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Liquid organic fertilizer availability and utilization in Nigeria: A review

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Abstract

The word as in general has the responsibility to respond to the emerging food crisis to match the growing population. Africa and many other Low Income Countries under Stress [LICUS] will face a stiffer challenge. Africa and specifically Sub-Saharan Africa depends much on synthetic fertilizers with disease burden. The concept and awareness of Organic Fertilizer and its Utilization in Agro farming with attendant benefits in Nigeria is at its lowest ebb.

This review highlighting availability, of Liquid Organic Fertilizer in Nigeria agro-allied market among farmers and the awareness/benefits in Organic farming reveals much on the scale of 10. 1-3 reliable fertilizers companies are visible with most emphasis on synthetic fertilizer blending only. 1-2 reliable fertilizer company manufactures urea and synthetic fertilizer from which other companies get involved in the distribution. 1-2 claimed that their fertilizers are purely organic in powdered sachet forms. 1-3 claimed to produce liquid organic fertilizer alongside synthetic fertilizer formulation. 1-2 notable liquid organic fertilizers available claimed foliar mode of application. 2 out of 10 makes use of solid human wastes for liquid organic fertilizer. 5 out of 10 liquid organic fertilizer were found to be compost in nature while 2 out of 10 claimed to be organic liquid in nature. 1 3 Liquid Organic Fertilizers encountered cannot be verified by literature on their composition, materials and process of production. The available liquid organic fertilizer in Nigeria is with mixed acceptance. Synthetic fertilizer manufacturers claimed that their products can be used as organic fertilizer. Droppings from animal waste claimed their products are manures and fertilizers. Other liquid organic fertilizer companies claimed use of sea weeds without clear mechanism of actions. Nevertheless, a liquid fertilizer company located in Kuje, Abuja has been identified to possess state of art product line facilities with purely organic materials as source.

Keywords: Agriculture; Fertilizer/Liquid organic fertilizer Availability; Utilization; Organic Agriculture farming; Nigerian agro allied market.

1. Introduction

Food and Agricultural Organization (FAO) arm of the united nation is concerned with feeding the growing world population that is currently estimated to be above 7 billion (FAO, 2006). It is the responsibility of every nation through its government to provide utilizable food crops to meet her ever teeming population. The use of synthetic fertilizer has always been utilized to overcome the food need of nations of the world (Borch and Kjaenes, 2016). Nevertheless, the consequence and the impact of synthetic fertilizer utilization on the soil is enormous ranging from environmental degradation to increase in soil acidity culminating in soil nutritional imbalance (Saweda O. L-T et al., 2014). It therefore becomes imperative to look beyond synthetic fertilizer crop farming to ecofriendly agro production that can sustain crop production.

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Crop production through sustainable agriculture is through subsistence farming coupled with importation of basic/staple food items which we could have ordinarily produced given enabling environment (Philip D. et al., 2009). Thus, sustainability of agricultural practice to produce adequate food security largely depends on synthetic fertilizer for those who can afford them. The quest for alternatives to synthetic agricultural farming causes the long age use search and utilization of organic fertilizer. Organic fertilizer utilization is traceable to fossilized age, as far back as 6000 years before now (Carpanez, T et al., 2022 and Mintallah M.A et al., 2022). In ancient Egypt, sediments or alluvium from river Nile utilized to increase crop yield is a classical utilization of Organic fertilizer (Hitha S. et al., 2021). Scriptures traceable to China and Japan for over three thousand years made reference to organic fertilizer as additives wastes from wild or domestic animals, humans and birds to soil and thereby enhance its fertility (Saweda O. L-T, et al., 2014). The availability of organic fertilizers makes the concept of Liquid Organic agriculture thus a possibility. This concept was developed by workers such as Rudolf Steiner (Retrieved translation, 2014), Sir Albert Howard (retrieved Facsimile edition, 1940) and F.H. King (fact check, Encyclopedia Britannica, retrieved, September, 2023). All these works point to the belief and the actualization that using manures from animal dungs, the practice of crop rotation and biological controls of pests makes best of farming system of an organically nutritious crop yields with excellent health parameter outcomes. Developing countries and or Low Income Counties under Stress (Robert E.B.L, 2008) are currently paying attention to the utilization of organic fertilizers and grows crops that are devoid of synthetic fertilizers and mostly without the use of pesticides thereby making safe, human health and environment (Gerald, E.B, 2019).

Fertilizers in general are materials that are additives to soil or plants to provide nutrients needed by crop plants and to sustain their growth (Hitha, et al., 2021). Organic fertilizers specifically are natural products from the wastes of animals, meat processing and watery mixture of insoluble matter; also, they are derived from plant materials such as compost and bio solids (Saweda O. L- T, et al., 2014).

