The accessibility, utilisation and role of indigenous traditional vegetables in household food security in rural Hwange District.

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Abstract
Traditional indigenous vegetables have been consumed by many rural communities for centuries and have a potential to contribute to household food security by providing direct access to readily accessible nutritious food and household income generation, (Mnzava 1999). The availability of fresh vegetables is however seasonal but communities in Hwange have made it an all year round activity by having winter gardens in the alluvial deposits in river beds.

A survey was conducted in 2012 in Nekatambe ward of Hwange in Matabeleland North province of Zimbabwe to assess the accessibility, importance, availability and role of the indigenous traditional vegetables in income generation, food security and livelihoods of households.

Data was collected through focus group discussions, field observations and a questionnaire survey on forty households. Results showed that traditional vegetables were abundant all year round for communities living along the major district rivers. *Amaranthus* (pigweed), *Corchorus* spp (idelele), *Cleome* gynandra *(Ishungwa/Ulude)*, *Vigna unguiculata* (cowpea), *Legenaria siceraria* (gourds) and pumpkin leaves *(Curcubita spp)* were the most popular vegetables in summer whereas in winter, the popular vegetables were *Curcubita spp* (pumpkin), *Legenaria siceraria* (gourds), *Vigna unguiculata* and *Citrullus lanatus* (melons). The vegetables are for household use and income generation. There was a general positive attitude towards indigenous traditional vegetables. The supply of vegetables was reported to be on the increase possibly due attitude changes and training.

Information on agronomy, nutritive value and methods of preparation that minimise nutrient leaching is scarce among the communities. It was recommended that, as a food-based initiative toward alleviation of micro-nutrient deficiencies and poverty, stakeholders should start promoting and strengthening current efforts that encourage the consumption of traditional vegetables.

Indigenous traditional vegetables, accessibility, livelihoods

1. Introduction
Indigenous farmers/communities have for centuries relied on indigenous vegetables not only for food security, but also for medicinal, social, cultural and income generating purposes. However, there has been a general decline in the consumption of these vegetables over the years, a factor attributed to unavailability and disappearing knowledge particularly among the younger generations.

According to FAO (1988), traditional vegetables are all categories of plants whose leaves, fruits or roots are acceptable and used as vegetables by rural and urban communities through custom, habit and tradition. Before the introduction of exotic species, they were widely consumed, particularly during famines or natural disasters. While most of them are gathered when in season or are grown in home gardens as intercrops with staples, they may find their way to urban markets, (Mnzava, 1999).

Traditional vegetables are a valuable source of nutrition in rural areas where exotic species are not available and contribute substantially to protein, mineral and vitamin intake. They are compatible in use with starchy staples and represent a cheap but quality nutrition to the poor sector of the population in both urban and rural areas where malnutrition is widespread. They provide good nutrition at low cost, in contrast to exotic species, (Mnzava 1999).

1.1 What are indigenous traditional vegetables?
Indigenous traditional vegetables can be defined as plants that are native or introduced whose leaves, flowers or fruits have been used over a long time hence have become part of the culture and tradition of a community, (Maundu, 1997). The term “indigenous” has been used in generic form to accommodate those crop species, although not limited to native area, but have been produced over years for the enhancement of high value of nutritious leafy vegetable. There is now recognition that traditional vegetables are important for food security and that their production, processing and marketing are significant contributors to income. Marketing of traditional vegetables is increasingly becoming an important source of income for most communal communities in the SADC Region (especially women) who cannot get employment in the formal sector, (Lyatuu and Lebotse, 2010). Indigenous plants occur naturally in an area, are usually adapted to harsh environments, generally require simpler technologies and inputs to grow and can therefore be cultivated in more arid regions, (Van der Walt et al., 2005; Jansen van Rensburg et al., 2004; Chadha and Oluoch, 2002).

1.2 Food security
During periods of relish shortage, especially in the dry season (the relish-gap period), traditional vegetables previously preserved by drying become...
very important in household food security. Their ability to grow quickly and become harvestable within a short period makes them useful in sustaining nutrition-intervention programmes. They offer variety and can contribute to broadening the food base, (Okigbo 1977). Being accessible to the low-income communities in rural and urban areas, they offer an opportunity of providing affordable nutrition to avert malnutrition.

