



INDIGENOUS KNOWLEDGE AND SUSTAINABLE DEVELOPMENT



Editors:
Tom Kwanya, Peter Matu

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23. The Role of Indigenous Knowledge of Dietary Foods in Enhancing Food Security in Kenya

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Abstract

Indigenous foods are associated with local people's cultures. They are diverse, comprising crops and domesticated animals or from wild habitats and are a good source of nutrients. However, diverse factors impede their production and use. Kenya's population was 47,564,300 people in November 2019. They face food insecurity due to climate change and abandonment of traditional methods of conserving food species and habitats. This exploratory study investigated the role of indigenous knowledge of dietary foods in enhancing food security in Kenya towards achieving agendas 1 and 2 of the sustainable development goals. The objectives were to establish the role of indigenous knowledge in identifying and using these foods, examine factors which impede the use of indigenous foods in Kenya, and make recommendations for their value addition. Thirty female participants aged 60 and above were purposefully selected based on their association with indigenous foods from production, gathering, processing, preservation and storage at their households and consumption. Data was collected through interviews with 28 respondents through snowballing and literature reviews. Data was thematically analysed and integrated with findings from the literature review. The findings indicate that indigenous knowledge of indigenous foods was acquired from mothers, grandmothers, and relatives, as well as individual experiences of eating indigenous foods at home over time. It was used in the identification and selection of indigenous foods by communities to enhance food security, and the use of indigenous foods enhances food security in Kenya towards achieving agendas 1 and 2 of the sustainable development goals.

Keywords: *Culture, food culture, traditional foods, sustainable development goals*

1 Introduction

Indigenous knowledge (IK) refers to accumulated knowledge of the daily activities of a given people or society. Demi (2016) avers that IK is a body of cumulative knowledge practices and beliefs, evolved by adaptive process and handed down through generations by cultural transmission. Indigenous people possess immense knowledge of their environment based on centuries of living close to nature, including understanding the properties of plants and animals. This knowledge is primarily transmitted through socialisation, particularly interpersonal relations within family or community members, and is learned along gender lines. Thus, the use of indigenous knowledge helps communities in the understanding of indigenous food culture. Food security has four pillars: availability, accessibility, utilisation and stability. It is achieved when all people at all times have regular and permanent physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Government of Kenya, 2017).

The Constitution of Kenya 2010 states that Parliament shall enact legislation to recognise and protect the ownership of indigenous seeds and plant varieties, their genetic and diverse characteristics and their use by communities in Kenya (Government of Kenya, 2010, p.27).

The knowledge transmitted orally from generation to generation is unique to a particular community and forms part of their cultural identity and pride (Chepchirchir et al., 2019). Community cuisine reflects the history, lifestyle, values, and beliefs of a community that has been with man since interacting with nature as an agricultural community before moving to industrial, information society, and knowledge economies.

In Kenya, various research institutions such as the National Museums of Kenya (NMK) and Kenya Agricultural and Livestock Research Organisation (KALRO) have been involved in strategies to safeguard the loss of these essential indigenous foods from the Kenyan diet for years. Kibe (2016) asserts that KALRO increased its focus on indigenous crops such as sorghum, millet, and pigeon peas. Their activities involve researching and documenting information on indigenous foods, including food diversity studies, farming systems, utilisation, promotion and public education. NMK, through the Kenya Resource Centre for Indigenous Knowledge (KENRIK), has documented and published the traditional foodways of Isukha and Pokot communities under the UNESCO programme for safeguarding intangible cultural heritage, including How to grow and use traditional vegetables with support from the United Kingdom, Department for International Development (DFID). On a visit to secondary schools with a team from the Ministry of Agriculture in Nzambani District, Maundu (2010) discussed the possibility of secondary schools growing local vegetables and introducing them into school meals. Food plant species and varieties have been documented, and a proportion have been planted and domesticated. The indigenous cultivars are kept at the genebank for long-term conservation. IK on recipes and nutrition has been shared with the public in an endeavour to increase the consumption of these valuable foods. For example, in Kenya, Amaica Restaurant is one of the indigenous restaurants in Nairobi that promotes the use of indigenous dietary foods through traditional African experience based on culinary specialists unique to different communities in Kenya. The restaurant provides customers with authentic African food around a traditional African ambience, replicated in an urban setup. The food is prepared using traditional methods, which ensures a healthy diet to preserve traditional African history and culture that can be transferred to the current and the next generations. The food preparation methods are preserved electronically and accessible on the Amaica Restaurant website. Neema Restaurant in Kitui also prepares traditional vegetables such as cowpeas and African nightshade. They promote local farmers by buying fresh vegetables to make African dishes.