In early works Columella, a Roman Empire Scientist subdivided fertilizer into: Manure; Compost; Fertilizer ground and Mineral fertilizer and concluded that manure is the best form of fertilizer (Amy T, 2008). The utilization experience gained over many years on organic fertilizer were from the works of many specialists (Hitha, et al., 2021) dedicated to provide solutions to myriads of challenges confronting agricultural practices. Over the years farmers gained informed knowledge on the use of synthetic fertilizers, herbicides, pesticides and engaged in many other agricultural practices that gradually eroded the integrity of the soil and decreased the upper layer of the soil thereby, distorting the eco system (UNEP, 2020). It is important therefore, to increase the depleted mineral nutrients in the soil by the utilization of organic fertilizers in many forms. The last ten years has witnessed the emergence of liquid fertilizer for agricultural practices in many advanced countries of the world (Babalola et al., 2012). Scanty information exist as to the emergence of its utilization on African continent beyond the advocacy for its use and the benefits that organic farming with the use of organic fertilizer offers (Akinbami et al., 1996). The increasing awareness of organic fertilizer utilization has given rise to the availability of various forms of this type of fertilizer.

The interest in this review focuses on the use of fertilizer for sustainable food security and thereby highlighting the emergence of liquid organic fertilizer in Nigeria. Where appropriate technologies exist, Liquid Organic fertilizers in some formulations, comes as a liquid complex fertilizer, where ammonia is neutralized by phosphoric acid or polyphosphoric acid (Sridhar et al., 2003) with different concentrations of nutrients. Where appropriate technologies also exist, the liquid fertilizer is mixed with water or solutions with synthetic pellet fertilizers; or the liquid fertilizer is mixed directly with nitrogen devoid of ammonia (GREENODIN, 2007). In low income country without appropriate technology, substances such as Ethylene Diamine Tetra Acetic acid (EDTA) is used as a solution base in which synthetic pellet fertilizer is grounded and dispersed inside to ensure its slow release; with certain weed compost made into solution for efficient use of the fertilizers and the natural product component (Juan, 2022). Though these kinds of fertilizers are claimed to be Organic, the presence of synthetic fertilizer incorporated into its solution base cast doubt as to their claim. Important to mention is also the emerging use of Bio fertilizer (Satish K, et al., 2022), though not enough for large scale commercialization in Nigeria. These type of fertilizer are also known to make available nutrients needed by crop plants such as Nitrogen, Phosphorus, zinc and other micronutrients (Shaji, et al., 2021).

Innovation of liquid organic fertilizer that is purely organic with analytical evidence will be important in advancing organic agricultural practice with its full benefit to health and environment. The emphasis of this review shall therefore cover availability of fertilizer in Nigeria Agro market, its impact on sustainable agricultural practice, comparing the various available formulations and determining liquid organic fertilizers utilization to crop growth, crop yield and soil nutrients and soil nutrient balance.

Similar definition by (Bernard S.K, 2017) describes Liquid organic fertilizers as a solution of compost and manure from various sources applicable directly on crop plants at various stages of crop plant growth. Availability is defined as the fact or possibility that something can be obtained or have something in place; that something is ready, present or

available (Wikipedia, accessed September, 2023). Availability of liquid organic fertilizer in Nigeria is not in doubt. Table 1 (NFM, 2022 – 2023, FAO, 2016) gives an overview of fertilizers: organic fertilizer, Liquid organic Fertilizer, bio liquid fertilizers and synthetic fertilizers, presented as pellet, animal drops manure/fertilizers, powders and supplements. Table 2 (NFM, 2022 – 2023) provides at least ten available companies in Nigeria in the business of producing Fertilizers. Though our interest in this paper relates to liquid Organic fertilizer, other companies in the production of synthetic fertilizers are listed (from product leaflet, labels and product information channels and communication handles/platforms).