The potential effect of traditional vegetables on the nutritional status of a particular population will depend, among other things, on the species that are geographically and seasonally available; the species that are known and socio-culturally acceptable or popular as food and the frequency of consumption and the amount consumed.

1.3 The role of traditional vegetables in the lives of people in Hwange communal area

During the rainy season (December to April), the main constraint on horticultural production is the high incidence of insects and diseases. In the winter season (May to November), vegetables are produced in plenty by those who have access to irrigation facilities or access to dambo gardens (wetlands). From August to the end of December, the availability and accessibility of vegetables becomes very limited to people in communal areas and people in Hwange resort to *inchelela* or traditional gardens in the alluvial deposits in river beds. During these months, temperatures are highest and evapotranspiration is at maximum. Most gardens are dry and field vegetables will still be unavailable. People buy exotic vegetables such cabbages and use the reserves of dried vegetables they prepared in times of plenty. These dried vegetables include both exotic and traditional species.

1.4 Statement of the problem

Vegetables have tremendous potentials to address poverty alleviation and nutritional security because they are affordable and easily available, easy to grow, require minimum production inputs, rich in vitamins and minerals, and are loaded with phytochemicals and anti-oxidants properties (Eusebio, 2009). Food security remains a challenge for many rural communities in Zimbabwe and other developing countries. The continued neglect and under utilisation of indigenous vegetables will lead to the loss of indigenous knowledge and hence the loss of the food, genetic diversity or genetic erosion. Some indigenous vegetables are considered weeds in commercial farming systems and are subject to continued destruction before they seed. The neglect and destruction is against the background of food shortages, malnutrition and high unemployment in the communal. Indigenous vegetables offer unique opportunities to diversify farming systems to ensure food security at household since they are nutritious and offer cheaper alternatives to the more expensive exotic counter parts with lower nutritional value.

1.5 Justification of study

Research has shown that consumption of vegetables is the most sustainable way of reducing and controlling micronutrient deficiencies in resource poor communities. Indigenous vegetables besides being micronutrient rich have the added advantage of possessing other desirable traits. These vegetables are often easier to grow, resistant to pests and diseases and are quite acceptable to local tastes. However, in many countries, indigenous vegetables are at risk of extinction as they are being replaced by high yielding commercial vegetables. When an indigenous vegetable is lost, it can never be recovered; there is an urgent need for intervention to avoid such a situation. Indigenous vegetables offer unique opportunities to diversify farming systems to ensure food security, biodiversity, nutrition and offer cheaper alternatives to the more expensive exotic counter parts with lower nutritional value. They can alleviate poverty and generate income for communal farmers and urban dwellers. The documentation of their importance will encourage their production, accessibility and utilization. Lack of research in this area has led to the loss of indigenous knowledge and thus this research seeks to document the importance of production and marketing of the indigenous vegetables so as to attract more people in the production of the vegetables.

2. OBJECTIVES OF THE STUDY

The specific objectives of the study were:

2.1 To document the diversity and value of indigenous vegetables within the study area in Hwange District.

2.2 To establish the consumption, marketing of traditional/indigenous vegetables by rural households in Hwange District.

2.3 To determine the importance of traditional vegetables as a source of income, food security in the rural communities.

3. METHODOLOGY

3.1 Study area

The survey on indigenous vegetables (availability, accessibility and utilisation) was carried out in July to December 2012, in Nekatambe Ward in Hwange District of Matabeleland Province of Zimbabwe. The study area is in Agro-ecological Region V. This is a lowland area with an altitude of 630 metres above sea level with rainfall up to 550 mm annually.

The study included a qualitative explorative phase consisting of observations and semi-structured interviews with key informants as well as focus group discussions to determine the availability, accessibility, beneficial traits, constraints related to the production and consumption, their household use, beliefs, practices, marketing and income generation.

This was followed by a quantitative household survey to determine production, consumption, processing and sale of indigenous vegetables. The quantitative survey was carried out in August and September 2012.
The results were analysed using SPSS Version 16 and MS Excel.