1.1 Indigenous vegetables

Indigenous vegetables contribute a significant source of food. They are traditionally gathered from inhabited lands and form a more significant part of the rural communities' daily diet, mostly during rainy seasons and along the wetlands during drought. Gido et al. (2016) observed that Kenya, like the rest of Africa, has a variety of vegetables, such as mushrooms originating from Africa, which are cultivated in rural areas, marketed and consumed in both rural and urban Kenya, and the rest of Africa. They include African nightshade, cowpeas, amaranth, spider plant, African kale, African eggplant, jute mallow, cassava leaves, pumpkin leaves and slender leaf, among others. One's cultural background influences the consumption of different varieties of vegetables. Mbhenyane (2017) asserts that indigenous foods and dietary diversity are vital to food and nutrition security. They can be a powerful source of nutrients that are better for health as they exacerbate micronutrient deficiencies.

Regarding production and sustainability, local seeds are used for re-planting and are usually intercropped with maize. Kabede and Bokelmann (2017) concur that they are usually grown

in backyards or home gardens or intercropped with other crops. Indigenous people eat indigenous and traditional foods that grow in the wild as a coping strategy during drought and periods of food shortage or hard times to contribute to dietary diversity and food security. Maundu (1994) affirmed that the Ng'iketootok of Turkana use wild vegetables during the rainy season and fruits during the dry season. Vegetables such as mushrooms naturally grow after the staple food crops are harvested. Communities recognise them for their contribution to food security and income generation to ensure essential micronutrients are acquired in addition to curing and preventing humans against chronic diseases (Gido et al., 2016). Table 1 shows the nutritional values of some of the indigenous vegetables.

Table 1: Nutrient content of commonly eaten African indigenous vegetables (mg/100g)

| Indigenous vegetable | Ca | P | Fe | Mg | Na | K | Vitamin C |
|--|----------|--------|-------|--------|--------|--------|-----------|
| Amaranthus (Mchicha) | 323.70 | 89.00 | 7.50 | 122.00 | 230.00 | 341.00 | 50.00 |
| <i>Solanum americanum</i> or Nightshade (Osuga) | 100.47 | 62.50 | 8.63 | 461.00 | 74.22 | 100.00 | 54.00 |
| <i>Crotalaria ochroleuca</i> or Slender leaf (Mitoo) | 1,234.40 | 11.25 | 28.13 | 155.00 | 22.66 | 162.50 | - |
| Cowpea (Kunde) | 155.00 | 14.00 | 1.90 | 37.00 | 23.00 | 358.00 | 000 |
| <i>Corchorus olitorius</i> (Mrenda) | 207.00 | 88.00 | 6.30 | 30.00 | 18.00 | 283.00 | 37.00 |
| <i>Basella alba</i> or vine spinach (Nderema) | 231.50 | 155.00 | 1.026 | 46.45 | 20.31 | 125.00 | 80.00 |
| <i>Cleome gynandra</i> or Spider plant leaves (Saga) | 1,484.40 | 48.95 | 29.67 | 47.50 | 18.75 | 75.00 | - |

Sources: FAO/GOK (2018); Sehmi (1993)

1.2 Other foods

According to the Food and Agricultural Organization of the United Nations (FAO, 2009), indigenous food systems and farming practices encompass fishing, pastoralism, foraging and forestry, as they all depend on existing knowledge and practices that help to ensure food and agricultural diversity, valuable landscape and seascape features, livelihoods and food security. About 7,000 species of plants have been cultivated since humans adopted farming, out of which only 30 crops provide dietary needs (FAO, 2009). They include wheat, rice and maize, while out of 15,000 identified species of mammals and birds, only 30 to 40 have been domesticated for food production. These include cattle, goats, sheep, buffalo and chickens. Indigenous food system puts emphasis on crop diversity, and there is nothing like authentic human foods; what constitutes food to one indigenous tribe could be a taboo in another tribe or used as a pet for some or an object of worship to others (Demi, 2014).

