

Consumers` Perceptions and Consumption Dynamics of African Leafy Vegetables (ALVs): Evidence from Feni Communal Area, Eastern Cape Province, South Africa

Amon Taruvinga ¹⁺ and Rudzani Nengovhela ²

^{1,2} Department of Agricultural Economics & Extension, University of Fort Hare Bag X1314, Alice 5700, South Africa

Abstract. Despite having multiple benefits and positive promise towards contributing to household food security, dietary diversity and dietary quality, African Leafy Vegetables` (ALVs) production, consumption and documentation is still characterized by extremely low volumes. Thus far, considering the claimed benefits in the face of low volumes, there is a need to appraise consumption dynamics from a rural perspective for purposes of understanding shared perceptions by society. Using cross-sectional survey data from rural Eastern Cape Province of South Africa, the study estimated consumer awareness, consumption frequency, perceptions and determinants of consumption. Descriptive results reveal high level of awareness, consumption and positive perceptions with regards to ALVs. Regression estimates suggest possibility of increased consumption based on age, access to extension, availability on market, production and health perceptions, while education and poor taste may promote non-consumption. The revealed high level of awareness, consumption and positive perceptions presents an opportunity for the research, government, private sector and NGO community to reconsider the role ALVs can play as a household food security strategy especially in rural Africa.

Keywords: African Leafy Vegetables (ALVs), food security, consumption of AILVs

1. Introduction

African Leaf Vegetables (ALVs) sometimes referred to as “indigenous/wild leafy vegetables” can be defined as a collection of “normally indigenous” naturally growing plant species whose leaves, young shoots and flowers are consumed as leafy vegetables [1]. With reference to consumption, several studies suggest that consumption, availability and production of ALVs is currently declining [2], [3] and variable depending on seasons, poverty status and degree of urbanization [4]. Lack of awareness of these vegetables, westernization, negative attitudes and poor taste are some of the mostly quoted reasons for the decline in consumption [4]. On a positive note, ALVs are believed to contain significant levels of diverse micro and macro-nutrients essential for human health [5]-[7] capable of addressing nutritional needs of rural households [8]. Thus far this paper explores consumer perceptions and consumptions dynamics of ALVs given their claimed multiple benefits amid reports that their availability and consumption is declining.

1.1. Problem Statement

Regardless of the numerous benefits associated with ALVs [9] there is limited published literature on their production, availability on markets and consumption dynamics [5]-[10]. Research done so far and available data with reference to ALVs has been largely scattered and un-coordinated [11]. Also, literature suggests that even the FAO database on vegetable production in sub-Saharan Africa fails to capture ALVs currently used by the subcontinent [11]. Thus far, considering (a) the increasing global attention towards

⁺ Corresponding author Tel.: +27 79 2421194.
E-mail address: ataruvinga@ufh.ac.za

This section presents study results on rural consumers` awareness, consumption frequency, perceptions and factors that influence consumption of African Leafy Vegetables (ALVs).

4.1. Reported Africa Leaf Vegetables (ALVs) from the Study Area

This section focuses on reported ALVs from the study area. Table 1 summaries common ALVs reported from the study area. Three main vegetables summarized in Table 1 were reported as common and popular from the study area. Amaranth was one of the most preferred ALV from the study area followed by common sow thistle and lastly black nightshade.

Table 1: African Leafy Vegetable (ALVs) common from the study area

	<i>Xhosa Name</i>	<i>English Name</i>	<i>Scientific Name</i>	<i>Comment</i>
1.	<i>Utyuthu</i>	Amaranth	<i>Amaranthus hybridus</i>	Very common
2.	<i>Ihlaba</i>	Common sow thistle	<i>Sonchus oleraceus</i>	Very common
3.	<i>Umsobo</i>	Black nightshade	<i>Solanum nigrum</i>	Very common

Literature also reveal that more than 30 species of wild leafy vegetables (to include the above identified from the study area) are eaten in the Transkei region of South Africa alone [9]. These findings therefore suggest that rural communities are very much aware of several ALVs that exist in their locality. Thus far, the next section focuses on awareness and consumption frequency of ALVs.

