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The Utilization of Traditional and Indigenous Foods and Seeds in Uganda

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Abstract There is an immutable need to preserve and utilize the genetic materials of indigenous crops and plants for nutrition and preservation of genetic diversity. The scientific community needs to support farmers in the preservation of indigenous foods and seed. African Rural University (ARU) participated in indigenous seed and food fairs to collect data while showcasing the preservation, preparation, value addition and consumption of local seeds and foods in Uganda. The purpose of the traditional seed and food fair events was to demonstrate both the existence and resilience of African culture in food and nutrition through participation of farmers and ARU students. There were three series of such fairs at local (10 groups), regional (49 groups) and national levels (30 groups). ARU research team and students participated in all the fairs as both exhibitors and researchers. Results indicate that exhibitors showcased traditional/indigenous foods both in raw and cooked forms. There is still a wide variety of beneficial indigenous and traditional foods in Uganda. It may be helpful to establish a complete traditional food data system for all ethnic groups in Uganda and prepare recipes for preparation of their traditional dishes, establish botanical gardens for conservation, earth markets and more regular food and seed fairs for farmers to interact and exchange the planting materials.

Keywords: *indigenous foods, conservation, consumption, propagation*

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1. Introduction

The Government of Uganda through the Vision 2040 envisages to have all citizens attain middle income status by 2020 [1]. Uganda's economy is, however, largely dependent on agriculture as its mainstay [2]. The World Bank report of 2018 says that the agriculture sector remains critical to Uganda's economy, in that it employs approximately 69% of the labour force, 77% of who are women, and 63% are youth, mostly residing in the rural areas. However, according to National Seed Policy document of Uganda, up to 85% of the seed which Ugandan farmers plant is through the informal seed sector [3]. A seed is any propagative material, plants and parts of plants intended for propagation and multiplication of a variety. Indigenous and traditional foods and seeds are getting extinct from the ecosystems yet the Sub Saharan Africa is still faced with food and nutrition insecurity.

Uganda faces malnutrition i.e. under nutrition among the urban poor and over nutrition – obesity among the urban rich [4,5]. This is because African diets are gradually being replaced with more convenient and conventional food alternatives [4]. The conventional foods include; fatty meats, highly sugary, salty and oily street and supermarket foods, and exotic vegetables and cereals [4]. It has been noted in many studies that reduced dietary diversity has serious effects on the nutrition and health of rural and urban populations. Dietary diversification is widely accepted as a cost-effective and sustainable way of improving malnutrition. Neglected and underutilized food resources constitute the bedrock of the diversity in traditional and indigenous food systems of developing countries [6,7,8].

Consumption of indigenous foods changes as people move from villages to towns. Indigenous foods are consumed in fresh form [4] and these include; small grain cereals, dark green leafy vegetables, tropical fruits, legumes, starchy stem, wild yams, root tubers and a range of edible insects [4,9]. The consumption of indigenous foods is, however, constrained by the underdeveloped production and marketing systems, inadequate awareness of benefits, limited processing and cultural acceptance [10].

The indigenous/traditional plants are propagated by both sexual (seed) and asexual (vegetative) methods [11]. Vegetative propagation methods include; use of cuttings, splits, rhizomes, suckers, crowns, slips, tubers, bulbs, vines, corms and runners [11,12,13,14].

Traditional and indigenous foods were previously preferred in African diets for they are less deleterious to the environment and address cultural needs and preserve the cultural heritage of local communities. Indigenous people living in rural areas possess food resources that are usually not completely understood by the contemporary agriculture and health sectors. This means that the usual processes of nutrition assessment and identification of food-based strategies for micronutrient promotion cannot take these resources into full consideration for planning.

The indigenous food and seeds have traditionally been a significant contributor to food security, nutrition and incomes for smallholder farmers in many parts of Uganda and East Africa at large [15]. They have an advantage over exotic crops. They are more resilient to harsh environmental conditions, highly medicinal and nutrient rich [4,16,17]. They are food and sources of income coupled with many other socio-cultural benefits [10,18], [19].

Owing to these benefits, a deliberate effort has to be taken by researchers, academics and conservationists to preserve and multiply these indigenous and traditional seed materials. There is an immutable need to preserve and utilize the genetic materials of indigenous crops and plants for nutrition and preservation of genetic diversity [20]. This is because the indigenous seed of grain, fruits, herbs, bulbs and stems are currently disappearing at an alarming rate. The traditional seed bank is disappearing among many communities in Uganda. These have been substituted with hybrid and now genetically modified crop and animal materials that are readily available in farm shops. Several Ugandans can barely remember their indigenous and traditional food and seed varieties! Such is the decline of our indigenous and traditional food and seed systems that many can barely be traced within communities despite the numerous nutritional, medicinal, social and economic benefits they have. Nonetheless, there are communities which are still resilient; they have preserved the cultural and traditional practices amidst modernization [21,22]. If the research and scientific community of African academics does not act now, the local communities may lose the battle of sustainably preserving these indigenous plant materials thus impairing the nutrition and health of bona fide citizens.

There is thus need to consider the entire value chain of production and distribution of indigenous and traditional seeds of selected plants focusing on local landraces that are on the verge of extinction yet carry very important genes and nutrients. Domestication of endangered food and medicinal wild plants is very important, now that natural ecosystems (habitats e.g. forests, swamps, wetlands, mountains) are getting degraded by the increasing population and urbanization. Domestication of these plants is possible through the creation of regional arboretums, botanical gardens, and community seed banks in Uganda following the agro-ecological zones and practices.