4. RESULTS AND FINDINGS

During the focus group discussions, the participants identified the most dominant indigenous traditional vegetables in their areas. Those vegetables available in the summer months (December to April) and those cultivated in the winter months (May to November). The source, seasonality and information on the household use, were obtained for each of these vegetables. Aspects that were also discussed included the parts of the plants that are used, processing and processing methods, beneficial traits, cultural beliefs and constraints for consumption, acceptability in terms of taste and knowledge/perceptions of nutritional benefits. For plants that were cultivated, additional aspects discussed were cultivation practices and constraints, susceptibility to pests and diseases, water use, marketability and the family members responsible for cultivation, processing and marketing of these vegetables.

4.1 Demographics

During the study, 57% of the respondents were female, while 43% were male. All age groups were involved in winter vegetable production. The youngest respondent was 20 years whilst the oldest was 75 years. Table 1 shows the ages of the respondents.

Table 1 Age range of respondents

<table>
<thead>
<tr>
<th>Age Range (years)</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 30</td>
<td>20</td>
</tr>
<tr>
<td>31 - 40</td>
<td>17</td>
</tr>
<tr>
<td>41 - 50</td>
<td>27</td>
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<tr>
<td>51 - 60</td>
<td>27</td>
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<tr>
<td>61 - 70</td>
<td>7</td>
</tr>
<tr>
<td>Above 71</td>
<td>3</td>
</tr>
</tbody>
</table>

The traditional gardens offer some work to almost all age groups and sexes in the community. In the past, the winter gardens were an activity carried out by older women and the men and other household members only assisted in fencing and watering. This has changed over years since men and younger women are now involved in the winter production of indigenous vegetables.

The study showed that 57% of respondents have at least some primary education, whilst 37% and 6% have secondary and no formal education respectively. It was found that 45% of the respondents were married with 10%, 15% and another 15% being widowed, single and separated respectively.

Number of people per household

The sizes of the families vary from 2 to 15 people. More than 70% of the respondents have at least 1 to 5 people in the household, whilst 23% have 6 to 10 people per household. These people all assist in the production of indigenous vegetables.

Vegetables utilised by the households in Nekatambe Ward.

The study found out that there were three classes of indigenous vegetables in the district. Table 2 shows the indigenous vegetables produced and are available in summer, whilst Table 3 and 4 show the wild and weedy vegetables in summer and the vegetables available in winter respectively.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Edible Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cichorius sesamoides</td>
<td>False sesame</td>
<td>Leaves</td>
</tr>
<tr>
<td>Amaranthus hybridus</td>
<td>Pigweed</td>
<td>Leaves</td>
</tr>
<tr>
<td>Amaranthus thunbergii</td>
<td>Pigweed</td>
<td>Leaves</td>
</tr>
<tr>
<td>Scoloporus oleraceus</td>
<td>Milkweed</td>
<td>Leaves</td>
</tr>
<tr>
<td>Alternanthera sessilis</td>
<td>Dwarf copperleaf</td>
<td>Leaves</td>
</tr>
<tr>
<td>Solanum nigrum</td>
<td>Nightshade</td>
<td>Leaves</td>
</tr>
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</table>
Plates 1 to 4 below show the main available and cultivated species used as leafy vegetables.

**Plate 1 Amaranthus hybridus Pigweed**

**Plate 2 Cucurbita maxima Pumpkin**

**Plate 3 Cucurbita pepo. Pumpkin leaves**

**Plate 4 Legenaria siceraria Gourds**

**Table 4: Vegetables grown and available in winter (June to November)**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Edible Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legenaria siceraria</td>
<td>Gourds</td>
<td>Fruit</td>
</tr>
<tr>
<td>Vigna unguiculata</td>
<td>Cowpeas</td>
<td>Leaves and fruits</td>
</tr>
<tr>
<td>Citrullus lanatus</td>
<td>Melons</td>
<td>Fruit</td>
</tr>
<tr>
<td>Cucumis melo</td>
<td>Melons</td>
<td>Fruit</td>
</tr>
<tr>
<td>Cucurbita maxima</td>
<td>Pumpkins</td>
<td>Leaves and fruit</td>
</tr>
<tr>
<td>Cucurbita pepo</td>
<td>Pumpkins</td>
<td>Leaves and fruit</td>
</tr>
<tr>
<td>Abelmoschus esculentus</td>
<td>Okra</td>
<td>Fruit and leaves</td>
</tr>
</tbody>
</table>

