

MEDICINAL VALUE OF AFRICAN PEAR (*Dacryodes edulis*): IMPLICATION FOR AGRICULTURAL EXTENSION ACTIVITIES

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Abstract: Plants generally possess inherent values relevant to human health but crops in various forms have direct beneficial effects as food and medicine. This review work on the medicinal value of African pear (*Dacryodes edulis*) and its extension implication seeks to explore the nutritional and medicinal value of the crop in terms of its proximate analysis from existing literatures, the perception of farmers on its food and medicinal values, and the implications for agricultural extension services. The transfer of technological innovations in agriculture remains the major focus of extension work among the farmers as a tool to transform rural farming methods to innovative agricultural practices with an increase in production level and transformation of life for the farm families as the immediate goal. The emphasis on the medicinal value of crops generally has been downplayed, hence the main objective of this review work. The African pear contains much of Vitamin C, Potassium, Protein, Oils, and other nutrients and Vitamins that have been found very beneficial to human health in terms of its potentials to manage peculiar health conditions like Sickle cell anemia, Protein deficiency, Hypertension, and also a potential antioxidant and immune booster among others. The farmers and indigenous groups in localities where African pear exist believe it possesses laxative properties and therefore helps in digestive problems and its associating ailments and some other health benefits. It is commonly consumed with boiled corn in communities where it is found and its production always coincides with early fresh Maize harvest. The emergence of human diseases in various forms globally necessitates keen interest in crops like African pear with antioxidant, antimicrobial, and immune boosting properties among other qualities of the crop. Conclusively, evidences abound that African pear is beneficial in building body immunity and management of some ailments due to its phytochemical contents. Recommendations include further extensive research and development on African pear with a view to explore its potential for human health management to transform livelihoods and boost internal and foreign trade impact on the nation's economy.

Key Words: Crops, Medicinal, Agriculture, Extension, Health

1 INTRODUCTION

Plants generally possess constituents that make them relevant for human uses in different forms both as food and medicine. "Food is medicine and medicine is food" is a common parlance to express the medicinal value of foods. Specific crops consumed directly have been found useful in the treatment of ailments or sometimes extracts from crops have been found potent in the management of ailments. Fruits and vegetables are generally known to be very important in human diets because of their constituents and their proximate profiles which have been scientifically investigated in the management of chronic or "so termed terminal ailments". Umoh (1998) noted that fruits are generally used for the treatment of ailments when taken in recommended dosage and not as a

snack, such that some fruits have been found to assist in weight loss therapy and convalescing among patients in need of quick recuperation.

However, the crucial role of agricultural extension in enlightenment campaigns and the utilization of agricultural innovation deserves specific focus to emphasize the medicinal value of crops, particularly in view of globally emerging diseases which have put lots of pressure on mankind in terms of the complexity of symptoms, scale of spread, and complexity of management. According to Oladoja (2008), agricultural development studies have proved that education is a crucial variable for achieving economic growth and human progress and agricultural extension has been designed for farmers' self-help to boost livelihood and transform lives.

Agricultural extension as an informal, out-of-school education aims at boosting the farmers' general livelihood through education to improve farmers' productivity. The whole educational process of extension may fall short of its goal if the farmers' empowerment excludes education on the medicinal benefit of crops produced. The farm gate benefit of a farmer must be the rich diets of the fresh farm produce consumed at the farm gate before the produce gets to the markets after some days.

African pear (*Dacryodes edulis*), called *Ube* among Igbos in South Eastern Nigeria and various names in different parts of West Africa believed to be its origin, is commonly found around dwelling areas within communities in South East and South South Nigeria, where it is regarded as a choice fruit because of its perceived food and medicinal value compared to other parts of Nigeria. It is not commonly found in other parts of the country like the Southwest, Central, and Northern Nigeria. African pear, also regarded as native pear because of its green acid pulp like the Avocado pear (Umoh 1998), has a peculiar oblong shape and pink color of the fruit which turns black when ripe, making it very attractive.

