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ANALYSIS OF FARMERS' PERCEPTION OF *MORINGA OLEIFERA* AS AN INTERCROP IN SABON GARI LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA

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Abstract

This study analysed farmers' perception of *Moringa oleifera* as an intercrop in Sabon Gari Local Government Area of Kaduna state, Nigeria. The study was conducted with selected farmers who participated in the demonstration exercise of Moringa-cowpea intercrop at Bassawa community of Sabon-Gari Local Government Area of Kaduna State. Group discussion and interview method of data collection as well as self-administered structured questionnaire were used to elicit information from the farmers. From the descriptive statistical techniques used, it was observed that Majority of the farmers (84%) have one form of education while only 16% were illiterate. 56% of the population became aware of Moringa within 0-15 years while 44% have more than 15 years awareness. From the view points of the majority of the farmers, various vegetative crops such as carrot, lettuce, pepper, cucumber, tomatoes and soybean have potentials with Moringa as intercrop. Majority of the farmers preferred leaf production of Moringa which has positive implication for its purpose as an intercrop. There is positive sign that farmers are willing to adopt this novel farming practise but such factors as land availability, security of the farm from human and animal encroachment, and facilities to process them for market are constraining and limitative features that need to be addressed. Therefore farmers need to be encouraged to go into the commercial cultivation of *Moringa oleifera* either as sole or intercrop and e trained to adopt the best methods of Moringa production in association with other crops, bearing in mind the limitations of subsistent farmers. Provision of security check for farmland expected to be used by farmers for Moringa intercropping is a critical factor that can engender its popularity and this can only be achieved through collective stakeholders understanding which include farmers, cattle owners, law enforcement agencies and both local and state authorities.

Keywords: Moringa, Intercrop, perception.

INTRODUCTION

There is evidence that farming systems are becoming unsustainable as the population increases and the amount of agricultural land available has also decreased (ICRAF, 2007 and KARI, 2012). It is characterized by frequent droughts, famine and climatic variations which affect both the community's livelihood and livestock. Moringa with arable crops (such as cowpea, pepper, carrot, tomato, onion etc.) intercrop has been suggested as an intercropping that could serve as an opportunity to improve agriculture at smallholding level. The adoption of this farming system and approaches depends not only on socio-economic conditions and household conditions but also on how farmers perceive this novel technology based on their level of awareness of its importance.

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The satudy by Ojeleye, *et al* (2014) showed that about one-third of the sampled households are food insecure with a shortfall of about 15% of their daily calorie requirement. This study also revealed that majority of the households are subsisting on less than the minimum required calorie per capita per day as the household size of the food insecure significantly lower the per capita calorie consumption of households. Ojeleye *et al.*, (2014) observed that this could have negative impact on the food security situation of rural households in the study areas.

Moringa oleifera is highly nutritious crop cultivated mostly in all parts of the world. It is a valuable food crop, grows very fast and even beyond food it serves many benefits. It has been used to fight against malnutrition, especially among young ones and lactating mothers. Its various plant parts are used for different purposes. It is the richest plant source of Vitamins A, B, C, D, E and K. Minerals present in this tree include K, Mg, Ca, Mn, Zn, Cu, and Fe. Its various parts are used for the treatment of various diseases. It is resistant to drought duration because of long taproot system. Its cultivation is very simple and requires fewer efforts. It plays an important role in conservation of soil, water, and mitigating climatic change (Singh, Jyoti and Singh, 2019). This plant thus could be a promising alternative to smallholders' nutrient needs and livelihood sustenance as well when it is incorporated as intercrop.

Alamu, (2002) *et al.*, (2008) defined intercropping as the growing of two or more crops simultaneously or during parts of the component crop life cycle on the same piece of land. It provides the farmer with a variety of returns from land and labour, often increases the efficiency with which scarce resources are used, and reduces the risk of high dependency on a single crop that is susceptible to environmental and economic fluctuations. Farmers have generally regarded intercropping as a technique that reduces risks in crop production; if one member of an intercrop fails, the other survives and compensates in yield to some extent, allowing the farmer an acceptable harvest. Pest levels are often lowered in intercrops, as the diversity of plants hampers movement of certain pest insects and in some cases encourages beneficial insect populations. (Hugh and McSorley, 2000).