4.2 Traditional indigenous vegetable production system and usage.

Use of these vegetables was for both home consumption and for sale. Most weedy vegetables such as Cleome or Spider flower and Corchorus spp are regarded as weeds in commercial farming systems but not in the communal area cropping systems. Women who do most of the weeding in the communal cropping systems often distinguish between undesirable weed species, which are hoed or pulled out and species that belong to the local collective of leafy vegetable species, are harvested or left undisturbed for subsequent use. Most of the species that are consumed as vegetables grow in summer. These are harvested and sold in nearby urban areas to raise some income. The study found out that there is a decrease in these vegetables because people have not been letting the plant to seed or were not sowing them.

The study found that in winter, vegetables were grown in the alluvial deposits gardens in the river bed of the major rivers in the study area.

The major traditional vegetables grown for cash are the gourds (30%), followed by pumpkins (17%). The gourds are grown for their fruit which are boiled for consumption. The gourds can be eaten with milk or tea. The dry seeds from watermelons, melons, pumpkins and gourds are roasted, ground and used for cooking other vegetables. The gourds are very popular since the plant has two to three flushes of flowers and hence produces fruits for a prolonged time. The leaves are not normally eaten because they are rough.

Immature cucumbers, watermelons and melons are boiled with salt and eaten. The mature melons are used to cook a thick porridge (*Inhopi*). This was found to be very popular.

Production of indigenous vegetables was mainly on a subsistence basis in summer but the winter produced vegetables are used for both subsistence and income generation.

These summer traditional vegetables are often intercropped and rarely occupy a significant proportion of the farm. Indigenous vegetables often
occupy areas around the disused cattle kraals, fields with pearl millet, maize and sorghum. Supply of the vegetables is highest two to three (2-3) months after the onset of the rains, when tender plants are uprooted during weeding for use as relish.

A site with reeds in the river bed is selected. The reeds (*Phragmites mauritianus*), are cleared and the area is fenced using brushwood. Basins are dug by removing the sand until one gets to the alluvial deposit or layer. The basins are 1.5 to 2 metres apart, 30 to 50 cm in diameter and 20 to 30 cm deep. Three or four seeds of the same or different vegetable varieties are planted in the basin with no precise spacing. Weeding is done by uprooting any weeds that may have grown in the basin. The main “weeds” are the shooting reeds and *Argeomone Mexicana* or German weed. The weeds are very minimal due to the basin irrigation method used and that most of the weeds are not that prolific in winter.

Supply then drops in April/May, until the months of June/July, when the irrigated indigenous vegetables planted in the alluvial river deposit gardens can be used. This results in an increase in supply, up to the onset of the rains and first major floods of the rivers in November/December. The gardens are washed away by the seasonal floods during the rainy season. By this time the wild and weedy vegetables like Spider flower and *Corchorus* spp would be in season in the small grains fields.

Cowpeas (*Vigna unguiculata*) and pumpkins (*Cucurbita pepo, C. maxima* and *C. moschata*), melons (*Citrullus lanatus* and *Cucumis melo*) and other selected indigenous cucurbits, gourds (*Legenaria siceraria*), okra (*Abelmoshus esculentus*) are inter planted with the pearl millet or sorghum and are rarely grown as a sole crop in a field.

In winter, cucurbits, though frost sensitive, do very well in Hwange from May/June because of the non-occurrence of frost due to the warmer winter temperatures compared to the other parts of Zimbabwe. These are grown in gardens in alluvial deposits in the river beds. They therefore provide the main accompaniment to sadza for families and income from the sale of the fruits. Plates 5 to 8 shows the river bed winter gardens stages.

**Plate 5 Vegetable seedlings in a basin**

During the summer months, all these gardens are washed out by the flooding river; hence there are no crops until the next winter season. This ensure a “dead” season and this rotational system does not allow any build up of diseases and pests.
4.3 Food security and livelihoods

The winter gardens provide employment, food security and a source of income for investment into livestock. 60% of the respondents reported that only one person is engaged in activities that bring in cash into the home, whilst 27%, 3% and 10% reported that 2 to 3, more than 4 and none respectively. The winter gardens are a major livelihood strategy for the rural communities. The primary sources of income are small livestock sales (40%), crop and vegetable sales (33%) and casual non agricultural work 23%.

