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Assessment of the Cultivation of Indigenous Leafy Vegetables in Kwara State, Nigeria

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Abstract

Indigenous leafy vegetables have been displaced and neglected, leading to a decline in production, use, and conservation. This study examined the farmers' awareness; assessed the level of cultivation of the vegetables and identified constraints to their cultivation. A three-stage random sampling technique produced a sample size of 160. Data were collected using a structured interview schedule and analysed using descriptive statistics, Multiple Regression Analysis, and the Pearson's Product Moment Correlation. Findings reveal that the mean age, average income and years of farming experience of the respondents were 49.56 years, ₦57,418 and 19.60 respectively. About 69 percent had secondary level education. Results also reveal a high level of awareness (88.94%) and a poor level of cultivation (M.S=1.61) of indigenous leafy vegetables. Poor demand (MS=2.95) was the most severe constraint to cultivation. At P<0.01, farmers' level of education (β=-0.225), years of farming experience (β=-0.012), frequency of extension contact (β=0.154) and membership of farmer-groups (β=0.386) were the determinants of cultivation. The study concluded that the cultivation of indigenous leafy vegetables was low and influenced by farmers' socio-economic characteristics. It advocates the provision of better processing and storage facilities. It also recommends increased extension contacts and further research on improved varieties of these crops.

Keywords*: Cultivation, Decline in production, Indigenous leafy vegetables, Constraint to cultivation.*

Introduction

There are new evidences that point to a rise in world hunger and under-nutrition. Food and Agriculture Organisation of the United Nations FAO (2018) reported that an estimated 821 million people which is approximately one out of every nine persons in the world is undernourished. These estimates unfortunately confirm the prevalence of undernourishment in Africa and this has been reported to be increasing yearly. Africa remains the continent with the highest prevalence of undernourishment, affecting almost 21 percent of the population (more than 256 million people) (FAO, 2018). The situation is more pressing in sub-Saharan Africa where an estimated 23.2 percent of the population or one out of every four people may have suffered from undernourishment (FAO, 2018). In Nigeria specifically, number of undernourished people has significantly increased from 11.5 million persons in 2003 to 21.5 million persons (15.4% of the total population) in 2017 growing at an average annual rate of 5.08 % (FAO, 2018). These estimates of undernourishment is a sign of increasing nutrient insecurity.

The place of indigenous leafy vegetables in the fight against undernourishment cannot be underestimated. Indigenous Leafy vegetables (ILVs) form part of the great biodiversity of plants that could be explored and used for nutritional, medicinal, and therapeutic purposes (Arowosegbe, 2013). ILVs are inexpensive sources of protein, carbohydrate, minerals, vitamins and fibres. Schippers, (2000) reported that indigenous vegetables play an important role in income generation for farmers and have health protecting properties and uses as opined by Okeno, *et al.* (2003). Indigenous leafy vegetables have good nutritional qualities such as macro and micro nutrient (Vincenti, 2013). They also help the body to achieve smooth digestion of food (Muhammad and Shinkafi, 2014). Nwauwa and Omonona, (2010) also reported that indigenous leafy vegetables

possess the potentials to alleviate poverty and address nutritional insecurity because they are easy to cultivate, highly affordable, easily available and require minimum production inputs. In many parts of Nigeria, indigenous leafy vegetables have been accepted as dietary constituents, generally forming a substantial portion of the diet in the preparation of soups and stews (Oluoch *et al.,* 2009). Some common indigenous vegetables include Ugwu (*Telfairia occidentalis*), water leaf (*Talinium triangulaire*), bitter leaf (*Vernonia amygdalina*), Green (*Amaranthus caudatus*) and ukazi (*Gnetum africanum*). Many indigenous leafy vegetables are collected in their natural growing habitats as wild species, while only few are cultivated for consumption.