Kenya experiences a 20-30% deficit in staple foods every year (Government of Kenya, 2017b), a mismatch with the increase in population growth. Indigenous foods, particularly vegetables, contain adequate nutrients that have medicinal and nutritional benefits and are culturally acceptable to most communities. However, their diversity is declining due to modern farming systems, yet their commercial value is evident, while their frequent intake prevents communities from malnutrition and chronic diseases. Waithaka (2011) asserted that one of the challenges facing Kenya is the reliance by many farmers on indigenous knowledge to achieve food security for her growing population and the reduction in numbers of those holding indigenous knowledge due to death. This statement supports the African proverb, "When an old man dies,

a library burns to the ground". IK has largely remained fragmented alongside the unique nature of the settings where the knowledge is being applied (Chanza & Musakwa, 2022). Thus, there is a need for increased dietary awareness and sharing of wisdom and experience that ensures increased growth and use of indigenous foods in enhancing food security in Kenya towards achieving agendas 1 and 2 of the sustainable development goals (SDGs).

2 Literature review

Studies have shown that people learn their culture by consuming traditional foods. Efforts by the Government of Kenya through local institutions to revitalise indigenous food production and use have been ongoing for the last 25 years. Kenya Resource Centre for Indigenous Knowledge, based at the National Museums of Kenya, has been involved in the revitalisation of traditional foods through the Indigenous Foods Programme and the African leafy vegetables Programme. However, diverse factors that impede the production and use of these foods include negative attitudes, inaccessibility, old-fashioned habits, and poor man's food (Mbhenyane, 2017). Kenya's population, which stood at 47,564,300 people in November 2019, faces food insecurity due to climate change and diverse societies, leading to the abandonment of traditional methods of conserving food species and their habitats, resulting in genetic erosion. Indigenous knowledge transfers and use are weak owing to the rate at which knowledge holders are dying, the negative attitude of the young generation towards the consumption of indigenous foods

2.1 Role of indigenous knowledge in the identification and use of indigenous foods

Ngugi (1999) asserts that indigenous knowledge is the basis for natural resource management and use by local communities, which has helped them in the selection of food, medicine, clothing, shelter and other necessities in their lives. Communities use IK at their local level as the basis of decision-making about vital activities in which food security is included (Oniang'o et al., 2004). Indigenous foods form the basis of survival of the rural community (Ibnouf, 2012). UNESCO World Forum (2019) asserts that food has created, formed and shaped the relationship between man and his environment. The knowledge and experiences of indigenous communities in food security systems deserve some attention (Chanza & Musakwa, 2022). Indigenous people and local communities depend on natural resources such as plants for their welfare and survival (Kariuki et al., 2018). They use intuitive indigenous knowledge to identify processes and use plants as food. Their environment has influenced their knowledge of food plants as they adapt to use what is available for dietary diversity. The continued use of wild and cultivated plants is essential to food security and varied diets as they enhance dietary diversity. Nutritional status improves food flavour and increases their consumption, primarily by children who are prone to malnutrition. Kariuki (2018) asserts that throughout the year, many traditional and rural societies rely heavily on edible wild plants for energy and micronutrients. IK helps in the understanding of indigenous food systems and culture.