4.4 Marketing of indigenous vegetables

The study found that, 57% of the production and more than 95% of the handling and marketing is done by women. For the men interviewed, the spouses were reported to be involved in the production and marketing. The women harvest and pack the vegetables for the vendors who come to these alluvial winter gardens. Women vendors from other rural areas with no access to water and alluvial garden sites and urban centres of Dete, Hwange and Victoria Falls buy and transport vegetables to strategic road side markets and urban vegetable markets. At each vegetable exchange point, a profit of well over 100% is made. The vendors purchase a bundle of vegetables for $0.50. They split the bundle into two and each is sold at $0.50 to the consumers. During the winter months, retailers like TM Hwange buy gourds at $1.00 for four gourds. The four weigh almost one kilogram. The retailers sell the gourds at $2.50 per kilogram to consumers.

Local production of indigenous vegetables for marketing is relatively high during the dry season through the irrigated alluvial gardens. Vendors and traders travel up to 30 to 100 kilometres and spend money buying these vegetables for resale in Hwange, Dete and Victoria Falls.

The study revealed that there are two main types of markets where the traditional vegetables are marketed - formal and informal. Formal markets are specialised types such as TM supermarket in Hwange and Zimbabwe Traders in Victoria Falls. Informal markets include local sales, door to door and road side markets in Lamba and Lukosi road side markets.

Local sales were reported by 73% of the respondents. Barter trade with grain (maize, sorghum and millet) was reported by 23% and 4% of respondents exchange with non-food items (soap and clothing), and non staple food items (salt, sugar and cooking oil). The traded parts of the vegetables are the leaves and fruits. The barter trade is two gourds for a 1 litre cup of grain and a bundle of about 1kg of green leaves to 1 litre of grain. The producers reported getting between 150 to 250 kg of grain per month. The grain is then used by the household as the staple food.

The barter with non-food and non staple items is done mainly in Hwange town. The producers go to Hwange and move from house to house in the residential areas where these vegetables are on demand and are very popular. Vendors and buyers also go to the alluvial gardens and purchase the vegetables for resale. These are harvested as the buyers wait.

4.5 Income generation

The study found out that 47% of the respondents reported making more than US$200 in the past two months prior to the study, 13% and 10% reported having made US$101 to $200 and $50 to $100 respectively.

4.5.1 Income distribution and household expenses

The main expenses in the household in the last month prior to the survey were the purchase of staple food (70%), medical expenses (13%) and purchase of small livestock (goats and chicken) was reported by 17% of respondents.

4.6 Indigenous vegetables processing

Many of the leafy vegetable species in Tables 1 and 2 are seasonal and highly perishable. To extend the period during which they are available, different ways of preservation are used by the households.

Dried vegetables are used by the households during the times of the year when the supply of fresh vegetables is low. It was reported that 3%, 13%, 30%, 24% and 7% consume dried vegetables more than five times, four times, thrice, twice, once whilst 23% did not eat any dried vegetables.

4.7 Processing of vegetables

The study found out that 97% of the respondents processed the excess vegetables that were produced and harvested, whilst 3% do not process. The main processing methods are drying in direct sunlight (77%), dry in shade (7%), boil and dry in direct sunlight 13%. Three (3) per cent reported drying melon and cucumbers they harvest from the summer field. The melon rind is removed and the melon cut into thin slices. These slices are dried and can be cooked during the dry season. Plate 8 show some dried indigenous vegetables.

Plate 8 Sun dried Corchorus

4.8 Consumption of certain vegetables

There are certain perceptions that men do not eat certain indigenous vegetables. The study found that the only indigenous vegetable that is not eaten by men is Ceratotheca sesamoides (Ibwina).
The major vegetables like pumpkin leaves, okra and cowpeas are all consumed by men. It was reported that 17%, 30% and 53% of respondents consumed cowpea leaves twice, once and nil in the past seven days before the survey. Therefore the study found out that men eat these traditional vegetables. This was reported by 61% of the male headed households and 88% of the female headed households. It was reported by 77% of the respondents that children eat and enjoy the traditional vegetables.

