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Nutritional Health and Economic Importance of Legumes in Nigeria: A Review

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Abstract: *There is increasing interest in finding new food sources to alleviate malnutrition and food security in developing countries, such as Nigeria. Legumes have played an important role in raising productivity of farming in the temperate zone, and some part of Nigeria. Legumes are Nutritious and versatile food that should be included in a Healthy diet. They are high in protein, fiber, and essential vitamins and minerals, and have been shown to have numerous health benefits, including reducing the risk of heart disease, managing blood sugar levels, and supporting healthy gut bacteria. With their wide range of culinary uses, legumes can be easily incorporated into a variety of dishes, making them a great addition to a healthy and balanced diet. Legumes represent an important source of food in developing countries and Nigeria is one of them. Legumes are next to cereals in terms of their economic and nutritional importance as human food sources in Sub-Sahara African region. It includes chickpea, black gram, mung bean, and pigeon pea which have an estimated 16,000 –19,000 species in 750 genera. Asia ranks first both in area harvested and in production capacity. India, on the other hand, accounts for 75 to 96% of the total global production of chickpea and pigeon pea, respectively. Nigeria is the largest producer of cowpea in the world and one of the highest consumers. Cowpea is produced in 32 of 37 states and the Federal Capital Territory (FCT) of Abuja, Nigeria. With about 18.4% of the total land area, Zamfara is the largest producer, followed by Borno, Kano, Jigawa, Bauch, Sokoto, Niger,Kaduna, and Katsina state. This top 10 states account for about 82% of the Country's total area planted to Cowpea. Eighteen of the 32 states and FCT showed declines in the area planted to Cowpea over the year's period. Four of the 10 top producing states showed substantial rate of growth (ROGs) for yield; these were Sokoto with 11.28%, Kano with 7.41%, Borno with 7.33% and Niger with 4.88%, which table 1 and 2 explain the statistical growth and producing Cowpea and Groundnut in Nigeria. This review explain the importance of legumes and insights, it's nutritional, health and also their economic impact.*

Keywords: *Legumes, Importance, Nutritional, Health, Economic, Food Security, Nigeria.*

1.0 Introduction

The accessibility to nutritious, and safe food to meet the demands of a growing global population is one of the grand challenges of our present time in Nigeria. With a projected global population increase from more than 7 billion in 2024 to 9.5 billion in 2050, it is estimated that food production must increase by more than 60% to meet future demand and control the Food insecurity in Nigeria, Africa and worldwide. Much of the research on global population change and the impact on food systems focuses on the effects of change on agricultural production, such as the impact on land use, pollution and biodiversity at the expense of post-harvest value chain issues such as storage, preservation and packaging.

1.1 Legumes are dicots. Legumes are flowering plants (*dicotyledons*) in the Leguminosae family and were derived from the latin word *legere* (to gather) and *legumen* (seeds harvested in pods) during the mid-17th Century. It includes chickpea, black gram, mung bean, and pigeon pea which have an estimated 16,000–19,000 species in 750 genera. Asia ranks first both in area harvested and in production capacity. India, on the other hand, accounts for 75 and 96% of the total global production of chickpea and pigeon pea, respectively. The expression food legumes usually mean the immature pods and seeds as well as mature dry seeds used as food by humans. Based on Food and Agricultural Organization (FAO) practice, the term legume is used for all leguminous plants. Legumes such as French bean, lima bean, alfafa, or others that contain a small amount of fat are termed pulses, and legumes that contain a higher amount of fat, such as soybean and peanuts, are termed leguminous oilseeds. Legumes represent an important source of food in developing countries. Soybean, groundnut, dry bean, pea, broad bean, chickpea, and lentil are the common legumes in most countries. In some countries, depending on the climatic condition and food habits such as Sub-Sahara Africa, and mostly Nigeria, other legumes are grown. Legumes are next to cereals in terms of their economic and nutritional importance as human food sources in Sub-Sahara African region. They are cultivated not only for their protein and carbohydrate content but also because of the oil content of oilseed legumes such as soybeans, groundnuts. Legumes are sources of protein and are relatively costlier economically compared to cereals with great food value; and are reasonable nutrients for the maintenance of the body, e.g., vitamins and minerals. The legumes has almost the same energy value per unit weight compared to the cereal grains (4.2 kcal), albeit, they provide more calcium, iron, thiamine, riboflavin, pantothenic acid, among others than cereals. The utilization of legumes is highest in India and Latin America owing to religious restrictions and food attitudes. Legumes also contain some anti- nutritional factors, such as *trypsin and chymotrypsin, phytate, lectins, polyphenols, flatulence-provoking and cyanogenic compounds, lathyrogens, estrogens, goitrogens, saponins,* anti-vitamins, and *allergens*. However, heat treatment is known to destroy the anti-nutrients, such as *protease* inhibitors and *lectins*, although it also destroys vitamins and amino acids. Legumes are a good source of dietary fiber; the crude fiber, protein, and lipid components have a *hypocholesterolemic* effect. Legumes are a type of plant-based food that are highly nutritious and versatile. They are a key component of a healthy diet and have been a staple food in many cultures around the world for centuries. Legumes are the seeds of plants in the Fabaceae family, which includes beans, lentils, peas, and peanuts. They are characterized by their fruit, which is a pod that splits open to reveal the seeds. Legumes are a Nutritious and