LITERATURE REVIEW

African medicinal plants to a great extent have been investigated to assess the chemical constituents and some of the isolated compounds have been shown to possess interesting biological activity with few found active in controlled clinical evaluation such that edible plants, spices, and fruits are the dominant ingredients in many medicinal remedies (Iwu 2013).

The relevance of most of the African medicinal plants, particularly the crops, as evidenced by use in traditional medicines and several ongoing investigations, is gaining more attention, particularly with the involvement of governmental and non-governmental agencies in investigation and standardization of these health products. The Nigeria Natural Medicine Development Agency (NNMDA), National Food and Drugs Administration and Control (NAFDAC), Pax Herbal Nigeria among others are relevant in this regard.

Proximate Composition and Medicinal Value of African Pear

Several studies have documented the high value of the African pear constituents in terms of richness

in vitamins and phytochemicals which enhance their value in diets and medicinal preparations. The richness in essential amino acids like Lysine, Phenylalanine, Leucine, and Isoleucine, and phytochemicals that have been isolated like terpenes, flavonoids, oxalates, tannins, alkaloids, and saponins (Ajibesin 2019).

African pear possesses antioxidants and antimicrobial properties with other phytochemicals that can boost body immunity. Its possession of natural folic acid makes it a beneficial fruit to pregnant women. The Vitamin C helps to boost immunity while the Phosphorus and Calcium contents promote strong bones and teeth. Its richness in Carbohydrate, thiamine, and riboflavin was also noted. The healing of wounds, management of skin infection, and dysentery have also been ascribed to African pear (Ibemere 2022).

Iwu (1986) reported that African Pear has been found useful in the treatment of parasitic skin diseases, wounds, and fever by using the stem exudates and leaves. Studies by Nlenecha (2018) documented the capacity of African pear to fight Cancer and protect women against menopausal breast cancer, decrease colon Cancer infection due to the Fiber, Vitamins, Minerals, and essential fatty acids content. Its ability to support strong bone formation, prevention of constipation, and being heart friendly was also noted.

The proximate analysis of African pear constituents as reported by Omogbai and Ojeaburu (2018) showed a Protein content of 2.89 to 4.16%, while the details of other nutrients and minerals are stated in Tables 1 and 2 below. It was also reported that the anti-nutritional content levels are low in comparison to World Health Standard Organization (WHO) standard for foods.

The effect of processing on the toxicity levels revealed that boiling and roasting have significant effects on toxic metals thus reducing the accumulation levels in the edible portion to the standards within the recommended value by World Health Organization and Food and Agriculture Organization (WHO/FAO) joint expert maximum acceptable recommendation (Dan and Udo 2013).

Table 1: Proximate Analysis Value of African Pear

Parameters	Values (%)	
Moisture	44.45 – 50.93	
Lipid	30.55 – 35.60	
Protein	2.89 – 4.16	Source: Omogbai and
Ash	2.65 – 2.76	
Crude Fiber	1.52 – 1.61	
Carbohydrate	9.75 – 12.59	
Ojeaburu (2010)		

Table 2: Proximate Analysis of African Pear (Minerals)

Minerals	Values (mg/100g)	
Phosphorus	695.55 – 698.40	
Potassium	540.81 – 553.15	
Calcium	347.50 – 354.60	
Magnesium	280.15 – 287.65	Source: Omogbai
Sodium	162.50 – 170.00	
Zinc	3.65 – 3.81	
Iron	3.43 – 3.58	
Copper	0.38 – 0.45	
and Ojeaburu (2010)		

RELEVANCE OF EXTENSION PRINCIPLES IN CROPS' MEDICINAL VALUE CHAIN

Extension education, basically, has been a potent tool in executing development projects because target beneficiaries must be sensitized to perceive development projects as self-help tasks meant to transform lives. The knowledge gap, which this review study seeks to bridge, is the value that agricultural extension personnel must place on their message to the farmer on the beneficial values of farm produce without ambiguity but in the simplest form.

