26 – 46
5. O.O Aiyeluagbe and Paul M. Osamueliamen phyto-chemical screening for active compounds in mangiferaindica leaves (2009).
6. Pourbaix M. (1974), Atlas of Electrochemical Equilibria in Aqueous Solutions, NACE, p. 389.

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Capitalism and True Environmentalism: A Contrast of Approaches as Seen in Literature in the Indian and Global Scenario

By Ananthan K P

Abstract- The paper sought to study the Indian and the global approaches towards environmental conservation as have reflected in respective literature and to find out which approach converge towards true environmentalism. In the course of the study, it put on discussion the undercurrents of capitalism in the works of western literature by analysing a sample of different poems. Further it inspected how environmentalism finds its place in Indian literature where nature and environment becomes a thing of worship, the very heart of Indian poetry.

The paper found that India sets an ideal and ultimately the only effective approach towards environmental conservation. Unlike the ongoing efforts led by capitalist organisations, which seek only to bring back the comforts man has lost as a result of his destruction of nature, India has set an example of how to live sustainably in harmony with the nature.

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I. Indurodution

Environmentalism has, of late, found its voice round the globe amidst the onslaught of man's capitalist tendencies. There are evident differences in approaches towards environmentalism in different parts of the world. India in particular has ever stood out, for its efforts to conserve nature not recently but from the ancient times. A stark difference could be observed between today's globally accepted conservation strategies (that put forward by UN and such organizations) and that India has so far followed and made a part of its social life.

In the course of history, man has constantly kept moving away from the nature, scaling horrible and apparently irretrievable lengths. His aimless trajectory in pursuit of comfort and pleasure served him converge nowhere, only to be lost in the void. Technological advancement has took a turn apparently to such heights that it could nevermore come back and touch the raw earth. But people around the world have more or less become aware that this fantastic world of modern developments is not to last forever. They have started to miss the comforts they have been thanklessly enjoying at the hands of nature. They began to realize what they have lost owing to their own destructive aggression on environment. Despite this, one should bear in mind that such concern for nature does not seem to have arisen out of sincere empathetic realisation. Rather it isa desperate cry over the lost and owes merely to his selfish intentions. For all the ongoing discussions about nature, climate change, biodiversity and extinction strictly mourn the wellness, the pleasure we have consequently lost. Is this a true and sincere approach towards conservation of nature? We speak of conservation strategies, action plans, and sustainable development. What do we develop? We develop a thousand new chemicals every year to poison earth, to poison water, to poison food and breathing air. We develop innumerable new diseases. We develop cutting edge technology to kill life on earth. Do we need more action plans, for every action in the course of man's history has started turning against and hitting back right on him. What remains of all action is the prevalent unrest.

We are always on the run, we run for money, we run for fame and what else that we do not run for. Capitalist way of thought could be seen operating in every new development in the world. Even the apparently sincere efforts going on to conserve nature are sometimes no different. Such capitalist tendencies have been reflected on all walks of life, undoubtedly on literature too. The question that why we have millions of works written so far in western literature (and world literature for the latter has learnt to categorically follow patterns of the former and create exact replicas!) invariably centred on man, and roams wearisomely around the futile and the superficial, and that too from the stereotypic monotonous mundane life, explains that. Every time a new work is produced, some kind novelty is expected of it. But most of the time it is all the same, the same old patterns, recurrent themes on a new attire. Think how many works have been written so far, for instance, in English literature. From the age of Chaucer, through the Golden era, Shakespeare, Milton, and the great Victorian masters of novel or so they are called. How many of their works, how many have something to tell other than human triviality, dispersing discussions on the convolutions of human mind? Chaucer is praised best for his Canterbury Tales, perhaps the first in the train among the best works in English literary canon. What do those tales tell? What do Shakespeare's greatest tragedies tell? They all tell of man, his manners, his folly, his futilities, his chronicles, his bravery, his downfall, and a little more. Nature hardly comes into the scene, or if at all it does, it stays aloof being a different

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entity that has nothing significant to do. It is man and man alone always on the focus. One may ask well, what else could literature tell; for literature is essentially connected to human life. This is because we are so programmed by the kind of literature we are accustomed to. We cannot imagine Shakespeare writing pages in praise of Birnam forest. But look how this Indian poet, the greatest perhaps in many respects, chose to begin one of his most praised works of poetry.

Astyuttarasyam disi devadatma

himalayo nama nagadhirajah

purvaparau toyanidhim vagahya

sthitah prithivyamiva manadandah.

[There, in the north, is the soul of Gods

Himalaya in name, the king of mounts

Reaching to the waters on east and west

Stands who as if to measure the earth] [There, in the north, is the soul of Gods

Himalaya in name, the king of mounts

Reaching to the waters on east and west

Stands who as if to measure the earth]

The poetis none other than Kalidasa. These lines from *Kumar asambhavam* seems more likean invocation. Himalaya is raised to being no less than a Godhead. It is a selfless praise of the mountain that gives life giving waters to India. Being the heart of life in the subcontinent, Himalaya is therefore, undoubtedly worth of worshipping. The invocation continues until the tenth verse of the work. It is not often that such sincerity of expression in tribute to nature happens in world literature. Does it become of the literature of our day in general? Even if occurs such honest devotion towards a natural entity, it remains only as a glimpse considering the huge mass of works written every year. Coleridge's *Rime of the Ancient Mariner* is one*;*

He prayeth best who loveth best

All things both great and small.

We do not have time for trifles like reflecting on, conserving, empathising with, if not worshipping, what surrounds us and more ironically what has shaped us and given life to us and is very well a part of us.We are after many other things. As Robert Frost puts it in one of his most quoted lines,

Woods are lovely dark and deep

But I have promises keep

And miles to go before I sleep

Nature gives us pleasure on seeing, yet we will keep on killing systematically every component of nature to keep our promises, to make the miles long journey of life easy and comfortable. But people have started realizing that things are not that easy. Every killing adds to the growing unrest and leads man towards a fast approaching extinction. Man cannot stand aloof separating himself from nature, however hard he tries and by killing each living being he is killing himself. It is high time that we were more kind; to be kind towards everything means kind towards ourselves. This short poem, "The Mower" of Philip Larkin is worth notingas it conveys the same sense.

The mower stalled, twice; kneeling, I found

A hedgehog jammed up against the blades,

Killed. It had been in the long grass.

I had seen it before, and even fed it, once.

Now I had mauled its unobtrusive world

Unmendably. Burial was no help:

Next morning I got up and it did not.

The first day after a death, the new absence

Is always the same; we should be careful

Of each other, we should be kind

While there is still time.

The 'mower' is the ruthless brute force of capitalist current. We need no mowers anymore. Their blades have started turning back to us to make a fatal wound. It is no more a question of being kind, It is, in fact, a question of survival. It is struggle for existence.

It is fundamental to human behaviour not to be content with what is. This misconception that there is something to be done, some change to be made on the natural by man's action, by his masculine bravery is the answer to why the world has been manipulated as seen today. But now that he has changed his mind, by to days ecological activism, he is again back in action to make further changes but this time in a different direction. Conservation strategies formulated by modern ecology and the action plans by international organizations like UN, WWF, and IUC Nare part of that. All of them create the impression that a reverse transformation is in the making, that too again by man's brave hands. But such make-beliefs can only create an illusion. It is man's principles and formulations that brought nature to this plight. How ridiculous it would be to expect the same to save the earth!

Then how can environment be conserved in the true sense? The answer is simple and is very well consisted in India's body of knowledge and literature as old as Vedic Literature.

Om purnamata purnamidam

purnatpurnamudachyate

purnasya purnamadaya

purnamevavasishyate..

[Everything is complete in itself, perfect in every respect. From that which is complete does emerge only 'the complete?. Even if you make something out of it,

only 'the complete' do you get. And add something to it, only the complete will be left.]

Hence nature is complete in itself. It does not need human intellect to save itself. It becomes complete by its own force if weallow it to. The best effort to conserve nature is to remain as non-violent as possible towards living things, doing the few that human life could do in help of nature.

Life on this earth (and anywhere else) is simple, transparent, natural, and so profuse, full and self-sufficient as no need, there is, of an external intervention. Science, reason, and systemic conceptions become a need when human consciousness feels otherwise. Theories, and scientific misconceptions are not what life is. Nature is perfect in its own way and if not it knows how to be. All one should do is to remain passive without any intrusion.

Wotks Cited

1. Sri Sankara. (1964).*Ten Principal Upanishads: With Sankarabhashya. Vol.1.* Delhi: Motilal Banarsidas.
2. Stopping by the Woodsona Snowy Evening. Poem Hunter. Web. 21 Mar 2018 https://m.poem hunter.com/poem/ stopping-by-woods-on-a-snowy-evening-2/
3. The Mower. Poetry Foundation. Web. 21 Mar 2018
4. https://www.poetryfoundation.org/poems/48423/the -mower-56d229a740294

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Effects of Periodic Markets on Job Creation, Socio Economic Growth and Sustainable Development

By Babajo. H, Dr. R. O. Yusu f & Prof. I.J. Musa
Ahmadu Bello University

Abstract- The study focuses on the effects of periodic markets on socio-economic development of Giwa Local Government Area of Kaduna State. Purposive sampling and Random sampling technique were used to sample four periodic markets and 437 respondents in the study area. Data were collected using questionnaire focusing on participants from the four different periodic markets across Giwa Local Government Area. The data was analysed using both descriptive and multiple regression analysis. The study revealed that periodic markets have significant effect on the socio-economic development of the study area as confirmed by the regression analysis which were significant at 5% level through increase in trader's income (0.000), with 24% of the traders earning above N 30,000 monthly, and creation of job opportunities (0.000) like head loaders, carriers, shoe makers road transport workers, grain mill, welding, telecommunication business etc,. It is concluded that, periodic markets have tremendous effects on the socio-economic development of Giwa Local Government Area. It is recommended that, there should be establishment of financial institutions in the study area which will help traders to have access to loans to enable them expand their business to earn more income.

Keywords: periodic markets, job creation, socio-economic development.

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I. Introduction

Agriculture has long been recognized as a source of generating income for most rural households as well as an engine for economic growth. The ability of households to exchange or move surplus from region of comparative advantage to region with less potential within a country or across national borders is an important ingredient towards the growth of agriculture and improvement of rural livelihood (Muchopa, 2011). And this is done through periodic markets in rural areas.

Arua (2004) observed that promotion of livelihood should concentrate on human resources and people at grass root levels and they should be mobilized to work together voluntarily to put scarce resources at their disposal. Marketing these agricultural products specifically plays vital roles in enhancing rural dwellers' income and eventually promotes their livelihood.

Rural development has been cardinal to Nigeria's socio- economic development and important aspect in the development of periodic market is essential for development of rural economy. The rural economy largely depend not only the agricultural productions but also on the marketing of produce. The functions of periodic markets are dynamic as forces directly related to the life style of the rural people in particular and the rural development in general.

The rural market towns in Nigeria form impressive growth points largely due to changing lifestyle patterns and rapid change in demand structure of the consumers of rural produce as exemplified by Giwa which this study focuses on. Market towns are economically viable centres and represent the regional foci of development. Markets in rural areas change with the factor in the differential growth of cities and in the changing socio- economic aspects of rural areas. As such periodic markets perform important functions in the development of rural communities in developing countries. However, such development should be based on proper understanding of their functions and linkages. The study area is well served by four periodic markets and also helps to establish rural urban linkages to facilitate rural development.

Periodic markets provide outlets for disposing rural produce, source of local supplies, and foci for periodic service provision where a full range of fixed services would not be viable. In order to ensure a balance development process in rural as well as urban areas, it is necessary to provide basic services in rural areas to stimulate the rural economy and the levels of incomes and employment opportunities. Such a development effort requires the utilization of growth potentials of rural markets centres as basic nodes to articulate the rural economy and to link it in to the national hierarchical order of settlements. This therefore means the threshold of rural periodic markets extend beyond the immediate rural surrounding. Without these market centres cannot grow beyond certain limits. The establishment of a successful periodic market in a suitable location provides a basis for the development of an integrated rural service centre incorporating both fixed and periodic service facilities and growing in to a substantial nucleated settlement. Without a market, many other services are unlikely to be established, and if

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they are, they may fail or disappear for lack of custom (Bromely, 1976).

Therefore, the quest to investigate the effects of periodic markets on the socio economic development of Giwa LGA becomes necessary to create understanding on how the markets has improved the economic and social well being of the rural people. It is generally accepted that marketing is a way of income diversification and a pre-requisite to sustained economic and social advancement of rural areas (Benjamin and Okwoche, 2011) and rural socio economic development is highly linked to marketing (especially agricultural marketing) because that is the major activity in the rural areas (Daudu, 2010). This background provides the rationale for this study.