4.2. Consumers` Awareness of African Leaf Vegetables (ALVs)

Fig. 1 presents a summary of the observed distribution of respondents with respect to awareness of Africa Leaf Vegetables (ALVs). Results reveal that most of the respondents (79%) were aware of ALVs with a few (21%) who reported that they were not familiar with ALVs.



Fig. 1: Distribution of respondents with respect to awareness of ALVs.

Most of them argued that these vegetables are a common dish known by almost everyone from the study area. Similar comparable findings were also noted by [9] arguing that since ancient times, humans have always supplemented their diets with wild leafy vegetables. The observed distribution suggest that ALVs may be popular in rural areas of Africa worth understanding given their multiple benefits.

4.3. Consumption patterns of African Leaf Vegetables (ALVs)

Fig. 2 presents a summary of the reported consumption frequency based on those who were aware of ALVs (79%). Results indicate that 20% of the respondents consume ALVs on daily basis, 40% on weekly basis and 40% on monthly basis. Most daily and weekly consumers of ALVs cultivated them as well as naturally collecting them from the forests. Monthly consumers normally relied on natural harvesting from the forests during winter, before the onset of natural rains and in their fields after harvesting.

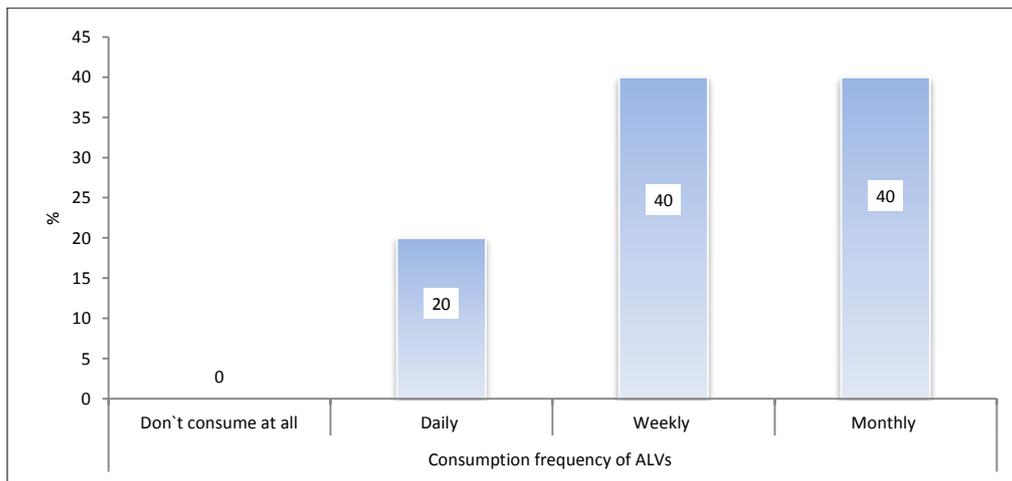


Fig. 2: The reported consumption frequency of ALVs from the study area.

Results also reveal that none consumption was not an option from the study area. These findings suggest that ALVs are a popular vegetable source in rural areas consumed frequently especially during winter and early summer periods to complement declining food reserves.

4.4. Consumers` perceptions of African Leaf Vegetables (ALVs)

This section focuses on reported perceptions with regards to consumption of ALVs. Fig. 3 presents the reported summary of consumer perceptions with regards to consumption of ALVs. Results reveal that a majority of the respondents (84%) believe that ALVs contain some nutritional value critical for their balanced diet. Results also indicate that a significant number of the respondents (81%) share the perception that ALVs have health benefits that have helped them to cope with several diseases. Previous literature supports these findings noting that ALVs are capable of boosting the human immune system, prolonging life span and acting as a digestive cleansing agent [9]-[15].

With reference to taste, results indicates that most households (74%) do believe that ALVs have a pleasant taste and are easy to prepare (58%) which makes them a favourite dish in most rural daily meals. Similar comparable believes were noted by previous literature [4]. Of interest is the influence of culture on consumption, where a significant number of respondents (51%) noted that their consumption of ALVs was mostly cultural driven.