versatile food that should be included in a Healthy diet. They are high in protein, fiber, and essential vitamins and minerals, and have been shown to have numerous health benefits, including reducing the risk of heart disease, managing blood sugar levels, and supporting healthy gut bacteria. With their wide range of culinary uses, legumes can be easily incorporated into a variety of dishes, making them a great addition to a healthy and balanced diet.

1.2 Identification of Some Legumes Varieties in Nigeria

There are many different types of legumes in Nigeria, which some are identified below:

i. Beans: kidney beans, black beans, Chickpeas, and Lima beans.
ii. Lentils: Green lentils, Red lentils, and Yellow lentils.
iii. Peas: Garden peas, Snow peas, and Snap peas.
iv. Peanuts: while often through of as a nut, peanuts are actually a type of legume.
v. Soybeans: used to make a variety of products, including Tofu, Tempeh, and Edamame.

S/No.	LEGUMES	LEGUME VARIETIES			
1.	**Beans**	Kidney beans	Black beans	Checkpeas	Lima beans
2.	**Lentils**	Green lentils	Red lentils	Yellow lentils	-
3.	**Peas**	Garden peas	Snow peas	Snap peas	-
4.	**Peanuts**	peanuts	-	-	-
5.	**Soybeans**				

1.3 Properties of Legumes

Unlike fresh fruits and vegetables that have high moisture content (typically 70 -95%), large unit size (typically 5g to 10g), high rate of respiration, soft texture and short shelf life, cereal grains and legumes haves low moisture content (typically 10 – 15%), small unit six (typically less than 1g), very low rate of respiration, hard texture and long shelf life. Consequently, fresh fruits and vegetables are commonly referred to as perishables while Cereal grains and legumes are referred to as durables. The problems associated with the postharvest storage and handling of durables are different from those of perishables.

2.0 Nutritional, Health and Economic Importance of Legumes

2.1 Nutritional Benefits of Legumes

The nutritional value of legumes is gaining considerable interest globally because of the demand for healthy foods. Consumed regularly, legumes contribute to a healthy diet, and would help to control metabolic diseases such as diabetes mellitus (Nestel *et al*., 2014). In general, legumes are sources of complex carbohydrates, protein and dietary fibre, have significant amounts of vitamins and minerals, and high energetic value (Almeida- Costa et al., 2016). Legumes are an affordable source of protein and have the advantage of having low glycemic index, and significant antioxidant activity (Granito *et al.,* 2008). Legumes have been demonstrated to help manage both cholesterol and blood glucose (Olmedilla Alonso *et al.,* 2013). Legume consumption has been associated with a lower risk of developing several chronic diseases, mainly cardiovascular diseases, but also obesity and type 2 diabetes (Schröder, 2017; Sievenpiper *et al*., 2019). Legumes contain a range of nutrients and bioactive components that may explain their protective effect.

Legumes are an important food crop in Nigeria and all over the world because they provide a vast number of the population with a cheap alternate source of protein. Cowpea, groundnut and soybeans are the major legumes consumed in Nigeria. Bean production increased from 2.14 million hectares in 1994/1995 to 3.47 million hectares in 2005/2006 (Akinyele, 2009). In order to secure food supply for the Nigerian population, research efforts are being directed towards the study of underexploited legumes that are well adapted to adverse environmental conditions and highly resistant to disease and pests.

Legumes are rich in nutrients and have several health benefits, making them an essential part of a healthy diet. They are high protein, fiber and essential micronutrients, and have been shown to reduce the risk of chronic diseases, such as heart diseases and diabetes.