II. Aim and Objectives

The aim of this study is to assess the effects of periodic markets on socio-economic development of Giwa Local Government Area of Kaduna state. However, the specific objectives of the study are to:

i. characterize the socio- economic attributes of the traders in the study area.
ii. analyse the contributions of periodic market to job creation, income, innovation and revenue generation of the study area.

a) *The Study Area*

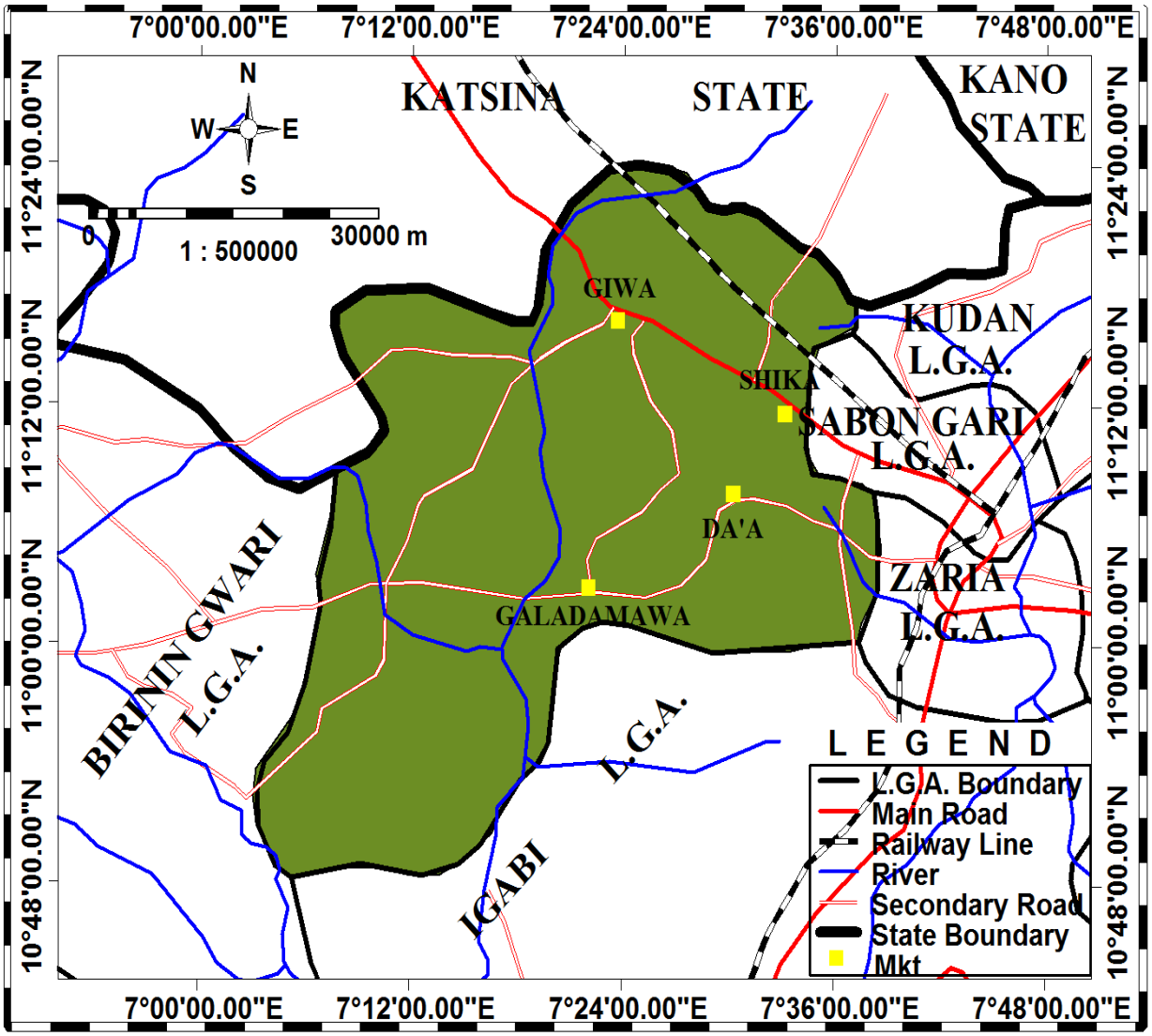
The study area as presented in Figure 1.1 is located between latitude 11.00°N to 11.30°N of the equator and longitude 7.00°E to 7.45°E of the Greenwich meridian. It is located north west of Zaria, in the northern guinea and southern tip of the sudan savanna. The study area has a total land area of about 2,066km (Ochiche, Ajake, Okpilia 2013). Topographically, the area is blessed with floodplains popularly known as Fadama lands. These floodplains are characterized by availability and accessibility to both open surface and underground water. The mean annual rainfall varies from 635 mm to 1,524 mm (Yakubu and Abbass 2009).

There are two distinct seasons in the study area; the rainy season and the dry season. The rainy season commences between April and June. The length of the rainy season varies from 90 days to 200 days. The dry season extends from October to early June and is marked by hot dry north eastern harmattan winds. The lowest mean temperature is usually recorded during the harmattan period. This occurs between November and February with the range from 18°C – 23°C.The major source of livelihood in this area is agriculture and the bulk of agricultural production is undertaken by small farmers of which women are included (Yakubu and Abbass 2009). The study area had a population of 286,427 people in 2006 with a projected population of 332, 255 people in 2011 at a population growth rate of 3.2 per cent (NPC, 2006). The people are mostly Hausa Fulani by ethnic category. Other tribes like Ibo, Ebira, Tiv, and Yoruba patronize the markets. The traders who undergo trading activities in the various markets in Giwa LGA makes up the population of the study, it is important to have an understanding of their socio economic characteristics.

The farming system in the upland area of Giwa LGA is essentially rain-fed while in low land areas, both wet and dry season farming occurs. Upland farming is for the most part cereals (like millet, rice, maize and sorghum); legumes (including cowpea; groundnut and soya bean). The lowland farming involves mainly vegetables; tomatoes, pepper and onions. The major crops grown in the area are maize, cowpea, tomatoes, pepper, onions, wheat, lettuce, carrot, garden egg plant, amaranthus and sugarcane (Oyakhilomen, 2014). Small-scale farmers carry out agricultural production predominantly. The cropping systems in the area are also dominated by mixed cropping, although sole cropping is practiced. In addition, significant parts of the populations are involved in livestock keeping which depends on grazing Oguntolu, (2005) cited in Ayinde, Omolehin and Ibrahim (2011). The nomadic Fulanis predominantly do the grazing and livestock rearing.

The market serves as the main points of exchange for the indigenes and traders from neighbouring states. The markets in Giwa LGA include Giwa, Shika, Galadimawa and Da'a. These markets operates on two days weekly basis given the cycle in marked succession (Yurkushi, 1995) as cited in Dyaji (2016), to allow participation by proximate border towns and communities. A large proportion of the exchange transaction takes place on personal face to face basis people converge in these markets on market days to buy and sell. All the markets in the study area are periodic markets.

The Study Area



Source: Modified from Administation map of kaduna

Fig. 3.1: Giwa local Government Area Showing Location of Periodic Markets

III. Materials and Methods

a) Sample Size and Sampling techniques

In order to determine the sample size for this study, Giwa Local Government revenue office was consulted. Four functional periodic markets in study area were identified. They are all selected as sampling frame. Purposive sampling method was used in the selection of the periodic markets, since there are only four functional periodic markets in the study area. Typology of commodities and numbers of participants in each of the markets were identified and a total number of 8,085 traders were identified in all the markets.

Krejcie and Morgan (1970) table for the determination of sample size was used to select sample size for the entire population (8,085), hence a total number of 437 respondents were used as sample size.

However, for questionnaire administration, procedure for sample size selection of the respondents in each of the market was determined using the formula below. Commodities and services in the markets were grouped and respondents were selected using the random sampling technique.

$$\frac{n}{N} \times 437$$

Where n = market population

N= Total population of selected markets.

IV. Method of Data Analysis

Different analytical techniques were employed in the analysis of the data collected for this study. The techniques of analysis are presented based on objectives.

Objective 1: To characterize the socio- economic attributes of the traders in the study area.

Descriptive statistics were used to analyse the socio- economic attributes of the traders and other service providers. Percentage, tables and other descriptive statistics desirable were used and graphical illustrations were also used for effective comprehension.

Objective 2: To delineate the locational and threshold pattern of periodic markets in the study area.

This was achieved through information collected from the traders to show the locational and threshold pattern. GPS were used in taking the location of the various markets. The distances from the market to the participants' communities were cartographically presented to show the extent of reach of the markets. Also Onokerhoraye (1985) suggestion of collecting primary data and using percentage to describe the volume is combined with cartographic approach.

Objective 3: To analyse the contributions of periodic market to job creation, income, innovation and revenue generation of the study area.

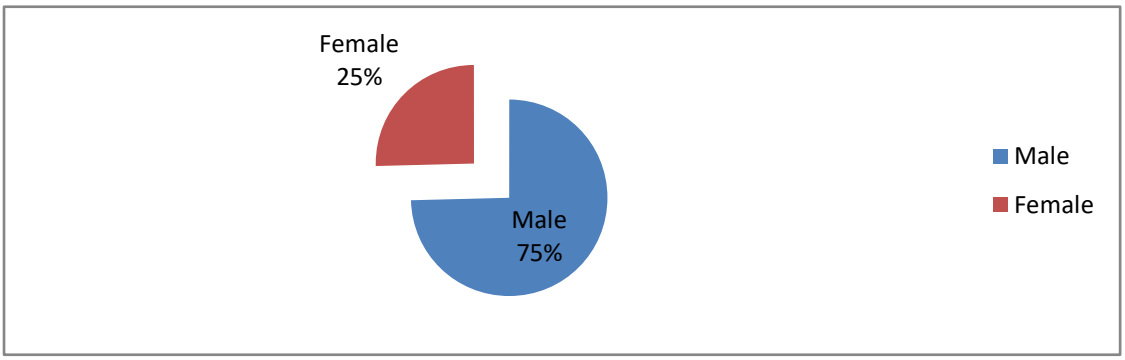
The contributions of periodic market to job creation, income, innovation and revenue generation as obtained from the questionnaire were analysed using multiple regression analysis. This was done in the SSPS environment.

V. Results and Discussion

a) Socio Economic Characteristics of Respondents

i. Sex Distribution of Respondents

Marketing in periodic markets of Giwa LGA is operated by both men and women. Figure 1.2 shows the distribution of respondents by sex. The distribution shows that the males are the dominant group among the marketers. This accounted for about 74.6% of the sampled marketers compared to the females that made up 25.4%.



Source: Author's field work,(2016).

Figure 1.2: Percentage Distribution of Marketers by Sex

It could be said that the male and the female members of the society are represented in the marketing activities in the area. However, the observed lower proportion of women in the marketing activities in the study area could be associated with the economic empowerment system which is lower for females in the society. Also women in the study area may lack exposure to business opportunities because it requires a lot of energy and involves movement from one place to another. Another factor that hinders the low participation of women in marketing activities in the study area could be religion and cultural barriers as Islamic religion is the dominant religion in the study area which did not permit women to go out of their homes and consider marketing as men profession making males mobile and females sedentary. All these make men to participate more in the markets. In addition to this, women lack collateral to borrow money to invest in marketing activities.

The finding is directly opposite to the study of Ehinmowo and Ibitoye (2010) in Akoko southwest and that of Yusuf (2009) in Kwara State which reveals that most marketers in rural periodic markets are females especially in Yoruba and Nupe communities. However, the finding is in line with that of Benjamin and Ok woche (2011) which reveals that majority of the marketers in sorghum marketing are males with very few females in Benue state. This therefore means cultural orientation may be an underlying factor in gender involvement in marketing activities indicating that involvement of women in marketing is higher in southern and western Nigeria, as compared to northern Nigeria.

b) Age Distribution

The age distribution of respondents helps to determine the nature of labour force available as well as their contributions to economic development of the area. Age is one of the socio- economic characteristics of

marketers which play a very important role in the economic development of the study area. According to Inoni and Omotor (2009), age is one of the factors that affect the efficiency of carrying out marketing activities. Table 1.4 shows the distribution of marketers by their age.