Moringa (*Moringa* spp.) is one of the world's most useful foods, medicinal and industrial plants (Fuglie, 1999; Foidl *et al.*, 2001; & Fahey, 2005). It is a fast-growing tree and is grown throughout the tropics for human food, livestock forage, medicine, dye, and water purification. Moringa is grown traditionally as backyard trees or hedges for its leaves which are used domestically as culinary. Moringa requires a thoroughly prepared land or seedbed. Moringa is planted either by direct seeding especially in high density monocropping or transplanting usually in intercropping with other crops. Hard wood stem cuttings can also be used and their length can be anything ranging from one and half feet and upwards. The cuttings may be cured by allowing it to 'dry' under shade for at least three days.

Moringa oleifera is certainly under-exploited at present. Its numerous uses as a vegetable, seed oil, gum, hedge tree, ornamental and medicinal plant, and its easy propagation and cultivation justify the need for more intensive research into its biological and economic potential. Moringa is a drought handy plant and hence require less water for growth and production. In general, sandy loam and laterite soils are suitable for Moringa cultivation. For intercropping in Moringa field, the companion crops should be related is such a way that they are also drought tolerant and their soil preference is also same alike Moringa. Over irrigation to intercrops will affect the Moringa by keeping the trees in vegetative stage for quiet long time. Hence water

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requirements of the main and intercrops are the key factor which determines the combination of crops in intercropping system. This study therefore was aimed at describing the socio-economic characteristics of sampled farmers, evaluate their level of awareness of multidimensional uses of *Moringa oleifera*, evaluate farmers' response to cultivate *Moringa oleifera* as intercrop and identify the feasible problems that may face cultivation of *Moringa as an* intercropping in the study area.

METHOD AND MATERIALS

This study was conducted in Bassawa community of Sabon-Gari local Government of Kaduna State, Nigeria, located in the northern part of the country between latitude 110 32' and 090 02' North of the equator and 800 50' and 060 15' East of the meridian. Kaduna state population is estimated to be 6,066,552 million people (NBS 2012). It has average annual rainfall of 1500mm. Humidity is low in January between 15-35% and high in July between 65-85%. Annual temperature is between 24-28°C. The soil is generally described as sandy loam. Agriculture is the main stay of the economy of the people.

A purposive sampling procedure was used for this study specifically on selected farmers who participated in the demonstration exercise of Moringa-cowpea intercrop at Bassawa community of Sabon-Gari Local Government Area of Kaduna State. Group discussion and interview method of data collection as well as self-administered structured questionnaire were used to elicit information from the farmers. Descriptive statistics was used to achieve all the set objectives of this study. This involved the use of frequency distributions, percentages and ranking using charts

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics

Table 1 revealed the age distribution of the farmers. Majority of the farmers' falls within the age bracket of 20-40years which represents 78% of the sampled population. 18% of the sampled population were between age 41-60years, while 4% was between 61-70years. It is therefore evident that 92% which represent majority of the farmers in this group fall within the economically productive age. The level of literacy is a key to farmer's capacity and ability to understand, and make use of agricultural innovations extended to them. (Udo E.J 1990) Only 16% of the population have no education while majority of the farmers representing 44% have Islamic education coupled with another formal education.

Variable	Frequency	Percentage (%)
Age Range		
20-30	28	56
31 - 40	11	22
41 - 50	7	14
51 - 60	2	4
61 – 70	2	4

Table 1: Socio-Economic Characteristics of Respondents

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Momind	20	64	
Single	32 16	04	
Widowed	10	52 A	
Divorced	0	4	
Educationa	l Level	0	
Adult Educ	ation 2	4	
Primary Edu	acation 5	10	
Secondary I	Education 15	30	
Tertiary Edu	ication 10	20	
Islamic Edu	cation 22	44	
No Education	on 8	16	

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Farmers Level of Awareness of Various Uses of Moringa Oleifera

Table 2 below showed the distribution of farmers according to their level of awareness about Moringa. It was revealed that 56% population of the farmers became aware of Moringa within 0-15yrs while 44% became aware more than 15years.