Uganda Rural Development and Training Programme (URDT) and African Rural University (ARU) have thus embarked on a campaign to restore the utilization and conservation of indigenous and traditional foods among communities in Uganda. ARU was started by URDT and is one of Uganda's newest universities and among the first non-denominational all-women rural universities in Africa. The University (ARU) was founded to institutionalize and deepen the home-grown methodology for human and rural development, based on the Visionary Approach and the principles of Systems Thinking [23]. ARU puts its emphasis on practical learning of local interventions mainly through community engagement by students and their mentors. The mentors are University Academic Staff and Traditional Wisdom Specialists (TWS) – 'auxiliary professors. ARU produces visionary leaders – Epicenter Managers who are recruited by URDT – the mother organization, to work in selected villages to catalyze community driven integrated development [24].

URDT and ARU participated in community/local, regional and national food and seed fairs, and the documentation of indigenous and traditional foods in Uganda. The main intention was to support the realization of Sustainable Development Goal (SDG) #2 to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture. The purpose of this study was, therefore, to profile the propagation, production (growing), conservation and utilization of indigenous and traditional foods in Uganda through local, regional and national food and seed fair events. The study results are expected to revamp the propagation, growing, utilization and conservation of the indigenous and traditional foods. The data collected will support initiatives to ensure that farmers in the community adapt to self-sustained agro-ecological systems to end hunger, reduce all forms of malnutrition, and protect agro-biodiversity in Uganda.

2. Methodology

The study was conducted through a participatory approach. Students and researchers at ARU participated in local/community, regional and national indigenous food and seed fair events (Figure 1 & Figure 2). The events were held in October 2019 at the University campus in Kagadi; Fort Portal Town in Kabarole district; and at Uganda Manufacturers Association (UMA) conference Hall and Parking area, in Kampala city, Uganda respectively.

During all the three events, ARU research team and students exhibited and documented all the other indigenous seeds and foods brought by other exhibitors. Data collection focused on the nutritional values, preservation, preparation, value addition and consumption, utilization and processing of indigenous food plants in Uganda.

2.1. The Local, Regional and National Food and Seed Fairs

The community (local) indigenous seed and food fair event took place at ARU and it was organized by URDT and ARU at the latter's Multipurpose Hall, for one day on 5th October, 2019. Participants (exhibitors) included researchers, students and TWS from ARU, URDT girls' school students, community members (farmers), Epicenter managers and URDT staff. There were ten (10) groups of exhibitors composed of the above participant categories. There was a panel discussion where the ARU researchers

engaged the judges on preparation, conservation, consumption and nutritional benefits of indigenous foods from different parts of Uganda. The ARU research assistant and researcher conducted in-depth interviews with the ten exhibitors on the same variables as above (Figure 1). Other exhibitors had information regarding their displayed food items written down on info sheets. They voluntarily provided copies of such to the researchers. The nutritional content data was obtained from online sources (www. healthline.com, and www.glnc.org.au). The regional two-day event was held in Fort portal, Kabarole district between 11 - 12th October, 2019 (Figure 2).

Figure 1. ARU researcher interviews one of the exhibitors during the community event at ARU in Kagadi District, Uganda

Figure 2. The ARU researcher attending to a client at the regional event in Fort Portal, Kabarole District, Uganda

There were 49 groups of exhibitors at the regional event, each operating one or more exhibition stalls. Farmers exhibited different types of indigenous foods and seeds. The ARU researchers and students also ran an exhibition stall but also moved to all the 49 stalls and interacted with the farmers/exhibitors regarding the identity, propagation, processing and nutritional benefits of the exhibited materials. Data was collected using printed data sheets (Table 1). During the event, ARU research team documented all the exhibited indigenous seeds and foods focusing on the same variables as above. The national event was held at UMA conference hall and parking area on 25th October, 2019. Farmers exhibited different types of indigenous foods and seeds from different regions and ethnicities of Uganda. The same methods as for the regional event were also used (Table 1).

2.2. Data Collection Procedure

Data collectors moved through the exhibition area, observed and interviewed (In-depth Interviews) all exhibitors in their stalls. Only indigenous foods and seeds brought to the community (local), regional and national food fair events were enumerated. The data tools used focused on the following variables (Table 1).

Table 1. Key Variables in the Data Collection Tool

Indigenous fresh foods	Indigenous seeds
Ethnic group/tribe	Ethnic group/tribe
Name of traditional foods	Name of local seed
Recipe (preparation)	How seed is propagated
Ingredients added	How seed is processed
Equipment / utensils used	How seed is stored
Benefits obtained	Products obtained from seed

2.3. Data Analysis

Data was mainly qualitative and was analyzed inductively and manually using content analysis in Microsoft Word and Excel computer programs. It was condensed into meaning units and then coded. Themes were identified and organized into meaningful categories. Data from the local, regional and national food and seed fair events was merged, putting similar responses together. 8

3. Results and Discussion

3.1. The Indigenous Foods Brought for the Seed and Food Fair Exhibition

The local event attracted 19 different foods, nine local (indigenous) dishes (i.e. *ensande*, *empogora*, *enyama*, *eshabwe*, *firinda*, *nyamusiri*, *oburo*, *mubumbo* and *omukaro)* and seeds by six tribes (Batooro, Banyoro, Baganda, Banyankole, Bakiga and Iteso) within Kagadi district, Western Uganda. Most local foods in the local event were relishes and sauces e.g. *firinda* for the Batooro, *eshabwe* for the Banyankole, *omukaro* for Banyoro etc. These relishes and sauces are used to supplement the main dishes which mainly were *akaro* (mingled cassava and millet), *mubumbo* (mashed green bananas (matooke)-usually steamed), and *empogora* (steamed unpeeled banana fingers) (Table 2). These were prepared following the summarized recipes in Table 2 using traditional equipment e.g. clay pots. The raw foods and seeds at the local event were mainly cereals and fruits e.g. beans, millets, and sorghum and fruits like guava, green passion fruits, etc. There were also medicinal beverages (herbs) mixed with hot drinks to increase the aroma and also treat several ailments. Some of the outstanding exhibitors were supported to proceed to the regional food and seed fair event.