5. DISCUSSION

5.1 Consumption of indigenous vegetables and fruits

Consumption of vegetables in sub-Saharan African countries is low as compared to other countries like those in Asia, Latin America, World Health Organization (WHO) and Food and Agricultural Organization (FAO) recommend that a person should consume 400 grams of vegetable daily, or 146 kg per year, (Ruel, 2002). Indigenous fruits and vegetables have been verified to be superior nutritionally compared to exotic fruits and vegetables. They are good sources of vitamins, minerals and fibre. Consumption of indigenous vegetables observed in this study is therefore considered low.

Just as observed in the road side markets and household farm production, cowpea and pumpkin leaves, spider flower, gourds and jute mallow were the most popular indigenous vegetables. These vegetables were being consumed by more than 60% of the households. The other popular vegetable was Amaranthus, despite the fact that availability at local markets and at household farms was low. About 50.8% of the households reported having consumed it in the last 7 days preceding the survey.

The wide range of indigenous vegetables available in the area can enable rural households to meet their varied household needs for food, nutrition and medicines. These species are often part of the traditional diet and culture and the subject of a body of indigenous knowledge regarding their management and use, (Schreckenberg, et al, 2006). Despite this their consumption levels have been decreasing with time as more emphasis is directed towards the exotic vegetable varieties.

5.2 Nutrition

Indigenous vegetables play an important role in the African agricultural and nutritional systems. They are used in meals as side dishes, relish and/or for food variety and decoration.

The high protein and vitamin content in these vegetables can eliminate deficiencies amongst children, pregnant women and poor people living in rural areas. Since indigenous vegetables are cheaper and can replace meat in the diets of those who cannot afford to buy meat. Amaranthus leaves are rich in Calcium, Iron and vitamins A, B and C. Spider flower leaves have a mildly bitter taste but contain 5% protein, 6% carbohydrates and are high in Vitamin A and C, Calcium, Phosphorus and Iron. Cowpea leaves have high vitamin and protein content and they also fix nitrogen in soil. Nightshade leaves provides good levels of protein, Iron, Vitamin A, Iodine, Zinc, and Selenium (Lyatuu and Lebotse, 2010).

Due to the medicinal value, people suffering from diseases such as high blood pressure, HIV/AIDS, cancer, hypertension have been advised to consume indigenous leafy vegetables.

Table 5 shows the nutritive value of some selected indigenous and exotic vegetables popularly grown, consumed and marketed in the study area and many parts of the country.

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Protein (%)</th>
<th>Ca (mg)</th>
<th>Fe (mg)</th>
<th>B-Carotene (mg)</th>
<th>Vitamin C (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indigenous leafy vegetables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amaranthus</td>
<td>4.0</td>
<td>480</td>
<td>10.7</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>Spider plant</td>
<td>5.1</td>
<td>262</td>
<td>8.7</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>Cow pea</td>
<td>4.7</td>
<td>152</td>
<td>5.7</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>Nightshades</td>
<td>4.6</td>
<td>442</td>
<td>8.8</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>Jute mallow</td>
<td>4.5</td>
<td>360</td>
<td>6.4</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td><strong>Common Exotic Vegetables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kales</td>
<td>2.5</td>
<td>187</td>
<td>7.3</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>1.4</td>
<td>44</td>
<td>1.2</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Spinach</td>
<td>2.3</td>
<td>93</td>
<td>5.1</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

Source FAO and WHO

There was only one organisation in Hwange District that was encouraging the production and utilisation of indigenous vegetables. The organisation, Lubhancho House works in all rural communities in the district. The government extension agents have not been involved in these gardens. Whatever the communal farmers are doing has been passed down from generation to generation as a way of mitigating against times of food and vegetable shortages.

5.3 Current situation of marketing of indigenous vegetable by communal farmers

Informal markets are the main marketing channel of marketing though this channel has many disadvantages to both the seller and buyer. The seller may walk long distances without guaranteed buyers. Damages are also relatively higher in the event that the vegetables are not bought.