Adedoyin and Aderinto (2013) opined that the role of extension education is to empower farmers directly to help themselves to raise their living standards and ultimately affect the general populace. Oakley and Garforth (1997) noted that extension is a dynamic concept because the interpretation is always changing; as a term, it cannot be defined precisely because it is a description of a continually changing process in the rural economy and is guided by principles. Some of the extension principles are relevant to properly mobilize for the utilization of

crops' medicinal value. They stated the following extension principles, a few of which are adapted for this review:

- Needs and Interest of Target Beneficiaries:** Felt needs as precursor drives attention, motivates action, and mobilizes for adoption. Peculiar needs of target beneficiaries must be explored to fast-track tapping the advantage of crops' medicinal value.
- Operation at People's Level:** Interaction at the farmers' level is key in winning the attention of a farmer for involvement in extension education. The primary level to gain attention in extension of medicinal value of crops is to open up the farmers' attention to the medicinal value of crops on his farm beyond the food or dietary value. Even though rural people, particularly adults, have indigenous knowledge on plants' medicinal value, although such knowledge may be limited, they will be ready to learn if rightly prompted.
- Extension Works with People, Not for the People:** The extension work basically lies with the rural people, who already have orientation and knowledge of what to do. They only need guidance, not domination or bossy attitude; their decisions need support to solve their perceived problems for extension goals to be achieved. Extension presents facts, helps people to solve problems, and encourages farmers to take decisions. Confidence is generated when farmers are part of programme decisions.
- Extension is Accountable to its Clients:** Extension workers relate to their superiors and the government department and at the same time respond to the needs of their clients who look forward to extension workers to mobilize them for self-help as government representatives around their locality.
- Extension as Two-Way Link:** The two-fold linkage of receiving from research stations to reach farmers on the field. In the crops medicinal value chain, bulk research results exist with research organizations on various crops' benefits beyond the dietary value. Extension service through the field workers are the viable links.

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EXTENSION COMMUNICATION IN CROPS' MEDICINAL VALUE CHAIN

Generally, crops are highly valued as the end product in the agricultural production process because of their potential domestic and industrial uses as food, medicine, or other applications. Iwu (2013) noted that with recent developments, management of chronic ailments and metabolic disease conditions have been found feasible through various research studies in Phytomedicine and Bioresources.

The concept of extension communication involves educating people for self-help to transform lives through innovation transmission with the ultimate goal of empowerment and improved living standards as a potent tool for development.

Innovation transmission as a deliberate action is the major theme of agricultural extension, and in this perspective, the medicinal value of crops is the brand of innovation that farmers need to be motivated into. Innovation has been defined as anything new introduced into an economy or social process (OECD 1997). The key elements of communication as emphasized by Oakley and Garforth (1997) include channel, message, source, listening, and shared meanings. These are core issues that underlie any successful communication and are highly relevant to the dissemination of crops' medicinal value information.

Since the adoption of the memorandum on the unified agricultural extension system by the National Council for Agriculture in 1989, which gave rise to the national policy and the subsequent implementation in 1990, the various states were advised to adopt the unified extension system (Adediji, 2013). The unified extension system was introduced to cater to various segments of agriculture as practiced in Nigeria such that smallholder farmers who practice various aspects of agriculture might be covered holistically by the agricultural extension system, thus enhancing the various value chain processes in the agricultural production cycle.

Thrupp (1996) identified the following factors as essential for success in the knowledge or technology dissemination process among farmers:

1. Vested leadership or shared control with the farmers in every aspect of technology dissemination.
2. Participation and empowerment of farmers and

communities.

3. Linkage between groups, institutions, and organizations, both governmental and non-governmental.
4. Innovation learning and effective communication.
5. Policy environment and political influence.