The regional event attracted the highest diversity of traditional foods. There were 63 different foods and seed types by five tribes i.e. Batooro, Banyoro, Banyankole, Bakiga and Bakonzo) in the Rwenzori region, making 49 groups. The indigenous foods at the regional event were also mainly sauces e.g. pigeon pea sauce, oyster nuts etc. There were also fruits e.g. *amatehe* (*Aframomum angustifolium*), *entuutu* (goose berries), tree tomato and beverages/herbs e.g. moringa leaves, powdered avocado seeds, and rosemary plants. There were also preservatives mainly chili, and tobacco leaves (Figure 4).

Figure 3. Some of the indigenous foods brought at the regional event (the English and botanical names are in Table 2)

The national event attracted 36 different foods and seeds (Figure 3 & Figure 4) by only 11 tribes within Uganda. These include; Banyoro, Batooro, Bagisu, Acholi, Baganda, Basoga, Bagwere, Langi, Bakonzo, Kumam, and Iteso. Some of the items at regional and national events were also at local event e.g. sorghum, local beans, oyster nuts, tree tomato, bitter berries. We had mainly fruits and cereals plus oil plants like pea nuts, sim-sim, sun flower. At the national event foods were mainly sauces and more food items were added e.g. *malewa* (smoked bamboo shoots) from eastern Uganda, oxalic, *malakwang* (*Hibiscus sabdariffa*) from the northern Uganda. There were fruits eaten fresh and herbal beverages taken with tea and foods for the main meal e.g. climbing yam. Forty-one foods were enumerated and these were brought by different tribes of Uganda.

Figure 4. Indigenous seeds and foods exhibited at the national event

Figure 5. Indigenous seeds and foods exhibited at the regional event

Despite the fact that local foods have been replaced with western alternatives like maize, wheat, rice, exotic vegetables like cabbages [4] the African indigenous foods are still existing. In the urban communities, diets are now dominated by exotic foods like fatty meats, sugary and salty foods. The African indigenous foods reported in other researches include; small grain cereals, dark green leafy vegetables, tropical fruits, legumes, starchy stem, wild yams and root tubers. These are, however, slowly disappearing from the agroecosystems in Uganda. Fresh fruits and vegetables including legumes, root tubers are also becoming scarce. There are also legumes that include; marama beans in South Africa, cowpeas, Bambara, ground nuts, chick peas. The oil seeds are mainly sesame oil seed. Cereals are sorghum, pearl millet, and finger millet.

There were no edible insects brought to the exhibitions yet traditional foods in East Africa also include edible insects. There are 1,900 edible insect species in east Africa and these include; termites, grasshoppers, crickets, ants, mayflies [9]. The indigenous vegetables in Tanzania include African night shade, African eggplant, amaranth, okra, sweet potato leaves, pumpkin leaves, baobab, sesame, black jack, cassava leaves, jute mallow, and cowpeas [8]. In Uganda, indigenous foods, generally, include; vegetables e.g. black night shade (*enswiga*), fruits e.g. wild plums, gooseberries, A*framomum anguistifula* (*amatehe*), *Physalis peruviana* (*entuutu*) root tubers e.g. African yams, pulses e.g. cowpeas and cereals. Others include bean leaves eaten as sauce and medicine, pumpkin leaves and fruits eaten as both sauce and main dish. The calabash is eaten when young but used for serving local drinks when fully grown and dried [10]. In Uganda we have grains – finger millet, and sorghum, staples – green banana, dried bamboo shoots (*malewa*), African bitter yams (*balugu*), vegetables and pulses like ground nuts, pumpkin, cowpeas, leafy vegs e.g. amaranthus, tricolor spinach, spider weed, cocoyam leaves, and roselle. Condiments and spices include clarified butter (ghee); animals are Mubende goat, Ankole long-horned cattle; fish – African lungfish, and sprat, insects – grasshoppers, winged termites (white ants), red palm weevil larva. There is also tamarind, kisansa and nyasa land coffee, green and purple passion fruit and honey [25]. The indigenous foods in Nigeria include milk, plantain, maize, palm sap, African locust, beans, millet, sorghum and cassava [16] There is also yam, cowpea, and capsicum (pepper).