Contrary to literature suggestions with regards to “poor people’s food” label [4]-[15], only a few respondents (10%) believed that ALVs are labeled as “a poor people’s food” and considered to be cheap vegetables. These finding suggest that rural communities share positive perceptions with reference to consumption of ALVs and may mean a valuable source of food for them [21], worth protecting and passing to the next generation as they have also received it from the previous generation [9].

4.5. Factors that influence consumption of African Leafy Vegetables (ALVs)

This section presents inferred results on factors that influence consumption. Table 2 presents the binary logistic model results for the factors that influence consumption of ALVs among rural communities. With regard to the model fit, *Nagelkerke* R^2 of 0.881 was obtained indicating that more of the variation was explained by the model with an overall prediction percentage of 93. Household head age was significant (*p-value*: 0.000) and positively related to consumption of ALVs. The results suggest that, for every unit increase in household head age there is a 2.523 increase in the log odds of ALVs consumption by households, holding all other independent variables constant. These findings support previous conclusions by several authors who argue that the youth of today perceive ALVs negatively, considering them as weeds or food consumed by the poor [4]-[15].

With respect to education, the results indicate a negative significant influence on consumption of ALVs (*p-value*: 0.000). Per every unit increase in household head education, the results suggest a 4.116 decrease in the log odds of ALVs consumption holding all other independent variables constant. These results confirm earlier findings by [17] which link more consumption of ALVs by less educated households compared to

their educated counterparts most probably due to affordability. The positive significant (*p-value*: 0.008) coefficient of availability of ALVs on the market reveal its positive influence on consumption. Per every unit increase in availability of ALVs on market, the results show a 1.394 increase in the log odds of ALVs consumption, holding all other independent variables constant.

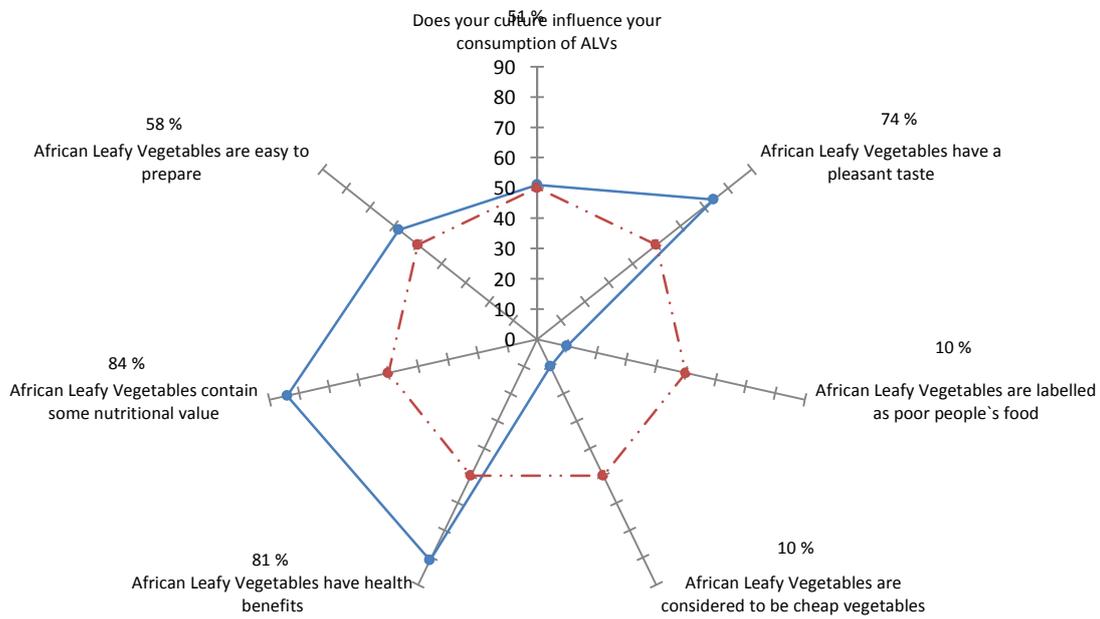


Fig. 3: Reported consumer perceptions with regards to consumption of ALVs.