2.2 Food and culture

Indigenous foods are those associated with people's cultures and have existed for centuries. Mbhenyane (2017) affirms that they grow spontaneously in natural ecosystems or are cultivated and have served humanity as food and medicine for generations. Additionally, these foods are an important cultural heritage that must be preserved, as the food crops are crucial contributors to the diet by providing essential micronutrients and health benefits. They comprise a variety of crops from cultivated lands or wild habitats such as forests. They encompass vegetables,

fruits, roots and tubers, cereals, edible insects (termites, crickets, caterpillars and locusts), birds, and mushrooms. Forest foods include wild fruits, wild vegetables, honey, wild roots and tubers. Chanza and Musakwa (2022) assert that most households collect indigenous fruits as a coping strategy to deal with drought and avert household food insecurity. They help maintain household nutrition during lean seasons to complement seasonal staple crops in low agricultural production during periods of climate change, induced vulnerability and when food availability gaps occur (Vinceti et al., 2013). In addition, indigenous people have developed knowledge systems, practices, and decision-making skills for identifying, preparing, and sustainably managing wild foods in forests and farms. The knowledge of foods includes established processes of food gathering and collection, preparation and ways of service as part of different communities' cultural heritage. Traditional foods and food systems are part of indigenous knowledge. They include identification, varieties, food taboos and customs, feeding regimes, recipes and food preservation methods. Demi (2016) affirms that indigenous food culture describes the mode of food production, distribution, consumption and re-use of by-products of foods by indigenous people. It emphasises food as an ethnic marker and the construction of identities and cultures. In the process of people learning to consume their traditional foods, they also learn their cultural identity.

2.3 Factors which impede the use of indigenous dietary foods in Kenya

Dietary deficiencies and food insecurity are partially a result of decreasing diversity in traditional foods (diets). Food culture can solve the overlapping challenges of population growth and climate change. It provides inspiration to tackle challenges related to sustainable agricultural and fishery practices, education for behavioural changes, and food security.

There is a dearth of literature on the role of indigenous knowledge in enhancing food security. Thus, this study focused on using indigenous foods to improve health through the consumption of various traditional foods, enhancing food security and sustainable development in Kenya.

3 Methodology

The study was designed as exploratory research to investigate the role of indigenous knowledge of dietary foods in enhancing food security in Kenya. This study was based on a population of 28 women aged 60 years and above, comprising 26 who retired from NMK and two women research scientists still working because, as scientists, they retire at age 70. The women were chosen to participate in this study because they were assumed to have sourced indigenous foods from their home gardens, market, or demonstration garden at KENRIK based at NMK when this research was conducted. They also participated because of their role in using indigenous foods, including production, gathering, processing, preservation, and storage at their homes. The targeted population of active vegetable harvesters was 30, although only 28 participated in the research, with one of them being a former staff member at KENRIK. The objectives of the study were to establish the role of indigenous knowledge in the identification and use of indigenous foods in enhancing food security in Kenya towards achieving SDG 1 and 2, examine factors which impede the use of indigenous dietary foods in Kenya, and make recommendations. The study purposefully selected 28 active women consumers of such foods as cereals, roots, tubers, fruits and vegetables. Data was collected through telephone interviews with 28 key informants and documentary analysis of primary sources (mainly reports and conference proceedings) and secondary sources (KENRIK website and other published works) for sharing results of previous related studies

on indigenous foods with the audience. Qualitative interview data was thematically analysed and integrated with findings from the literature review.

4 Findings and discussions

The findings of this study, as they are discussed, are based on the study's objectives and results from the literature review and telephone interviews conducted.

4.1 Role of indigenous knowledge in the identification of indigenous dietary foods

The study established that knowledge transfer in most Kenyan communities is done according to gender type. For example, the girl child interacts with the mother, while the boy interacts with the father. The knowledge on identification and preparation of indigenous foods was learned from mothers, grandmothers, and female relatives, as well as from the experience of eating them at home over time while growing up. One respondent eluded their knowledge of identification due to working at KENRIK. Their long experience and observation of what was collected and how it was prepared ensured that the respondent learnt how to identify and collect indigenous foods from their farms or markets. The following are the excerpts from the majority of the respondents:

"My mother taught me which foodstuff to collect and also how to prepare it" [Indknow 3]

"I have been eating these indigenous foods since my childhood for substance" [Indknow 13]

"It is staple food in my community" [Indknow 15]

"I observed what the researchers did when I was working at KENRIK and accompanied the researchers to the field" [Indknow 25]

A study on wild and medicinal food plants in Loita, Narok County by Kariuki et al. (2018) found that local communities use their intuitive indigenous knowledge to identify, collect, process and use food plants. Communities identified and set aside some traditional conservation cultural sites in areas where vital wild and medicinal food plant species naturally cropped up. Such areas are considered sacred, and communities encourage sustainable harvesting of wild plant resources as part of biodiversity conservation, as this ensures food security.