Table 2. Fresh Foods their Propagation and Processing Techniques

Traditional foods (English, (*botanica*l) and local name)	Propagation	Processing and benefits (nutritional content obtained from www.healthline.com, www.glnc.org.au)	Ethnic groups
Air potato or Wild climbing yam *(Dioscorea bulbifera)* Amasomi or kiseebe in Runyoro or Kkobe in Luganda	Seed or whole fruit or rhizome	Steaming fruit unpeeled. Eaten like potatoes or yams to supply fiber and carbohydrates. They are powerful antioxidants and anti-inflammatory. Air potato treats diarrhea, goiter and arthritis.	Baganda and Basoga
Pea nuts or ground nut (*Arachis hypogaea)* ebinyobwa in Runyoro and Rutooro	seed	Sun drying, roasting, boiling, pounding seeds to make peanut butter. It is rich in fiber, fats, vitamins and minerals.	Northern Ugandan ethnic groups.
Bitter berries (*Solanum anguivi*) katunkuma in Luganda or buthakalha-isole in lukonzo; Obutakara/Obujambura in Rutooro	seed	Sundried, grinded into powder, boiled with other foods, it's a spice, immune booster and normalizes blood pressure, and treats diabetes and strengthens bile. It cleanses the blood system and enhances kidney performance.	Bakiga, Banyoro and baganda.
Tree tomato (*Solanum betaceum*) ebidodoima in Rutooro and lukonzo	seed	Sliced and added onto sauce as spice, fruits are squeezed to make juice. Its juice is a detoxifier and antioxidant and provide vitamins and minerals e.g., iron and potassium, carbohydrates, protein, fat, calcium, copper and zinc.	Batooro and Bakonzo
Black night shade (*Solanum nigrum*) Enswiga in Rutooro and Runyoro or esisogho in lukonzo	seed	Steaming leaves, drying and grinding leaves and berries. Contains water, iron, protein, calories, carbohydrates, fibre, calcium, ascorbic acid, ß-Carotene, phosphorus, and riboflavin. It induces sleep and sweating, treats coughs, burns, ulcers, and gout, ringworm and earaches and liver infects.	Bakiga and Banyoro
Pigeon peas (*Cajanus cajan*) entendeigwa, enkuuku in Runyoro or endandibwa in lukonzo	seed	Sun drying, milling beans into powder, for making local porridge. Contains protein, dietary fiber, and various vitamins: thiamin, magnesium, phosphorus, potassium, copper, and manganese. The pigeon pea leaves are believed to treat stomachache.	Batooro and Banyoro
Oyster nuts (*Telfairia occidentalis*) ebinyobwa by'omuti	seed	Sun Drying, pounding nuts, making pasted sauce after removing hard outer cover. Contains oils, proteins, and heals wounds. It is also a source of calories, protein, fat, vitamin D, vitamin B1, vitamin B3, Vitamin B12, and Iron. Grown and eaten.	Banyoro and Batooro
Pumpkin (*Cucurbita* spp.) Empambo or eryoli in lukonzo	seed	Sun drying and roasting seeds. Young fruits can be sliced and dried (ebikeke in Runyoro). Roasted seeds are eaten as snacks (empambo in Runyoro). They contain calories, carbs, fiber, protein, vitamin K, Vitamin C, Potassium, Copper, manganese and riboflavin	Banyoro, Batooro, Basoga and Bagwere
Sorghum *(Sorghum bicolor)* Omugusa in Rutooro or omuhemba in lukonzo	seed	Sun drying, milling, grinding grains to makes porridge, bread and alcohol. Contains carbohydrates, protein, fat, dietary fiber, potassium, sodium, vitamins, copper, manganese, calcium, and phytochemicals.	Bakiga, Banyankole, Banyoro and Batooro
Millet (*Panicum miliaceum*) oburo	seed	Sun drying, roasting, milling, grinding, pounding the grains. Contains Copper, Manganese, Carbohydrate, Phosphorus, Leucine. Millet prevents diabetes and cancer, assists in digestion, balances blood cholesterol level.	Most Ugandan tribes
Turmeric *(Curcuma longa)* ebinzari	Rhizomes	Washing, sun drying, pounding rhizomes to treat cancer, diabetes, heart diseases. It also treats depression, aging and heart diseases, improves skin and brain health, its anti-inflammatory, and antioxidant.	Bagisu, Bakonzo, Banyankole, and Batooro
Local banana (*Musa* spp.) Ebitooke	Suckers	Cooking, juice making, alcohol. Ripe fruits are eaten as disserts	Most Ugandan tribes
Lemon grass *(Cymbopogon citratus)* kalifuha Mentha	Suckers	Drying, grinding, into powder, boiling in tea leaves are medicinal. Lemon grass is good for digestion, contains antioxidants, anti-inflammatory, and antibiotics, regulates high blood pressure, boosts metabolism and burns fat, for naturally great skin and hair, heals cold and flu, and relieves menstrual pain.	Banyoro
Water minth (*Mentha aquatica* L. (Lamiaceae)) Ehohwa	seed	Added as a beverage on tea. The leaves are dried and stored. It treats fevers, headaches, digestive disorders, sore throat, ulcers, and bad breath. It is, however, toxic in higher doses.	Most Ugandan tribes
Ginger *(Zingiber officinale)* tangahuzi	Rhizome	Sun drying, grinding, put in hot water/tea. Ginger powder adds flavor, cleanses the body and treats cancer by most Ugandan tribes. Ginger contains carbohydrates, protein, fiber, ash, calcium, potassium, iron thiamine, riboflavin and vitamin C. Treats cough, flu, asthma, arthritis, improves blood circulation, Reduces fat deposits in arteries	Most Ugandan tribes
Hard green cover passion fruits (*Passiflora* spp.)	seed	The pulp is removed and squeezed to make juice. Contains vitamins; C, B3 and B6.	
Chayote Fruit (*Sechium edule)* Also, Cho-cho in English; Surisuti in Runyoro or Ensusuti in Luganda or munete in Runyankole	Whole fruit	Steaming, or slice and boil with sauce. Slice cook with other foods, cures ulcers and cleanses the body. Source of protein and fiber and improves eye sight. Contains Calories, Carbs, Protein, Fat, Fiber, Vitamin C, Vitamin	Baganda, Banyankole, Banyoro and Batooro