Table 1.4: Age Distribution of Respondents

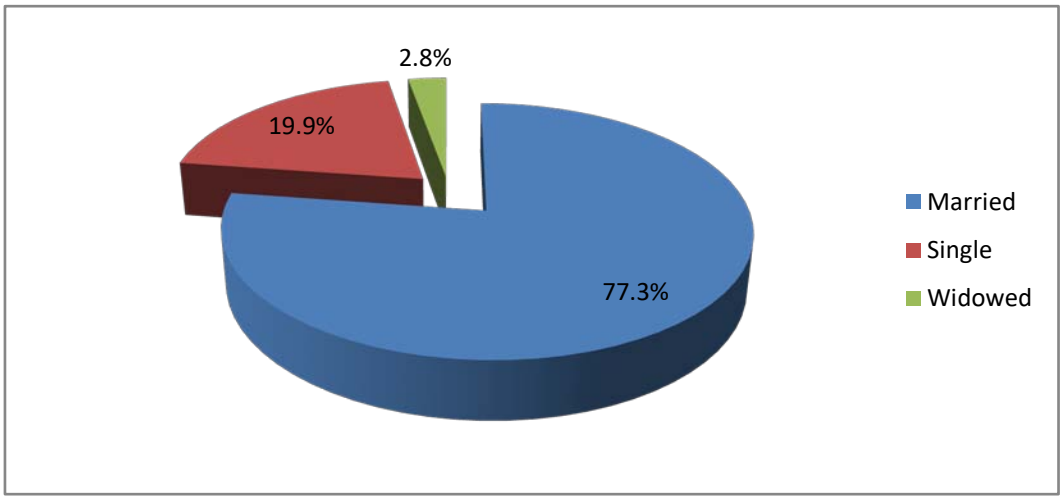
Age category	Frequency	Percentages
Less than 20 years	59	13.5
20- 25 years	58	13.3
26-30 years	77	17.6
31-35 years	91	20.8
36-40 years	81	18.5
45 years >	71	16.3
Total	437	100

Source: Author's Field work, (2016)

From the data in Table 1.4, majority of the participants are within ages 26-45 years, which indicates that most respondents (about 73.2%) are within the economically active population while 26.8% are teenagers hawking consumable goods. This implies that marketing in the study area enjoys high patronage by both young and middle age people who are energetic enough to withstand the stress involved in buying and selling. This also shows that they are within active and productive age that could add to the productivity of the economy of the rural area. This agrees with the finding of Kudi (2005) who asserted that the older the trader, the lower the probability that the household head would be productive. Naturally, when people are above 50 years, their productivity diminishes especially when the work they do demands physical efforts than mental energy. Thus, the productivity of the respondents in terms of marketing would not be expected to be low.

c) *Marital Status*

The marketers in the study area are categorised based on their marital status. Figure 1.3 shows the distribution of respondents by marital status. The presentation shows that 77.3% of the traders are married as at the time of the study while 19.9% are single and 2.8% are widowed. This indicates that both married and unmarried persons are involved in marketing activities in the study area.



Source: Author's Fieldwork, (2016.)

Figure 1.3: Percentage Distribution of Marketers by Marital Status

Married persons are perhaps more because they have to meet family responsibilities; hence the need to work and raise income for the family welfare is necessary. The high percentage of married respondents also confirmed the high value placed on marriage institution in rural areas of the study area.

On the other hand, the low percentage of widows is an indication that vulnerable groups of the population in the study area are not actively involved in trading. This could be due to credit and other constraining factors which either affects their ability to benefit from government intervention on credit or societal factors limiting their participation. This may be more applicable to the widow rather than the widowers which are a reflection of the gender representation of the market participants as observed in figure 1.2.

Educational Qualification of the Respondents

Education in terms of literacy and numeracy is important for easy communication between the market participants. Thus, the result of the distribution of

respondents by educational attainments is presented in Table 1.5

Table 1.5: Level of Educational Attainment of Respondents

Educational qualification	Frequency	Percentages
Informal	119	27.2
Primary	148	33.9
Secondary	104	23.8
Tertiary	66	15.1
Total	437	100

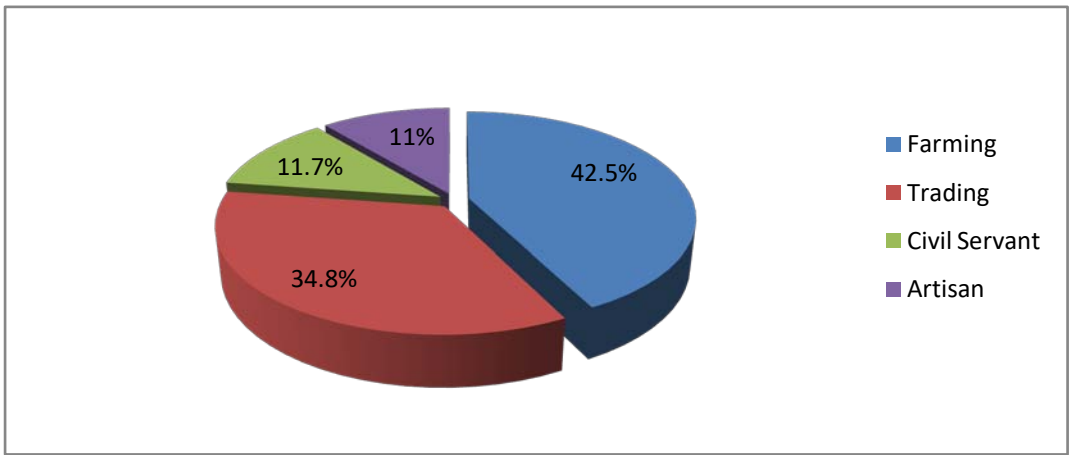
Source: Field work, 2016.

The Table shows that about 27% of the participants in studied markets have no formal education, while about 73% of them have some form of formal education. This category constitute 34 % who had primary education as their highest qualification, 24% have attained secondary education and 15 % have acquired tertiary education. The level of educational attainment at 73% implies that many respondents had formal education, which consistently shows that participants have adequate basic literacy knowledge to transact business and engage in marketing activities. Also some of the traders are urban based.

A high level of educational attainment is also expected to affect positively the productivity of rural market participants especially traders as educated traders are likely to adopt modern trading and marketing skills. The implication of this finding is that the level of trader's education is believed to influence adoption of innovative methods and improved technology in marketing system.

d) Primary Occupation of the Respondents

The main occupation of the people in the study area is agriculture. The primary occupations of the market participants are presented in Figure 1.4.



Source: Author's Field work, (2016)

Figure 1.4: Percentage Distribution of Market participants by their primary occupations

Out of 437 respondents administered with questionnaires in the study area, 42% are producers and at the same time marketers of agricultural produce as their primary occupation, 35% are marketers of other products (Industrial goods, consumable goods, textile, agricultural inputs etc), 12% engaged in artisan activities. However, 12% are civil servants and marketers at the same time.

The highest concentration of the respondents in farming could be because the main occupation of the people in the study area is agriculture. The findings is in line with the study of Ehinmowo and Ibitoye (2010) in Akoko southwest that a large percentage of the population in rural areas engaged in farming as their major occupation while few engaged in tertiary activities like trading, teaching and artisans etc.

e) Income of the Respondents

The disposable incomes of the traders do affect the level of involvement and investment in marketing. It can also determine the level of the social welfare of the marketers. Corey (1998) puts it, that there is clear perception that changes in economic welfare (level of income) indicate changes in social welfare in the same direction if not the same degree. The implication of this finding is that if the traders earn much income from their sales, their welfare needs will equally increase. Table 1.6 presents the income of traders.

Table 1.6: Distribution of Participant's Monthly Income

Average Monthly Income	Frequency	Percentages
Less than ₦5000	61	16.3
₦ 5000 - ₦ 10,000	86	19.6
₦ 15,000- ₦ 20,000	85	19.5
₦ 25,000- ₦ 30,000	92	21.1
₦ 30,000- above	103	23.6
Total	437	100

Source: Author's Field work, (2016).

Table 1.6 shows that only 24% traders earn up to ₦ 30.000 and above monthly. Followed by, those who earn income between ₦ 25,000 - ₦ 30,000 with 21%. It is obvious from the table that majority 55% (16%, 20% and 19%) of the respondents earn less than ₦25, 000 monthly. This indicates that majority of the traders are still operating at micro scale or small scale. This result coincides with Usman (2011) who reported that petty trading is one of the informal sectors whose return is very low. Another reason for the low income could be due to the fact that most agricultural traders in the markets usually satisfy their food needs before the excess are sold in the market. Thirdly, majority of the traders are rural marketers who do not have access to substantial financial resources.

f) Periodic Market and Socio-economic Development

The focus here is to assess the impact of periodic market on socio-economic development of the study area. This takes into consideration the contribution of periodic markets to selected indicators of socio-economic development (Income of traders, innovation, job creation to the unemployed and revenue generation to government). This is in line with Fagin (2010), who highlighted that a well structured market benefit communities by serving as a place where local farmers can sell their food at a high profit, which benefits the local economy and preserves agricultural land, bring people together, strengthen the community, create a spill over economic effect for other down town businesses as well as drive the development of new local system, incubate new businesses and brings about general community development.

In order to confirm this, the variables were subjected to multiple regression analysis. This is to enable the researcher identify the relationship among the variables under investigation. Table 1.7 shows the multiple regression analysis of the socio-economic development indices. The result reveals that there is significant positive relationship between periodic market and income with a coefficient of 0.789 and a p-value of 0.0000 at 1% significant level. This implies that as the participation in periodic market increases, income of the rural people will also increase in the same direction. This could be as a result of more number of people that participate in the market. This is in agreement with Litman (2010), definition of development as a progress toward a community's economic goals such as increased employment, income, productivity, property values and tax revenues.

Table 1.7: Multiple Regression Analysis of the Role of Periodic Market on Socio-economic Development

Variables	Coefficient	Std error	Beta	T values	P values
constant	0.286	0.036	-	7.931	0.000
X_1	0.789	0.088	0.749	9.057	0.000**
X_2	-0.070	0.095	- 0.071	- 0.730	0.466
X_3	0.285	0.074	0.240	3.877	0.000**
X_4	0.015	0.009	0.033	1.618	0.106

Source: Author's Field work, (2016)

Number of observation 437
R- Squared = 0.818
Adj. R- Squared = 0.816
F. Statistic = 485.999
** Significant at 0.05 probability level
Y= Regularity of attending periodic markets
KEY
X_1= Average income of traders
X_2= Revenue generation to government
X_3= number of people engaged in non- trading activities
X_4= Types innovation diffused in the market

The regression analysis result presented on Table 1.7 reveals R- squared 0.82, implying that 82% of changes that occur in socio- economic development could be explained by the independent variables included in the equation. The F value is 485.999 and is significant at 0.05% level of probability. Considering p>/t/ values for all the variables included in the equation only X_1 and X_3 are significant and they are significant at 5% β- levels; having confidence interval of 95% each. The implication of these findings is that increase in the level of any of the variables X_1 and X_3 will influence positively the impact periodic market would have on economic development.

The significant influence of X_1 (income) with coefficient value 0.798 and p value of 0.000, implies that the role of periodic market in amount of income earned by traders cannot be overemphasized. To further buttress this point, Dyaji (2016) opined that marketing is one of the strategies of generating income by rural dwellers to participate in socio economic development of community.

The significant influence of X_3 (Job creation) with coefficient value 0.285 and p value of 0.000, implies that there is significant role played by periodic market in job creation in the study area. Hence the higher the periodic markets the more the job opportunities created

which will bring more income earnings and more development economically as opined by Litman (2010) who averred that progress towards a community's economic goals such as increased employment and income. This is in line with the findings of the researcher where services like head loaders, Barrow pushers, Okada/ keke riders, Road transport union, hawkers, petty traders, shoe repairers/ cobblers, traditional barbers, etc. were found at all markets studied.

Finally, the relationship between periodic market and innovation shows an insignificant positive relationship from the correlation coefficient of 0.015 and a p-value of 0.106. This shows that innovations come to the study area through the presence of periodic market in a slow manner. This could be as a result of less number of participants from other far away States that will bring along with them different ways and ideas of marketing, farming and others. This finding is in line with that of Yusuf (2008) who states that majority of the traders claimed latest information and new ideas on best practices in their trade reached them from traders and buyers who come from other rural and urban settlements.

VI. Conclusion

From the findings of this study, it could be concluded that presence of periodic market in the study area is of tremendous economic benefits to the people and their rural communities. This is because there are various agricultural commodities to trade in the study area as farming still remains the major economic activity of the communities. Presence of periodic markets in the study area has improved the welfare of the settlers positively who are the major traders in the market by increasing their income through creation of different non trading job opportunities. There is inadequacy of modern skills, innovation and knowledge of trading among traders in the study area which reduces their profit gain.