Table 2: Factors that influence consumption of ALVs among rural communities

Variables		B	S.E.	Sig.
Constant	β_0	.781	.357	.029
1. Gender	β_1	-.311	.507	.540
2. Age	β_2	2.523	.598	.000**
3. Marital status	β_3	19.836	4776.773	.997
4. Income	β_4	.262	.238	.272
5. Education	β_5	-4.116	1.054	.000**
6. Market	β_6	1.394	.523	.008*
7. Extension	β_7	2.019	.657	.002*
8. Buy / grow ALVs	β_8	1.837	.492	.000**
9. Taste perceptions	β_9	-.487	.238	.041*
10. Health perceptions	β_{10}	5.249	1.101	.000**
Model Summary				
Chi-Square (df = 10)				90.300
(-2)Log Likelihood				22.167
Accuracy of prediction; Overall (%)				93.0
Nagelkerke R ²				.881

Notes: ** and * indicates significance at 0.01 and 0.05 probability level respectively.

Access to extension services was positively correlated to consumption of ALVs with a *p-value* of 0.002. These findings suggest that, for every unit increase in access to extension services, a 2.019 increase in the log odds of ALVs consumption holding all other independent variables constant is likely. These findings support the positive role played by agricultural extension services across rural Africa in educating farmers.

Consumption was positively correlated to production of ALVs. These findings suggest that consumers who produce ALVs are more likely to consume African Leafy Vegetables compared to those who depend on buying them from the market. Taste was also a significant factor negatively conditioning consumption of ALVs. These results suggest that the more consumers believe that ALVs have a poor taste the less likely would they want to consume them. Lastly the health perception of ALVs was positively correlated to consumption meaning, the more consumers believe that ALVs have health benefits the more likely would they want to consume them.

5. Conclusions

The paper concludes that rural consumers are aware of African Leafy Vegetables (ALVs) and they frequently consume them. Also, the paper concludes that consumers do generally share positive perceptions with reference to ALVs. With regards to factors that influence consumption, the paper concludes that the following factors positively condition consumption: age, market, extension, production and health perceptions while the following factors negatively condition consumption: education and poor taste.

6. Policy Insights

High level of awareness, consumption and positive perceptions of ALVs among rural consumers presents an opportunity for developmental stakeholders (research, government, private sector and NGO community) to repackage and reconsider ALVs as a potential rural household food security policy strategy. Awareness campaigns, more research and documentation of ALVs literature (explaining more on production techniques, creation of local seed banks, post harvest handling strategies, nutritional and medicinal values) especially targeting the young and educated communities may promote increased consumption. Future breeding efforts targeting to improve taste may be necessary to promote consumption.

7. Acknowledgements

We acknowledge Govern Mbeki Research Development Centre (GMRDC) for financing this study.

8. References

- [1] J.A. Chweya, and P.B. Eyzaguirre, ed. The *biodiversity of traditional leafy vegetables*. International Plant Genetic Resources Institute, Rome, Italy, 1999.
- [2] S.A. Adedoyin, and O.A. Taylor. Homestead Nutrition Garden Project: An extension communication strategy for eliminating vitamin A deficiency (VAD) among poor households in Nigeria. *Nig. J. Nutr. Sci.* 2000, 21, 34-40.
- [3] Community Technology Development Trust. *Indigenous vegetables – An alternative to household food security in Zimbabwe*. IDRC End of Project Report, 2000.
- [4] I.H.L. Vorster, W.J. van Rensburg, J.J.B. van Zijl, and S.L. Venter. The importance of traditional leafy vegetables in South Africa. *African Journal of Food, Agriculture, Nutrition and Development*. 2007, 7 (3&4), 49 – 54.
- [5] J.A. Okeno, D.K. Chebet, and P.W. Mathenge. Status of indigenous vegetables in Kenya. *Acta Hort.* 2003, 621, 95-100.
- [6] G. Mulokozi, E. Hedren, and U. Svanberg. In vitro accessibility and intake of β -carotene from cooked green leafy vegetables and their estimated contribution to vitamin A requirements. *Plant Foods for Human Nutr.* 2004, 59, 1-9.
- [7] C.N. Muchoki, J.K. Imungi, and P.O. Lamuka. Changes in beta-carotene, ascorbic acid and sensory properties in fermented, solar-dried and stored Cowpea leaf vegetables. *African Journal of Food, Agriculture, Nutrition and Development*. 2007, 7(3&4), 16 – 26.
- [8] G. Mwai, O. Njau, C. John, and M.O. Abukusta-Onyango. Taxonomic identification and characterization of African Nightshades (*Solanum* L. Section *Solanum*). *African Journal of Food, Agriculture, Nutrition and*