These factors, in relation to knowledge transfer of African pear medicinal value, will help to boost indigenous knowledge documentation and scientific information transfer. Consequently, the various researchers and organizations involved in Bioresources development in linkage with farmers can cross-fertilize ideas to probe into farmers' knowledge on its medicinal value and as well share the scientific information on its proximate value and its health benefits.

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THEORETICAL FRAMEWORK

The following theories discussed below provide a framework for this review work.

Knowledge Gap Theory

The theory of knowledge gap is based on information or knowledge acquisition generally, emphasizing that people don't acquire information at the same rate. Variables like socio-economic status and rate of learning, among others, influence the degree of knowledge acquisition. According to Asemah (2011), the theory states that the spread of news in a society can lead to an increase in the gap between people of different economic statuses, such that attempts to improve life in a social system may not always work as planned. The heterogeneous nature of economic statuses plays vital roles in individual wants, needs, and responses to knowledge acquisition. The theory views knowledge as a commodity, product, or idea not evenly distributed in society. People with higher economic status and innovative minds tend to have better access to knowledge acquisition than laggards, who are late adopters or non-adopters of innovation. Folarin (1998) noted the impact of media output in a given society: as the media grows, the knowledge gap between the privileged and underprivileged social groups increases. The relevance of the Knowledge Gap theory to crops'

medicinal value chain communication rests on the knowledge gap existing among various categories of farmers on health benefits derivable from crops beyond the food value.

Diffusion and Innovation Theory

The Innovation Diffusion theory emphasizes the information flow over time through a social system until it becomes adopted as a new product or idea observed to have beneficial value. Asemah (2017) noted that the diffusion of innovation as an idea was developed into theory in the United States of America. Agricultural technology advancement took a rapid dimension, and researchers examined the adoption of hybrid seeds, equipment, and crop propagation techniques by farmers. The relevance of Innovation Diffusion theory to crops' medicinal value adoption rests on the current emergence of diseases on a pandemic scale, such as COVID-19, Lassa fever, and HIV/AIDS. The effect of disease emergence on the disruption of the economy and human health are great challenges that mankind has come to face squarely in the twenty-first century. The necessity for alternative and supplementary therapy to manage these health challenges supports the relevance of this theory in the dissemination of crops' medicinal value as an innovation, of which African pear is one. article [utf8]inputenc

METHODOLOGY

This study, as a review work, examined existing investigative studies in literature available in libraries and on the internet concerning the medicinal value of African Pear and the relevant agricultural extension concepts and principles. The professional experience of the researcher as an Agricultural Extension specialist among rural farmers over the years also contributed to knowledge sharing in this review work. article [utf8]inputenc

CONCLUSION

The peculiarity of agricultural extension as a veritable tool to transform the lives of rural farm families and, by extension, the economic development of nations has been well documented. It has become a potent game-changer in human development projects globally. Agricultural extension is an informal, out-of-school adult education that employs various approaches and methodologies to reach rural farmers.

As reviewed in this study, the diffusion and adoption of the health benefits of crops, which can be further packaged to enhance their value, cannot be overemphasized, judging from the volumes of existing investigative work on crops' medicinal value.

Rural farmers, who are primarily smallholders, have been identified as a major source of farm produce supply in Sub-Saharan Africa. The primary benefits of crops' medicinal value to the farm family and the general populace remain largely untapped. Coincidentally, humanity is at the peak of global health challenges due to emerging diseases.

RECOMMENDATION

The promotion of further research and development on the African pear food and medicinal value chain deserves priority attention due to its immense food and health benefits to human development and the global economy. The need for a viable supplement to existing drug therapy for disease management provides a good opportunity for the exploitation of African pear's medicinal value at domestic and industrial scales. Integration of crops' medicinal value as a core subject matter in agricultural extension as a global need deserves implementation to enable the full exploration of natural reserves in African pear. article [utf8]inputenc apacite

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