Niger Delta University
Wilberforce Island

27th Inaugural Lecture

Title:
FISHERY-THE EARTH'S FOUNDATION: A TREASURE IN OBSCURITY

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FISHERY-THE EARTH'S FOUNDATION:
A TREASURE IN OBSCURITY

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Dedication

This inaugural lecture is dedicated to Late uncle Mr. Gabriel Nestor Abowei, my late parents, Mr Freeborn Nestor Abowei and Mrs Friday F.N. Abowei; His Highness, Engineer, Professor Millionaire Freeborn, Nestor, Abowei, my entire family and the God Head.

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SUMMARY

The 27th Inaugural Lecture of the Niger Delta University, presented by Professor **Abowei Jasper Freeborn Nestor**, a professor of Biological Sciences, Entitled: "FISHERY-THE EARTH'S FOUNDATION: **A treasure in obscurity"** focuses on the clarification and justification of the title, the hidden treasures in fishery: Fish, fish products and other aquatic organisms such as Source of: food and essential nutrients, water for drinking, livestock, irrigation and energy, provides employment, means of transportation and communication, provision of raw materials for other industries, used in the construction industry, Foreign exchange, tourism and sporting, protection, horticulture, religion and spirituality, religious dietary restrictions, musical instruments, adornment, crafts, architectural decoration, art, animal feeds, beddings, pharmaceuticals and other health services. The lecture also highlighted my contributions to research, knowledge, and human resources (Ph. D and M. Sc students supervised/supervising), community service (reviewer to both international and national reputable journals) Consultant/expert opinion witness to individuals, communities national and multinational companies (SPDC and Chevron) both at national and international levels. The people that contributed to my success are acknowledged and all Journal articles, books, conference papers and monographs referred to are referenced in the bibliography.

PROTOCOL

The Vice-Chancellor, Sir
Members of the Governing Council
Deputy Vice-Chancellors
Other Principal Members of the University
Provost College of Health Sciences
Dean School of Postgraduate Studies
Deans of Faculty
Heads of Department
Distinguished Professors and Scholars
Members of the Press
Members of FiSON, EMAN, STAN Professional Colleagues
Staff and Students of NDU, RSUST and UNIPORT
All Alumni of RSUST and UNIPORT
Distinguished Guests
Ladies and Gentlemen

1.0 **Introduction**

1.1 Preamble

I am indeed grateful to God Almighty for all he has done in every area of my life. I must sincerely thank the University Management for this opportunity to present my Inaugural Lecture.

Inaugural lecture is a tradition in all Universities to showcase her newly appointed or promoted professors. It is a platform for new professors to exhibit their research so far, highlight their intellectual activities and future research interest(s) to the university community and the general public. These are the intended objectives in this 27th inaugural lecture of this University.

MR Vice Chancellor Sir, my inaugural lecture is Titled: FISHERY- THE EARTH'S FOUNDATION*:* A TREASURE IN OBSCURITY.

This topic was carefully chosen to reflect my past, current and future research interests. In the course delivering my lecture, I intend to go through my journey into fisheries in particular and Biological Science in general, discuss the concept of "fishery", Its being the earth's foundation and a treasure in obscurity. I also intend to unveil the obscure fishery treasures, concentrating on fish, fish products, seashells and seaweeds, challenges and recommendations. I hope to Highlight my contributions to fisheries, hydrobiology, other areas of biological sciences in terms of knowledge and future research interests.

I once more welcome all of you to the 27th Inaugural Lecture of the Niger Delta University. I believe, it will be quite informative, stimulating, worthwhile and connect you to the fisheries world. If adhered to strictly, this lecture will change the economic status of our country, state, communities, and individuals from the present state positively. Let it be so in Jesus Name. AAAMEN.

Vice Chancellor Sir, one may be wondering the relationship

between biological sciences and fisheries. Fisheries is an aspect zoology in applied biology.

The Title "FISHERY" THE EARTH'S FOUNDATION: A TREASURE IN OBSCURITY highlights the fundamental issues: Fishery, Foundation, Earth, Treasure and Obscurity.

Fishery(Pl. Fisheries):

- A place where fish and other aquatic resources are reared or caught in numbers
  Source: ***Oxford Dictionary of current English, Fourth Edition***
- The industry or occupation of catching, processing of fish and other aquatic resources.
  Source: ***www the free dictionary com fisheries***

Foundation:

- An underlying basis for something.

Earth:

- The planet in the solar system on which we live
- The Earth is the Lord's and the fullness there of.

Treasure: The good things: wealth and beyond wealth

Obscurity: Hidden, unknown

This implies that the title exposes the wealth and beyond wealth in fishery.

Source: Dictionary of current English, Fourth Edition

1.2 Classification of Fisheries

- Nigeria is blessed with a relatively long coastline and its offshore area has a high fishery potential. Thus, over 60% of the country's fishery resources are located in this offshore area.
- The inland water fisheries may be sub-divided into: natural water bodies; and man-made water bodies.
- The water bodies include: natural lakes, rivers, flood ponds, flood plain swamps, creeks and lagoons.

- Man-made water bodies in which fish may be caught include artificial reservoirs such as Lakes burrow-pits, mining paddocks, cattle ponds and fish ponds.

The classification of fisheries is not exhaustive and depends from the perspective it is considered (Table 1).

Table 1 Classification of fisheries based on the perspective.