4.2 Use of indigenous foods in enhancing food security in Kenya

The study established that food found in the wild could make supplementary, seasonal and emergency contributions to household food supplies, particularly during the drifting periods of either too much rain accompanied by floods that sweep away crops or drought that leaves households with nothing but the sun to bath. Wild plants provide essential sources of food and fodder for domestic animals during hunger or peak planting seasons when people have less time for food preparation. Only two of the ten respondents said they had used wild amaranths (terere) and vine spinach (nderema). According to the Government of South Africa (2014), dietary diversity is vital to food and nutrition security. Thus, indigenous food is an important cultural heritage that must be preserved. In Kenya, dietary diversity is critical to achieving human development goals, and it is essential to ensure the availability of diverse, wholesome, and nutritious foods for meaningful contribution to socio-economic development (Government of Kenya, 2017a). However, the Kenya Food Security Act does not mention the role of indigenous knowledge in dietary foods towards achieving food and nutritional security.

In terms of socio-economic sustainability, grains of wild food plants such as maize, millet and sorghum were found to provide other products like flour, which can be gathered and sold. The study established that these grains are also used because of their nutritional benefits and sustenance staple foods, including for medicinal purposes. Indigenous foods in the category of roots, including tubers, starchy fruits, cassava, sweet potatoes, bananas, and yams (*Dioscorea* spp.), are used due to their medicinal value and as sustenance staple and famine foods. They can withstand harsh climate conditions, mainly when other foods are scarce or unavailable.

The study found that leafy and fruity vegetables such as amaranth (*amaranthus* spp.), cowpeas (*Vigna unguiculata*), spider plant (*Cleome gynandra*), African nightshade (*Solanum* species), and jute mallow (*Corchorus olitorius*) among others can be used as sauce or vegetable. This study established that the primary sources of these vegetables were home farms and markets. In the rural setup, these vegetables are planted on their home farms. Amaranthus and vine spinach (*basella alba*) or 'nderema' as commonly known, are also obtainable from the wild. A minority of the respondents got some of the vegetables from the Kenya Resource Centre for Indigenous Knowledge demonstration garden based at the National Museums of Kenya. In contrast, five respondents attested to getting them from friends. When asked to state reasons for the consumption of these indigenous vegetables, all the respondents said that they consume them for:

“sustenance staple food” [Indknow 17]

“Nutritional benefit and medicinal value” [Indknow 9]

In addition, two respondents said they also plant them because of:

“economic gains they get from selling them” [Indknow 28]

Traditional plants such as chilli pepper (*Capsicum annum*) and lemon grass (*Cymbopogon citratus*) have been used as flavouring and additives for food tastes in the oil category.

Seeds from shea butternut (*Butyrospermum paradoxum*) and sim sim (sesame), among others, can be used to produce oil, food and drink. Traditionally, potash is used as a substitute for salt or to soften and shorten cooking time for leafy vegetables. Although products of all these wild foods can be sold for economic benefits, the study found that only two respondents cultivated them for economic gains.

Mbhenyane (2017) asserts that indigenous foods and dietary diversity are better for health since they are potent sources of nutrients which play a significant role in enhancing quality diets, improving food and nutrition security and that Kenya is among the African countries that use 800 species at community level, thus demonstrating the global use of indigenous edible wild plant species. In their study on food security on indigenous vegetables, Kabede and Bokelmann (2017) found that the common indigenous vegetables include cowpeas (*Vigna unguiculata*), Amaranthus, Spider plant (*Cleome gynandra*), African nightshade (*Solanum* species) and Ethiopian kale (*Brassica carinata* and mushroom among others. The production of these vegetables was sustainable and could ease food security since most products used local seeds, which they intercropped with Maize without the requirement of irrigation.