In spite of the aforementioned importance of indigenous leafy vegetables, they are not consumed in adequate quantity. Badmus and Yekini, (2011) reported that in developing countries, the consumption of vegetables is generally lower than the FAO recommendation of 75kg per year individual (205g per day). Even though indigenous leafy vegetables can play an important role in alleviating hunger and malnutrition in Nigeria, they have been displaced and neglected, leading to a decline in production, use, and conservation. There are over 40 indigenous leafy vegetables consumed in Nigeria, and most of them grow in the wild, therefore their economic value has not been maximised. The rare cultivation of indigenous leafy vegetables has been linked to poor handling of seeds, poor seed quality and poor infrastructure. Non-availability of improved seeds has also been reported as a major constraint to the wide spread cultivation of indigenous leafy vegetables in Nigeria (Adebooye *et al.*, 2005). It is also possible that the awareness of farmers of indigenous leafy vegetable influence its cultivation. It is against this backdrop that the study sought to assess the cultivation of indigenous leafy vegetables in Kwara State, Nigeria. Specifically, the study aimed to:

1. describe the socio-economic characteristics of vegetable farmers in the study area;
2. examine the farmers' awareness of indigenous leafy vegetables;
3. assess the cultivation of indigenous leafy vegetables in the study area; and
4. identify the constraints to the cultivation of indigenous leafy vegetables.

Hypotheses of the Study

The hypotheses of this study were stated in the null form as follows;

$H0_1$: Socio-economic characteristics of farmers do not affect their level of cultivation of indigenous leafy vegetables.

$H0_2$: There is no significant relationship between farmers' level of awareness and their level of cultivation of indigenous leafy vegetables.

Methodology

The Study Area

The study was conducted in Kwara State, Nigeria. Located between latitudes 7^0 45^0 N and 9^0 30^0 N and longitude 2^0 30^0 E and 6^0 25^0 E, with her capital in Ilorin. The state is made up of 16 Local Government Areas (LGAs) and has Agriculture as the mainstay of its economy. With an annual rainfall that ranges from 1000mm to 1500mm and an average temperatures which vary between 30^0C and 35^0C, crops commonly grown include cassava, rice, maize kolanut, coffee, tobacco, beniseed, cotton, palm produce, and vegetables such as amarathus, okra, and pepper. The soil is fertile and the state is well watered by the various tributaries of the Niger River across the state. The Agricultural Development Programme (ADP) department of the Ministry of Agriculture divided the state into 4 zones for the administration of agricultural extension services which are handled by the. The zones are further subdivided into blocks. The smallest unit of administration are cells which make up the blocks. The four (4) zones are; Zone A- Baruteen and Kaiama LGAs,

Zone B- Edu and Pategi LGAs, Zone C- Asa, Ilorin West, Ilorin East, Ilorin South and Mooro LGAs, Zone D- Irepodun, Ifelodun, Oyun, Isin, Offa, Oke-Ero, Ekiti LGAs.

Sampling Procedure and Sample Size

The population of the study consisted of all vegetable farmers in Kwara State, Nigeria. A three-stage sampling technique was used to select the respondents for the study. The first stage was the purposive selection of four (4) of the sixteen (16) Local Government Areas in the state. This selection is based on the justification that the bulk of vegetable production in the state is credited to the selected Local Government Areas. Secondly, 15percent of villages in each of the selected Local Government Areas were randomly selected to give a total of 16 villages in all. Finally, 20% of vegetable farmers were randomly selected from each of the selected villages to make a total of 162 respondents. However, only 160 responses were found analysable giving a response rate of 98.8percent.

Data Collection and Analytical Techniques

A structured interview schedule was used to collect primary data from the field survey. Data collected were subjected to both descriptive and inferential statistical analysis. Descriptive statistics involving the use of frequency counts, percentages, mean and standard deviation was used to present the findings from the objectives of the study. The Pearson's product Moment Correlation (PPMC) and the multiple regression analysis (OLS method) were used to test the hypotheses of the study.

The multiple regression model for this study is specified as follows;

$Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \ldots.. + \beta_6X_6 + \beta_7X + \beta_8D_1 + e_i$

where; β_0 = intercept, β_1- β_8 = coefficients, D= dummy variable

Y= Level of cultivation of ILVs, X_1 = age of the farmer (in years), X_2 = average annual income from vegetable farming (amount in ₦), X_3 = level of education (number of years spent schooling), X_4= household size (number of people feeding from the same pot), X_5= farm size (in acres), X_6= farming experience (number of years spent farming), X_7= farming frequency of extension contact (number of contact in the immediate past 6 months period of the study), D_1= membership of farmer group (1 if yes, 0 if otherwise), e_i= error term

The model of the Pearson Product Moment Correlation is given as:

$$r = \frac{E[XY] - E[X]E[Y]}{\sqrt{\sqrt{E[X^2]} - E[X]^2 \sqrt{E[Y^2]} - E[Y]^2}}$$

Where: $\sum xy$ = sum of the products of paired scores

$\sum x$ = sum of x scores

$\sum y$ = sum of y scores

$\sum x^2$ = sum of squared x scores

$\sum y^2$ = sum of squared y scores

Measurement of Variables

Farmers' Awareness of Indigenous leafy vegetables

A list of various indigenous leafy vegetables was drawn and respondents were asked to indicate whether or not they were aware of them. The responses were treated as a dummy variable; 1=Aware, 0=Not aware. Percentages were aggregated for each of the indigenous leafy vegetables. The average score on all listed ILVs was taken as a measure of respondents' level of awareness of ILVs.