	Frequency	Percentage (%)		
Years of Awareness				
< 5	12	24		
5-10	2	4		
11-15	14	28		
16-20	10	20		
> 20	12	24		
Total	50	100		

Table 2: Frequency Level of Farmers' Awareness on Moringa oleifera

Suggested Crops for Intercropping with Moringa Oleifera

During the group discussions and interview with the farmers, the following crops were suggested as possible intercrop with Moringa; carrot, soybean, lettuce, cucumber, tomatoes and pepper. From the findings as shown in Fig 1, it was observed that majority of the farmers subscribed to Moringa intercropping representing 92% of the population. However, their views varied on which plants should be the candidate intercrop with Moringa. 20% are for carrot, 12% for soya, 4% for lettuce, 16% for cucumber, 12% for tomatoes and 28% for pepper. Although pepper has the highest ratio but from statistical point, there is no significant difference in the choice made by farmers. This implies that there is a chance that any of these crops can be adopted by farmers based on their interests. This also supports the findings of Essien et al., (2016) that moring has significance influence on performance of crops especially vegetables.

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Fig 1: Farmers' Perception of Moringa as Intercrop

Farmers Views of Feasible Moringa Value Addition Production

Results has highlighted in fig 2 reveals how farmers view Moringa production and likely area they will venture into. 40% of the farmers' population prefer green leaf production, 22% are likely to do dry leaf production, 24% for medicinal purpose (herbal production), 14% for seedling purpose, while none of the farmer intends to do seed production. The implications of this finding suggests that majority of the farmers (62%) will maintain the Moringa plant to accommodate intercropping system better than the 14% who will allow the plant to grow to maturity to produce seeds for seedling purpose. Because all the parts are medicinal, there is likelihood that those farmers subscribing for herbal production may not be too disposed to intercropping. This is in agreement with FAO 2018 in its findings on transforming food and agriculture to achieve SDGs goals.

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Farmers' Perception of Threats to Farm Security

Figure 3a showed farmers' perception of threat to farm security. 26% believed human being is the main factor, 11% blame it on animals while 37% concluded that both human being and animal are the key reason. Figure 3b showed ratio of human being to animals in their contribution to security threat. 43% agreed it is 50:50, 14% agreed it is 40:60, 21% agreed it is 30:70, 7% in triplicate agreed that it is 20:80, 60:40 and 70:30. This finding affirms that human being and animal are the major factors of security. Thus human being therefore has larger role to play to undermine this threat.

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Fig 3a: Farmers' Response to Main Threat to Farm Security



Fig 3b: Farmers' Perception of Ratio of Human and Animal Threat

CONCLUSION AND RECOMMENDATIONS

From the results of this study, 92% of the sampled farmers fall within economically productive age, 64% of the farmers were married, 32% were single and only 4% widowed within the married population. Majority of the farmers (84%) have one form of education while only 16% were illiterate. 56% of the population became aware of Moringa within 0-15 years while 44% have more than 15 years awareness. From the views of the farmers, it can be deduced that various vegetative crops such as carrot, lettuce, pepper, cucumber, tomatoes and soybean have

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potentials with Moringa as intercrop. Majority of the farmers preferred leaf production of Moringa which has positive implication for its purpose as an intercrop. This is in agreement with findings of Moshibudi et al (2017) in their findings of production and utilization of Moringa by farmers in Limpopo province, South Africa.

It is also evident from this study that Moringa oleifera cultivation either as sole or intercrop is still a novel idea among many Nigerian farmers as discovered during the group discussion. Majority of the farmers are aware of the existence of *Moringa oleifera* and are quite familiar with its traditional usage. Their understanding of its modern use is still at the mediocre level and thus the need to expose them further to its various processing becomes more relevant. Their readiness to adopt and utilize various technique learnt during the study is real and commendable but such enabling atmosphere of available land, storage facilities, equipment for processing, accessibility to all marketing chains are very evident. One critical factor that this study has also highlighted is the issue of security which is manmade.

This study therefore suggests the need for more training and awareness campaign for both farmers and extension agent in harnessing all the potentials of Moringa. Also, facts on nutritional contents of Moringa should be explored to meet the needs of rural areas in respect of malnutrition, poverty and other health issues such as maternal and child mortality by proper communication through extension networks. All agencies of Government directly or indirectly involve in Agriculture should serve as base to encourage more farmers to go into the commercial cultivation of Moringa oleifera either as sole or intercrop and determine the best methods of Moringa production in association with other crops, bearing in mind the limitations of small farmers. Provision of security check for farmland expected to be used by farmers for moringa intercropping is a critical factor that can engender its popularity and this can only be achieved through collective stakeholders understanding which include farmers, cattle owners, law enforcement agencies and both local and state authorities.

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