2. Agro allied market showing top fertilizer product, claims, avauilability and utilization spread

Table 1 Available and identifiable Fertilizer and Liquid Fertilizers in Nigeria

S/No.	Name of Fertilizer	Composition and claimed activities	Remarks
1	SUPER GRO Organic Liquid Fertilizer	It is advertised to optimize water use by overcoming water repellancy, increasing the rate of soil penetration. Reduces run-off and evaporation (Super GRO organic fertilizerR label and product Information).	LIQUID ORGANIC FERTILIZER
2	AGRI LIFE Agriboom LOF	It is advertised for its ability to supplies nutrients to plants in an organic form and aids in cell division and cell elongation (AGRI LIFER Product leaflet and information on labels use).	LIQUID ORGANIC FERTILIZER
3	Bio-Plant Microbial Organic Liquid Fertilizer	The advert for Bio-plant is that it be used before planting (during land preparation) to Stimulates beneficial microbial activity (Bio- Plant Microbial Organic Liquid FertilizerR Labelling information).	BIO- ORGANIC LIQUID
4	SUPERGRO ORGANIC LIQUID FERTILIZER	Supergro Is An Organic Liquid Fertilizer, identified in Nigeria, claimed to be good For Use On Plants And Animals (SUPERGRO product introduction and labels Information).	Organic liquid Fertilizer
5	Green World NOPF (Nutriplant Organic Plus Fertilizer)	Green World NOPF (Nutriplant Organic Plus Fertilizer) are known to be available and advertised to possess the ability to increase the growth, thickness, resistance to plant diseases and increases the amount of yield per plant (NOPF labelling information on packaged product).	Organic fertilizer
6	ALL-IN-ONE Organic fertilizer	It advertised to be an Organic fertilizer used for trees, rice, maize, wheat, beans of any kind and helps improve harvesting rate (ALL-IN-ONER product hand bills and leaflets).	Organic fertilizer
7	FOLIA PLUS COMPLETE	Foliar PlusR Complete is a liquid organic foliar fertilizer of premium seaweed extracts origin, reinforced with essential micronutrients and macronutrients for plants (Foliar PlusR Product information and leaflets), and claimed to be ideal for the improvement of yield and quality in many crops including vegetables, maize, sorghum, lawns, tree and tuber crops.	Liquid Organic Fertilizer CANDEZR
8	AGOP Seaweed Organic Fertilizer	It is demonstrated to be highly concentrated, made from Cold-pressed Seaweed & Fish extracts (AGOP, product information and label). Labelled Direction	Liquid Organic Fertilizer

		500ml dilutes in 25-35L of Clean water 1L dilutes in 50-70L of Clean water. It tends to have pesticidal properties on plants once it's diluted and left to stand for 72hrs ().	
9	Azomite Organic Fertilizer - 1kg	It has been demonstrated (AZOMITER, Product information insert) that AZOMITE has been shown to improve root systems, yields and general plant vigor in a variety of applications of field crops. As claimed, AZOMITE helps remineralize nutrient- depleted soils and it is 100% naturally derived.	Powder – Organic fertilizer
10	Organic Fertilizer (Pig Dropping)	Pig Dropping for plating (Yadav, 2013, product information leaflet).	PIG DROPPINGS
11	Organic Poultry Waste Manure/fertilizer	Claimed to be a purely organic poultry bird's fertilizer. Without any added chemicals or preservatives (packaged leaflet information). A bag weighs 100kg and as much as 100kg x 1000bags.	POULTRY BIRDS DROPPINGS
12	Organic Fertilizer and Organic Food supplement	Grand Humus Plus is a 100% natural Organic and Fertilizer Enhancer which contains Humic Acid, Potassium and Organic Materials (Grand Humus PlusR product leaflet package label).	Organic fertilizer Supplement
13	Humus plus Organic Plant Fertilizer POWDER [SATCHET]	Claimed to contain (HUMUS PLUSR organic product Label): Humic acid (dry basis) - 87.5% Potassium as K2O (dry basis) - 12.1% Organic matter - 91.12% pH-value - 10 Water solubility - 100% Size - 80 mesh It's 100% organic (?) Claimed benefits: i). Improves soil structure. ii). Improves water-holding capacity iii). Increases root vitality. iv). Improves nutrient uptake. v). Better seed germination. vi). Increases fertilizer retention. vii) Improves yield.	Claimed to increase yield and harvest by 40% or more in a year' NOTE A sachet/pack (100g) as claimed takes care of 2 acres of farmland. [2 sachets can be mixed very well with 1 bag of fertilizer (50 kg) & applied to farm as usual]
14	Chicken Waste Manure	Waste feeds from chicken (Sampled waste market and Yadav A, 2013).	Animal droppings
15	Organic Fertilizer (BIOSOIL)	BioSoil organic fertilizer as claimed, is a type of fertilizer that is made from the frass residue of black soldier flies (Hermetia illucens). Frass is the solid excrement produced by insects, and in the case of black soldier flies, their frass is rich in nutrients that are beneficial to plants (BIOSOILR leaf insert and product labels). PRODUCTION Production begins with the cultivation of black soldier fly larvae on organic waste material, such as food scraps or animal manure. The larvae feed on the waste material and produce frass as a byproduct. The frass is then collected and processed to create BioSoil. BioSoil is said to be a sustainable and eco-friendly alternative to traditional chemical fertilizers. It is claimed to be rich in nutrients such as N, P, and K, which are essential for	BIO ORGANIC SUPPLEMENT