Cultivation of Indigenous Leafy Vegetables

This was measured using a 4-point Likert scale. A list of indigenous leafy vegetables was drawn and respondents were required to indicate their frequency of cultivation on a scale of 1-4 as follows; Never Cultivated=1, Rarely Cultivated=2, Often cultivated=3, Always Cultivated= 4. Scores were sum-up and converted to means for each of the respondents. The mean scores were adopted as a measure of the respondents' level of cultivation of ILVs. The level of cultivation was categorised using a benchmark of <2 for low, 2-3 for average, and >3 for high.

Constraints to the Cultivation of Indigenous Leafy Vegetable

This was measured using a 4-point Likert-type scale. A list of possible constraints was drawn and respondents were required to rate their level of severity on a scale of one to four graduated as follows; **Not a constraint =1, Less severe=2, Severe=3, Very severe=4.**

Scores were aggregated and converted to means for each of the listed possible constraints. The mean scores were adopted for ranking of the constraints in order of severity.

Results and Discussion

Socio-economic Characteristics of Vegetable Farmers

This section presents results and discussion on the socio-economic characteristics of the respondents. The results are presented in Table 1.

Table 1 show that majority (85.6%) of the respondents were above 40 years of age. With a mean age of 49.56 years, the result implies that vegetable farmers in the study area were middle-aged and hence physically active. This is similar with the findings of Busari *et al.*, (2012) and Arowosegbe *et al.,* (2018). The result also shows that vegetable farming in the study area was dominated by females with only 31.2% males. This finding is similar to that reported by Isitor *et al.,* (2016). The study further reveal that though the majority of the respondents (84.4%) had formal education, only few (3.1%) had tertiary level of education. Basically, the levels of education of farmers could significantly influence their productivity, choices, and ability to effectively adopt and use innovation (Nwaiwu *et al.,* 2012). With the respondents' average annual income of ₦58,000 (less than $200) on vegetable farming, there is room for farmers to increase income from the cultivation of indigenous leafy vegetables. The average farming experience of 19 years in an indication that the respondents had been in the business of vegetable farming for an appreciable length of time. The average area of farmland cultivated was 2.6acres, which indicates that vegetable farmers in the study area produce vegetables on a small-scale basis. Also on the average, the respondents had only 2 extension contacts in the immediate past six months period prior to the survey. The same was reported by Akinrinde *et al.,* (2018). The poor frequency of extension contact could be attributed to the arrays of challenges combating extension delivery service in Nigeria which include large farmer to extension ratio among others (Adejo *et al.,* 2012)

Awareness of Indigenous Leafy Vegetable

The summary of the results of the respondents' awareness of indigenous leafy vegetables is as presented in Table 2.

Table 1: Distribution of Respondents according to their Socio-economic Characteristics (n=160)

Variables	Frequency	Percentages	Mean±SD
Age (in years)			
< 30	1	0.6	
30-40	22	13.8	49.56±7.75
41-50	68	42.5	
51-60	56	35.0	
≥ 61	13	8.1	
Sex			
Male	50	31.2	
Female	110	68.8	
Marital Status			
Married	152	95.0	
Otherwise	8	5.0	
Level of Education			
No formal education	25	15.6	
Primary education	20	12.5	
Secondary education	110	68.8	
Tertiary education	5	3.1	
Primary Occupation			
Vegetable farming	108	67.5	
Otherwise	52	32.5	
Annual Income from vegetable production			
< 15,000	7	4.4	
15,000-30,000	17	10.6	57,418.80
30,001-45000	34	21.3	
≥ 45,001	102	63.8	
Farming Experience			
< 5	8	5.0	
5-15	72	45.0	19.60±10.60
16-25	33	20.6	
≥ 26	47	29.4	
Farm Size (Acre)			
<2	98	61.3	
2-5	57	35.6	2.60±1.50
>5	5	3.1	
Household Size			
≤ 2	2	1.3	
3-7	101	63.1	6.80±3.40
8-12	46	28.8	
≥ 13	11	6.9	
Frequency of Extension Contact			
0	2	1.3	
1-3	157	98.1	1.90±0.50
>3	1	0.6	
Membership of Farmer-group			
Yes	115	71.9	
No	45	28.1	