		B9, Vitamin K, Vitamin B6, Manganese, Copper, Zinc, Potassium, Magnesium. It is antioxidant, anticancer, improves digestion, enhances heart and liver health.	
Guava (*Psidium guajava*) amapeera	Seed	The whole fruit is eaten when ripe or squeezed to make juice	Most Ugandan tribes
Lima beans (*Phaseolus lunatus)* Amaijalero	Seed	Sun dried and boiled as the usual beans	Banyoro and Batooro
Aframomum (*Aframomum angustifolium*) Amatehe or esyandehe in lukonzo	Suckers, seed	Wash and eat as snack or dissert. The pulp may be squeezed to make juice rich in iron, fiber, vitamin C, treats cancer and bacterial infections.	Batooro, Banyoro
Cape Goose berry (*Physalis peruviana*) entuutu or embupuru in lukonzo	Seed	Fruits eaten as snack or dissert. Whole fruit mashed to make juice rich in vitamin C and fiber, treats cancer. Also has Vitamin C and antioxidants, contain vitamin for eye sight, contain phyto-chemicals that can regulate high blood pressure, has calcium and phosphorous for strengthening bones, has soluble fiber like fructose which can control diabetes, fights flu and cough, anti-inflammatory and helps in weight loss.	Batooro
Mondia *(Mondia whitei)* mulondo	Rhizome	Wash and eat roots. Dry roots, pound and put in tea to enrich it with vitamin C. Treats anorexia, stress, bilharzia and sexual dysfunction and body pains	Banyoro, Batooro, and Bakiga
Moringa (*Moringa oleifera*) Moringa	seeds	Leaves are dried, pounded and put on warm water or porridge.	Batooro and Bakonzo.
Red pepper (*Capsicum annuum*) kamurali or busewe/piripiri in Lukonzo	Seed	Put in sauce to boost appetite, eye sight and cleanse the body. Used by most Ugandan tribes.	Most Ugandan tribes.
Rosary peas (*Abrus precatorius)* Amarunga	Seeds	Sun dried and pounded. Put on tea when fresh or grinded. Known to cure allergy, increase appetite and flavors.	Batooro and Bakonzo
(*Ipomoea biflora* (L.) Pers.) Karanda-rugo	Seeds	Mix mashed leaves with raw eggs and water to cure cough.	
Rosemary *(Rosmarinus officinalis* or *Salvia Rosmarinus)*		Squeeze out juice and put on food as flavor. You may alternatively pound dry leaves and add on tea. This plant repels snakes. Rosemary is believed to contain anti-inflammatory, anti-allergic, anti-fungal and antiseptic properties and may fight cancer. It prevents premature balding, soothes painful ailments, improves brain function, eases stress and repels bugs.	Batooro and Bakonzo tribes
Calabash (*Crescentia cujete*) Ekisisi/ mirankwongere or ekisya in lukonzo	seeds	Grown as pumpkin, harvested when young, sliced, cooked and eaten. Its rich in fiber, iron, and zinc.	Batooro, Banyoro and Bakonzo
Tobacco (*Nicotiana tabacum*) Etaaba	seeds	Planted around gardens to repel pests. Tobacco powder preserves grain.	Bakonzo and Banyoro and Batooro
Chia seeds *(Salvia hispanica)* Chiya	seeds	Seeds are put in hot water or any hot drink. Chia seeds Weight loss, eases digestion, control diabetes, and heart diseases, boosts the mood, and strengthens bones.	Bakonzo
Okra or bamia in Runyoro *(Abelmoschus esculentus)*	seeds	Slice the young fruits and add water. Leave the mixture to stand for a night. Treats ulcers, diabetes, heart diseases, kidney stones and increases women fluids and enhances blood clotting. Used to thicken sauce. Can be dried and mixed with tea. Chopped and prepared as sauce or vegetable.	Bagisu, Bakonzo, Banyankole, Batooro, Acholi, Langi and Iteso
Loofah (*Luffa aegyptiaca*) Ebijumankuba	Seeds planted beside a tree	The plant treats ulcers, cancer, pressure and diabetes. It is used as bathing sponge (*ekyangwe in Runyoro*)	Bakonzo and Banyoro
Colored maize (*Zea* spp.)	seeds	Can be roasted, steamed, cooked, and milled. It makes posho, porridge, and popcorn.	Most Ugandan tribes
Sim-sim or Sesame *(Sesamum indicum)* Entungo in Runyoro	seeds	Roasting, grinding to make paste (odi) or roasted seeds, eaten as snack. Makes natural cooking oils.	Langi and Acholi Bagisu, Bakonzo, Banyankole, Batooro
African spider plant (*Cleome gynandra*) Eshogi in Rukiga or eyobyo in Runyoro	seeds	Harvested leaves are known to fight ulcers and improve eye sight.	Bakiga
Sun flower (*Helianthus* spp.) Amacande in Runyoro/Rutooro	seeds	Sun drying, roasting, pounding to make oils and paste.	Batooro
Cow peas (*Vigna unguiculata)* Omugobe in Runyoro and Rutooro	seeds	Leaves are boiled and dried, pounded and pasted with pea nut butter.	Banyoro, Batooro
screw pine *(Pandanus* spp.*)* Ebyamba (ananna)	seeds	Harvest, wash and eat.	Bakonzo
Jackfruit seeds *(Artocarpus heterophyllus)* Ffene in Runyoro	seeds	Drying seeds, pounding and sieve out the powder. Add on hot water and drink as tea.	Most Ugandan tribes
Avocado seeds *(Persea americana)*	seeds	Drying, pounding and sieve out the powder. Add on hot water and drink as tea.	most Ugandan tribes
Bitter gourd (*Momordica charantia*)	seeds	Mixing with cold water to treat medicine for High Blood Pressure, diabetes, body cleanser.	
Bamboo (*Bambusa vulgaris*) Maleewa or mulhonge in lukonzo	Suckers	Harvested from the cool tops of the mountain, then smoked to dry, then chopped, prepared as mushrooms, then pasted, g-nut paste pea nut butter. Supplies proteins, fiber, ion, calcium, potassium, cancer fighter.	Bagisu