		plant growth. Additionally, it contains beneficial microorganisms that	
16	Organic Vermicompost Fertilizer Manure (One Custard Paint).	Vermicompost is claimed to be 100% organic and unadulterated as it does not contain any artificial chemicals, it increases the immune system of plants and increases the yielding ability by producing quality flowers and fruits. Vermicompost is easy to use in lawns; it is claimed to keep the lawn whole year green. Also claimed, is that it attracts deep-burrowing earthworms already present in the soil. Those worms will feed on the degradable waste in soil and leaves the castings in soil. Microbial activity in worm castings will be 10 to 20 times higher than in the soil and organic matter that the worm ingests. Thus, as the worms move inside the soil, it loosen the soil and increases soil aeration, providing sufficient space for the plant roots to develop (Organic Vermicompost Fertilizer manure product leaflet and product Labels).	COMPOST MANURE Vermicompost as claimed is easy to store and easy to use. (Advised to be Stored in a shady areas without direct sunlight contact).
17	Super GroR (Natural Liquid Fertilizer)	It claimed to be a wonder Drop for Farming. Super- Gro is advised to be applied to all Plants such as Rice, Maize, Corn, Soya bean, Millet, Tomato, Pepper, Mango, Banana, Pawpaw, Watermelon, Pineapple, Carrot, Ginger, etc. Super gro as clamed helps to achieve a better growth and harvest that farmers desires. Like other organic fertilizer, Super-Gro Organic Liquid Fertilizer add benefits to the Soil and Plants; and it is also claimed to be economical and easy to handle (Super groR product labels).	SUPPLEMENT [NGN 46,000] MANUFACTURED BY NEOLIFE. As claimed, one gallon (5 Liters) is equivalent to 10 bags of conventional fertilizer (50K bag)
18	Urea Fertilizer	Urea has a high concentration of nitrogen fertilizer, claimed to be a neutral organic fertilizer; and can be used also in the production of a variety of compound fertilizer (product leaflet).	DANGOTE – SYNTHETIC SOLID NGN 23,000.00
19	Fertilizer - NPK 15:15:15	NPK 15:15:15 fertilizer goldenR also contain (NPK GoldenR Product insert): I.). Special concentrated mix micronutrients and organic activated humic acid as essential required nutrients for plants. ii). It has macro nutrients nitrogen phosphorus potassium : (15%) in NPK, 15:15:15 – iii). It also contains concentrated micronutrients which gives proper controlled growth of crop plants by enhancing flowering fruit vegetable of plant.	WACOT NPK 15:15:15 NGN 34,000.00 The 3 (three) component together as claimed gives tremendous results on field.
20.	D I Grow Organic Plus Foliar Fertilizer	DI Grow Organic plus fertilizer comes were identified in two types: DI Grow Green (Growth Booster) and DI Grow Red (fruit and flower enhancer). It was noted that DI Grow Green (Growth Booster) is suitable not only for plants but also for animals, poultry and fishes (DI, Grow organic product insert).	SUPPLEMENT [for plants and Animals]

21.	Bio power Plus Organic Seaweed Fertilizer	Biopower plusR organic seaweed fertilizer is claimed to be famer friendly and help both the plants and animal grow faster, and strong with best yields. It can be used at any stage growth of crop plant. A litre may covers 1.3 hectares of farmland (Bio power Plus labels and Yadav, A. 2013).	BIO FERTILIZER
22	Potassium Nitrate Soluble MULTI – K [CLASSIC]	Potassium nitrate is a great supplement in agriculture production and nutrition. It provides a means to grow a stronger healthier crop through balanced plant nutrition. As it is often used to support specialty or high-value crops (Multi – K classic product leaflet and labels).	

Table 2 Identifiable Top fertilizer manufacturers in Nigeria (NFM, 2023)

S/No	Name of Manufacturer	Product/Capacity	Comment	Utilization and availability index
1	Earth Care Nigeria Limited, Ikorodu LAGOS	Municipal Solid waste 200, 000 Metric tonnes/ Annum	Largest organic fertilizer in West Africa	4
2	Brass fertilizer and petrochemical Limited, Brass, Bayelsa state	Up-coming – prep using petro-chemical	5.37 metric tonnes/annum	1
3	Indorama Eleme fertilizer and chemical Limited	Urea/Granular; 4000tonnes /day	Largest in sub- Saharan African	3
4	Notore chemical Ind. PLc	Leader in Agro allied	Education and educating farmers	2
5	Bejafta Group Ltd	Fertilizer blenders, NPK 15:15:15; 20:10:10	Established 1998; 900 tonnes /day	3
6	Golden Fertilizer Co. Ltd (Flour Mills of Nigeria as sole owner)	Fertilizer blenders, Distribution and Supply	Established, 1997	3
7	Nitromobil International Nig. Limited	Efficient, effectiveness at meeting customers at point of need	Partnership with Agro chemical companies in Europe, Asia and France	3
8	Dangote fertilizer Complex; occupies 500 hectares of land, built at the cost of 2.5 Billion – Lekki Free trade zone, Lagos	Africas largest granulated urea fertilizer complex; produces 3 million Metric tonnes /annum (Phase 1).	Consumption rate – 1.5 million metric tonnes; Need = 5 – 7 million metric tonnes per annum of fertilizer	5
9	OCPA Africa develops fertilizer solution for local consumption according to needs	Produces – NPK 20:10:10; 15:15:15; 27:13:13; [MonoAmmPhoS[DiA mmPhos/TriSuper Phos].	Blending of granular fertilizer; [Office cherifient des Phosphate Group Africa] 2024 – expected production output	1