S/no	Perspective	Classification
1	Production	Industrial/commercial fisheries; Artisanal/ subsistence fisheries
2	Activity	Capture fisheries; culture fisheries
3	Vessel	Trawl fisheries; canoe fisheries
4	Water body	Reservoir fisheries, River Fisheries, Inland fisheries, Lake fisheries, Marine fisheries
5	Fisheries resources	Mollusks fisheries; echinoderms fisheries; Crustacean fisheries
6	Genera	Shrimps fisheries; Oysters fisheries; Seaweed fisheries; Tuna fisheries
7	Type of fish	Fin fish fisheries; Shellfish fisheries
8	Water level	Pelagic fisheries; Benthic fisheries
9	Fishing gear/methods	Gillnet fisheries; Hook and Line fisheries
10	Coastline	Inland water, Off shore fisheries

2.0 Importance of Fishery and Aquatic Products

The enormous potentials and hidden treasures in fishery are inexhaustible. This lecture is limited to fishery, animal products and seaweeds:

2.1 Fishery and animal products

2.1.1. Source of Energy

- An increasing number of reservoirs are being created in Nigeria primarily for hydro-electric power generation, irrigation and urban water supply.
- These include Lakes: Kainji, Jebba, Shiroro (in Niger State), Bakolori (in Zamfara State), Tiga (in Kano State) and Asejire (in Oyo State).
- Crude oil, a product from sedimentary rock is from fishery.
- Mangroves, Nampa palms and some seaweeds are bio-energy sources.
- Water is the source of life.
- The importance of seaweeds cuts across various environmental, ecological, socio-economic benefits and services as food for man, in the phycocolloids and expanding phycosupplement industries, as sink for excess carbon dioxide and excess nutrients; for sustainable energy generation and as fossil fuel substitutes.

2.1.2. Provides Employment

Fishing takes place in the fishery employing many people including:

- The fisher folk
- canoe builders
- makers of fishing gear;
- fish smokers;
- suppliers of wood, baskets and bags;
- people who package the smoked fish;
- fish transporters;
- fish merchants in urban markets; and
- fish retailers, major and minor.
- The smoked fish business is also important in that it makes animal protein widely available at affordable prices.

2.1.3. Source of food and essential nutrients

The fishery provides fish and other aquatic products:

- Fish and other aquatic animal products do not only provide essential nutrients for the body but of several uses.
- Fish and fish products are consumed as food all over the world.
- With other sea foods, it provides the world's prime source of high-quality protein: 14–16 percent of the animal protein consumed worldwide.
- Fish and turtle eggs called CAVIARE prepared and salted are quality food eaten by man.
- Fish possesses high calorific fats, high quality proteins, fat soluble vitamins (A, D, E and K) and some mineral salts necessary for healthy growth and maintenance.
- Over one billion people rely on fish as their primary source of animal protein (Abowei and Ezekiel, 2013c).

Fish and other aquatic organisms are also processed into various food and non-food products.

- Fish oil is recommended for a healthy diet because it contains the omega-3 fatty acids, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA), precursors to eicosanoids that reduce inflammation throughout the body.
- In Ancient Roman society, garum, a type of fish sauce condiment, was popular.
- Presently, shellfish dishes are a feature of almost all the cuisines of the world, providing an important source of protein in many cuisines around the world, especially in the countries with coastal areas. Familiar marine molluscs eaten as a food source by humans include many species of clams, mussels, oysters, winkles, and scallops. Some crustaceans commonly eaten are shrimp, prawn, lobster, crayfish, and crabs (Plate 1).

Plate 1. Some popular dishes using shellfish
Source: Abowei and Ezekiel, 2013a

2.1.4. Provision of raw materials for other industries

- Shark skin and ray skin which are covered with, in effect, tiny teeth (dermal denticles) can be used for sandpaper.
- These skins are also used to make leather.
- Ray fish skin leather is used in the manufacture of swords.
- Some other species of fish are also used to make fish leather, and this material is more and more popular among luxury brands and also emerging designers.
- it is now possible to wear shoes made of salmon leather, a jacket made of perch leather, or a hand bag made of wolf fish or cod leather. Once tanned, the leather is non smelly and is stronger than other traditional leathers of the same thickness.
- The skin of some cartilaginous fishes when dried can be used for hand bags, wallets, belts and shoes.
- The dried skin (shagreen) can be used like glass papers for polishing surfaces.
- The scales of some fishes produce collagen substances that when coated on the inside beads make artificial pearls.
- Oysters contain pearls which are polished and worn as jewelry.
- Fish glue is made by boiling the skin, bones and swim bladders of fish. Fish glue has long been valued for its use in all manner of products from illuminated manuscripts to the Mongolian war bow.
- Fish oils besides being used as food, are used in the manufacture of soap and drugs (eg. cod liver oil).
- Fish emulsion is a fertilizer emulsion that is produced from the fluid remains of fish processed for fish oil and

fish meal industrially. Fish bones are used for the manufacture of glues and fertilizers.

- Fish hydrolysate is ground up fish carcasses. After the usable portions are removed for human consumption, the remaining fish body – guts, bones, cartilage, scales and meat are put into water and ground up.
- Fish meal is made from both whole fish and the bones and offal from processed fish. It used as a high-protein supplement in animal feeds.
- Fish sauce is a condiment that is derived from fish that have been allowed to ferment. It is an essential ingredient in many curries and sauces.
- The lining of the gas bladder of sturgeons is used for making isinglass, a shiny powder used as adsorbents in wine industry.
- Pearls, mother-of-pearl, and abalone are valued for their lustre.
- Sea horse, star fish, sea urchin and sea cucumber are used in traditional Chinese medicine.
- The sea snails *Murex brandaris* and *Murex trunculus* are used to make the pigment Tyrian purple.
- Some sepia pigment is made from the inky secretions of cuttlefish.
- A shimmery substance found on fish scales, most usually obtained from herring and one of many by-products of commercial fish processing, can also be used for pearlescent effects, primarily in nail polish.
- Seaweeds can be used when freeze dried and powdered into an agar called "Seaweed gum", suitable as a base for culturing bacteria in medical research and other industrial uses.