VII. Recommendations

Based on findings of this study, the following recommendations are posited:

i. The study reveals that majority of the traders are men. Since provision of family needs is not limited to men alone, more women should be encouraged to participate in trading activities in the markets. This can be achieved if government will grant loan to women at one digit interest rate through cooperative activities, microfinance banks and commercial banks. And other government policies that could encourage rural women in marketing activities such as women literacy, economic empowerment training and financial literacy should be pursued. There should be the establishment of financial institutions in the rural areas which will help traders to make micro- credit more accessible and available to them. This should be urgently done to help the low income earners to expand their businesses therefore earn more income.

ii. Agricultural produce especially grains which are the major commodities in the market shows that majority of the traders are farmers. Marketers in this area should be encouraged to diversify to marketing of other commodities particularly urban consumable goods to enhance their income. This could be done through improvement in access to credit/ loan to encourage urban consumable goods marketers. Also bulk whole sale through the rural outreach section of urban industries should be encouraged.

iii. Traders should be encouraged by government to form market focused multipurpose and credit thrift co-operative societies through which they can mobilize funds for self help. These co-operatives should be platforms for provision of some services and facilities such as construction of roads and market facilities which will help in easy movement of goods and people in and out of the markets and also makes the market activities easy. The economic development of the Giwa LG secretariat should liaise with ministry in charge of co-operatives

iv. Efforts should be made by government to boost the income diversification of the traders through provision of infrastructures like road, electricity and water supply to rural communities of the study area. This will increase other nonfarm activities that could generate income for the people and thereby improving the socio-economic development of the markets and the study area.

References Références Referencias

1. Arua, E.O. (2004). *Comparative Cooperative System*. Unpublished Departmental Monograph. Department of Agricultural Economics, University of Nigeria, Nsukka.
2. Ayinde T.B, Omelehin R.A. and Ibrahim U. (2011). Efficiency of Resources Use in Hybrid and Open Pollinated Maize Production in Giwa LGA of Kaduna State, Nigeria. *American Journal of Experimental Agriculture* 1(3) 86- 95
3. Benjamin, C.A and Ok wocha A.O (2011). Marketing of Agricultural Produce among Rural Farm Household in Nigeria: The case of Sorghum Marketing in Benue State. *International Jounal of Bussiness and Social Sciences* 1 (3) 13.
4. Bromley, R.J. (1976). Periodic Markets and Rural Development Policy. *Ekistics journal* 42(248) 49-54
5. Corey, L.M (1998). Social Psychology Quarterly with the mean monthly temperature of 25C *American Sociological Association Stable* 61(2) http://www.stor.org/stable/2787065.
6. Daudu, J.R. (2006). *How Can the Poor Benefit from the Growing Markets for High Value Agricultural*

Products? Research Report, Natural Resources Institute, Kent, UK.
7. Dyaji, R.D. (2016). *Assessment of the Effects of Agricultural Marketing on Socio Economic Development in Southern Part of Kaduna State, Nigeria.* An Unpublished PHD Dissertation of Geography Department, Ahmadu Bello University Zaria.
8. Ehinmowo, A. A. and Ibitoye, A. O. (2010). Periodic market, a common marketing feature in Akoko South West. *Journal of Geography and Regional Planning.* 3(12), 361-364.
9. Fagin, S (2010). *Engaging the Community for Farmers Market Success.* Northeast Organic Farming Association of Vermont. United States of America.
10. Inoni, O.E. and Omotor, D.G. (2009). Effect of Road Infrastructure on Agricultural Output and Income of Rural Households in Delta State *Agricultural Tropical ET Subtropical.* 42(2).
11. Kudi, T.M. (2005). *Economic Analysis of Sesame Production and Marketing in Jigawa State*. Doctoral Dissertation, Department of Agricultural Economics and Rural Sociology, Institute for Agricultural Research, Ahmadu Bello University, Zaria.
12. Krejcie, R.V. and Morgan, D.W. (1970). *Determining Sampling Size for Research Activities Education and Physiological Measurement* 30, 60-610.
13. Litman, T. (2010). *Evaluating Transportation Economic Development Impacts. Victoria* Transport Policy Institute, 8.
14. Muchopa *et al* (2011). Evaluating Performance by Cooperative Value and Efficiency. *Nigerian Journal of Cooperative Studies.* 2(1), 39 – 54.
15. Ochiche, C.A; Ajake, A.O.; Okpilia, F.I. (2013). Spatio-Temporal Distribution of Rural Market in Bekwarra local Government Area of Cross River State of Nigeria. *Journal of Humanities and Science.* 16(3), 104-112.
16. Onokerhoraye, A.G. (1985). *An Outline of Human Geography*. Eguavoen Printing Press Benin City Nigeria.
17. Oyakhilomen, O. (2014). Gender Influence on the Income of Maize Farmers in Giwa Local Government of Kaduna State. *Russian Journal of Agriculture and Socio Economic Science,* 1 (25), 15.
18. Tracey-White, J. (2003), *Marketing Extension Guide*, Chapter 4: Planning and Designing Rural Markets, Rome, Food and Agriculture Organization of the United Nations.
19. Usman N.E. (2011). *An Assessment of the Impact of Microfinance Institutions on Poverty Alleviation in Kaduna State.* Unpublished M.Sc Thesis, Department of Geography, Ahmadu Bello University, Zaria.
20. Yakubu, R. and Abbass, I.M. (2009). National Poverty Eradication Programme (NAPEP) and Poverty Alleviation in Rural Nigeria. A Case Study of Giwa Local Government Area of Kaduna State. *European Scientific Journal* 8(18) 90-103.
21. Yusuf, R.O. (2009). The Dynamics of Periodic Markets on Rural Traders' Profit and Welfare in Kwara State. *Nigeria journal of geography environment and planning.* 4(1), 83-92.

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Seasonal and Spatial Variation in Physico- Chemical & Biological Quality of Rainwater in Benin City, Edo State

By Ayeki Judith Aiwansosa, Asikhia Monday & Ojeh, Vincent. N
University of Benin

Abstract- One major socio-economic problem today is coping with increasing demand for water for domestic and other uses. In most cases, people depend on alternative means of supply such as rainwater harvesting, collection from rivers, streams and any available water body, channelling runoff to ponds and other storage facilities and purchase from water vendors. These methods often compromise water quality. This study evaluated the spatial variation of rainwater quality in Benin City using the core of the city (Forestry, Ring-Road), intermediate zone (Upper Mission Road, Airport Road) rural-urban fringe (Ikpoba-Hill, Ogba) and NIFOR (control) in Benin City in the months of March and July, 2016. The objectives of the study are to examine the spatial variation of the physical (Colour, Electrical Conductivity, Salinity, Total Suspended Solids), chemical (pH, Total Dissolved Solid, Chemical Oxygen Demand, Nitrate, Sulphate, Magnesium), biological (Total Coliform Count) and heavy metal (Iron, Copper, Zinc, Manganese) properties of rainwater, examine the seasonal variation of rainwater quality, compare rainwater quality with the World Health Organization (WHO) Quality Standard (2012) for Domestic Water and examine the implications of rainwater quality in the study area. Descriptive Statistics, Analysis of Variance and Student t-test were employed in the analysis of the data collected for this study. The results showed that rainwater quality in study locations was more acidic in the month of July which represents the typical wet or rainy season of the year compared to the month of March.

Keywords: *rainwater quality, spatial variation, seasons, benin city, WHO STD.*

GJHSS-B Classification: *FOR Code: 040699p*

Strictly as per the compliance and regulations of:

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Ayeki Judith Aiwansosa [α], Asikhia Monday [σ] & Ojeh, Vincent. N [ρ]

Abstract- One major socio-economic problem today is coping with increasing demand for water for domestic and other uses. In most cases, people depend on alternative means of supply such as rainwater harvesting, collection from rivers, streams and any available water body, channelling runoff to ponds and other storage facilities and purchase from water vendors. These methods often compromise water quality. This study evaluated the spatial variation of rainwater quality in Benin City using the core of the city (Forestry, Ring-Road), intermediate zone (Upper Mission Road, Airport Road) rural-urban fringe (Ikpoba-Hill, Ogba) and NIFOR (control) in Benin City in the months of March and July, 2016. The objectives of the study are to examine the spatial variation of the physical (Colour, Electrical Conductivity, Salinity, Total Suspended Solids), chemical (pH, Total Dissolved Solid, Chemical Oxygen Demand, Nitrate, Sulphate, Magnesium), biological (Total Coliform Count) and heavy metal (Iron, Copper, Zinc, Manganese) properties of rainwater, examine the seasonal variation of rainwater quality, compare rainwater quality with the World Health Organization (WHO) Quality Standard (2012) for Domestic Water and examine the implications of rainwater quality in the study area. Descriptive Statistics, Analysis of Variance and Student t-test were employed in the analysis of the data collected for this study. The results showed that rainwater quality in study locations was more acidic in the month of July which represents the typical wet or rainy season of the year compared to the month of March. Critical levels of heavy metals were observed in March (Cu: 0.003-0.023mg/l; Fe: 0.21-1.93mg/l; Pb: 0.003-0.017mg/l; Cd: 0.002-0.013mg/l; Mn: 0.057-0.010mg/l in study locations). Contaminant levels were found to be a function of the seasonal variation of rainfall. It is therefore concluded that there is spatial and seasonal variation in rainwater quality in Benin City and the rainwater is not fit for human consumption.

Keywords: rainwater quality, spatial variation, seasons, benin city, WHO STD.

I. Introduction

The most direct impact of urbanization on ecosystems is altering the hydrologic cycle that controls the ecosystem energy and matter flows (DeFries and Eshleman, 2004). Indeed, water resources in urban environments around the world are increasingly stressed due to population rise, rapid land use change (Foley *et al.,* 2005; Piao *et al.,* 2007), and climatic variability (McCray and Boving, 2007; Sun *et al.,* 2008). In many parts of the world, water availability has severely limited environmental, social, and economic development (Vorosmarty *et al.,* 2000; Falkenmark *et al.,* 2007; McDonald *et al.,* 2011). Water stress is especially problematic in fast-growing population centres in particular, where water demands are high and water quality is generally low. (Oki and Kanae, 2006).

Air pollution is one of the most visible environmental problems in urbanized areas (Babanyara and Saleh, 2010).Air pollution is defined as the presence of one or more contaminants (pollutants) in outdoor atmosphere and indoor in such quantities that they may tend to be injurious to humans, plant or animal life. Air pollutants are sometimes classified into primary air pollutants(mainly suspended particles, oxides of sulphur and nitrogen, hydrocarbons, carbon monoxide and toxic trace elements, halides, organic phosphates, chlorinated hydrocarbons, uranium and radioactive elements emitted by man) and secondary air pollutants(formed as a result of chemical reactions of primary gaseous pollutants within the atmosphere (Harrison, 1986). During rainfall, these gases are washed out from the atmosphere by rainwater thereby causing land and surface water pollution (acid rain).

Right from the outset Benin City had always been a region of attraction because of its commercial and administrative roles. For example, the ancient Benin Empire was prominent and regarded as the centre for trade in ivory, pepper and slaves. The kingdom's artisans were noted for wood, ivory carving and bronze casting. These socio-economic roles are still functional (though gradually fading away) in this contemporary era (Nkeki, 2016).Presently, Benin City has experienced a transformation from agro-based socio-economic activities to a growth pole of commercial and administrative functionality, supported by numerous financial establishments, educational, health and other plethora of corporate activities.

These activities especially industrial are expected to impact on its air quality and hence on the rainwater quality. In view of the inadequacies of water supply witnessed in Nigeria and Benin City in particular, it has become absolutely necessary to examine the quality of rainwater. It is important because its

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knowledge will help highlight its suitability or otherwise for specific uses. This should be an important aspect of planning for domestic water supply. According to National Bureau of Statistics (2009), at least 27% of Nigerians depend absolutely on streams, pond, river and rainwater for their drinking water source. Research has shown high prevalence of waterborne diseases such as cholera, diarrhoea, dysentery, hepatitis etc. among Nigerians (Oguntoke*et al.,* 2009; Raji and Ibrahim, 2011). The need for water quality monitoring is paramount to safeguard the public health and also to protect the water resource in Nigeria.

Bangira*et al.,* (2007), conducted a study in Harare, Zimbabwe's largest city, to determine the concentration and flux of lead in rainwater, and to identify areas that experience acid rain. The study was carried out during the 2000/2001 to 2003/2004 rainy seasons. Rainwater was collected after each rain event from three meteorological stations located in Harare: Harare Agricultural Research and Extension (Arex), Harare International Airport (Airport) and Belvedere. The results showed that Harare experienced acid rain with Arex having the highest frequency of acidic rainwater than Belvedere and Airport throughout the four seasons. Very high Pb concentration in rainwater was recorded. The seasonal lead concentration in rainwater at all the sites was more than ten times higher than those reported in industrialised areas indicating high levels of pollution. Since Harare is not as industrialised as cities in the developed world, acidity and high levels of Pb in rainwater in Harare were attributed to the long range transport of pollutants and high levels of sulphur-dioxide and Pb emissions from the exhausts of motor vehicles that still use leaded petrol. It was concluded that Harare experienced acid rain and Pb problem.

Eruola*et al.,*(2011), investigated the Qualitative Assessment of the Effect of Thunderstorm on Rainwater Harvesting from Rooftop Catchments at Oke-Lantoro Community in Abeokuta, Southwest Nigeria. Results showed strong dilution effects in the variation in harvested rainwater quality with thunderstorm and rainstorms. However, the rainwater harvested under thunder storm had less pollution as compared to water harvested from rain storm. The asbestos roofing sheet water sample gave higher calcium and magnesium content which reflects in the total hardness value. Sample from the aluminum roofing sheet gave the best result but it was also affected by the influence of atmospheric dust particles. Considering the results of the physico-chemical tests, irrespective of storm, the harvested water samples could be put to other domestic uses, as they cannot be consumed directly.

