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Prospects of Agriculture Enterprise for Sustainable Economic Development: Success Story of University of Ilorin Moringa Value-Addition Activities

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Abstract

The exacerbated spate of poverty and youth unemployment in Africa is greatly disturbing. While agriculture portends prospect for employment creation and poverty reduction, interest towards optimizing the benefits appears grossly divided. Subsequently, the *critical mass*, in terms of commitment and investment, needed to positively engineer the commercialization of the sector has not been reached. Recently, concerted academic research on *Moringa oleifera* has ignited rekindled interest on the array of opportunities from Moringa value addition development. The purpose of this study is to show case the prospects of Moringa value addition in tackling the problem of unemployment and poverty. Secondary data on published figures of the processing and production cost, sales record of University of Ilorin Moringa Plantation and capital requirements of commercial banks in Nigeria were used. Result indicate that on a per hectare basis, the estimated profit is N828,640 (N186/plant/annum). Furthermore, a comparative analysis of the economic benefits in terms of employment generation vis-à-vis capital asset worth indicate that for every ₦73 million capital base, the Moringa value addition project can recruit 53 workers, while a worker will be recruited by an average Nigerian bank with the same amount. This study concludes by recommending the replication of the Moringa value addition success story in similar climes in Africa and the formulation of sound policy on Moringa value addition based on viable and practical consideration that would fast-track the development of a sustainable agriculture.

Keywords: youth employment, Moringa, and economic returns

Introduction

A casual observation at the level of technological advancement and economies of most developing countries in Africa, suggests an infancy stage characterized in Rostow's five categories of economic dimensions of nations. Rostow (1953) had earlier suggested that societies can be categorized based on their economic dimensions, as lying within one of five categories: the traditional society, the preconditions for take-off, the take-off, the drive to maturity, and the age of high mass-consumption (Rostow, 1953). This is because the informal sector of these countries is primarily characterized by subsistence and labour intensive agriculture, little investment in capital and low access to formal credit which curtails growth and limits the potentials for development. A classical example of such nations is Nigeria, where development in the agricultural sector is still characterized with features associated with the early phases of economic development.

In Nigeria as in most other African countries, agriculture holds the highest prospect for youth employment. Despite this, years of neglect of the sector have made it unattractive to the youths and the country currently witnesses a steady rise in youth unemployment profile. The cost associated with youth unemployment transcends the financial quantification of the loss of output that unemployed workers could have produced to the social cost of poor health and mortality, social unrest, loss of freedom and social exclusion, discouragement and loss of motivation for future work, weakening of family structure, racial, religious and gender intolerance and technical conservatism (Sen, 2004).

To remedy this disturbing trend, the creation of employment opportunities is noticeable in the Nigerian Government policy (Awogbenle and Iwuamadi, 2010) and several initiatives have been embarked upon to achieve self-sufficiency and entrepreneurship by the youth. However, while this is broadly commendable, it is rational to examine the costs and returns per unit capital invested in terms of labour employed. This is critical because of the underlying basic economic problem of resource scarcity in the face of alternative uses. One identified possible investment alternative for sustainable employment generation is in Moringa Oleifera value addition development (Nadeau and Zakaria, 2012). Recent concerted academic research on Moringa across diverse fields of study in the pure and applied sciences and the social sciences, has transformed the landscape of knowledge on the value and uses of *Moringa oleifera* offering a plethora of new opportunities for further expansion of the Moringa Industry and its contribution to human and animal health and welfare, and sustainable growth in wealth and the improvement of the standards of living of individuals, communities and nations. In the light of this, this study present the success story of how the University of Ilorin Moringa Plantation unleashed the abundant economic and social opportunities of *Moringa oleifera* production and processing vis-à-vis the capital requirement per number of employed hands. This case study is the story of a success project embarked upon by the university of Ilorin Moringa Plantation and Management Committee (MPMC).

The case study is organized as follows; this section is followed by an introduction into the Moringa crop, propagation and end-use options, the methodology, results and discussion and conclusion and recommendation.

Moringa Propagation, End-product Options and Technology Requirements

According to Crosby (2007), Moringa plant comes under different names such as the drumstick tree, ben oil tree and horseradish tree. Almost all parts of the plant are useful for food and animal feed. It can also be regarded as a vegetable tree (Fahey, 2005). The leaves in particular have a distinctive strong, mustard-like taste. These could be , eaten as a supplement to major staple foods and considered to be a good source of provitamin A, vitamins B and C, minerals (particular iron) and protein. Due to the numerous products from, it has been considered to be a money generating tree.