Legumes are highly nutritious and provide a range of essential vitamins, minerals, and macronutrients. Some of the key nutritional benefits of legumes which include the following:

i. High in protein content: legumes are a good source of protein content, making them an excellent option for vegetarians and vegans
ii. Rich in Fiber: legumes are highly in dietary fiber, which can help to lower cholesterol levels and promote digestive health
iii. Good Source of Essential Vitamin and Minerals: legumes are a good sources of essential vitamins and minerals, including iron, zinc, potassium, and folate

Legumes have long been known to be highly nutritious for both humans and animals. As expected, the fixation of N2 leads to generally higher protein levels in the plants' tissues. Mannetje et al (1980), reported crude protein levels in temperate legumes, tropical legumes and tropical grass of 23.5, 21.2 and 12.2%, respectively, when grown under identical controlled environmental conditions, even though the grass received 112 kg N/ha in.
Dry-matter digestibility of the three groups were 76, 72.8 and 70.5%, respectively. Phosphorus concentrations of the tissues were similar.

Because of the initially higher levels of protein in the legume tissues, it takes longer for their protein content to fall to less than 6.5%, the lower protein threshold for animal maintenance, thus prolonging the period during which its forage value is high. Dry-season burning can improve grass quality under conditions of residual soil moisture, but this is slight compared with residual legumes. Legumes have tap roots and therefore usually root deeper than grasses.
They often remain green longer. The seeds are often a further source of high-quality feed. However, late season grazing can interfere with seed set and reduce the amount of seed available for re-establishing the legume in the following season.

The greatest constraint on animal performance in Africa and elsewhere in the seasonally dry tropics is the low nutritional value of most animal feeds during the dry season. Evans (1992) showed that live-weight gain of steers was directly proportional to the proportion of legume in pasture. A great many trials have studied the effects of legumes in the diet on animal production.

Legumes show promise in being able to provide better quality feed during the dry season, and have the additional benefit of helping to restore soil fertility depleted by more intensive cropping.

Legumes could be included either within the cropping phase, to reduce the rate of soil fertility depletion, or during the fallow phase, to speed up the fertility restoration rate.

2.2 Health Benefits of Legumes

The health benefits of legumes are numerous and well-documented. Some of the key health benefits of legumes which include the following below:

i. Reducing the Risk of Heart Disease: The Fiber, potassium, and antioxidants in legumes can help to lower cholesterol levels and blood pressure, reducing the risk of heart disease
ii. Managing Blood Sugar Levels: legumes have a low glycemic index, making them an excellent choice for people with diabetes or those trying to manage their blood sugar levels
iii. Supporting Healthy Gut Bacteria: legumes are prebiotic, meaning they feed the good bacteria in the gut, supporting a healthy gut microbiome
iv. Reducing the Risk of Certain Cancers: the antioxidants and phytochemicals in legumes have been shown to reduce the risk of certain cancers, including colon, breast, and prostate cancer.

Proteins are essential component of diet performing multifarious role in human body. Present project was an attempt to extract and characterize legumes protein isolates for their functional properties. Four different legumes i.e. cowpea, pigeon pea, peas and mungbean were evaluated for protein content, functional properties and their ability to improve nutritional quality of foods. Cowpea exhibited maximum protein content 27.88±1.95% followed by mungbean, peas and pigeon pea. As for as functional properties are concerned, cowpea protein isolates showed highest bulk density 0.71±0.05 g/cm^3 however, maximum protein solubility 82±4.97 was observed in pea protein isolates. Maximum water and oil absorption capacity 163±10.05, 168±11.72% was observed in mungbean and pigeon pea protein isolates, respectively. Likewise, different legumes protein isolates showed significant results for emulsifying, foaming and gelling properties.

2.3 Economic Importance of Legumes

The National Bureau of Statistic (NBS) of Government of Nigeria lists Cowpea and Groundnut as two of about a dozen major crops that includes Sorghum, Millet, Maize, Cassava, Yam, Rice, Melon, Cocoyam, and Cotton in Nigeria. The data base, covering the period from 1994/95 to 2005/06, shows that Cowpea and Groundnut are grown at approximately 2.2 million ha of land each per year as describes on table below. The two crops account for about 9.7% of the total area planted to the major crops of more than 22.8 million ha for all Nigerians.