2.1.5. Used in the construction industry

- Shells of oysters and periwinkles are sometimes used for the manufacture of paints and also mixed with cement and sand to build houses and ceramic tiles.
- Numerous other seashells (Plates 2-7) are used in the construction industry.

Plate 2 Sea Shells

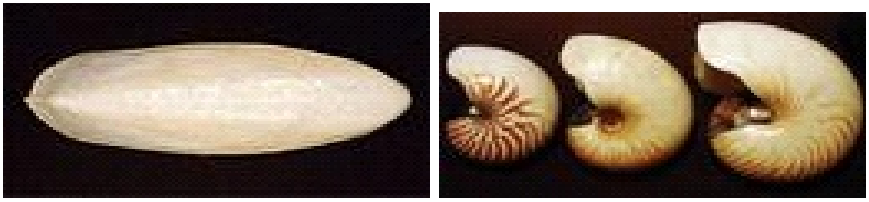

Plate 3. Species of cephalopod

Plate 4 Many Mollusk species and families

Plate 5 Shells of some marine invertebrates

Plate 6. Other categories of marine animals considered that remains seashells
Source: Abowei and Ezekiel, 2013b

2.1.6. Foreign exchange, tourism and sporting

- In commercial fishing, fishes harvested may be exported for exchange earning. Locally it is being used for trade by barter. Fisheries may serve for tourism and sporting, Angerlers and sport fishermen go to fisheries establishments for recreation.
- Fish may also be collected live for research, observation, or for the aquarium trade.
- Seashells have been used as a medium of exchange in various places. The most common shell fish species used as currency are *Cypraea moneta*, the "money cowry", and certain tusk shells or Dentalium (Plate. 7).

Plate 7. Some uses of sea shells
Source: Abowei and Ezekiel, 2013c

2.1.7. Protection

- The ray fish provides landing ground when boat cap sides in the sea
- The flowing water detoxifies poison in the body. Hence in water baptism in a river or flowing water.
- Empty molluscan seashells are a sturdy and usually readily available, "free" resource which is often easily found on beaches, in the intertidal zone, and in the shallow subtidal zone. As such they are sometimes used second-hand by animals other than humans for various purposes, including for protection as in hermit crabs (Plate. 8).

Plate 8 .Molluscan seashells used for protection by other animals
Source: Abowei and Ezekiel, 2013c

2.1.8. Traditional uses

2.8.1 Fish hooks: Cook's turban shells can be used to fashion the tips of hooks. The iridescent inner shell of pāua was used for fishing lures.

2.8.2. **Tools:** Seashells have often been used as tools, because of their strength and the variety of their shapes. Giant clams (Family Tridacnidae) have been used as bowls, and when big enough, even as bathtubs and baptismal fonts.

- Melo melo, the "bailer volute", is so named because Native Australians used it to bail out their canoes.
- Many different species of bivalves have been used as scrapers, blades, clasps, and other such tools, due to their shape.
- Some marine gastropods have been used for oil lamps, the oil being poured in the aperture of the shell and the siphonal canal serving as a holder for the wick.
- Mussel shells can be used for cutting hair and for scraping flax leaves in order to expose the fibres below the outer green layer. Tuatua shells can be used for scaling fish.

2.1.9. Horticulture

- Because seashells are in some areas a readily available bulk source of calcium carbonate, shells such as oyster shells are sometimes used as soil conditioners in horticulture. The shells are broken or ground into small pieces in order to have the desired effect of raising the pH and increasing the calcium content in the soil.

- Crushed shells are used as loose paving in gardens and for decoration.

2.1.10 Religion and spirituality

Seashells have played a part in religion and spirituality, sometimes even as ritual objects.

- In Christianity, the scallop shell is considered to be the symbol of Saint James the Great.
- In Hinduism left-handed shells of *Turbinella pyrum* (the sacred shankha) are considered to be sacred to the god Vishnu.
- The person who finds a left-handed chank shell is sacred to Vishnu.
- The chank shell also plays an important role in Buddhism.
- Cowries have often been considered to be symbols of female fertility. They were often treated as actual fertility charms. The dorsum of the shell resembles a pregnant belly, and the underside of the shell resembles a vulva.
- In the South Indian state of Kerala, cowries are used for making astrological predictions.
- In Santería, shells are used for divination purposes.
- The Moche culture of ancient Peru worshipped animals and the sea, and often depicted shells in their art.

2.1.11. Religious dietary restrictions

- The Jewish laws of Kashrut forbid the eating of shellfish.
- The book of Leviticus prohibits the consumption of shellfish.

- In Islam, the Shafi'i, Maliki and Hanbali schools allow it, while the Hanafi school does not allow it in Sunni Islam.
- The Shi'ite school (Ja'fari) does not allow it. Seventh-day Adventists eat no shellfish.

2.1.12. Musical instruments

Trumpets : Trumpets known as pūtara were made from New Zealand's largest sea snail, *Charonia lampas* by fitting a wooden mouthpiece to the top of an empty shell. A loud note is produced because the sound is amplified within the shell. The large, rare triton shell (*Charonia tritonis*) was also used. Seashells have been used as musical instruments wind instruments.

- Most often the shells of large sea snails are used, as trumpets, by cutting a hole in the spire of the shell or cutting off the tip of the spire altogether.
- Various different kinds of large marine gastropod shells can be turned into "blo wing shells", however the most commonly encountered species used as "conch" trumpets are: The sacred chank, *Turbinella pyrum*, known in India as the shankha. In Tibet it is known as "dung-dkar". The Triton shell also known as "Triton's trumpet" *Charonia tritonis* which is used as a trumpet in Melanesian and Polynesian culture and also in Korea and Japan. In Japan this kind of trumpet is known as the horagai. In Korea it is known as the nagak. In some Polynesian islands it is known as "pu". The Queen Conch *Strombus gigas*, is or was sometimes used as a trumpet in the Caribbean (Plate 9).