Olayiwola and Igbavboa (2014), revealed that Benin City has actually experienced significant expansions at three different periods between 1987 and 2008.It follows therefore that bythe year 2050, if the population of Benin City stands at 5,805,573 as projected, it is expected that the city will be left with only 385,505.9 hectares of its total area. This is likely to have impact on human health. The natural bush cover is being removed without any consideration for replacement, thus there is the tendency for reduction in the amount of carbon-dioxide in circulation. Consequent upon this, there is likely to be a change in the environmental conditions in terms of rainfall and temperature.

Most of the residents in Benin City have resulted to different alternative source of water. in addition, the cost of drilling a water bore-hole to an accepted depth and its maintenance are high, coupled with the inadequacy of surface water and public supply scheme have resulted to use of rainwater harvested and stored for various domestic needs and consumption. It is obvious that from the existing literature that little or no research work has been carried out on the spatial variation of rainwater quality in Benin City.

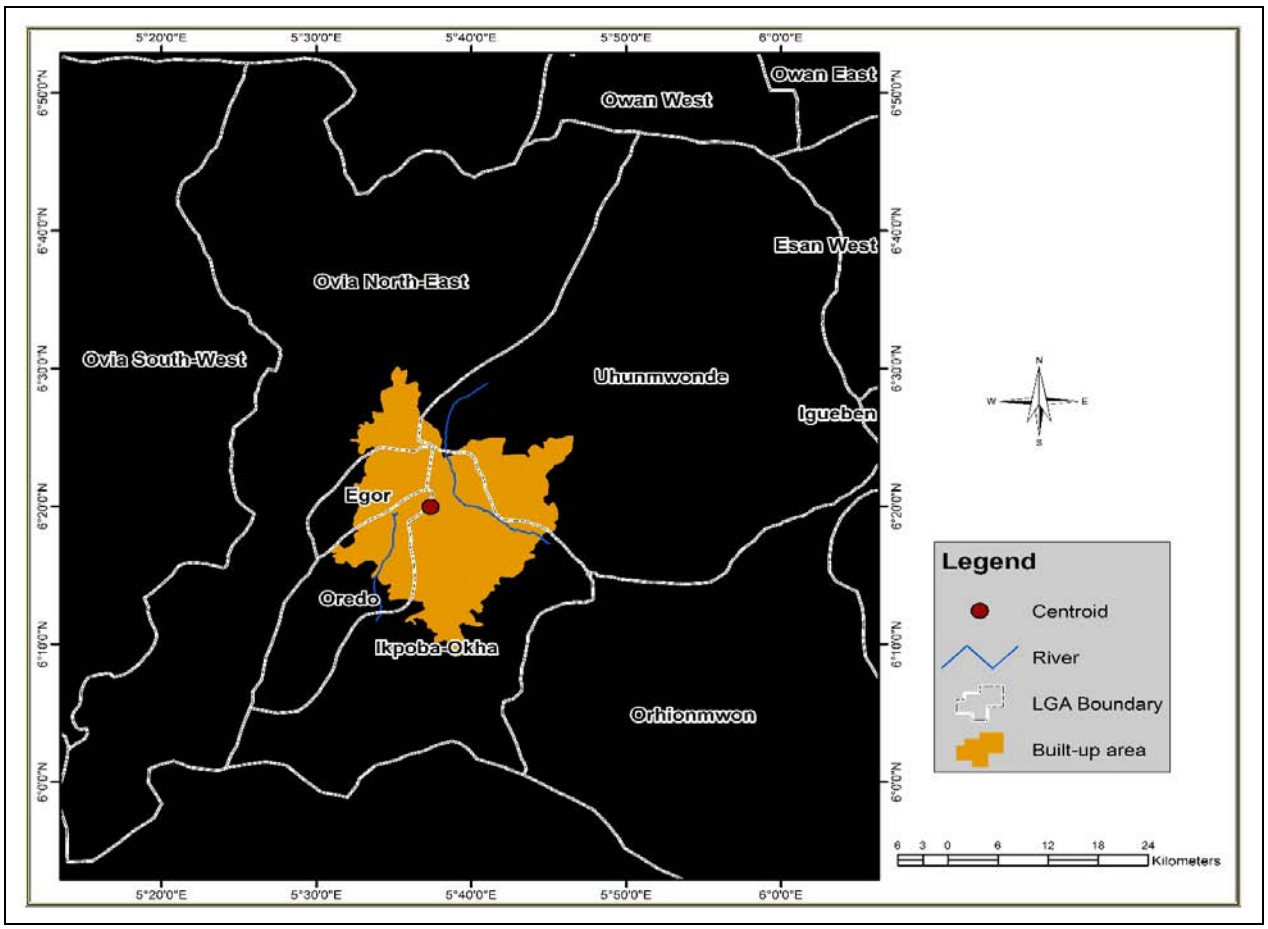
II. Materials and Methods

a) *Study Area*

Benin City is the administrative capital of Edo State. It is found at the southern margin of the state between latitudes 6° 16' to 6° 33' N and longitudes 5° 31' to 5° 45' E (Figure 1). To the west of the city is Ovia-North East Local Government Area, to the South is the fringe of Oredo Local Government Area while to the East is Ikpoba-Okha Local Government Area (Okafor, 1998). Initially, the urbanised part of the region spread over three local government areas (LGAs), these are Oredo, Egor and Ikpoba-Okha. Overall, it territorial coverage is roughly 1,318 km2 with 166 km in perimeter and average elevation of about 78 meters above sea level (Nkeki, 2013). Due to its rapid urban growth, the metropolitan region has presently spread into two additional contiguous LGAs-Ovia northeast and Uhunmwode.

Benin City has a land mass of 10,956km^2 (Edo World, 2016).The population is heterogeneous owing to rural-urban migration within Edo State as well as migration from other parts of Nigeria as a result of the constant growth in the level of economic opportunities over the last years coupled with other factors such as extended family affinity system (Onokerhoraye, 1995). By 1952, the population of Benin was 53,753 and by 1963, the population almost doubled to a figure of 100,694 with annual growth rate of 5.5 percent. In 1972, it was estimated to have increased to 201,000 (Doxiadis Associates, 1972) and in 1976 a household survey presented an estimate of 314, 219 (Sada, 1976). This estimation indicates 8.5 percent growth rate between 1963 and 1976. In 1991 (NPC, 1991), the population of the city rose to 801,622. By 2006, the population for the region had risen to 1,085,676 (NPC, 2006). The population of Benin City as at 2017 is projected to be

1,456,716 using the national growth rate of 2.7%.This rise in population has initiated a steady increase in the spatial extent of the metropolitan region with its attendant effects on quality of water resources.



Source: Nkeki (2017)Produced from 2015 Google data

Figure 1: Spatial Extent of Benin Metropolitan Region within the LGAs in Edo State

b) Rainwater Sampling Procedures

Rainwater samples were collected at the onset of the rainy season (March, 2016) when gaseous impurities in the air reaches their highest concentration which have not been optimally removed by the rainwater on account of the dry season (Ubuohet al., 2012) and also during the peak of the rainy season (July, 2016) from the core area of the city (Forestry, Ring-Road), intermediate zone (Upper Mission Road, Airport Road) Periphery (Ikpoba-Hill, Ogba) and Nigerian Institute For Oil-Palm Research (NIFOR) according to the prevailing wind direction (North-east,South-west) as shown in Figure 2 and Table 1. Two samples were collected in all the selected sites in the city as well as the control. In all four samples were collected per zone.

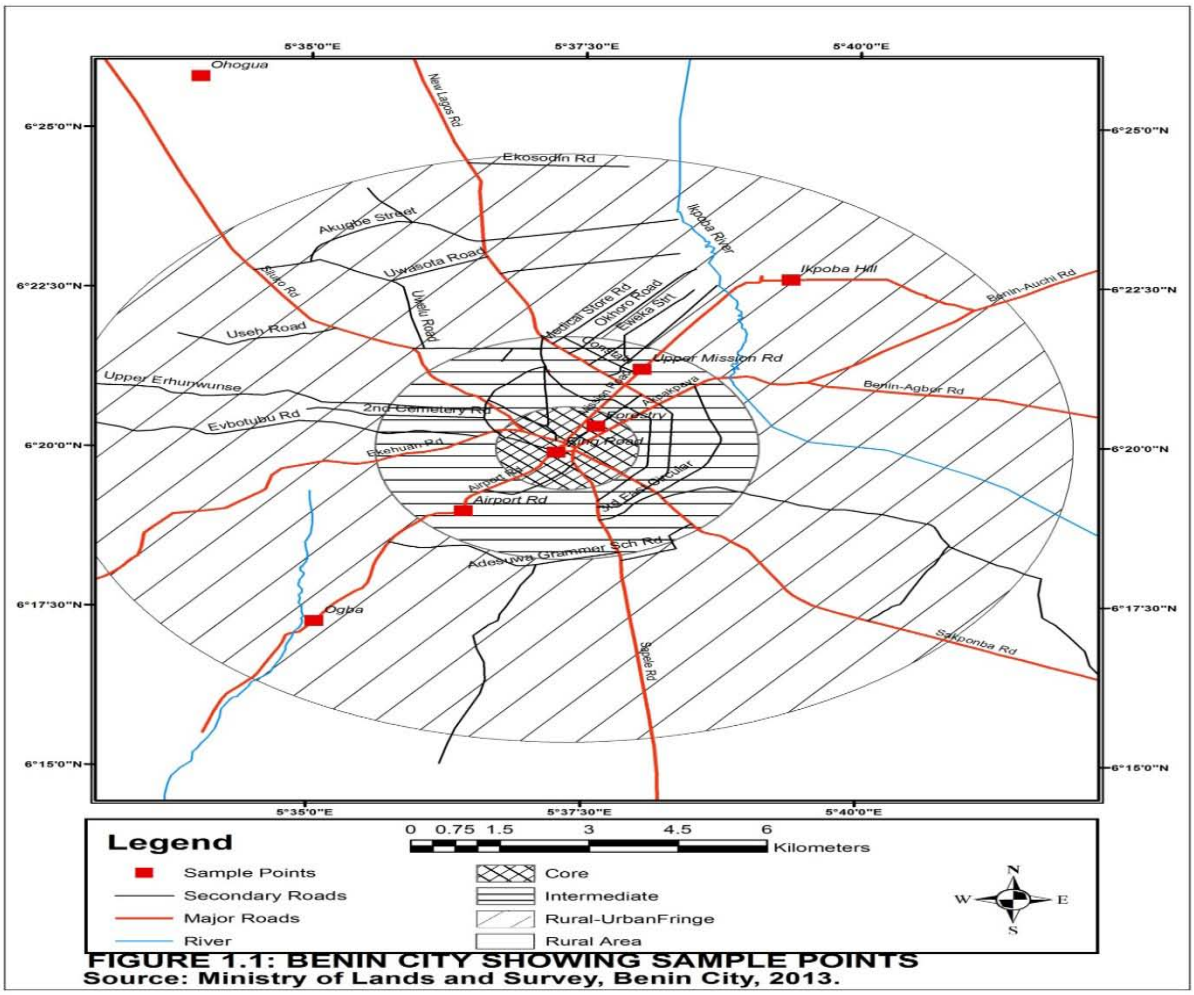


Figure 2: Benin City and the Sampling points for the study

Table 1: Sample Locations

S/N	ZONE	SAMPLING LOCATIONS
1	Core	Forestry and Ring-Road
2	Intermediate	Upper- Mission and Airport Road
3	Rural-Urban Fringe (Periphery)	Ikpoba-Hill and Ogba Road
4	Control Site	NIFOR

Source: Author's computation from field work (2016)

c) Laboratory Analysis

Rainwater samples were collected by placing an open container (20.5cm diameter) in an open space free from direct human activities and 1.5m away from ground level (of for, *et al.,* 2014). At the end of each rainfall event, the samples were immediately transferred into clean high density polyethylene (HDPE) bottles and transported to the laboratory following Beavington (1988).The rainwater samples were collected and analyzed for physical, chemical, biological and selected heavy metal content following standard laboratory procedures. We tested for the following: Colour, turbidity, total suspended solids (TSS), total dissolved solids (TDS), chemical oxygen demand (COD), Ammonium-Nitrogen, total coli form count (Macconkey Agar), and determination of heavy metals (Fe, Zn, Cu, Pb, Cr, V& Ni)while the pH and electrical conductivity of rainwater samples were determined in situ electrometrically with a glass electrode (JENWAY 3540) pH/conductivity meter and a conductivity meter (Standard Methods for the Examination of Water and Wastewater, 2004).