Oxalic *(Oxalis corniculata)*		Bitter greens chopped, cooked, and pasted with pea nuts, pea nut paste, deworming medicine, vegetables.	Bagisu
Malakwang *Hibiscus* spp. Near diversifolius Jacq.	Seeds	Chopped and prepared as source, eat leaves as vegetables, or seeds are pounded into paste, salt, greens, appetizer, kills hung-over, boosts breast milk for mother's supplies proteins, fats.	Bagisu, Langi, Acholi
Bambara nuts *(Vigna subterranean)* Empande in Runyoro and Rutooro Kalin in Acholi	Seeds	Pound seeds and eat the powder/paste as source, or cook the seeds and eat them as snacks, pea nut paste. It is an energy giving food and a source of Man power.	Acholi and Bagisu.
Straw berry *(Fragaria ananassa)*	Seeds	Eaten live as fruits to give Vitamin c and protein, Brain booster, Fixes nitrogen in the soil.	Baganda and Basoga
Stevia *(Stevia rebaudiana)*	Seeds	Local sugar put on tea and porridge, as carbohydrate source.	Baganda and Basoga
Soya bean *Glycine max*	Seeds	Process milk out of it by pounding it after cooking, then add hot water And the remaining are also eaten as source, source of proteins, Fats Nitrogen fixing being a legume	Most Ugandan tribes
Obukupa /Yams Dioscorea	Rhizome	Cook it like potatoes but for a longer time because it's hard. Source of carbohydrates.	Basoga and Bagwere
Kibogaboga *(Mollugo cerviana)*		Cooked and eaten like pumpkins. It Boosts immunity, supplies proteins, Iron and Phosphorus.	Basoga and Bagweere
Local eggs	Chicken	Boiled directly in hot water and then eaten, Salt, Proteins, Boosts immunity	Most Ugandan tribes
Animal bones	Cattle	Are burnt into ash that is rich in calcium, magnesium, zinc, ion, and phosphate, -organic fertilizers, Solid waste pre-recycling.	Basoga and Bagweere
Cocoa *Theobroma cacao*	Seeds	Eaten as fruit, to supply iron, fiber, vitamins.	Banyoro, Batooro, Bakonzo and Basoga and Bagweere
Karambara fruit	Seeds	Extraction of juice from it. It can be eaten live as a fruit. Contains sugar, Fiber, Ion and Vitamin C.	Basoga and Bagwere
Jute mallow or Otigo-diri Lala-Madyaka in Lugwere (*Corchorus olitotius*) Ndenderu in lukonzo		It is sauce, paste containing proteins, medicine, Iron, fats.	Basoga and Bagwere
Shear nut seeds *(Vitellaria paradoxa)* Moyawo in Acholi	Seeds	Pound the seeds and produce oil called shea nut butter – *moyao in Acholi*. Source of natural cooking oil. It is Antioxidant, Hair health, prevents wrinkles, soothe inflammation, Stretch marks. It also Protects the skin, used in hair treatment, prevents wrinkles, soothes inflammation of the body	Acholi, langi, Batooro and Bakonzo.
African marigold *(Tagetes erecta)* or mukazi-murofa in Rutooro	Seeds	Plant around the garden to repel/chase away crop pests.	Banyoro, Batooro and Bakonzo
Phoenix dactylifera Emirivuma		Roast, pound the seeds and put on tea, it's a body cleanser, de-warmer, gives Man power, Ulcer fighter and Reduce on high blood pressure.	Baganda
Pomegranate (*Punica granatum*) Nkoma-mawanga in Luganda	Seeds	Eaten as fruit for Medicine for; Malaria, vitamin c, and cough.	baganda
Bush plum (*Carissa spinarum)* muyonza in Luganda		Fruit that can be eaten live once it is ripe. It is Medicine for; Ulcers, and Trachoma.	Baganda
Honey	Bees	Harvest honey locally in the bush/forest. It contains Iron and Vitamin C, calories sugar, including fructose, glucose, maltose and sucrose. Honey is a sweetener, has antiseptic and antibacterial properties and thus used in wound, burns and cough, colds management. It reduces duration of diarrhea. preferred by most Ugandan tribes	Most Ugandan tribes
Entajumba Guinea fowl *Numida meleagris*	Eggs	Control bugs, small snakes, rodents, and indicates looming dangers	most Ugandan tribes

3.2. Preparation of Indigenous Traditional Foods

The indigenous food dishes that were exhibited during the food fair events include the following foods; Mixture of wild yams (ekirali/kaama), plantain banana (gonja) *Musa* spp., local yam (*Dioscorea* spp.), and cassava (*Manihot esculenta*); This was prepared in pans where spear grass was placed at the bottom of the pan and the raw foods put on top and covered with banana leaves. Water was added and the food was placed on fire and allowed to boil. It is eaten with beans (*Phaseolus vulgaris*) and *omukaro* (smoked meat with roasted and ground nut paste) sauce. The bean sauce may be mixed with African eggplants (*obujagi* in runyoro) (*Solanum macrocarpon),* onions (*Allium cepa),* ghee and cherry tomatoes (*Solanum lycopersicum* var. cerasiforme). The *omukaro* sauce is prepared by roasting meat about four days ahead of the event and then boiling it with white ants, mushrooms, and then pasting it with roasted groundnuts (Table 2). The *enjwangya* food is preferred by the Bakiga tribe in south-western Uganda. The *enjwangya* food is prepared by