Plate 9 . Musical instruments seashells
Source: Abowei and Ezekiel, 2013c

- Whole seashells or parts of sea shells have been used as jewelry or in other forms of adornment since prehistoric times.
- Mother of pearl was historically primarily a seashell product, although more recently some mother of pearl comes from freshwater mussels.
- Seashells are often used whole and drilled, so that they can be threaded like beads, or cut into pieces of various shapes and neklaces.
- The necklaces represent a significant cultural tradition which is still practiced by Palawan women elders. The shells used include pearly green and blue-green mariner (rainbow kelp) shells, brown and white rice shells, black cats' teeth shells and pink button shells.
- Naturally-occurring, beach worn, cone shell "tops" (the broken-off spire of the shell, which often has a hole worn at the tip) can function as beads without any further modification.
- In Hawaii these natural beads were traditionally collected from the beach drift in order to make puka shell jewelry. Since it is hard to obtain large quantities of naturally-occurring beach worn cone tops, almost all

modern puka shell jewelry uses cheaper imitations, cut from thin shells of other species of mollusk, or even made of plastic.

- Shells historically have been and still are made into, or incorporated into, necklaces, pendants, beads, earrings, buttons, brooches, rings, hair combs, belt buckles and other uses.
- The shell of the large "bull mouth helmet" sea snail, scientific name *Cypraecassis rufa*, was historically, and still is, used to make valuable cameos.
- Mother of pearl from many seashells including species in the family Trochidae, Turbinidae, Haliotidae, and various pearly bivalves, has often been used in jewelries and buttons. In London, Pearly Kings and Queens traditionally wear clothing covered in patterns made up of hundreds of "pearl buttons", in other words, buttons made of mother-of-pearl or nacre.
- The majority of "pearl buttons" are imitations that are made of pearlescent plastic.

2.1.13. **Adornment(plate 10)**

- Tusk shells were used as anklets and necklaces, and pieces of pāua shell were sometimes hung on skirts.
- Pieces of pāua shell were used as inlay in wooden and bone carvings, often representing eyes.
- Bowls and containers.
- Dosinia species and scallop shells are used to hold pigments for tattooing.

2.1.14. Crafts

- "Sailor's Valentines" were late 19th century decorative keepsakes which were made in the Caribbean, and which were often purchased by sailors to give to their loved ones back home.
- These valentines consisted of elaborate arrangements of small seashells glued into attractive symmetrical designs, which were encased on a wooden hinged box-frame.
- The making of shellwork artifacts is a practice of Aboriginal women from La Perouse in Sydney, New South Wales, dating back to the 19th century.
- Shellwork objects include baby shoes, jewelry boxes and replicates of famous landmarks.
- The shellwork tradition began as an Aboriginal women's craft which was adapted and tailored to suit the tourist souvenir market, and which is now considered high art (Plate 11).

Plate 10. Seashells used for personal adornment

Plate 11.craft from seashell

Source: Abowei and Ezekiel, 2013c

2.1.15. Architectural decoration

- Small pieces of colored and iridescent shell have been used to create mosaics and inlays, which have been used to decorate walls, furniture and boxes.
- Large numbers of whole seashells, arranged to form patterns, have been used to decorate mirror frames, furniture and man-made grottos.

2.1.16. Art

- A very large outdoor sculpture at Akkulam of a gastropod seashell (Plate 12a) is a reference to the sacred chank shell, *Turbinella pyrum* of India.
- Maggi Hambling designed a striking 13 ft (4 m) high sculpture of a scallop shell (Plate 12b) which stands on the beach at Aldeburgh, in England.
- The goddess of love, Venus or Aphrodite is often traditionally depicted rising from the sea on a seashell. In the Birth of Venus (Botticelli), Botticelli the goddess Venus rising from the ocean on a scallop shell (Plate 12c).

2.1.17. Animal feeds

- Sea shells found in the creek and backwater of the coast of west India are used as an additive to poultry feed. They are crushed and mixed with jawar maaze and dry fish.
- In the past, they were taken from beach deposits around the country, such as at Quail Island in Canterbury and the extensive shell ridges in the Firth

of Thames.

- Another source is the by-product of oyster, mussel and scallop harvests.

a b c

Plate 12. Various arts from sea shells
Source: Abowei and Ezekiel, 2013c.

2.2 Potential products and uses of seaweeds

The useful qualities of seaweed can be grouped into;

- A food with preservation characteristic
- A health food with medicinal quality
- A seaweed gum, a good source of colloid material for industrial use.
- With regard to all three qualities, the high percentage of polysaccharide in the seaweeds seems to be an important factor.

The Utilization and products of seaweed resources in Nigeria is presented in Table 2.

Table 2. Utilization and products of seaweed resources.

Potential utilization/product	Species
Medical/ pharmaceutical-related	*Sargassum sp Ulva sp.,Dictyota sp., Bryopsis sp., Jania sp*
Human consumption	*Asparagopsis sp. Chaetomorpha sp.,Centroceras sp., Cladophora sp Entromorpha Sp., Gelidium sp., Gracillaria sp.,Grateloupia sp., Dictyopteris sp. Sargassum sp., Ulva sp.,*
Environmental	*Gracillaria sp., Ulva sp.Gelidium sp.,*
Industrial	*Centroceras sp., Sargassum sp Gracillaria sp., Gelidium sp.,*
Agricultural	*Gelideum sp., Cladophora., Sargassum sp., Chaetomorpha sp*

Source: *Oyedeji and Abowei, 2012*

2.2.1. Preserved food from seaweeds

Seaweeds can be eaten in a number of ways:

- Some are eaten raw as salads,
- some are flavored before eating; and
- some are made into processed foods (Plate 13).