Table 2. Trends of Major Grain Legumes of Nigeria

Crops	Area		Grain Yield		Production	
	1000 Ha	ROG (%)	Kg/Ha	ROG (%)	1000MT	ROG (%)
Cowpea	2,207	-3.95	700	0.94	1,546	-3.01
Groundnut	2,159	-0.82	1191	-0.04	2,571	-0.85
Soybean	581	0.91	910	5.28	529	6.24
Total/Average	**4,947**	**NA**	**NA**	**NA**	**4,646**	**NA**

According to this source, the annual rate of growth (ROG) for area of Cowpea and Groundnut has declined at 3.95% and 0.82% respectively, during this period, meanwhile, the yield for cowpea grew at 0.94% per year whereas the yield of groundnut showed a slight declined by 0.04% per year. Annual production is estimated at nearly 1.55 million and 2.57 million metric tons MT, respectively, and declined at the rate of 3.01% and 0.85% per year, respectively.

The statistic above period lists Soybean as an important Legumes for Nigeria. The estimated area coverage is reported as approximately, 3.95 million ha for cowpea, 2.08 million ha for groundnut and 581000 ha for soybean. The huge disparity between the NBS and FAO database for cowpea is perhaps the former includes only pure stand whereas the latter report intercrops with Cereals.

According to FAO data, the ROGs for area planted to Cowpea, Groundnut and Soybean were 0.41%, 0.06% and 0.91%, respectively, whereas the annual growth for yield was 4.33% for Cowpea, 5.72% for Groundnut, and 5.28% for Soybean. The FAO data estimates put the area occupied by all Legume crops of Nigeria at approximately 41.42 million ha.

2.3.1 Food Security

Legumes is a staple Food in Nigeria, providing a rich source of protein, fiber and essential micronutrients. Cowpea, for example, is a popular legume in Nigeria, with over 70%of urban households consuming it and utilizing into many products.

2.3.2 Income Generation

Legumes plays a vital role in Nigeria's economic, particularly in the area of Food security, income generation.

Legumes is an important cash crop for many smallholder farmers in Nigeria. The production and sale of legumes provide a significant source of income for these farmers and producers, helping to reduce poverty and improve livelihoods. The exploitation of orphan legumes, such as cowpea and soybean, can generate revenue for smallholder formers and contribute to the Country's economic growth.

2.3.3 Major Legume Crop's areas of Production in Nigeria

Cowpea and/or Groundnut are grown in the majority of the states of Nigeria, which describes on table 2 below. Cowpea is produced in 32 of 37 states and the Federal Capital Territory (FCT) of Abuja, Nigeria. With about 18.4% of the total land area, Zamfara is the largest producer, followed by Borno, Kano, Jigawa, Bauch, Sokoto, Niger,Kaduna, and Katsina state. This top 10 states account

for about 82% of the Country's total area planted to Cowpea. Eighteen of the 32 states and FCT showed declines in the area planted to Cowpea over the year's period. Four of the 10 top producing states showed substantial ROGs for yield; these were Sokoto with 11.28%, Kano with 7.41%, Borno with 7.33% and Niger with 4.88%. Dominant varieties of cowpea grown in Nigeria include, IT97K-4999-35, IT89KD-288, IT90K-277-2, IT89KD-391, and IT98K-205-8.

Table 2: Cowpea Trends in Top 10 Producing States of Nigeria by NBS and FAO

States	Area		Yield		Production	
	1000 Ha	ROG (%)	Kg/Ha	ROG (%)	1000 MT	ROG (%)
Zamfara	406	0.84	410	0.94	166	1.77
Borno	195	-12.63	977	7.41	191	-5.22
Kano	159	-5.13	569	-6.35	90	-11.48
Jigawa	158	-8.00	310	7.33	49	-0.67
Bauch	153	-5.08	408	-1.15	62	-6.23
Sokoto	151	1.15	709	11.28	107	12.44
Niger	141	-4.32	1973	4.88	279	0.56
Kaduna	135	-0.94	879	-2.85	119	-3.79
Yobe	130	1.30	686	0.05	89	1.35
Katsina	128	-2.26	362	-2.02	46	-4.28
Other states	452	NA	398	NA	348	NA
Nigeria	**2207**	**-3.95**	**700**	**0.94**	**1546**	**-3.01**