Markets for Moringa leaf exist at both the local and international levels. The crop is accepted locally and it is called several names in different parts of Nigeria. It is known as “Zogale” in Hausa, *Gawara*, in Fulani, *OkweOyibo* in Igbo, and *Ewe Igbale* in Yoruba (Kadashi, 2008). Apart from being widely consumed in parts of Northern Nigeria (Saint Sauveur, 2001), the Federal Government of Nigeria through the Raw Materials Development Council, is actively engaged in encouraging Moringa consumption by everybody across the country. Moringa has

found wide acceptance in various markets of developed countries of the world where herbal and nutritional food and drugs have to pass through screening and regulation to ensure product safety before distribution and consumption. An example is the United States, where US Moringa products are available in the markets for human consumption (Muller and Rebelo, n.d). This to some extent confirms the safety of Moringa products for consumption.

Moringa Trees are easily grown from seed. For commercial propagation, seeds may be first planted into nurseries before they are eventually transplanted into well cultivated soils when they are about 1–2 month old (about 30 cm [12 in] tall, 0.75 cm [0.3 in] in diameter (Radovich, n.d). Moringa can also be propagated asexually through stem cuttings. Cuttings to be used for propagation should be from at least 1-year-old wood, 4–16 cm (1.6–6.3 in) in diameter and up to 1.5 m (5 ft) long (Radovich, n.d).

Spacing for leaf production varies and it is a major determinant of productivity, yield and ultimately, profit. At a spacing of 1.5m within rows and 1.5m between rows, an estimated 4,444 stands of plants/ha can be established (Animashaun and Toye, 2012). Furthermore, spacing can also be more intensive at 1m by 1m which can lead to an estimated 10,000 plants/ha. At planting density of 4,444 plants/ha, and at 2 harvests per year, 110kg of dry weight Moringa leaf powder can be obtained (Animashaun and Toye, 2012) which is the equivalent of 24.5g/plant/annum dry weight of Moringa leaf.

Productivity and yield also vary significantly between seasons. In tropical climates, studies showed that most of the harvests take place during the wet or cool seasons. During the dry season, however, only one harvest or none at all is made. Fertilizer and irrigation are therefore recommended for maximum productivity. Trees have been reported to benefit from integrated (organic and synthetic) fertilization (Radovich, n.d).

Shoots and leaves can either be harvested manually or mechanically, depending on the scale of production. Shoots are preferably cut at a height of between 30 cm to 1 m. Harvesting of leaves from trees without cutting would lead to less vigorous re-growth (Muller and Rebelo, n.d).

Harvested leaves and shoots are normally kept in a well ventilated, dry and cool environment. The leaves are washed; drained and dried to remove any dirt and impurities after that they are milled into a powder, which is then sieved. Since Moringa dried leaf absorbs moisture easily, the powder still has to be re-dried again before it is packed into an air-tight container. However, care has to be taken when heating to avoid denaturing the protein and useful phyto nutrients in the plant.

Packaging Moringa leaf for consumption can come in various end-products based on available technology, scale of production and consumers' preference. As identified by various authors (Animashaun, *et al.*, 2012 and Williams *et al*., 2012), some of the identified consumers preferred options in Nigeria for Moringa include:

- Powderised Moringa leaf
- Moringa leaf powder in Teabag
- Moringa fortified fruit juice/honey
- Moringa in capsule/tablets
- Moringa fortified confectionaries

- Moringa fresh leaf

Materials and Methods

This Moringa Plantation is located in University of Ilorin in Kwara State, Nigeria. The state is located between Latitudes 11^0 2' and 11^0 45'N and between Longitude 2^0 45' and 6^0 4'E. Agriculture is the main source of the economy and the principal cash crops are: cotton, cocoa, coffee, Kolanut, tobacco, beniseed and palm produce (Wikipedia, 2012). The population estimate of the state as at 2005 was 2,591,555 (Wikipedia, 2012). About 1,347,608 (52%) of the population of Kwara State is in the adult category (18 years and above) while 48% are children and youths below the age of 18 years. Secondary data were used for this case study. It comes from the published report of the production and processing cost, sales record and labour requirement associated with the University of Ilorin Moringa plantation and from other published articles from different plantation. Secondary data was also collected on the capital requirement of Nigerian commercial banks and workforce used for this study was sourced from the CBN report and the internet.

Results and Discussion

Production and Processing Cost

Processing fresh leaves into leaf powder produces between 12.5% to 15% of leaf powder per unit of fresh leaves (Muller and Rebelo, n.d).Although detailed processing costs are rarely available in the literature (Ogoudaja, 2006), study by Animashaun and Toye (2012) revealed that Moringa plantation at a planting density of 4,444 plants/ha yielded 110kg/ha of processed Moringa dried leaf.. This is equivalent to 24.75g of dried leaf per plant. A cost and return analysis by the same authors further revealed that Moringa plantation in the guinea savanna region from a planting density of 4,444 plants/ha (1.5m by 1.5m) resulted in the following estimates (Table 1).