Farmers or producers get low profits due to high transportation costs and poor negotiation power. Poor or absence of market information systems and lack of promotion to articulate need and lobby for interest in the traditional vegetables industry contribute to low returns from sale of these vegetables.
Most vegetable production in winter is under irrigation. The dry season or winter gardens are a risk-avoidance strategy adopted by the rural households in order to meet their vegetable and nutritional needs of the households and community. Vegetable production in alluvial deposits and irrigation makes it possible to produce food, sell and raise income to buy other food and non food items. The winter gardens are thus a source of income, food security and livelihoods for all age groups and people in the communities since the gardens provide employment, food security and a source of income for investment into livestock. Seventeen per cent of respondents reported investing in small livestock. The small livestock are sold later to raise income for the household when the need arises. For anyone interested in rural women’s welfare, indigenous vegetable production offers an important entry point. These vegetables provide an important economic pillar upon which women’s rural livelihood is supported.

5.4 Drying

The drying process start from cleaning the vegetables, cutting, partial boiling in salt water and then placed in the sun. For the boiled indigenous vegetables, water is drained out before placing them on direct sunshine. This method leads to a loss in water soluble vitamins. Both these methods transform the leafy vegetables into dry products that have long shelf lives (Vorster et al., 2001). Solar driers can be used so that one produces more hygienic and clean dry vegetables. The technologies such as solar driers have not been used or introduced to the communal farmers or groups in Hwange District. The dried vegetables are consumed by the households during lean times. Thus the gardens make the households more food secure.

6. CONCLUSION AND RECOMMENDATIONS

Production and utilisation of indigenous vegetables is one of the fields that offer employment with higher profit returns, yet the starting capital required is lower than for most other agricultural investments.

Nutritionally, indigenous vegetables can provide widely accessible sources of essential vitamins particularly A, B, C and minerals (such as calcium and iron) as well as supplementary protein and calories. Market potential of indigenous vegetables is very large and has not been exploited. Current economic situation in the district and country provides opportunities for an expansion of indigenous vegetables production and marketing to enhance increased income of communal farmers. Moreover, there is a huge potential to commercialise indigenous vegetables, which currently are used mainly for subsistence in rural areas in either fresh or processed form. This sector is very important as it employs disadvantaged individuals and groups who cannot get formal employment anywhere else, except by growing these indigenous vegetables.

It has been recognised that an important factor in improving the viability of rural livelihoods in developing countries is the promotion of sustainable agriculture. As opposed to relying solely on cash crops, this can be more easily achieved through the promotion of the nutritious indigenous vegetables that can be cultivated and owned by communal farmers. These vegetables can grow under a wide range of environmental conditions, several species are more resistant to pests and diseases, are more nutritious and could most sustainably reduce micronutrient deficiencies in resource-poor communities, (Alphane, 2002). Therefore, through multi-functional and integrated farming systems, these indigenous plants can support environmental and social sustainability by providing food as well as promoting economic growth, (Akinnesesi et al, 2009). It is, therefore, important to promote their production and consumption. This can be done through sensitising a community’s own resource persons on the nutrition and adaptability of these products. The indigenous vegetables could also be incorporated in the ongoing food-based approaches of diversifying home and kitchen gardens. This could be further sustained by the agricultural sector in collaboration with nongovernmental organisations working together to ensure these plant species do not disappear and that community members have continued access to seeds and other planting materials.

6.1 Institutional Support

The study revealed that there is no support from government or other organisation in the training of farmers in indigenous vegetables. Training should be mainstreamed in the curricula in the training of extension personnel. This training can be cascaded down to the farming communities.

6.2 Research

There is a lot of research findings on the use and importance of indigenous vegetables. This information/material should be available to the end user/s through collaboration between research extension personnel and all other stakeholders. The generated knowledge and technology should be made available to the farmers. Researchers should continue collecting and recognising indigenous knowledge and improving on that knowledge. Extension should be strengthened with emphasis on linkage with research. Dissemination and sharing of available information through demonstration plots, agriculture shows, networking between institution, radio and magazine is essential.

6.3 Extension

Participatory Extension Approaches such as Farmer Field Schools (FFS) should be carried out to encourage exploratory learning at every stage of production of these indigenous vegetables. However, shortage of extension staff is a major challenge and researchers can assist in the training of extension personnel and the concept of “Training of Trainers” should be adopted.
6.4 Value Addition and Marketing

The farmers need to undergo training on the need of value addition to products for them to fetch better prices on the market.

References