Source: Field Survey (2018), S.D=Standard Deviation

Table 2: Distribution of Respondents Based on their Awareness of Indigenous Leafy Vegetables

Indigenous Leafy Vegetables*	Local names	Aware F (%)	Not Aware F (%)
Talinum triangulare	Gbure	160(100)	0(0)
Solanum macrocarpon	Efo igbo	160(100)	0(0)
Basella alba	Amunututu	160(100)	0(0)
Taraxacum officinale	Yanrin	160(100)	0(0)
Solanum nigrum	Odu	160(100)	0(0)
Cucurbita maxima	Elegede	160(100)	0(0)
Crassocephalon rubens	Ebolo	158(98.8)	2(1.2)
Solanecio biafrae	Worowo	158(98.8)	2(1.2)
Celosia argentea	Shoko yokoto	110(68.8)	50(31.3)
Gongronema latifolium	Arokeke	100(62.5)	60(37.5)
Cnidoscolus aconitifolius	Chaya	79(49.4)	81(50.6)

Source: Field Survey (2018), *multiple responses (Level of awareness of ILV =88.94%)

Table 2 shows farmers' awareness of various indigenous leafy vegetable. Result reveals a high level of awareness (88.94%) of indigenous leafy vegetables among the respondents. This could be ascribed to the high number of years of experience of the respondents in vegetable farming. Lyatuu and Lebotse, (2010) and Arowosegbe *et al.* (2018) reported that indigenous vegetables were popular due to their contributions to food and nutrition security. *Talinum triangulare*, *Solanum macrocarpon*, *Basella alba*, *Taraxacum officinale*, *Solanum nigrum*, and *Cucurbita maxima* were indigenous vegetables that were known to all the respondents. *Cnidoscolus acanitifolius* was the least known among the farmers.

Level of Cultivation of Indigenous Leafy Vegetables

Farmers' level of cultivation of the different indigenous leafy vegetables is discussed in this section. The results are presented in Tables 3 and 4.

Table 3: Frequency of Cultivation of Indigenous Leafy Vegetables

	Always Cultivated F (%)	Often Cultivated F (%)	Rarely Cultivated F (%)	Never Cultivated F (%)	MS	Rank
Solanum macrocarpon (**Efo igbo**)	94(58.8)	28(17.5)	37(23.1)	1(0.6)	3.34	1st
Celosia argentia (**Shoko yokoto**)	98(61.3)	18(11.3)	44(27.5)	0(0)	3.33	2nd
Cucurbita maxima (**Elegede**)	96(60)	17(10.6)	45(28.1)	2(1.3)	3.29	3rd
Talinum triangulare (**Gbure**)	71(44.4)	40(25)	46(28.8)	3(1.9)	3.12	4th
Solanum nigrum (**Odu**)	68(42.5)	55(34.4)	34(21.3)	3(1.9)	3.12	4th
Taraxacum officinale (**Yanrin**)	8(5)	85(53.1)	55(34.4)	12(7.5)	2.56	6th
Basella alba (**Amunututu**)	13(8.1)	79(49.4)	41(25.6)	27(16.9)	2.49	7th
Solanecio biafrae (**Worowo**)	7(4.4)	81(50.6)	51(31.9)	21(13.1)	2.46	8th
Crassocephalon rubens (**Ebolo**)	29(18.1)	26(16.3)	41(25.6)	27(16.9)	1.89	9th
Gongronema latifolium (**Arokeke**)	1(0.6)	10(6.3)	46(28.8)	103(64.4)	1.43	10th
Cnidoscolus aconitifolius (**Chaya**)	1(0.6)	8(5)	41(25.6)	110(68.8)	1.38	11th

Source: Field Survey (2018).