Profitability and Feasibility Analysis

According to the table, the project will start generating profit in the first year of operation. The estimated profit per ha is N828,640 (N186/plant/annum).The income statement shows that the project is viable (Table 1). Furthermore, a 10-year simulation based on the estimated cost and return analysis presented in Table 1 was carried out by Animashaun and Toye (2012) to examine the economic feasibility indicators of the Moringa project as an investment option at a discount rate of 17.5%. The Benefit Cost Ratio (BCR) indicates that for every ₦1 invested in cost, the investor could realize ₦1.69 in returns indicating the relative profitability of the enterprise. Equally, the Return on Investment (ROI) indicate a return turnover of 31.8% of the cost of investment and the Net Present Value (NPV) estimate of ₦4,378,6809 ($271,167) reflects the feasibility of the project. The evidence of success recorded in this study is supported with the findings of Nadeau and Zakaria (2012) which identified the success of the Moringa value chain development in the sahelian region of Niger.

Economic Benefits vis-à-vis Employment Creation in the Country

A hectare of University of Ilorin managed Moringa plantation and processing facilities requires a capital assets of N1,371,360 (USD 8679.49) and it created employment for a minimum of 4

persons; one person for management functions and oversight, two workers for field work and processing and one for product distribution. In addition to the supply of domestic needs, nutritional security and employment, the project has the capacity to generate tax revenue for the government Animashaun and Toye (2012). According to the Nigerian Stock Exchange (NSE) report for the month of March 2012, GT Bank, Zenith Bank and First Bank topped as the most capitalized banks on the Nigerian Stock Exchange with a total capital base of N1.1 Trillion. The total workforce as represented by the number of workers employed in all the cadres in the three banks accounted for by this capital base is 15,168 employees. This indicates there is a worker employed in the banking sector for average of N73 million (USD 462,025) capital base. A comparative analysis of the economic benefits in terms of employment generation vis-à-vis capital asset worth of a hectare of Moringa project and the three top most capitalized banks in Nigeria shows that Moringa project may offer more to employment other things being equal.

Conclusion and Recommendations

There is ample evidence to show that Moringa leaf-based value addition activities have a huge potential for employment generation and economic development. This can further be replicated both at the regional and international level.

There are, however, constraints to large-scale production and commercialisation of these products that need be addressed by all stakeholders. Obviously, Moringa leaf still has huge potentials for diversification, particularly into various high-value products. Several important components of phyto-nutrients, lutiens and amino acids can be extracted from the leaves and can be a source of revenue generation and economic development in the country.

Equally important is market research studies that would estimate the potential market for Moringa products and strong government policies that would regulate the market of the product to prevent market glut.

From an agricultural point of view, production can still be optimized by using specially designed cultivars. A program of genetic breeding of *Moringa oleifera* that would create new cultivars needs to be launched. Finally, government at all tiers of administration should provide the necessary facilities and enabling environment necessary for investment take-off into Moringa project.

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Table 1: Estimated Average Annual Cost Analysis of Moringa Leaf Production/ha

Items	**Cost (₦)\ha Annum**	**% of total Investment cost**	**Total**
Revenue			
Sales of 110kg of processed dried Moringa powder			**2,200,000**
Investment Fixed Cost			
Land-lease estimates	15,000	5.42	
Land clearing	9,600	3.47	
Factory house rent	120,000	43.38	

Plantation management and logistic	84,710	30.62	
Pest and disease control	30,000	10.85	
Blender/leaf grinder	15,000	5.42	
Knapsack sprayer	2,000	0.72	
Spade	200	0.07	
Machetes	200	0.07	
Hand trowels	250	0.09	
Total Investment cost	276,960	100	
Operating Cost			
Seedlings (N100 each)	444,400	40.6	
Labour(2permanent worke for weeding, harvesting and processing)@ N18,000 each/month	432,000	39.5	
Utility bills	30,000	2.7	
Labeling and Packaging	120,000	11	
Fertilizer (@N100/kg)	15,000	1.4	
Fertilizer application 2 man-day	2,000	0.1	
Miscellaneous expenses @ 4% of cost	51,000	4.8	
Total Operating Cost	1,094,400	100	
Total Production Cost (TPC)			**1,371,360**
Net Profit			**828,640**

Source: Animashaun and Toye, 2012