Table 3: Groundnut Trends in Top 10 Producing States of Nigeria by NBS and FAO

States	Area		Yield		Production	
	1000 Ha	ROG (%)	Kg/Ha	ROG (%)	1000 MT	ROG (%)
Kano	423	-4.41	782	-1.07	331	-5.47
Niger	231	-2.27	1365	2.55	316	0.28
Kaduna	203	4.11	1650	-1.31	335	2.79
Benue	199	2.03	1787	-1.18	356	0.86
Zamfara	145	-3.22	839	-0.03	121	-3.25
Taraba	143	28.48	1237	-8.67	177	19.80
Bauch	140	2.65	955	1.75	134	4.40
Borno	109	5.93	2067	-9.34	226	-3.41
Katsina	105	4.67	529	-0.86	56	3.82
Nasarawa	67	1.02	1153	-0.10	77	0.92
Other states	394	NA	580	NA	443	NA
Nigeria	**2159**	**-0.82**	**1191**	**-0.04**	**2571**	**-0.85**

Soybean is a relatively new crop in Sub-Sahara Africa but has now become an important component of smallholder cropping systems in some parts of Nigeria. The major production areas are the Moist Savanna and Sudan Savanna zones. Nigeria accounts for 43% of the total soybean production in Africa. A number of factors have now generated fresh and growing demands as explain on first line of introduction for this crops for domestic processing to meet the rising domestic demands for soybean meal and soybean oil and the flourishing small to medium scale processing and utilization outfits. Dominant varieties of soybean in Nigeria are describes as follows, TGx 1835 – 10E, TGx 1951 – 3F, TGx 1904 – 6F, TGx 1935 – 3F, and TGx 1955 – 4F.

The Government of Nigeria is revitalizing its Agricultural development and grain Legumes are among the high priority crops for economy strengthen and sustaining the population grow in the Country. There is creasing demands for all of the legumes in the Country.

Emphasis in phase 3 will be on doubling efforts of seed multiplication and delivery (with particular attention to strengthening community-based seed system), putting more emphasis on integrated crop management aspects, including moisture conservation technologies, releasing varieties in the pipeline and promoting their adoption, collaborating with PICS to promote the hermetic bag technology, and engagement in policy advocacy.

Nigeria is the largest producer of cowpea in the world and one of the highest consumers. This review explain the importance of legumes and the critical comparative reveals several importance insights, it's nutritional and also there economic impact. Legumes, more especially cowpea is important for households and commodities due to its substantial contribution to food security,

nutrition, and revenue production in Nigeria. Legumes plays a pivotal role in supporting various stakeholds involved in the value chain, including producers, processors, traders, and food vendors. Nigeria is the largest producer of cowpea in the world, with total production of 3.6 million tons in 2021, the demand for cowpea surpasses its supply due to factors such as the country's large population and low productivity.

Ecologically, legumes are largely species of successional habitats, to maintain stable legumes-based associations, management is a necessary input. The effectiveness of legumes in biological N_2 fixation is very variable, depending on environmental, nutritional, biological and genetic factors. Therefore, their effect on soil fertility is also likely to be variable and substantially under management control.

The contribution that legumes can make to herbage quality is considerable and there is ample evidence of substantial gains in animal production being possible. They also have high mulching value for crop production. Farming systems in most of sub-Saharan Africa are substantially different to those in Australia or much of tropical America. In most of Africa, smallscale, mixed crop-livestock farming systems are the norm, with the two components being closely integrated. In a variety of such systems legumes are being found that can be integrated into both the crop and the livestock component. In systems with minimal fertilizer inputs, legumes can contribute to the crop phase by reducing the rate of soil fertility decline, or even enhancing crop yield, as well as reducing the length of the fertility-regenerating fallow period. In the pastoral phase, legumes contribute to better quality and use of crop residues and of natural forages on fallow lands. A variety of farming systems are discussed for the humid, subhumid and semi-arid agro-ecological zones.

Many factors govern the all-important management aspects of legume intervention. The most important is the management of nutrients, as they determine the ultimate level of productivity. This not only depends on the actual level of the nutrients, but also their rate of circulation. In this respect, farming systems could be viewed in a more organismic or ecosystem framework than is presently the case.

2.4 Legumes Supplementing Residues and Byproducts

One important of legumes that could be common to all the zones in Nigeria is as a feed supplement with crop residues and agricultural byproducts. Some of these residues and byproducts are used mainly as mulch or are burned, e.g. sugar-cane tops, cocoa husks, coffee hulls. Supplementing some of these with urea/molasses can render them suitable for at least a maintenance feed for livestock, and their feeding value can be further enhanced by supplementing them with a leguminous forage (Preston and Leng, 2018).