Development. 2007, 7(3&4), 69 – 76.

- [9] M. Husselman, & N. Sizane. *Imifino: A guide to the use of wild leafy vegetables in the Eastern Cape Province*. Dupli Print, Grahamstown, South Africa, 2006.
- [10] Abugre. *Assessment of some traditional leafy vegetables of upper east region and influence of stage of harvest and drying method on nutrients content of spider flower*. Unpublished master thesis. Kwame Nkrumah University of Science and Technology, Kumasi Ghana, 2011.
- [11] I.F. Smith, and P. Eyzaguirre. African leafy vegetables: their role in the World Health Organization's global fruit and vegetable initiative. *African Journal of Food, Agriculture, Nutrition and Development*. 2007, 7(3&4), 1 – 8.
- [12] F.O. Orech, T. Akenga, J. Ochora, H. Friis, and J. Aagaard-Hansen. Potential toxicity of some traditional leafy vegetables consumed in Nyang'oma Division, Western Kenya. *African Journal of Food Agriculture Nutrition & Development*. 2005, 5(1): Available from: <http://www.ajfand.net/Volume5/No1/Akenga1575.pdf> [Accessed 10 December 2014].
- [13] T. Johns. Plant Biodiversity and malnutrition: Simple solutions to complex problems: Theoretical Basis for the Development and Implementation of a Global Strategy Linking Plant Genetic Resource Conservation and Human Nutrition. *African Journal of Food, Agriculture, Nutrition and Development*. 2004, 3– 3.
- [14] T. Johns, and B. Sthapit. Bio-cultural diversity in the sustainability of developing country food systems. *Food and Nutrition Bulletin*. 2004, 25 (2), 143-155.
- [15] M. Faber, A. Oelofse, P.J. Van Jaarsveld, F.A.M. Wenhold, & W.S. Jansen van Rensburg. African leafy vegetables consumed by households in the Limpopo and KwaZulu-Natal provinces in South Africa. *South African Journal of Clinical Nutrition*. 2010, 23 (1), 30-38.
- [16] J. Kimiywe, J. Waudo, D. Mbithe, & P. Maundu. Utilization and medicinal value of indigenous leafy vegetables consumed in urban and peri-urban Nairobi, *African Journal of Food Agriculture Nutrition and Development*. 2007, 7 (3&4), 27 – 32.
- [17] A. Mayekiso. *Perceptions and attitudes of rural communities towards indigenous leafy vegetables at Nyadeni Location in Libode, Eastern Cape Province, South Africa*. Unpublished Hons Dissertation, University of Fort Hare, South Africa, 2013.
- [18] G.B. Keller, H. Mndiga, and B.L. Maass. Diversity and genetic erosion of traditional vegetables in Tanzania from the farmer's point of view. *Plant Genetic Resources*. 2005 3(3), 400-413.
- [19] S. Mwangi, & M. Kimathi. *African leafy vegetables evolves from underutilized species to commercial cash crops*. Research Workshop on Collective Action and Market Access for Smallholders, 2-5 October 2006, Cali, Colombia, 2006.
- [20] D. Gujarati. *Essentials of econometrics*. New York: MacGraw-Hill, 1992.
- [21] D. Nguni, and G. Mwila. Opportunities for increased production, utilization and income generation from African leafy vegetables in Zambia. *Journal of Food, Agriculture, Nutrition and Development*. 2007, 7(3&4), 39 – 48.