mixing different foods and sauce in one pot, covered with pumpkin leaves and then boiled. The ingredients are; cowpeas or *masaza* in runyoro (*Vigna unguiculata*), Pumpkin/*ekihaza* (*Cucurbita* spp.), sweet potato (*Ipomea batatus*) (not peeled), black night shade/ *enswiga* (*Solanum nigrum*), and *ekisura* (rock salt) (Table 3). The *Empogora* food is prepared by many tribes but mostly preferred by the Bakiga tribe. It is prepared by boiling unpeeled banana fingers in a pot bottom-lined with spear grass and banana leaves and spear grass. It is believed that the nutrients in the banana sap get well soaked from the peels into the edible part of the banana/*matooke* (*Musa* spp.) during the cooking process. Banana is mostly grown in central districts of Uganda and Ankole region, but currently it is largely planted in many parts of Bunyoro sub-region especially by Bakiga people [26]. It has different species, each of which is prepared differently. The most common species in the restaurants is harvested freshly, and then peeled, put in the sauce pan, covered with banana leaves and then cooked/steamed. It is served in a mushy heap and eaten with different stews like *Lowombo* [25], beans, ground nuts, fish, and meat, among others. It can also be cooked or steamed unpeeled and the peelings are removed during serving then eaten with the above sauces. Other types of bananas include plantains (*gonja)* and apple bananas (*karijju/kivuvu*), these are harvested when ripe, cooked, roasted or smoked on top of the main meal and eaten for breakfast. One can also make *gonja* crisps which are widely sold in supermarkets as fast foods. There are also sweet bananas (*ndiizi* and Cavendish - *bogoya*) which are served as sweetener or dessert when ripe and can also be used to make pancakes for sell. *Empogora* and *Enjwangya* can be eaten with fresh meat well cooked in a clay pot and spiced with onions and tomatoes but not fried. The other sauce is *ekisooma* made from *enkaiga* (young bean pods), *enswiga*, and *ebisokoro* (steamed bean leaves). These are mixed together and boiled in a clay cooking pot. There was also *akobokobo* which is liked by Iteso ethnic group living in Bunyoro region. It is soaked in water and then boiled in clay pots. The Iteso also do a mixture of *mugobe* and *eteke* where they mix fresh pea leaves; boil and then add pea nuts, spiced with onions. *Atapa* (millet bread) is made from millet and a little cassava flour mingled in hot water in clay pot. *Ekigudde* was also prepared on the event and this is a delicacy for the Banyoro ethnic group. It is made from fresh cassava, beans and water. The ingredients are mixed together, boiled and then pounded. *Ekisikule* is preferred by Banyoro. *Ekisikule* is prepared from *eyobyo* (*C. gynandra*), ebinyobwa (ground nuts), *obujagi* (African eggplants), *akasura* (rock salt), beans and *enswiga*. These are first mixed and boiled, excess water removed and then pounded (mashed). There was also *Ekigude. Ekigude* food is for Batooro and was by prepared by mixing sweet potatoes, beans, African eggplants (*enjagi)* boiling them in a pot and then mingled. *Ekitakuli kyebisusu n'enswiga* was prepared by putting un-pealed sweet potatoes, water and salt in the clay pot add black night shade (enswiga) on top cover with banana leaves and then boil. Millet bread is prepared by mingling millet flour and little cassava flour. There was an important sauce for the Batooro and Banyoro called *firinda*. To prepare *firinda*, remove the seed coat from the beans and boil. Then add *akisura* (little rock salt), and *amagita* (cow ghee). *Esabwe* is liked by Batooro and Banyankole. It is prepared from *omukaro* (smoked meat); *katunkuma* (bitter berries), *ekisura* (rock salt), *obutuzi* (mushroom), and *amagita* (cow ghee). To get *esabwe*, mix them together and boil (Table 2). *Eshabwe* (Ghee sauce) is a traditional dish mainly prepared by the Banyankole tribe of western Uganda. According to a 22-year-old female student at ARU, to make *eshabwe*, wash the ghee in cold water to remove the dirt and impurities, mix a pinch of rock salt in water to dissolve, add the salty water to the ghee and stir until the ghee changes color from yellow to white, add water as you continue to stir, until the content turns white, dissolve the salt in cold, boiled water and pour into the already formed *eshabwe*. Stir until you get the desired thickness. Then, sieve the *eshabwe* to remove particles or impurities that could have remained. Serve the *eshabwe* as sauce with any food of preference like millet bread (*kalo*), *matooke*, sweet potatoes or posho. The same preparation of *eshabwe* has been reported by other researchers [25]. *Kalo* or *akaro* (millet + cassava bread) it is usually made from millet flour but also other starches such as sorghum or cassava flour are added. The Banyoro, Batooro, and Banyankole make *Kalo* from millet flour mixed with little cassava flour, but for Basoga and Bakonzo put more of cassava flour than millet flour or sometimes eat mingled pure cassava flour as *kalo*. The Iteso, Langi, Acholi, and Kumam tribes from Far East and northern Uganda use Sorghum instead of millet flour to make *kalo*. *Malakwang* is a green leafy vegetable but a little sourer. *Malakwang* is traditionally prepared in northern Uganda by Acholi tribes. It is relatively easier to prepare and the following are the steps; bring two cups of water to a boil in a saucepan, add *malakwang*, let it boil for 20 minutes or until *malakwang* is tender. Remove from the fire and drain, get another clean saucepan, add four cups hot water; add ground nut paste or peanut butter. Using a wooden spoon for mixing, stir the water and ground nut paste until they are well mixed. Add the drained *malakwang* and continue stirring until *malakwang* is well mixed into the ground nut paste. You then add salt to have taste. Serve *malakwang* when warm or cool. On the national event, exhibitors also brought *boo* (Acholi) or *Omugobe* (Runyoro). *Boo* is a popular sauce in northern Uganda but becoming common in north eastern and other parts of Uganda [25]. Ingredients for making *boo* relish include; chopped okra, *boo* leaves, sim-sim, or sesame seeds, rock salt and peanuts, also known as groundnuts. According to a 35-year-old male exhibitor from northern Uganda, “it is necessary to pluck each leaf, because the branches in the sauce make it hard to eat and enjoy the sauce,” he explains. He adds that it is important to measure the amount of okra you put in the sauce, as everyone’s taste varies. These same boo leaves are consumed in western and central parts of Uganda commonly known as ‘*omugobe*’. The fresh leaves are harvested, cooked or steamed, then the cooked leaves are sun dried on a clean flat plane, then pounded to form powder from it. It is this powder that is put in ready sauce like ground nut paste, ‘*omukaro’* (roasted pasted meat) sauce, among others and eaten.