10	Matrix Fertilizers, Dutse, Kaduna Zaria road, Kaduna	NPK blending company; 650,000	Notably serving the northern Nigeria	4

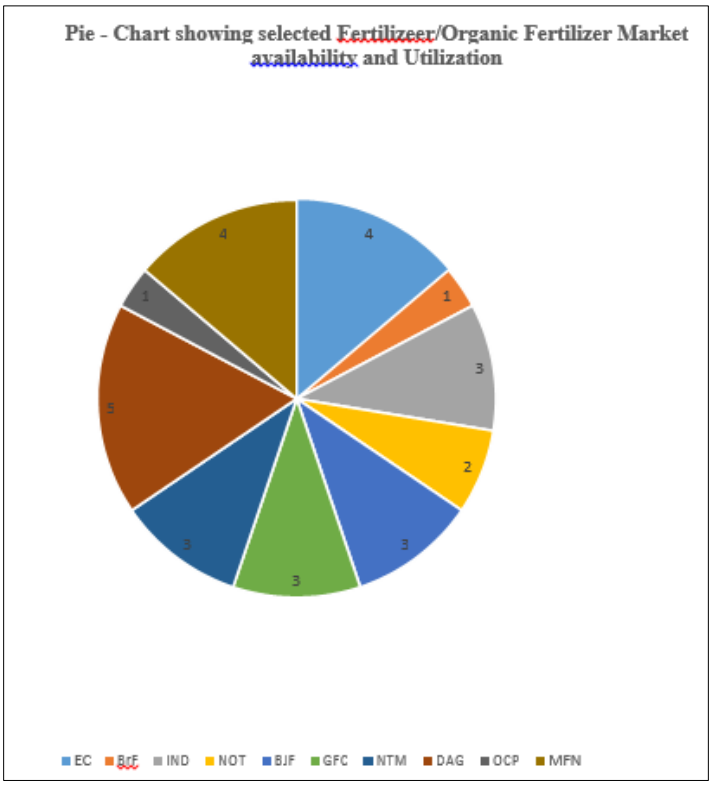
3. Distribution Summary and Charts of common Standardized and Unstandardized fertilizer in Nigerian Local markets and Agro Allied Stores

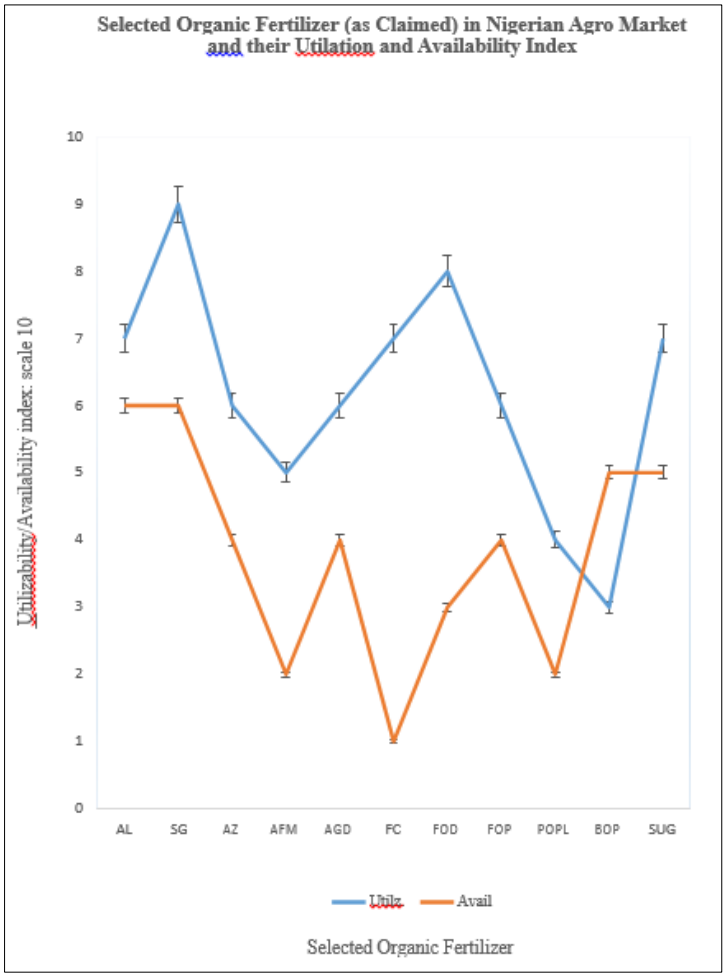
Table 3 Commonly found Organic fertilizer (as claimed, Liquid or pellet) list with their utilization and availability index