Plate 13 Seaweed products
Source: *Abowei and Ezekiel, 2013c*

2.2.2. Seaweeds as health foods

- The cell wall material and internally stored substances, which seaweeds produce through photosynthesis, are extremely diverse in terms of their chemical composition. This fact gives seaweeds their exceptional value as health foods.
- Modern nutritional studies have shown that seaweeds contain a great amount of vitamins and trace minerals essential to the human body.
- Some unique organic substances found in seaweed help in the prevention of the degenerative diseases. For example, the fucosterol found in kelp and Undaria is believed to reduce blood cholesterol and prevent thrombosis in the blood vessels.
- Also, experiments with mice have shown that alginic acids are anti tumor agents.
- Recent studies have also focused attention on edible seaweeds as a valuable source of dietary fibre.
- Some unique organic substances found in seaweed act to stimulate the digestive function of the intestine, thereby invigorating them.

2.2.3. Seaweed gum as a source of colloid

- Seaweed compounds can be use in a wide range of stabilizing agents that induce thickening suspending gelling, emulsifying and film farming .
- They are so numerous and diverse that they can be used for a wide range of products from ingredient for foods, cosmetics, pharmaceutical, textiles, paper making, paints, printing inks adhesives and detergents to building materials and many other industrial products.
- Seaweed colloids offer distinct chemical and economic advantages, the gums can be trusted as a healthy food source and as practical material for various industries (Tables 3).

Table 3. Uses of Seaweed gum

Uses	Products	Main Functions
Cosmetics & pharmaceuticals	Shampoo	Interface vitalization
	Tooth paste	Form retention & increasing viscosity
	Milky lotion	Emulsification
	Tablets	Coking
	Laxative	Indigestibility & lubrication
	Bacteria agar	Gelatin
	Dental molding material	Form retention
Food Additives	Frozen fish products	Adhesion & moisture retention
	Processed meats	Adhesion & prevention of juice separation
	Sauces & brewing	Increasing viscosity & emulsification
	Alcohol brewing	Precipitation and suspended matter
	Sweets	Gelatin, increasing viscosity & suspension
	Dairy products	Gelatin, foaming & suspension
Other industrial uses	Casting	Molding sand coking
	Welding rods	Coking
	Paints	Increased viscosity & suspension
	Thread making	Prevention of thread breaking
	Textile	Increase printing viscosity
	Paper making	Sizing
	Starch & adhesives	Increasing viscosity
	Pottering making	Suspension

Source: FAO, 2010 in Ezkiel and Abowei, 2012

2.2.4.Other uses

- Alginates are used in wound dressings, and production of dental moulds.
- In microbiology research, agar made from seaweed is extensively used as culture medium. Carrageenans, alginates and agaroses together with other lesser-known macroalgal polysaccharides, also have several important biological activities or applications in biomedicine. Seaweed is a source of iodine, necessary for thyroid function and to prevent goitre.
- Seaweeds have curative properties for tuberculosis, arthritis, colds and influenza, worm infestations and even tumors.
- Seaweed is known as a remedy for radiation poisoning.
- Seaweed extract is used in some diet pills.
- Other seaweed pills exploit the same effect as gastric banding, expanding in the stomach.
- Seaweeds can be used as fertilizer, compost for landscaping, or a means of combating beach erosion.
- Seaweed is currently under consideration as a potential source of bioethanol. Seaweed is an ingredient in toothpaste, cosmetics and paints.
- Alginates are used in industrial products such as paper coatings, adhesives, dyes, gels, explosives and;in processes such as paper sizing, textile printing, hydro-mulching and drilling.
- Although, rotting seaweed is a potent source of hydrogen sulfide, a highly toxic gas, and has been implicated in some incidents of apparent hydrogen-sulphide poisoning. It can cause vomiting and diarrhoea, it can be used as biological

weapon of war and ripening of fruits.
There is therefore no doubt that God Almighty, the omnipotent, Omnipresent and Omniscience God whose wisdom and knowledge is in-comprehensible, started creation with Fishery and laid the Earth's foundation on fishery.

"And the earth was without form and void and darkness was upon the face of the deep. And the spirit of God moved upon the surface of the water."Genesis I:2.

God again commanded us to invest in fisheries:
"Cast thy bread upon the waters: For thou shall find it after many days"Eccl. 11:1

Our Lord Jesus Christ acknowledged the importance of fisheries by building his Ministry on fisheries. He appointed fishermen as his first disciples. Matt 4: 18-19

Our Lord Jesus Christ also relied on fisheries in times of economic challenges. Matt. 17:27.

Vice chancellor Sir, It is necessary to discover our fisheries resources and their potentials to build our foundation on it to salvage our nation, state, industries and individuals from the current prevailing economic depression and continuous sustainable self dependency. It is my bid to discover the hidden good things in our fishery to provide documentary evidence to validate this submission that prompted me to research on various aspects of fisheries.