Results in Table 3 reveal the level of cultivation of indigenous leafy vegetables in the area of study. The most cultivated indigenous leafy vegetable in the area of study was *Solanum macrocarpon* (Efo igbo) (MS= 3.34). *Celosia argentea* (Shokoyokoto) (M.S=3.33), *Cucurbita maxima* (Elegede) (MS=3.29), *Talinum triangulare* (Gbure) and *Solanum nigrum* (Odu), both with a MS

of 3.12, were also commonly cultivated in the area of study. These vegetables were also identified by Arowosegbe *et al.,* (2018) as common indigenous vegetables cultivated in Nigeria. The least cultivated indigenous vegetable were *Gongronema latifolium* (**Arokeke**) (MS=1.43), and *Cnisdoscolus aconitifolius* (Chaya) (MS=1.38).

Table 4: Distribution of Respondents Based on their Level of Cultivation of Indigenous Leafy Vegetable

Level of Cultivation	Frequency	Percentage	Mean
Low (< 2)	149	93.1	
Average (2-3)	11	6.9	**1.61**
High (>3)	0	0	

Source: Field Survey (2018).

The result presented in Table 4 shows the level of cultivation of indigenous leafy vegetables among vegetable farmers in Kwara State. Result reveals that the level of cultivation of indigenous leafy vegetable was low among 93.1 percent of the respondents. With a mean level of cultivation of 1.61 out of 4, the result implies a poor level of cultivation of indigenous leafy vegetables among vegetable farmers in Kwara State, Nigeria. Though Okafor *et al*., (2004) opined that indigenous leafy vegetables were known to be the cheapest and most valuable source of nutrient needed in daily diet; its cultivation in the study area was low. This could be as a result of regular release of improved new varieties of routinely cultivated vegetables which has contributed to the neglect and poor cultivation of ILVs thus endangering their continued existence (Adebooye *et al.,* 2005).

Table 5: Constraints to the Cultivation of Indigenous Leafy Vegetables

Constraints	V.S F (%)	S F (%)	L.S F (%)	N.C F (%)	Score	MS	Rank
ILVs are grown as backyard crops by consumers hence low demand	67(41.9)	44(27.5)	23(14.4)	26(16.3)	472	2.95	1st
The vegetables perish/spoil easily (High Perishability)	68(42.5)	29(18.1)	39(24.4)	24(15)	461	2.88	2nd
Perceived nutrient deficiency of ILV	17(10.6)	94(58.8)	26(16.3)	23(14.4)	425	2.66	3rd
High susceptibility to diseases	21(13.1)	76(47.5)	49(30.6)	14(8.8)	424	2.65	4th
Regular release of improved varieties of routinely cultivated vegetables	18(11.3)	89(55.6)	30(18.8)	23(14.4)	422	2.64	5th
Consumer preference for routinely cultivated vegetables	10(6.3)	96(60)	27(16.9)	27(16.9)	409	2.56	6th
Planting of ILV is not as profitable as other vegetables (Low Profitability)	5(3.1)	95(59.4)	30(18.8)	30(18.8)	395	2.47	7th
Strenuous cultivation requirements	14(8.8)	45(28.1)	77(48.1)	24(15)	369	2.31	8th
Lack of awareness of the existence of ILV	12(7.5)	49(30.6)	33(20.6)	66(41.3)	327	2.04	9th
Unavailability of planting material	21(13.1)	33(20.6)	29(18.1)	77(48.1)	318	1.99	10th
Low market demand for ILV	2(1.3)	8(5)	27(16.9)	123(76.9)	209	1.31	11th

Source: Field Survey (2018). (ILV=Indigenous leafy vegetables, NC=Not a constraint, LS=Less severe, S=Severe, VS=Very Severe).

Constraints to the Cultivation of Indigenous Leafy Vegetables

This section presents results and discussion on the constraints to the cultivation of indigenous leafy vegetables in the study area. The results are presented in Table 5.

Table 5 reveals that the fact that majority of the consumers of ILV grow them as backyard crops makes the demand for the crops very low (MS=2.95) was the most severe constraints to the cultivation of ILVs. This was also reported by Isitor *et al*. (2016). The high perishability associated with indigenous vegetables (MS=2.88) also discourages farmers from growing them. The perception of consumers on nutrient deficiency of indigenous vegetables (MS=2.66) posed a threat to the consumption of ILVs and hence its cultivation. The regular release of improved new varieties of routinely cultivated vegetables (MS= 2.64) contributes to the neglect of ILVs thus endangering their continued existence (Adebooye *et al.,* 2005). The least identified constraint to cultivation of indigenous leafy vegetable was low market demand (MS=1.31).