Generated data was tested statistically using Analysis of Variance (ANOVA) and the Student's t-test performed by the use of Statistical Packages for Social Sciences (SPSS 16.0) and results presented.

III. Results and Discussion

a) Spatial and Seasonal Variation of the Physical Properties of Rainwater in Benin

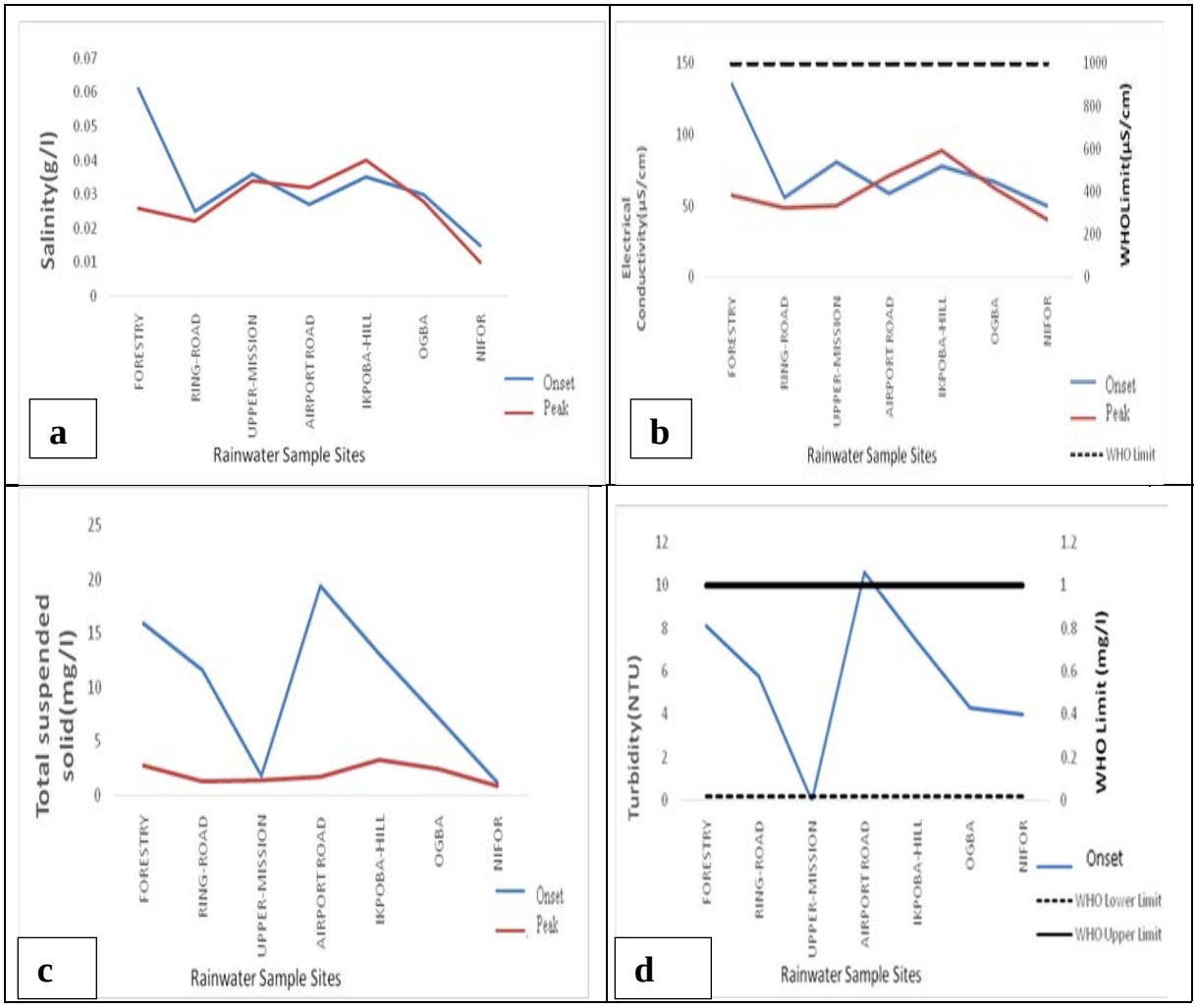
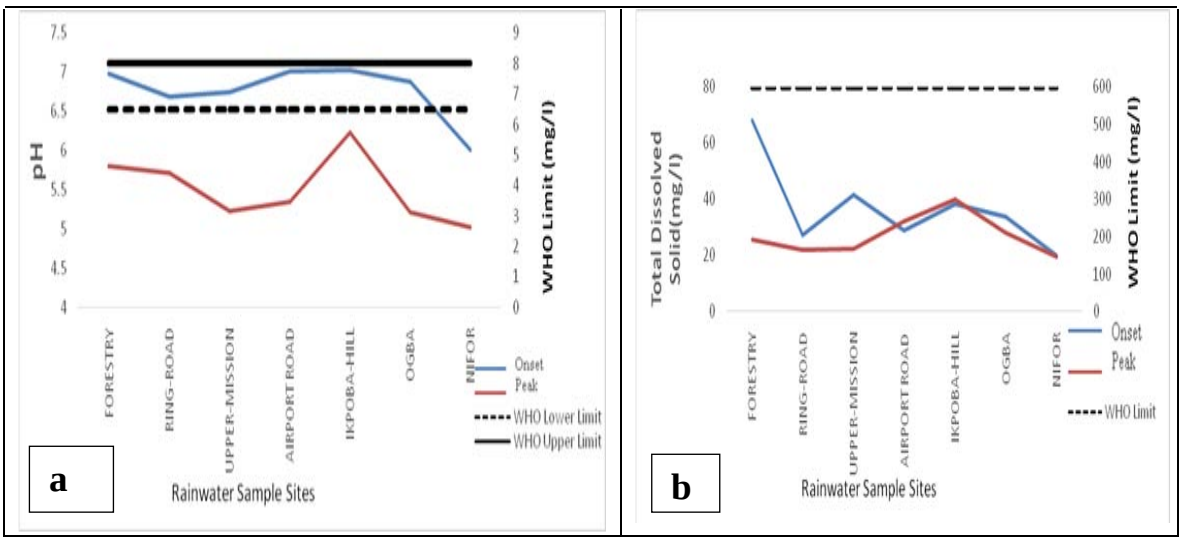


Figure 1: Mean Content of (a) Salinity (b) Electrical Conductivity (c) Total Suspended Solids and (d) Turbidity in rainwater at the onset and peak of rainy season 2016

b) Spatial and Seasonal Variation of the Chemical Properties of Rainwater in Benin



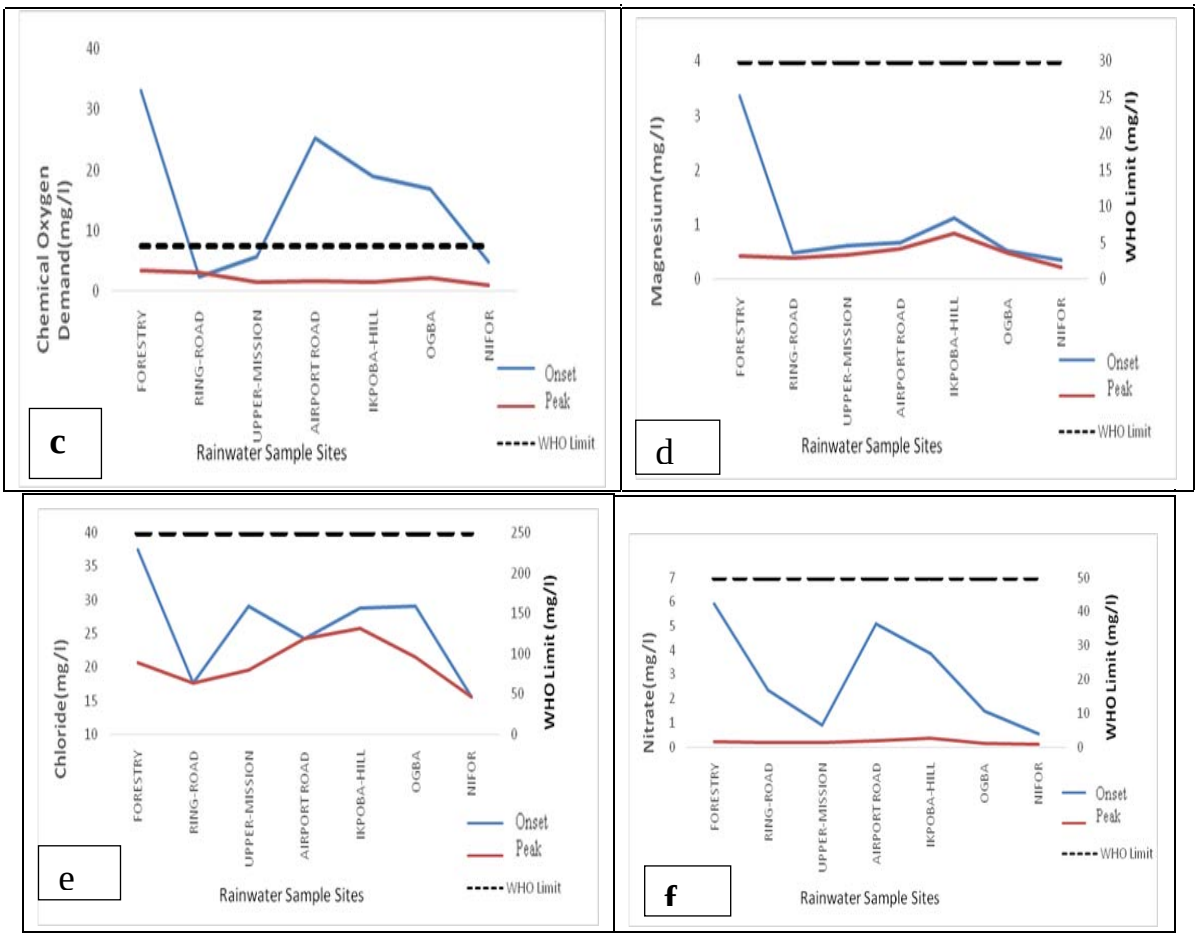


Figure 2: Mean content of (a) pH (b) TDS (c) COD (d) Magnesium (e) Chloride and (f) Nitrate in rainwater at the onset and peak of the rainy season

c) *Spatial and Seasonal Variation of the Biological Properties of Rainwater in Benin*

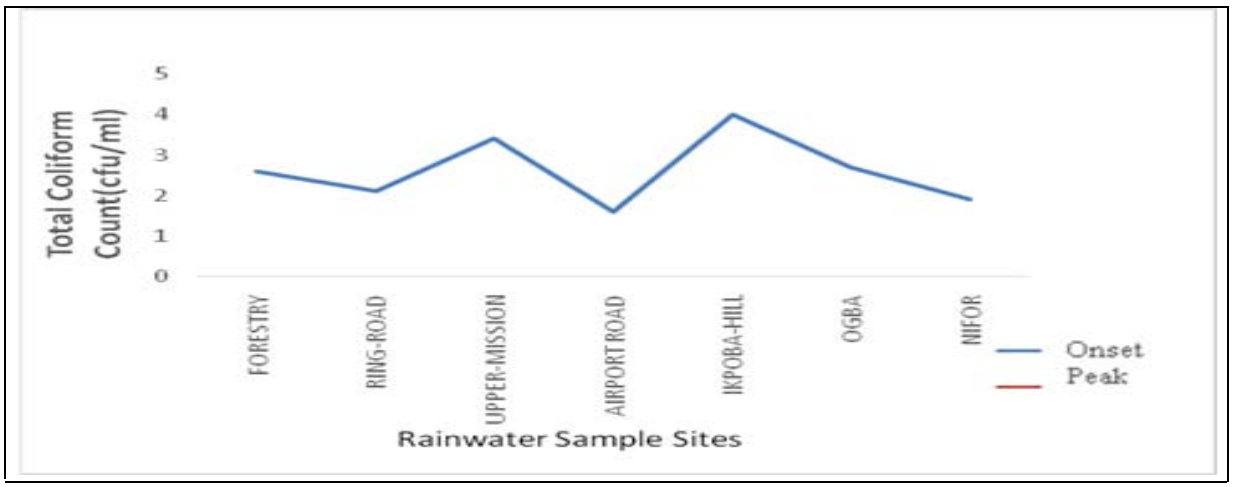


Figure 3: Mean Total Coliform Count (TCC) content of rainwater at the onset and peak of the rainy season

IV. Discussion of Result

In figure 1 (a), the values of salinity of rainwater samples are presented. For the onset of the rainy season (March), the values from the core area of the city were; Forestry (0.061g/l) and Ring-Road (0.025g/l), intermediate- Upper Mission (0.036g/l) and Airport-Road (0.027g/l), rural-urban fringe – Ikpoba-Hill (0.035g/l) and Ogba (0.030g/l) and NIFOR (control site) was 0.015g/l. During the onset of rainy season (March), the values ranged from 0.015 to 0.061g/l with a mean of 0.032g/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (0.026g/l) and Ring-Road (0.022g/l), intermediate-Upper Mission

(0.034g/l) and Airport Road (0.032), rural-urban fringe – Ikpoba-Hill (0.040g/l) and Ogba (0.028g/l) and NIFOR (control site) was 0.010g/l. The values ranged from 0.010 to 0.040g/l with a mean of 0.27g/l at the peak of rainy season (July). The presence of a high salt content may render water unsuitable for domestic, agricultural or industrial use, or may affect its suitability for shellfish (WHO, 2001).