S/No.	Name of Fertilizer	Utilization index	Availability/Verifiable index
1	Agri life	7	8
2	Super Gro (NEOLIFE)	9	6
3	Azomite	6	5
4	Afrimash (N:P:K – Liquid fertilizer)	5	3
5	Agrodyke	6	3
6	Farm Care	7	2
7	Foliar Complete Plus DI	8	7
8	Foliar Plu	6	5
9	ProPlant	4	4
10	Bioplant	3	4
11	SuperGro and Sufarctant	7	5

Table 4 Commonly found Liquid Organic fertilizer (as claimed) list with their utilization and availability index (NFM, 2023)

S/No.	Name of Organic Fertilizer	Utilization Index	Availability index
1	Simple gro Liquid fertilizer	6	7
2	Maxi Crop, Liquid Natural Fertilizer	5	7
3	Liquid Horse Manure,	6	5
4	Amino fulvant,	4	4
5	Calcium Ammonium Nitrate (CAN) liquid fertilizer	3	4
6	Neem Organic Fertilizer	7	7
7	Agri-Zyme	4	4
8	Horn Dust (Cow horn meal)	3	5


Pie - Chart showing selected Fertilizeer/Organic Fertilizer Market availability and Utilization
4
1
3
2
3
3
5
1
4
EC
BrF
IND
NOT
BJF
GFC
NTM
DAG
OCP
MFN


Selected Organic Fertilizer (as Claimed) in Nigerian Agro Market and their Utilation and Availability Index
Utilizability/Availability index: scale 10
0
1
2
3
4
5
6
7
8
9
10
AL
SG
AZ
AFM
AGD
FC
FOD
FOP
POPL
BOP
SUG
Utilz
Avail
Selected Organic Fertilizer