3.0 My contributions

3.1 Water bodies studied:

This ranged from:

- Stagnant (Borrow pits: Yakubu,A,F; Sikoki, F.D, Abowei J.F.N and Hart S. A; 1998) to flowing waters (Nun River: Abowei J.F.N 2009),
- Field research (Okpoka creek: Abowei J.F.N and George A D I; 2009) to Ecotoxicological studies (Abowei *et al* 2005; Hart A. I; Abowei, J.F.N and Ireogbu B. C. 2008), and; including the physico-chemistry, benthos and fish population dynamics (Abowei, J.F.N and Ezekiel E. N, 2003) in:

1. Nun River (Abowei, J.F.N and Hart, A.I, 2007),
2. Qua Iboe and Cross River Systems off South-East Nigeria (Allison, M.E, Gabriel, U.U, Abowei, JFN and Inko-Tarih, M.E, 1998),
3. Some Rivers, Creek and Borrow pits in Biseni (Yakubu, A.F, Sikoki, FD, Abowei, JFN and Hart, AI, 1999),
4. The Flood Plains of Odhioku-Ekpeye(Ezekiel, EN., Abowei, JFN and Hart AI, 2002),
5. Sombreiro River(Abowei, *et. al;* 2008),
6. Elechi creek (Davies, OA, Tawari, CC and Abowei, JFN, 2008),
7. Bonny Estuary River(Abowei, *et. al;* 2008a),
8. Nun river Estuary(Abowei, *et. al;* 2008b),
9. Okpoka Creek(Abowei, JFN and George, ADI 2009),
10. Minichinda Stream(Davies, OA, Abowei, JFN and Otene, 2009),
11. Nkoro river(Abowei, *et al*; 2009),
12. Luubara Creek, Ogoni Land (Deekae, SN and Abowei,

JFN,2010),

13. Koluama Area and the Atlantic Ocean (Abowei, JFN and Ezekiel, EN, 2013),
14. Amassoma flood plains, Odi floodplains(Ezekiel, EN and Abowei, JFN, 2013)

3.2 Aquatic Organisms

The organisms studied include:

planktons (Yakubu, *et. al*; 1999; Abowei *et al*; 2008f Davies, *et al*; 2008, 2009 (a,b); Ezekiel *et al*; 2011f-i Abowei and Ezekiel, 2013b; Tawari, *et al*; 2014b;),

- **Micro** and **macro aquatic invertebrates (Abowei** and Ezekiel, 2011a,b,d; Akankali, *et al*; 2014a; Ezekiel, *et al*; b,c; George, *et al*; 2009a, 2010b),
- **Finfish** (Sikoki, et. al; 1998; Sikoki and Abowei,1998; Abowei, 2010a,b; Abowei, 2009a-e, Ogamba and Abowei, 2013; Ogamba et. al; 2014 a,b);

Shell fishes (**Abowei, *et. al*; 2006; Deekae and Abowei , 2010a-g; Deekae, *et. al;* 2010a-b; George and Abowei, 2009, George, *et. al*; 2009a-b;** Jamabo and **Abowei;** 2010, 2012):

1. Periwinkles (Jamabo, N.A and Abowei, J. F. N, 2010, 2012),
2. Shrimps (**Abowei, *et. al;* 2006; Deekae and Abowei ,2010a-g; Deekae, *et. al;* 2010a-b;**) and
3. Crabs (**George and Abowei, 2009, George, *et. al*; 2009a-b;**),

- Aquatic plants (Oyedeji, A. A and Abowei, J.F.N, 2012),
- Seaweeds (**Abowei** and Tawari; 2011a, Ezekiel and **Abowei,** 2012; **Abowei** and Ezekiel (2013a),
- Aquatic Birds (Ogamba and Abowei, 2012e),
- Aquatic insect (Abowei and Okorojie, 2012),

- Aquatic reptiles (Ogamba and Abowei, 2012d),
- Aquatic mammals (Ogamba and Abowei, 2012e).

3.3 Other Areas

- **Water physico-Chemical parameters (**Abowei and Ezekiel, 2003; Abowei and George 2009a; Ezekiel et al 2011d,e; Deekae, *et. al*; 2010b,c;**)**;
- **Fish Predation/predators** (Ogamba and Abowei, 2012d-e),
- **Fish diseases and Fish parasites** (**Abowei** and Ezekiel, 2011a-d; Abowei and Briyai, 2011; Abowei, *et; al*; 2011c,d),
- **Topography in culture fisheries** (Abowei,J.F.N and Bariweni, P. A. 2011; Bariweni, and **Abowei**; 2011a,**b ; Abowei** and Bariweni; 2012),
- **Fish stock assessment** (**Abowei, *et al*; 2007a,b; 2008a,c,d,h;2009a,b; Abowei** and Hart, 2007, 2008, 2009;**Abowei**, 2009a,b,c,d,e;2010a,b,d;2010b **Abowei** and George., 2009a,b;2010; **Abowei** and Davies., 2009a,b,c; **Abowei** and Ezekiel (2013d). Deekae and **Abowei.,** 2010a,b,c.d.e,g,h; Deekae et al; 2010a; Ezekiel, et al 2002; Ezekiel and Abowei, 2013,014a,b; Ogamba et. al; 2013a,b; 2014a,b, Sikoki, *et. al*; 1998,2000; Sikoki and Abowei, 1998; 1999,2000,2002),
- **Fish processing and preservation**(Abowei and Tawari, 2011 a,b)
- **Fish feed formulation** (Abowei and Ekubo, 2011),
- **Fisheries economics** (Ogamba and Abowei, 2012),
- **Medicinal importance of some aquatic organisms**

(Oyedeji and Abowei, 2012)

- **Sustainable fisheries management** (Abowei and Tawari, 2011).
- **Trawl Fisheries** (Deekae, et al; 2007),
- **Artisanal fisheries** (Abowei and Hart, 2008) and
- **Aquaculture** (Akankali *et. al;* 2011).

Vice Chancellor Sir,

- In fulfillment of providing documentary evidence and base line, for future research: I have been able to publish:
- One hundred and forty two articles in referred national and international journal classified in Table 4.
- Three monographs (Sikoki, FD and Abowei, JFN, 1998; Abowei, *et. al*; 2006 and Abowei *et. al*; 2006).
- Three books (Abowei, JFN and Skoki, FD, 2005; Abowei, JFN and Nyananyo, BL, 2008 and Abowei, JFN and Seiyaboh, 2008),
- Five technical reports,
- Attended and presented four conference papers (Abowei, JFN and Alfred-Okiya, JF, 2001; Sikoki, FD and Abowei, JFN, 2002; Abowei JFN and Ezekiel, EN, 2012; Ezekiel, EN and Abowei JFN, 2012).