In figure 1 (b), the electrical conductivity (EC)is presented. EC represents the amount of soluble salts (anions and cations) in the rainwater. The following values from the core area of the city were recorded; Forestry (135.1μS/cm) and Ring-Road (55.9μS/cm), intermediate - Upper Mission (80.4μS/cm) and Airport Road (58.8μS/cm), rural-urban fringe – Ikpoba-Hill (77.5μS/cm) and Ogba (66μS/cm) and NIFOR (control site) was 50.1μS/cm. The values ranged from 50.1 to 135.1uS/cm with a mean value of 74.91μS/cm at the onset of the rainy season (March). For the peak of the rainy season (July), the values from the core area of the city were; Forestry (57.2μS/cm) and Ring-Road (48.7μS/cm), intermediate - Upper Mission (50.0μS/cm) and Airport Road (71.1μS/cm), rural-urban fringe – Ikpoba-Hill (88.4μS/cm) and Ogba (62.6μS/cm) and NIFOR (control site) was 40.5μS/cm. The values ranged from 50.1 to 135.1μS/cm with reduced mean value of 57.50μS/cm. This also implies that more soluble salts associated with less dilation effect occurred at the onset of the rainy season (March) compared to the peak of the rainy season (July). Electric Conductivity for Forestry had the highest value (135.1µS/cm) due to urbanization while NIFOR location had the lowest of 50.1µS/cm for the onset of the rainy season (March) as seen in Figure 4.4. This property is related to the ionic content of the sample which is in turn a function of the dissolved (ionisable) solids concentration. However, it has no direct significance concerning the health of humans (WHO, 2002). The EC values were within the WHO (2012) permissible limit.

In figure 1 (c), the Total Suspended Solids (TSS)is presented. The values for Total Suspended Solid (TSS) from the core area of the city were; Forestry (15.9mg/l) and Ring-Road (11.6mg/l), intermediate - Upper Mission (1.8mg/l) and Airport Road (19.4mg/l), rural-urban fringe – Ikpoba-Hill (13.1mg/l) and Ogba (7.2mg/l) and NIFOR (control site) was 1.2mg/l. It ranged from 1.2 to 19.4mg/l with a mean of 10.02mg/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (2.8mg/l) and Ring-Road (1.3mg/l), intermediate - Upper Mission (1.4mg/l) and Airport Road (1.7mg/l), rural-urban fringe – Ikpoba-Hill (3.3mg/l) and Ogba (2.5mg/l) and NIFOR (control site) was 0.9mg/l. The values ranged from 0.9 to 3.3mg/l with a mean of 1.55mg/l as presented in Figure 4.6. It is observed that rainwater samples collected at the onset of rainy season (March) had higher amount of suspended solids than those collected at the peak of rainy season (July) for all locations. This may be attributed to the accumulation of particles from the air during long dry spell (October to February) before the onset of the rain.

In figure 1 (d), the turbidity of the rainwater is presented. During the onset of the rainy season (March), the values from the core area of the city were; Forestry (8.1NTU) and Ring-Road (5.8NTU), intermediate - Upper Mission (ND) and Airport Road (10.6NTU), rural-urban fringe – Ikpoba-Hill (7.4NTU) and Ogba (4.3NTU) and NIFOR (control site) was 4.0NTU. The content of Turbidity during the onset of the rainy season (March) shows that Airport road location had the highest turbidity value (10.6NTU). This can be attributed to the commercial activities in the area. Rainwater samples from NIFOR location yielded the least turbidity (4.0NTU) value. Turbidity for the onset of the rainy season (March) ranged from 4.0 to 10.6NTU with a mean of 5.74NTU while for the peak of the rainy season (July), values were not detected (ND). Mean turbidity value for different locations was above the WHO upper and lower limits of 0.2 and 1.0NTU respectively. Turbidity in water arises from the presence of very finely divided solids (which are not filterable by routine methods). The existence of turbidity in water will affect its acceptability to consumers, utility in certain industries and interfere with the treatability of waters. Turbidity can be caused by sewage matter and there is a risk that pathogenic organisms could be shielded by the turbidity particles and hence escape the action of the disinfectant (USEPA, 2001).

In figure 2 (a), the p His presented. During the onset of the rainy season (March), the values from the core of the city were; Forestry (6.98) and Ring-Road (6.69), intermediate - Upper Mission (6.75) and Airport Road (7.01), rural-urban fringe – Ikpoba-Hill (7.03) and Ogba (6.88) and NIFOR (control site) was 6.01. The values for the peak of the rainy season (July) for the core area of the city were; Forestry (5.80) and Ring-Road (5.72); intermediate-Upper Mission (5.23) and Airport-Road (5.23); rural-urban fringe- Ikpoba-Hill (6.23) and Ogba (5.21) and NIFOR (control site) was 5.03. Ikpoba-Hill location had pH of 7.03 during the onset of rainy season (March) which represents a neutral condition while NIFOR had a pH of 6.01 (slightly acidic). The pH ranged from 6.01 to 7.03 in March indicating slight acidity to neutral condition. This can be attributed to lack of rainfall. In July (the peak of the rainy season), the pH ranged from 5.02 to 6.23 indicating moderate to slight acidic rainwater quality as shown in figure 4.1 due to dilution by heavy rainfall. Hence, the rainwater was more acidic in the month of July which represents the typical wet or rainy season of the year compared to the month of March which represents peak month of the dry in agreement with the findings by Egwuogu et al., (2016) on rainwater quality assessment in Obio/Akpor Local

Government Area of Rivers State, South-South Nigeria and Bangira et al., (2007) findings on the Spatial and Temporal Variation of pH and Lead in Rain Water in Harare City, Zimbabwe. The values were within the WHO (2012) permissible limit (Upper limit-8.0, lower limit-6.5). pH affects mucous membrane, causes bitter taste and corrosion.

The Total Dissolved Solids (TDS) is presented in figure 2 (b). The Total Dissolved Solids (TDS) values of rainwater samples are presented in Figure 4.7. During the onset of the rainy season (March), the values from the core area of the city were; Forestry (68.2mg/l) and Ring-Road (27.3mg/l), intermediate - Upper Mission (41.4mg/l) and Airport Road (28.9mg/l), rural-urban fringe – Ikpoba-Hill (38.3mg/l) and Ogba (33.7mg/l) and NIFOR (control site) was 1.2mg/l. The values ranged from 20.0 to 68.2mg/l with a mean of 36.8mg/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (25.7mg/l) and Ring-Road (21.9mg/l), intermediate - Upper Mission (22.2mg/l) and Airport Road (32.0mg/l), rural-urban fringe – Ikpoba-Hill (39.8mg/l) and Ogba (28.2mg/l) and NIFOR (control site) was 19.5mg/l. The peak of the rainy season (July) had values ranging from 19.5 to 39.8mg/l with a mean of 24.04mg/l. TDS is concerned with fishery waters where high deposition of solids can interfere with fish and with spawning grounds. It leads to undesirable taste, gastro-intestinal irritation and corrosion or incrustation (Patil, Sawant, and Deshmukh, 2012). The values were within the WHO (2012) permissible limit.

The Chemical Oxygen Demand (COD) is presented in figure 2 (c). At the onset of the rainy season (March), the values from the core area of the city were; Forestry (33.2mg/l) and Ring-Road (2.4mg/l), intermediate - Upper Mission (5.7mg/l) and Airport Road (25.4mg/l), rural-urban fringe - Ikpoba Hill (19.0mg/l) and Ogba (16.9mg/l) and NIFOR (control site) was 4.9mg/l. The values ranged from 4.9 to 33.3mg/l with a mean of 16.78mg/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (3.5mg/l) and Ring-Road (3.2mg/l), intermediate - Upper Mission (1.6mg/l) and Airport Road (1.8mg/l), rural-urban fringe – Ikpoba-Hill (1.5mg/l) and Ogba (2.2mg/l) and NIFOR (control site) was 1.0mg/l. The values ranged from 1.0 to 3.5mg/l with a mean of 2.11mg/l. During the onset of the rainy season (March), Forestry location had the highest value (33.2mg/l) followed by Airport road location (25.4mg/l) while NIFOR location had the least value (4.9mg/l). There was a great drop in the Chemical Oxygen Demand values for the peak of the rainy season (July) with Forestry location (3.5mg/l) and NIFOR location (1.0mg/l). COD values for the onset of the rainy season (March) were above the WHO (2012) limit (7.50mg/l) while at the peak of the rainy season (July) was lower.

The Magnesium content in rainwater is presented in figure 2(d). Magnesium ion (Mg2+) concentration in rainwater samples collected from different locations ranged from 0.35 to 3.36mg/l with a mean of 1.01mg/l for the onset of the rainy season (March). The values from the core area of the city were; Forestry (3.36mg/l) and Ring-Road (0.48mg/l), intermediate - Upper Mission (0.62mg/l) and Airport Road (0.67mg/l), rural-urban fringe – Ikpoba-Hill (1.11mg/l) and Ogba (0.52mg/l) and NIFOR (control site) was 0.35mg/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (0.42mg/l) and Ring-Road (0.38mg/l), intermediate - Upper Mission (0.45mg/l) and Airport Road (0.56mg/l), rural-urban fringe – Ikpoba-Hill (0.84mg/l) and Ogba (0.48mg/l) and NIFOR (control site) was 0.22mg/l. The values ranged from 0.22 to 0.84mg/l with a mean of 0.47mg/l as shown in Figure 4.9. Forestry location had the highest value (3.36mg/l) during the onset of the rainy season (March) while NIFOR location had the least value (0.35mg/l). Magnesium ion (Mg2+) values for onset and peak of the rainy season (March and July) of rain were below the WHO (2012) limit (30mg/l) for portable water.

The Chloride values of the rainwater is presented in figure 2(e).The concentration of chloride ion (Cl-) of rainwater samples for the onset of the rainy season (March) from the core area of the city were; Forestry (37.4mg/l) and Ring-Road (17.7mg/l), intermediate - Upper Mission (29.1mg/l) and Airport Road (24.2mg/l), rural-urban fringe – Ikpoba-Hill (28.8mg/l) and Ogba (29.0mg/l) and NIFOR (control site) was 15.5mg/l. The values ranged from 15.5 to 37.40mg/l with a mean of 25.95mg/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (20.6mg/l) and Ring-Road (17.7mg/l), intermediate - Upper Mission (19.5mg/l) and Airport Road (24.3mg/l), rural-urban fringe – Ikpoba-Hill (25.8mg/l) and Ogba (21.5mg/l) and NIFOR (control site) was 15.5mg/l. The values which ranged from 15.5 to 25.8mg/l with a mean of 20.70mg/l were lower. The least value (15.5mg/l) for Chloride ion (Cl-) during the onset of the rainy (March) was recorded in NIFOR location while the highest value (37.4mg/l) was in Forestry location. The values dropped slightly during the peak of the rainy season (July) with Ikpoba-Hill location having the highest value (25.8mg/l) and the least was in NIFOR location (15.5mg/l). All values were below the WHO (200mg/l) limit (WHO, 2012). Sewage contains large amounts of chloride, as do some industrial effluents. If a daily water consumption of 2 litres and an average chloride level in drinking-water of 10 mg/litre are assumed, the average daily intake of chloride from drinking-water would be approximately 20 mg per person (Department of National Health and Welfare, 2000), but a figure of approximately 100 mg/day has also been suggested (WHO, 2002). Drinking water intake accounts for about 0.33–1.6% of the total intake. Chloride concentrations in excess of about 250 mg/litre

can give rise to detectable taste, eye/nose irritation, stomach discomfort and Increase corrosive character of water. Consumers can, however, become accustomed to concentrations in excess of 250 mg/litre (WHO, 2010). The Nitrate values of the rainwater is presented in figure 2(f).During the onset of the rainy season (March), the Nitrate (NO3-) concentration of rainwater samples collected from the core area of the city were; Forestry (5.92mg/l) and Ring-Road (2.36mg/l), intermediate - Upper Mission (0.92mg/l) and Airport Road (5.11mg/l), rural-urban fringe – Ikpoba-Hill (3.86mg/l) and Ogba (1.48mg/l) and NIFOR (control site) was 0.55mg/l. The values ranged from 0.55 to 5.95mg/l with a mean of 2.88mg/l. For the peak of the rainy season (July), the values from the core area of the city were; Forestry (0.219mg/l) and Ring-Road (0.192mg/l), intermediate - Upper Mission (0.166mg/l) and Airport Road (0.256mg/l), rural-urban fringe – Ikpoba-Hill (0.373mg/l) and Ogba (0.157mg/l) and NIFOR (control site) was 0.120mg/l. The values ranged from 0.120-0.373mg/l with a mean of 0.21mg/l as shown in Figure 2 (c). Nitrate found in natural waters is of mineral origin, most coming from organic (waste discharges) and inorganic (artificial fertilisers) sources. However, bacterial oxidation and fixing of nitrogen by plants can both produce nitrates. High nitrate levels in water (> 11mg/l) will render them hazardous to infants below the age of six months inducing them with shortness of breath and the "blue baby" syndrome (methaemoglobinaemia) (Patil et al., 2012).Sewage is rich in nitrogenous matter which through bacterial action may ultimately appear in the aquatic environment as nitrate. Nitrate values were within the WHO (2012) permissible limit.