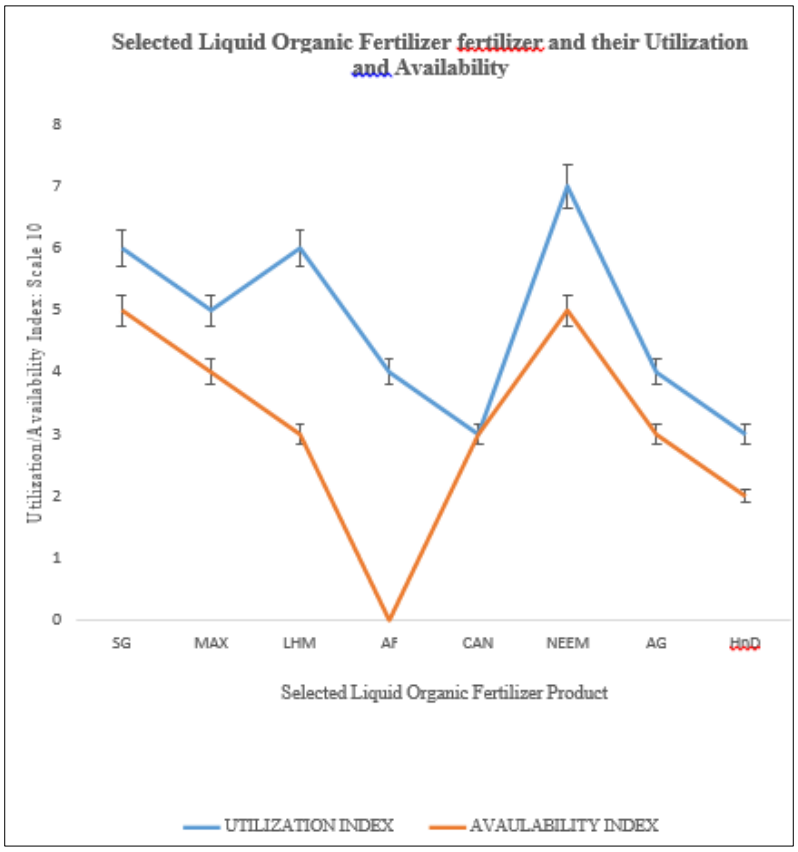


Figure 1 Top Fertilizer companies showing product Utilization and availability

4. Utilization availability fertilizers in various forms

Table 1, 2, 3 and 4 confirms the availability and utilization of fertilizers in various forms: Organic Fertilizer and specifically, Liquid Organic Fertilizer. Figures 1, 2 and 3 reveals graphical illustrations of market positions, rating index and availability/activities as claimed. Each selected companies and the availability index using EU aggregates (Eurostat, 2016), the result demonstrate their utilization in Organic farming with evidential impact on sustainable agricultural practice (Menale, K. et al., 2009) as seen today in Nigeria (Adeola and Adetunbi, 2015). In Nigeria, the tables shows that, the source of Liquid Organic Fertilizers is a combination of the different types of materials highlighted: they are commonly produced from animal diaries and droppings, poultry droppings poultry of egg producing birds and plant composts (Bernard S.K, 2017). Organic fertilizer/manures from Cattle dungs as we have in Nigeria was validated by (Hailin Z, 2017) coming from cattle and horse droppings (Bhunia S. et. al., 2021). Common to all as seen in the tables are their ability to produce or release into soils macro and micro nutrients/elements such as Nitrogen, Potassium, Phosphorus, Manganese, Zinc, Magnesium and Calcium (Bernard S.K., 2017). They claim that all increases water infiltrations, increases soil stability and could add bacteria thereby increases their activities in the soil, this was also the position of (Augustin, O. 2019). In Nigeria, the impact of fertilizers in general, organic fertilizer or Liquid Organic fertilizer on agricultural sustainability cannot be over emphasized as reflected in the consistency of Ofada rice in Nigeria since it was introduced by missionaries into the country between (Gyimah-Brempong, K. 2016; Udevi, O.A, 2019).

Establishing the right claim of fertilizer being organic or liquid organic fertilizer Nigeria market is an analytical questions to be answered. The available major companies highlighted in Table 2 gives an insight. The companies identified in this review were mostly in activities of blending and distributions (Borch and kjaenes, 2016). The bagged animal's droppings are real organic manures/fertilizers and are clearly visible in plant gardens and orchards in Nigeria Agro market (Menale, K., et al., 2009).

5. Discussion

Decision to adopt any kind of fertilizer for agricultural sustainability in Nigeria largely determined by the nutrient ratio (Yadav A. et al., 2013) and other agronomic response factors (Ilori, M.O. et al., 1999). Agronomic factor has been found

to be very important in soil characterization together with climatic influence on Liquid organic fertilizer utilization (Bhutania.S. et al., 2021) and its adoption for crop plant utilization. The position of Falusi A.O 1997 is for capital investment in fertilizer comparable to agronomic consideration (Ilori M.O, et al., 1999). Swedan L-T et al., 2014 also considered that the operational capital in cropping season, information and learning from extension worker cost and risk prevention are also important consideration. Supply side factor can easily be explained considering the huge cost of fertilizer and distribution cost in the chain in Nigerian. The overall impact the attendant high cost of fertilizer to our farmers. In Nigeria, whether, by cooperative associations across crop plant lines, individualized farmers and community farmers associations, the cost of all forms of fertilizers is still out of reach of independent farmers leading to food insecurity (Abdulkareem M,2023). Government therefore, at all levels need to take a lead to purchases these fertilizers, and distribute them to organized farmers at no cost or at reduced cost.

From table 1, it can be observed that the top local fertilizer production in Sub-Saharan Africa considers importation generally more economical than local production. Thus it becomes imperative for innovation of locally available materials to be considered in producing organic fertilizers at affordable cost, create awareness for organic farming and creating enabling environment for Nutritious/healthy organic diets.

Appendix I illustrate the available materials that can be converted to organic fertilizer as demonstrated by Sulaimain U and Kundiri M.A, 2016. These Organic materials are convertible to liquid Organic fertilizer based on their consistency, structure, texture and colour. From the work of Sulaimain U and Kundiri M.A, 2016, we can agree with (Yusuf H. et al., 2020) that most materials used for Organic fertilizer can comfortably be classified into the follows Appendix I:

6. Conclusion

It is overstatement to say that increase in population demands increase in agricultural resources with large amounts of agricultural products requirements. Achieving this as highlighted in this review is over the years achieved through technological farming with use of large amounts of different chemicals: herbicides, pesticides and synthetic or chemical fertilizers producing large amounts of agricultural products. The consequence is of these chemical substances for both land and for crop production and consumers of such crop products is enormous (Fertilizer nitrates and pesticides in many forms have been identified in water which has been confirmed to be due to leaching of chemicals and is traced to many diseases found close to agricultural endeavors or activities).

This review propose the following way out, as a recommendation: acceptance of green manure and compost manure that does not release synthetic pesticide and other harmful chemicals. Thus organic matter of the soil is maintained together with soil nutritive value. Fertilizer nitrates and pesticides in many forms have been identified water which has been confirmed to be due to leaching of chemicals and is traced to many diseases found close to agricultural endeavors or activities.

Agricultural practice where fertilizers farming practice is efficiently practiced is the only way out, nevertheless, the crop nutritious content through organic farming is recommended for nutritious elements that enhances healthy living and quality of life. The quick delivery and nutrient uptake rate of this liquid organic fertilizer, is an advantage; also, identifying cheap available raw materials that is environmentally friendly capable of increasing yield devoid of chemical hazards help our eco-system.