Table 4 published articles in referred Journals

Article classification	Number
Foreign	**115**
National	**27**
Single author	**11**
Two Authors	**57**
First Author	**63**
Three or more authors	**65**
Corresponding Author	**112**

Editorial Boards

- *Research Journal of Biological Sciences.* http://www.globalresearchjournals.org/?a=journal&id=jabs
- African Journal of Biochemistry Research. www.academicjournals.org/ajbr
- Journal of Horticulture and Forestry. www.academicjournals.org/JHF
- Journal of Aquatic Sciences. www.ajol.info; http://www.ajol.info/index.php/jas

Vice Chancellor Sir, It might interest you to know that, in my bid unmask the treasure in obscurity in the fishery, I have co-supervised four Ph. Ds and five M. Sc. Students in RSUST: Currently I am supervising Three Ph Ds and Two M. Sc students in NDU.

Supervised Ph.D students

- **Jamabo, Nene Amaber (PG. 22/1543)**. Ecology of *Tympanotonusfuscatus*(Linaeus 1758) in the mangrove swamps of the upper Bonny River, Niger Delta, Nigeria. 261pp
- **George, Awoteime Dateme Isaiah (PG. 20/13180)**. Aspects of the ecology of swimming crab *Callinectes aminicola* in Okpoka creek Niger Delta, Nigeria.365pp
- **Deekae, Suanu Nanee (PG.22/15546).** Population biology of *Macrobrachium macrobrachion* (Herklots, 1861) in Luubara Creek, Rivers state. 309pp.
- **Akankali Justin Ayaegbumem (PG.04/18541).**

Environmental Perspective of Fisher folk in the Conservation and Management of Fisheries Resources in the Niger Delta. Environmental Perspective of Artisanal fisher folk 208pp**.**

Supervised M.Sc students

- **Waribugo, Sabina (PG. 97/0708)**: Aspects of the Biology and Fishery of *Palaemon Sp*. From the Nun river Estuary. Niger Delta, Nigeria. 87pp.
- **Amakiri,N. Euncie (PG 20/11646):** Aspects of the biology *of Pseudolithus elongatus* (Bowdish, 1825) From Bonny Estuary, Niger Delta, Nigeria. 240pp
- **Dandy Garricks (PG.22/1162)**; Aspects of the fisheries and Ecology of the lower Somberiroriver, Niger Delta, Nigeria. 178pp.
- **Akankali J A (PG99/10938)**: Factors Affecting Conservation and Management of Fisheries Resources in the Niger Delta: An Institutional Environmental perspective. 93pp
- Onungu Ada: Aspects of the fisheries in Odi flood plains, Niger Delta, Nigeria. 78pp

Vice chancellor sir, in all these I have been able to establish the following:

- Baseline data for future research, better understanding of our environment(particularly, fishery) and environmental impact assessment in the Niger Delta
- Created awareness that aquaculture, artisanal fisheries and trawl can employ millions of Nigerians, promote local and foreign trade.
- Provided catalogues for fin fish species, aquatic reptiles,

birds, mammals, insects, plants and seaweeds in the Niger Delta

- Provided information on the food and feeding habits of several fin fish and shell fishes to facilitate their culture
- Provided information on the biodiversity and availability of fishery resources in the Niger Delta.
- Provided information on the recruitment pattern, overfishing, exploitation rates and ratios, fishing seasons, methods and fishing gear mesh size regulation.
- Provided information on fish feed formulation using commonly available materials.
- Utilization of seaweeds in agar manufacture, medicine, food and manufacture of fishing gear.
- Provided information for policy makers for decisions on the sustainable management of the fishery and fishery resources.

4.0. Challenges

There are several challenges facing the fisheries sector:

- Disregard for biological sciences, fisheries and other related disciplines
- the problem of illegal fishing by both local and foreign operators.
- dam construction;
- Drought and flooding ;
- inadequate enforcement of inland fishery laws and regulations.
- Over fishing/ under fishing
- the use of chemicals and explosives for fishing.

- inadequate facilities for fish landing, processing and transportation.
- sea piracy/militancy
- pollution
- illiteracy
- poverty/grid
- lack of Government support
- No electricity
- poor transport system
- the land tenor system
- rural to urban migration
- Lack of connection to the fishery

5.0. Recommendation

- Utilize the fishery potential sustainably
- Improving the sea patrol capability of the country's navy;
- The promotion of aquaculture .
- Enforcement of existing inland fishery laws and regulations;
- Encouraging fishermen to form cooperatives and empowering these cooperatives to tackle problems relating to the handling, processing, transportation and marketing of fish.
- Sustainable exploitation of other areas of fisheries such as sea weeds, aquatic plants, birds, reptiles, mammals, invertebrates, insects, plants, to compliment fish and fish products
- Encouraging people to be connected to the fishery

- Enlightenment campaigns
- Providing subsidy and credit facilities for fisheries
- Establishing of fisheries institutions; particularly in the Niger Delta
- Avoid all forms of pollution of the fishery

6.0 Conclusion

- Our fishery has several treasures in obscurity. There every need to develop the fisheries sector to compliment the oil sector.
- Fish and other aquatic animal products do not only provide essential nutrients for the body but of several uses.
- Apart from the medicinal values and their usefulness in the construction industry of fish products and other animals, their uses as poultry feed, craft, arts, architectural decorations, traditional use as tools and fish hooks, personal atonements, cultural and religion significance, horticulture, musical instruments cannot be overemphasized.
- Though, the poor state of research on seaweeds in Nigeria implies limitations in terms of abundance and species richness for commercial exploitation.
- However, the growing significance of seaweed cultivation in the world is a promising start towards realizing the goals of becoming a producer and harnessing the socio-economic benefits to be gained from establishing a seaweed sector.