Figure 3 shows the Total Coliform Count (TCC) which gives a general indication of the sanitary condition of a water supply. During the onset of the rainy season (March), the values from the core area of the city were; Forestry (2.6mg/l) and Ring-Road (2.1mg/l), intermediate - Upper Mission (3.4mg/l) and Airport Road (1.6mg/l), rural-urban fringe – Ikpoba-Hill (4.0mg/l) and Ogba (2.7mg/l) and NIFOR (control site) was 1.9mg/l. The TCC during the onset of the rainy season (March) had values ranging from 4.6 to 1.6cfu/ml while at the peak of the rainy season (July), TCC had non-detectable (ND) Coliform count per 100ml as a result of dilution or natural flushing from the rains. This is in line with the WHO (2012) standard which states that Total Coliform bacteria must not be detectable in any 100ml sample of water (0MPN/100ml). Total Coliforms include bacteria that are found in the soil, in water that has been influenced by surface water, and in human or animal waste. The absence of Coliform bacteria in the rainwater samples collected from different locations during the peak of the rainy season (July) is an indication that the harvested rainwater are in good sanitary state.

V. Conclusion

The study examined the spatial variation of rainwater quality in Benin City at the onset (March) and peak (July) period of rainy season. Specific attention was on the physical, chemical and biological properties of the rainwater and how it varies from the core of the city (Forestry, Ring-Road), intermediate zone (Upper Mission Road, Airport Road) rural-urban fringe (Ikpoba-Hill, Ogba) and NIFOR (control) in Benin City. Based on the research findings, we conclude that there is spatial variation in rainwater quality in Benin City because there is a distant decay effect as one move from the core of the city to the periphery. There is seasonal variation of rainwater quality in Benin City because there was a significant reduction in the concentrations of parameters. Values were generally higher at the onset of the rainy season (March) compared to the peak of the rainy season (July).The following suggestions are recommended based on this study; Rainwater during the onset of the rainy season (March) should be subjected to treatment before domestic use since analysis shows that it is more impaired.

References Références Referencias

1. Babanyara, Y. Y., and Saleh, U.F.(2010) Urbanisation and the Choice of Fuel Wood as a Source of Energy in Nigeria. © Kamla-Raj 2010 *J Hum Ecol,* 31(1): 19-26.
2. Bangira, C., Manyevere, A., and Mubvumba, P. (2007): The Spatial and Temporal Variation of pH and Lead in Rain Water in Harare City, Zimbabwe. *Journal of Sustainable Development in Africa,* Vol. 9, No.1, pg 1-19.
3. Beavington, F. (1988) 'Trace Element Content of the Atmospheric Environment in Western Nigeria', *Bulletin of the Scientific Association of Nigeria,* Vol. 3, No. 2, p. 267.
4. DeFries, R, and Eshleman, K.N., (2004). Land-use change and hydrologic processes: A major focus for the future. *Hydrol. Processes* 18:2183–2186.doi:10.1002/hyp.5584
5. Foley, J.A., DeFries, R ,Asner, G.P, Barford,C., Bonan, G., Carpenter,S.R., Chapin,F.S, Coe,M.T, Daily,G.C., Gibbs, H.K., Helkowski, J.H., Holloway, T., Howard,E.A., Kucharik, C.J., Monfreda, C., Patz, J.A., Prentice,I.C., Ramankutty, N., and Snyder, P.K., (2005). *Global consequences of land use.Sci*ence 309:570–574. doi:10. 1126/ science. 1111772.
6. Egwuogu, C.C., Okeke, H.U., Emenike, H.I. and Abayomi, T.A. (2016): Rainwater Quality Assessment in Obio/Akpor L.G.A of River State, Nigeria. *International Journal of Science and Technology (IJST),* Vol. 5, No.8.
7. Eruola, A. O., Ufoegbune, G. C., Ojekunle, Z. O., Makinde, A. A., and Ogunyemi, I. O., (2011). Analytical Investigation of Pollutants in Lagos

Coastal Waters, Nigeria. *Advances in Analytical Chemistry:* 1(1):8-11 DOI:5923/j.aac.20110101.02

8. Falkenmark M., Lundqvist J. and Widstand C., (2007): W*ater scarcity—An ultimate constraint in third world development*. Linkoping University, Stockholm, Sweden Piao, S., Friedlingstein, P., Ciais, N. and Noblet-Ducoudré, Labat, D., and Zaehle, S. (2007):Changes in climate and land use have a larger direct impact than rising CO_2 on global.
9. McCray, J. E., and T.B. Boving, T.B., (2007). Introduction: Urban watershed hydrology. *J. Am. Water Resources. Assoc.* 43: 839–840. doi:10. 1111/j.1752-1688.2007.00068.x
10. MacDonald, A., Davis, J., Calow, O. and Chilton, J., (2011): Developing groundwater: A guide to rural water supply, ITDGS Publishing. U.K.
11. Nkeki, F. N., (2016): 'The Influence of Urban Built Environment, Socio-Economic and Socio-Demographic Attributes on Travel Behaviour in Benin Metropolitan Region, Edo State'. A Ph.D Proposal submitted to the department of Geography and Regional Planning, University of Benin, Benin City.
12. National Population Commission (2006): Population Census Facts and Figures. Available @ http://www. population.gov.ng/facts and figures 2006 (accessed 3rd June, 2015).
13. Offor I.F., Nwabue F.I., and Omaka N.O.,(2014)Acid Rain Deposition in Selected Parts of South-Eastern and South-Southern Nigeria ,*IJRRAS 19 (2).*
14. Oki, T. and S. Kanae, (2006): Global hydrological cycles and world water resources. *Science* 5790:10681072.doi:10.1126/science.1128845.www. arpapress.com/Volumes/Vol19Issue2/IJRRAS_19_2 _04.pdf.
15. Oguntoke, O., Aboderin, O. J, Bankole, A. M., (2009),"Association of Water-borne Diseases Morbidity Pattern and Water Quality in parts of Ibadan City,Nigeria." *Tanzania Journal of Health Research,* Vol. 11, No. 4, 2009, pp. 189-195. ISSN:1821-6404.
16. Olayiwola, A. M. and Igbavboa, O. E., (2014): Land Use Dynamics and Expansion of the Built-Up Area in Benin City, Nigeria. *Mediterranean Journal of Social Sciences, MCSER Publishing, Rome-Italy, Vol 5 No. 20. ISSN 2039-2117 (online)* Doi: 10.5901/ mjss.2014.v5n20p2506.
17. Onoker horaye, A.G., (1995): Benin, A Traditional Africa City in Transition, Benin Social ScienceSeries for Africa, University of Benin, Benin City.
18. Patil, P.N, Sawant, D.V. and Deshmukh. R.N., (2012).Physico-chemical parameters for testing of water–A review. *International Journal of Environmental Sciences, Volume 3, No. 3, ISSN 0976 – 4402.*
19. Raji, M. I. O. and Ibrahim Y. K. E. (2011): Prevalence of waterborne infections in Northwest Nigeria: A retrospective study. *Journal of Public Health and Epidemiology,* Vol. 3, No. 8, (August 2011) pp. 382-385. ISSN 2141-2316
20. Standard Methods for the Examination of Water and Wastewater (2004), American Public Health Environmental Protection Agency, 18th Ed, NPDES Compliance Inspection Manual. May, 2004.
21. Sun, G., McNulty, S.G., Moore Myers, J.A. and Cohen, E.C.(2008a): Impacts of multiple stresses on water demand and supply across the South-Eastern United States. *J. Am. Water Resour. Assoc*. 44(6):1441–1457. doi:10.1111/j.1752-1688. 2008. 00250.x
22. Ubuoh E. A., Akhionbare, W.N. ,Akhionbare, S.M.O. and Ikhile, C.I., (2012) Evaluation of the Spatial Variation of Rainwater Quality in Parts of Akwa Ibom State of Nigeria Using Chloropleth Map. Volume 1, Issue 2 -2012 ISSN (2304-7151) http://www.abrj.org
23. USEPA, (2001): *Protocol for Developing Pathogen TMDLs*; EPA 841-R-00–002; United States Environmental Protection Agency: Washington, DC, USA.
24. Vorosmarty, C.J., Green, P.J., Salisbury, R.B. (2000). Global water resources: Vulnerability from climate change and population growth. *Science* 289: 284–288. doi:10.1126/ science.289.5477.284
25. WHO, (2012): *Water safety planning for small community water supplies: step-by-step risk management guidance for drinking-water supplies in small communities.* WHO, Geneva. WHO/UNICEF JMP (2010): Progress on Sanitation and Drinking-Water: 2010 update. Joint Monitoring Programme for water and sanitation http://whqlibdoc.who.int/ publications/2010/9789241563956_eng_full_text.pdf retrieved on the 6th of January, 2017.
26. WHO,(2002):"Chloride in Drinking-Water," Background Document for Preparation of WHO Guidelines for Drinking-Water Quality, World Health Organization, Geneva.

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FELLOWS

FELLOW OF ASSOCIATION OF RESEARCH SOCIETY IN HUMAN SCIENCE (FARSHS)

Global Journals Incorporate (USA) is accredited by Open Association of Research Society (OARS), U.S.A and in turn, awards "FARSHS" title to individuals. The 'FARSHS' title is accorded to a selected professional after the approval of the Editor-in-Chief/Editorial Board Members/Dean.

- The "FARSHS" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSS or William Walldroff, M.S., FARSHS.

FARSHS accrediting is an honor. It authenticates your research activities. After recognition as FARSHS, you can add 'FARSHS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, and Visiting Card etc.

The following benefits can be availed by you only for next three years from the date of certification:

FARSHS designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

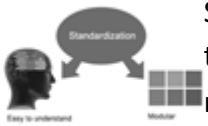
Once FARSHS title is accorded, the Fellow is authorized to organize symposium/seminar/conference on behalf of Global Journal Incorporation (USA). The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent.

You may join as member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. In addition, it is also desirable that you should organize seminar/symposium/conference at least once.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSHS can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSHS, you will be given a renowned, secure and free professional email address with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.



The FARSHS will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSHS member can apply for grading and certification of standards of the educational and Institutional Degrees to Open Association of Research, Society U.S.A.
Once you are designated as FARSHS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSHS members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

The FARSHS member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSHS is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSHS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSS member can decide its price and we can help in making the right decision.

The FARSHS member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN HUMAN SCIENCE (MARSHS)

The ' MARSHS ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The "MARSHS" is a dignified ornament which is accorded to a person's name viz. Dr John E. Hall, Ph.D., MARSHS or William Walldroff, M.S., MARSHS.

MARSHS accrediting is an honor. It authenticates your research activities. Afterbecoming MARSHS, you can add 'MARSHS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSHS designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSHS, you willbegiven a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSHS member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSHS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

Auxiliary Memberships

Institutional Fellow of Open Association of Research Society (USA) - OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

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Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template.zip

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

Before and during Submission

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

Policy on Plagiarism

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures

- Printed material
- Graphic representations
- Computer programs
- Electronic material
- Any other original work

Authorship Policies

Global Journals follows the definition of authorship set up by the Open Association of Research Society, USA. According to its guidelines, authorship criteria must be based on:

1. Substantial contributions to the conception and acquisition of data, analysis, and interpretation of findings.
2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

Copyright

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Appealing Decisions

Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

Declaration of funding sources

Global Journals is in partnership with various universities, laboratories, and other institutions worldwide in the research domain. Authors are requested to disclose their source of funding during every stage of their research, such as making analysis, performing laboratory operations, computing data, and using institutional resources, from writing an article to its submission. This will also help authors to get reimbursements by requesting an open access publication letter from Global Journals and submitting to the respective funding source.

Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Social Science Research Paper

Techniques for writing a good quality homan social science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.
Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

19. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

20. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

21. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

22. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

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Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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