This study found that African indigenous vegetables (AIVs) provide energy and protein for both children and the elderly, including the sick. Kabede and Bokelmann (2017) indicated that they are essential micronutrient sources, including vitamins A and C, iron, calcium, magnesium, proteins, and antioxidants required for average growth and health. The leading producers of African indigenous vegetables are women who use them as sources of income by selling them in nearby markets, thus enhancing their purchasing power and food production capacity, which

directly impacts household nutrition, health and food security (Kabede & Bokelmann, 2017). Indigenous starchy foods include sweet potatoes, finger millet, sorghum, green bananas, maize and cassava, among others, which are energy foods. They are mainly used as thin 'uji' or thick stiff porridge 'ugali' (cornmeal).

4.3 Factors which impede the use of dietary foods

The study established that consumer attitude accounts for the underutilisation of indigenous foods and the notion of being born and bred in the town. It is the strongest predictor of consumer intention to buy African foods in Kenya (Mbhenyane, 2017). Additionally, most indigenous foods are planted on small scales and intercropped with other crops, thus causing limited harvests. This portrays the limited plots or size of land set aside for the production or farming of indigenous foods, including vegetables, which play a significant role not only in the health of communities from both rural and urban settings but they are also a source of income for the farmers and an avenue for overall food security. There is optimal cultivation and production of indigenous vegetables as more land is converted into commercial agricultural production and real estate. For example, the case of sugarcane farming in Mumias at the expense of indigenous vegetables has eroded due to environmental, political and socio-economic factors, which include increased population. This not only erodes the indigenous knowledge of their cultivation but also means the insufficient supply of indigenous foods during crop development, reduced cultivation, processing and consumption of indigenous foods, while poverty levels are not reducing. Thus, the role of indigenous foods in food security among local and urban households is diminishing.

The adoption of highly improved varieties of commercial crops due to globalisation threatens indigenous vegetables, whose loss is associated with the loss of indigenous knowledge on their cultivation, use and conservation of indigenous vegetables.

The study found that using language for local names also creates a barrier to utilising dietary foods, particularly for those who do not understand and speak the language. Using local names for different or the same food can also confuse the younger generation, particularly those in urban areas.

This study provides insights into beneficial indigenous foods that help improve health through the consumption of a variety of traditional foods and the use of indigenous knowledge in the identification and selection of indigenous dietary foods by communities to enhance food security and sustainable development in Kenya.

5 Conclusions

Indigenous foods are expensive in urban areas where they are bought from markets, compared to cabbage and other related vegetables, which are safe, nutritious foods all year round, thus contributing to the diversification of diets for rural and urban populations. The use of IK is crucial to survival, especially in identifying and preparing indigenous foods, and enhances food security during lean seasons. It is an effective way of solving food shortages, supply and food security. In most African communities, indigenous knowledge was imparted according to gender roles. Thus, indigenous knowledge of dietary foods, particularly plant foods, was mainly acquired from mothers, partially through grandmothers and relatives. Indigenous foods are consumed for sustenance and improved livelihoods from the nutrients and reduced poverty levels resulting from income from small-scale sales. Promoting indigenous foods can encourage behaviour change towards sustainable consumption, waste reduction and lifestyle practices as part of the global

strategies to achieve the SDGs. The findings add new insights to the existing body of knowledge.

6 Recommendations

This study recommends that:

- The government should put more recognition on the role of indigenous knowledge on indigenous foods, particularly in reviewing and developing national policies to promote their diversity, growth and consumption, including commercialisation as a means towards preservation of Kenya's intangible cultural heritage and income generation for sustainable development and the achievement of agendas 1 and 2 of the sustainable development goals.
- The government should promote indigenous food diversity to raise awareness and encourage behavioural change through education and workshops to ensure sustainable consumption, waste reduction, and lifestyle practices as part of the global strategies to achieve the SDGs.

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