As it is commonly said, Ignorance is the choicest weapon of the Devil. Where there is no vision, the people perish. Here is Vision and Wisdom to save the nation, states, local Governments, communities and individuals from economic depression.

If we can resist misplacement of priority and caste our breads on fishery, We will find it after many days. We should all Go Fishery and Fish right for a good foundation, economic growth, development and healthy citizenry.

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Jasper Abowei

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Prof. Abowei Jasper Freeborn Nestor is a professor of Biological Sciences and Head, Department of Biological Sciences, Niger Delta University Wilberforce Island, Bayelsa State, Nigeria. Prof. Abowei Jasper Freeborn Nestor attended community primary school, Angiama -Gbene, St Peter primary school, yenagoa, UP primary school Ovom, Yenagoa and State School Alesa Aleme and obtained FSLC in 1979; Southern Ijaw Secondary School and Ogbo memorial Grammar school and obtained his WAEC in 1986. Prof. Abowei Jasper Freeborn Nestor obtained B.Sc in Applied Biology(Zoo option) and M.Sc Fisheries (Aquaculture option) from the Rivers State University of Science and Technology, Port Harcourt in 1990 and 1997 respectively and Ph. D. in Hydrology of Fisheries from the University of Port Harcourt in 2002. He has several other certificates: Diploma (GRM Awareness (DNE), Diploma (Conflict of management), Diploma (Code of conduct) Diploma (IRM-ELIS Awareness Training), Diploma (Anti-bribery Principles) and LLB in View.

He is the first tenor and indigenous professor of the Department; third inaugural professor in Faculty of Science, first professor of Biological Sciences in this part of the country; second professor in his family, second professor in his smaller community (Angiama- Gbene), third in his larger community (Angiama), and fourth in his Local Government Area and second inaugural professor in his local government area (Southern Ijaw Local Government Area) of Bayelsa State, Nigeria.

Prof. Abowei Jasper Freeborn Nestor has contributed tremendously to research, knowledge, and human resources. He has published more than a hundred and forty journal articles in scholarly national and international journals, three monographs, book(s) and conference papers, attended several conferences and produced more than five Ph. Ds and five M. sc graduates and currently supervising three Ph. D and Four M. Sc students. He has been involved in several Community services and a free reviewer to both international and national reputable journals.

Prof. Abowei Jasper Freeborn Nestor has worked as:

- Biology Teacher, Government secondary school Bazza, Gongolar (Now Adamawa State). **1990-1991**
- Biology Teacher, Obio comprehensive college, Rumuomasi Port Harcourt, **1994-1996**
- Biology Teacher, Niger Grammar School, Igbukwu Street, D-line Port Harcourt, **1996-1997**
- Graduate Assistant, Department of Animal and Environmental Biology, University of Port Harcourt, Choba, Nigeria, **1997-1999**
- Lecturer 11 Department of fisheries and Aquatic Environment, Rivers State University of Science and Technology, Port Harcourt, Nigeria. **2000-2003**
- Lecturer 1 Department of fisheries and Aquatic Environment, Rivers State University of Science and Technology, Port Harcourt, Nigeria. **2003-2006**
- Senior Lecturer, Niger Delta University, Wilberforce, Island Bayelsa State **2006-2014**
- Board Chairman, Bayelsa State Environmental

Sanitation Authority. **2012**

- Research Advisor (Sabbatical), Environment, Shell Petroleum Development Company, Nigeria. **2013-2014.**
- Professor Niger Delta University, Wilberforce, Island Bayelsa State. **2014-date.**

Prof. Abowei Jasper Freeborn Nestor is a Consultant/expert opinion witness to individuals, communities National and multinational companies (SPDC and Chevron) both at national and international levels. He has been a Research Advisor (environment Department) and spills claims advisor (Lands Department) with the Shell Petroleum Development Company Limited, (SPDC) Port Harcourt. He is also an expert/consultant EIA reviewer to SPDC (Biophysical) and Federal Ministry of Environment(Ecological). He is an External Examiner to the Graduate School (AEB Department) University of Port Harcourt and an visiting Professor (AEB Department) Rivers State University, Port Harcourt.

Prof. Abowei Jasper Freeborn Nestor is a member Science Teachers Association of Nigeria, Fisheries Society of Nigeria and Environmental Management Association of Nigeria where he is the public relation officer and organizing secretary.

In University Administration; He has functioned as:

- Department post graduate coordinator/Examination Officer
- Department welfare coordinator
- Member Faculty Postgraduate Committee
- Member Faculty Welfare committee
- Member Department post graduate courses review committee
- Member Department examination malpractice

disciplinary committee
- Seminar coordinator
- Chairman Departmental Quality Assurance committee
- Member of Senate, Niger Delta University
- Member several other boards and committees within the university

In terms of Community Service:
- Senior Prefect
- President, Dramatic Society
- National Youth Service (NYSC)
- Financial Secretary, Post Graduate Student Association
- Resource Person, SPDC: Effect of Pipeline Vandalization on the Environment.
- Sunday school Teacher in the Church

His research interests are:
- Fisheries biology and management
- Hydrobiology
- Aquatic pollution and control
- Environmental Biology

Prof. Abowei Jasper Freeborn Nestor is happily married to a beautiful wife: Mrs Ebikienmo Florence Jasper Abowei, with four hansom sons and two beautiful daughters. He has several siblings and dependants.

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