3.1 Legumes Based Interventions

The introduction and maintenance of legumes in any farming system must be accompanied by enlightened farmers. If the intervention is novel for the situation or the environment then the farmers or management must be researched and learned. All too often the legume, once introduced, is taken for granted, particularly in the case of forages. Farming and pastoralism are intrinsically management of various resources and innovations to productive advantage. In

grazing systems, management of the forage resource must be exercised through control of the grazing animals.
Africa is almost unique in that animals herded daily. Apart from India, almost everywhere else they graze untended, except for dairy animals. This offers an opportunity for managing forages far more effectively and intensively in Africa than is possible in most other areas. One of the main reasons for failures of pastoral legume interventions is poor farming or management. An important exception to this is the occurrence of disease, e.g. *Colletotrichum gloeosporoides* (anthracnose) in certain *Stylosanthes* spp.

In many cases farmers or management requires a much deeper understanding of the ecology of the situation than can be achieved by empirically-derived manipulations (Tothill, 1978). This was discussed extensively in the symposium on "Plant Relations in Pastures". Management or farmers is the means by which a particular ecological balance between vegetation and grazing animals is maintained. However, the basis for that management must also be understood.

3.1.1 Socio-economic factors

These are far more complex in African farming systems than in wholly commercial systems elsewhere, e.g. in Australia, much of South America, etc. Not only are there cultural considerations but also the animal is so closely integrated into the smallholder, mixed-farming system and is an essential part of the subsistence of the people within that system.

One of the most important constraints to management almost everywhere in Africa is that of labour, which at first would appear to be paradoxical. However with all the cropping-based systems there are severe bottlenecks at crop planting and weeding. All other operations must be overlooked at these critical times. Animal-related work, such as cultivation and sowing of forage plots and their weeding, will receive very low priority in the assignment of available labour. This is particularly the case in West Africa mostly especially in Nigeria where animals have only recently been incorporated into crop-based systems.

Another important consideration is the way in which animal products can be marketed. In basically non-cash economies quite different forces operate on the production system than in cash economies. This can often place an upper ceiling on the development of one component of an enterprise. The extent to which specific forages are grown will depend very much on the value of the produce, either in terms of cash or its internal value.

As has already been said, population density or pressure has a marked effect on farm operations. While labour is the basic constraint on farm size everywhere, population density is really the main determinant of the length of the fallow phase and, therefore, affects both the area of land not being used at any one time and the degree of fertility regeneration taking place. Obviously if productivity is to increase, fertility must also be increased to match the off take of nutrients that will follow. If the soil is not naturally fertile, this can only be done through inputs of fertilizer or by including legumes in the system, i.e. in the cropping or fallow phase, or into animals in the form of mineral supplements or slow release implants. The rate at which nutrients circulate within the system determines how efficiently they are used, and it is the essential nutrients, particularly N, that drive the system.

4.1 Future perspectives needs of legumes research

Legume crops can be developed for future exploitation, where the legumes provide many direct and indirect benefits in agriculture, health, nutrients, feed, environmental protection, and fuel/economic. The research efforts of legume crops should be directed in five directions: financing, breeding, production, farmers, and marketing. Provide financing for legume crops improvement as availability of credit, insurance facilities, besides working to increase support for scientific work and knowledge transfer activities to legumes farmers, also, technology could play different roles in improving legumes production under climate change and the increased global food demand as the population is multiplying in the country and worldwide, using precision agriculture tools could help farmers to overcome different negative impacts of many problems, which contributes to increasing productivity and improving farmer's profitability and protects the environment. Serious and fruitful investment in development and innovation research in order to create new, distinct and sustainable agricultural processing facilities large-small in scale of legumes for the marketing process.

4.2 Conclusion

Legumes are one of the essential crops for humanity and animals as well due to nutrition values, it's providing food requirements and nutritional security, used as animal feeds, and sustaining soil fertility, in addition to Legumes cultivation as intercropping crops decreasing fertilizing rate in agricultural rotations. There are major challenges facing legumes cultivation and reducing yields that made them unattractive for farming, like genetic, socio-economic, soil and climatic constraints, technological, and institutional constraints. Legumes production needs more attention particularly in the near future to provide enough food for the population of Nigeria and worldwide. The increment in production of legumes can be through horizontal expansion as the cultivated area and reclamation of desert lands. In addition, through multiple intercropping systems and crop rotation cycle, in addition, plant breeders increase legume productivity through using biotechnology for adapted legumes to global climatic changes particularly drought stress. Legumes crop can be developing for future exploitation, through a crop system adapted to environmental conditions, where leguminous crops are an essential component either as intercropping or between non-legumenous crops.

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