This review also recommend a land management system that is in every sense very sustainable. High level in overgrazing and an insecure arable forest where peasant farmers relies on for good agricultural practices in Nigeria must be dealt with in a holistic manner to enable food security where use of organic fertilizer is encouraged to support and increases crop yield is highly recommended. Another recommendation is for Nigerian to curtail deforestation while discouraging farming monocultures to curtail the annual flood; the annual flood in turn which wash off our top soil in Nigeria can that has come to stay and the use of Liquid organic fertilizer to ensure soil balance should greatly be embraced for agro ecological solution.

Providing food security among many demands involves food availability at low cost and improving its nutrient value. This can be achieved where farmers through concerted efforts embrace simple agriculture farming method using Liquid organic fertilizer. Insecure community should be educated to use the manure-based fertilizer in clusters to overcome too large scale that may eventually be lost to banditry and perennial flooding. It is therefore recommended that our agriculture practice should be Knowledge based through extension workers in a hub where cross fertilization of ideas can take place for profitable and healthy nutritious food cropping. The call for acquisition of farming and gardening space to demonstration this concepts is highly recommended as hope for hopeless farmers; and thereby encourage interest in farming despite challenges like insecurity that keeps large population out of farming practices.

It has been observed that cultivation of similar crop on the same land in all the seasons increases crop vulnerability to pest and diseases with greater tendency for decreased crop yields and overall productivity. This review recommends the return back to use of residues from crops, the practice of crop rotation, and accepting liquid organic fertilizer utilization that make use of fresh green manure will significantly increase crop yield and its quality throughout the year. This recommendation goes hand in hand with the practices where running water in raining season that can erode the top soil can be retained in farm space contours that could be used when later needed; this serve the same purpose as tap water installation and distribution for dry season farming. Crop area that need water can access water slowly for plant consumption in just enoughquantity with even distribution of Liquid organic fertilizer nutrients into the soil for crop plant benefits. This recommendation encourages farm land revitalization.

This recommendation supports continuous investment in conservation of natural resources ahead of unpredictable adverse climatic changes. It therefore necessary for our extension workers to develop strategies such as cultivation of trees and nurturing them to growth. As they grow, they are pruned into natural vegetation. The pruned parts are useful support for mulching, farming practices and cultivation of creeping crops. These recommendations if well-tailored to the need of our farmers who shall ultimately use Liquid organic fertilizer made from our wastes in recycled manner shall ensure our sustainable organic agricultural farming for healthy living.

Compliance with ethical standards

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Disclosure of conflict of interest

The author wish to state that the Review is devoid of bias and there is no conflict of interest throughout the study.

Ethical and consent

Acceptable best practices and Various on-line platforms were employed for this review and makes consent not necessary following citing all information sources.

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Appendix I

- Plant materials/Crop materials
  - Acacia Albide
  - Acacia Nilotica
  - Azadrirachta indica
  - Husk of millet
  - Husk of rice
  - Residue of crops
- Materials for Manures
  - Poultry manure
  - Compost manure
- Material droppings from animals
  - Dungs from camels
  - Dungs from cow
  - Dungs from horse
- D- Others
  - Human solid wastes

In a free and in an uncontrolled market like Nigeria, awareness of a product like Liquid Organic fertilizer comes along with authenticity and claims due to challenges of pre-production analysis and post-production analysis (Babasola O. J et al., 2017). Where a blending fertilizer company claim that synthetic fertilizer in solution possess organic fertilizer properties leads credence to uncertainty and claims in the fertilizer production industry. It is worthy to note the followings from the claims by most Agro-allied companies reviewed in this work: synthetic fertilizers are produced by most of Nigerian fertilizer companies; most companies are involved in fertilizer blending than real production; most organic fertilizers in Nigerian market are imported; most Organic fertilizers are characterized by inconsistent claims of nutrient ratio and variability. This revelation from observations highlighted emanates from the fact that pure organic fertilizers are extremely few if available in Nigeria markets; the claims organic fertilizers has become more of market strategies to increase utilization spectrum of the more available synthetic fertilizer; and absence of appropriate technology and committed investors leaves a vacuum for these type of claims (Bhutania.S. et al., 2021). This vacuum encourages claims the organic benefits that has no direct relationship with their product label (Ilori M.O. et al., 1999).

At this juncture, the advantage of organic liquid fertilizer must be highlighted in a competitive market where the dominance fertilizer products are mostly synthetic.

Liquid organic fertilizer possess inherent advantage of availability at low cost, increasing farmer's profits through high crop yield due to their soil improvement properties; reduces water use, increases biological diversity and reduces carbon emission to the barest minimum (Bambang W. H. et at., 2023). Utilized in an organic farming method, it suppress unnecessary needs that employs mechanical methods of farming and various chemicalization of soils and crop nutrients (Parman, S, 2007). When Neem which is a green pesticide are utilized together with plant compost and liquid organic fertilizer, the synergy outcome is a nontoxic and ecologically and organically suitable farming practice (Carol, 1998).