Results of Test of Hypotheses

$H0_1$: Socio-economic characteristics of farmers do not affect their level of cultivation of indigenous leafy vegetables.

Table 6: Results of OLS Regression Analysis on the Determinants of Cultivation of Indigenous Leafy Vegetables

Socio-economic characteristics	Beta	Std. Error	t-value	p-value
Constant	1.732	0.238	7.291	0.000
Age	0.002	0.004	0.589	0.556
Annual income from vegetable farming	0.00003	0.000	0.987	0.325
Level of Education	-0.225***	0.040	-5.662	0.001
Household size	0.002	0.010	0.225	0.822
Farm size	-0.014	0.022	-0.631	0.529
Farming experience	-0.012***	0.004	-3.287	0.001
Frequency of Extension contact	0.154***	0.055	2.807	0.006
Membership of farmer-group	0.386***	0.065	5.974	0.001

Source: Field survey (2018), ($R=0.613$, $R^2=0.375$)

Table 6 shows the result of regression analysis to identify the determinants of the cultivation of indigenous leafy vegetables. As shown in the table, level of education (β=-0.225), farming experience (β=-0.012), frequency of extension contact (β=0.154) and membership of farmers group (β=0.386) were the determinants of the level of cultivation of indigenous leafy vegetables. These four variables explain 37.5 % of the variations in level of cultivation of ILV among the respondents. The negative influence of level of education on the level of cultivation of indigenous leafy vegetables implies that, higher education level depicts a lower level of cultivation of indigenous leafy vegetables. This could be a result of exposure to new varieties of routinely cultivated leafy vegetables. Negative influence of farming experience on the cultivation of indigenous leafy vegetables also implies that vegetable farmers with lower years of farm experience tend to cultivate indigenous leafy vegetables than older farmers. This could be as a result of the young farmers drive to meet market demand of indigenous leafy vegetables and to diversify from the routine vegetable cultivation as stated in the findings of Abukutsa-Onyago

(2003), and Oladele (2011). The results also reveal that members of farmer-groups cultivate indigenous vegetables at higher levels than those who were not members of farmer-groups. This could be as a result of advantages and benefits associated with membership of farmer-groups which naturally puts small-holder famers who belong to such groups ahead of non-members in access to production resources, agricultural information and markets. The positive influence of extension contact on the cultivation of indigenous leafy vegetable indicates that an increase in the frequency of extension contact has a tendency to increase the level of cultivation of indigenous leafy vegetables.

$H0_2$: There is no significant relationship between farmers' awareness and level of cultivation of Indigenous leafy vegetables

Table 7: Result of the Correlation Analysis between Farmers' Awareness of ILV and Level of Cultivation of ILV

	Farmers' awareness of ILV	**Level of Cultivation**
Level of Awareness	1	-0.073
Level of Cultivation	-0.073	1

Source: Field survey (2018).

Table 7 show that farmers' awareness of indigenous leafy vegetable was not significantly related to the level of cultivation of indigenous leafy vegetables. This implies that farmers' awareness of indigenous leafy vegetable did not influence its cultivation. This agrees with the findings of Adebooye *et al.,* (2005), who reported that awareness of ILV is not a constraint to its production.

Conclusion and Recommendations

Based on the findings of the study, it was concluded that though farmers' awareness of indigenous leafy vegetable was high, the cultivation of same in Kwara State was low. Also, socio-economic parameters such as primary occupation, level of education, farming experience, membership of farmer-groups and frequency of extension contact are major determinants of the level of cultivation of indigenous vegetables in Kwara state.

The study therefore suggests as follows;

1. Research institutes, and agencies mandated to produce prototypes of technologies should fabricate and make available, processing and storage facilities for leafy vegetables to reduce post-harvest loss.
2. Research should be encouraged in the areas of disease resistant and other improved varieties of ILVs.
3. Ministry of health in collaboration with extension agencies should organize seminars and campaigns on the nutritional benefits of indigenous leafy vegetables.
4. Extension agencies should increase their visit to educate farmers on the need to preserve indigenous leafy vegetables from extinction through proper seed management, and cultivation of same.
5. Incentives should be given to vegetable farmers groups by stakeholders to encourage others to joining groups to enhancing their productivity, through sharing of technology, resources etc.

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