Table 3. Cooked Dishes of Traditional/Indigenous Foods

Local name of dishes and description	Preparation	Ethnic groups
Banana juice (ensande)	Yellow banana (fully ripened) is mixed with spear grass and squeezed until juice comes out. Water is then added and mixture filtered	Preferred by the Banyoro, Batooro, baganda – as an energy giving food
Empogora (Unpeeled steamed banana)	Clean unpeeled banana (*Musa* spp.) fingers steamed in a clay pot lined with spear grass and covered with banana leaves	Preferred by Banyoro as an energy giving food
Omukubi gw'enyama (Fresh boiled meat)	Pieces of clean meat are boiled in a clay pot or saucepan covered with banana leaves. Spices like onions, tomatoes, salt, are added. Served on clay plates called 'ebibindi'	Preferred by all tribes for body building
Eshabwe (ghee sauce)	Made from mushroom, cow ghee, onion, tomato, meat, and salt. Clean mature ghee is added to boiled warm water and salt is added. Wash ghee in cold water to impurities. Dissolve salt in water and add ghee to it until it (ghee) changes from yellow to white. Add water and stir until all turn white. Continue adding salt solution until you get the right thickness	Preferred by the Batooro and Banyankole
Firinda (bean paste)	Made from beans, ghee, eggplants, roasted meat, rock salt, pumpkin leaves and cowpea leaves. Beans are soaked in water to allow easy removal of seed coats. The threshed beans are boiled with African eggplants and cowpea leaves (eteke). The water is removed and the bean pound with a stick called ekibaya. Spices (salt, onions, tomatoes) are then added, water put back and boil. Ghee is then added.	Preferred by Banyoro, Batooro, as a body building food
Nyamusiri/eteke Cow pea leaves	Made from beans, eggplants, tomatoes, onion, salt. Served in orucuba – wooden plate. The cowpea leaves – eteke and eggplants are boiled with rock salt added. It is left to cool and then steered with a forked stick to form a sticky substance. Add spices (onions, tomatoes, and ghee) and then boil.	Preferred by Batooro and Iteso as a vegetable relish – vitamin source
Akalo (Millet bread)	Made from cassava and millet flour and then mingled in hot water in a clay pan (entamu) until it is tender – tenderness indicated by the sound. Served in baskets	Energy giving food to the Banyoro and Batooro
Omubumbo (mashed matooke)	Made using banana leaves, water, banana fingers. Peeled matooke are boiled wrapped in banana leaves. Mash them when ready and leave it on fire for it to generate flavor and aroma. It is served on a wide basket (orugali)	Preferred by Banyoro and baganda
Omukaro (Roasted meat)	Prepared from roasted meat, white ants, mushroom, sim-sim, onions, tomato. Roasted meat is boiled in a clay pot, add previously soaked mushroom and mashed white ants, sim-sim paste and onions and tomatoes.	Preferred by Banyoro as a body building food
Luwombo (Steamed meat)	Made using rock salt, onion, bell pepper, turmeric and meat pieces – mainly chicken. Wrap chicken pieces in young banana leaves and add all spices (salt, onions, tomato, green pepper, turmeric, water) Boil in clay pot or Aluminium saucepan lined with spear grass or banana leaves. Cover with many banana leaves, overlapping each other.	Preferred by baganda, banyankole and bakiga body building, energy giving, fats, etc.
Steamed ekirali, cassava, pumpkin, wild yam	Steamed with peels in clay pots lined with grass	Preferred by all tribes for energy giving
Obutuzi (Mushroom sauce)	Dried mushroom is mixed with omukaro pea nuts, or eshabwe	Preferred by Banyoro Batooro and bakiga for medicinal purposes – given to baby at birth against worms, increases breast milk
Sombe (Cassava leaves)	Chopped fresh mixed with pea nut butter and coked – eaten as sauce	Preferred by Iteso for body building, energy, minerals etc.
Boo (Cowpea leaves)	Chopped boo leaves are boiled in water with Rock salt and okra added until it turns yellow. Add sim-sim paste.	Preferred by Iteso, Acholi (boo) Banyoro, Batooro (omugobe) for body building, vitamins and carbohydrates

3.3. The Processing of Fresh (Uncooked/Fresh) Foods

The processed foods at the local/community event were mainly cereals, legumes, vegetables, fruits, tubers, and rhizomes. These were mainly processed by drying, roasting, cooking/steaming, boiling (Table 2). The traditional methods for food preservation and processing in other researches, include; sun drying – for cereals, grinding, roasting e.g. meat, yams, etc., mashing, cooking and shelling. A combination of methods is used on many occasions e.g. drying + grinding, boiling + drying + grinding, chop + drying and drying + roasting [27,28,29]. Sun-drying involves boiling the leaves in salted water and then setting them out to dry for days at a time. Food processing in west Africa is done in five categories; 1) Post harvest handling practices – threshing, winnowing, hulling, and peeling. 2) milling – dry milling, wet milling, 3) heat processing – roasting, cooking, parboiling, 4) sun drying, smoke drying; 5) fermentation, say for, milk, plantain, maize, palm sap, African locust, beans, millet, sorghum and cassava [16]. Local foods in Nigeria are processed by Lisabi mills into yam flour, cowpea flour, dried milled capsicum (pepper) [16]. There is sweet potato processed into chips in Zambia, smoked meat + ground nut paste in Uganda; cooking by wrapping in banana leaves – *luwombo, injera* in Ethiopia made from fermented cereal bread. Fermenting and drying green leaves of vegetables. Blood charquin made by boiling, and drying animal blood in Peruvian highlands [30].

3.4. Food Preservation Methods

Sun drying and roasting are the key modes of extending shelf-life of food commodities in Uganda. Almost all the exhibitors confirmed that they employ sun drying and food roasting as a means of food preservation. The Bakonzo use of *kafumbe* plant *(Conyza sumatrensis)* and

tobacco to repel and prevent some storage pests and diseases. These natural repellants are planted at the edges of crop fields to destruct pests from invading crops, without disturbing biodiversity. Other pest control measures include; chili solution, Hot water, and urine. These are applied on plants or around the stem using a bucket or watering can to repel pests. This minimizes land degradation by reducing the use of artificial pesticides. The preservation methods for seeds in other studies include; application of organic materials as pesticides e.g. anthill soil, ash, pepper, and tephrozia [10]. The seeds are preserved by soaking in cow urine, cow dung, slurry, animal fat, oils and milk to maintain their dormancy. People from the northern region of Uganda preserve *boo* by drying the leaves in the sun for consumption during the off-season. These modes of preservation are the most common in the developing economies like Uganda, as has been observed by other researchers [27,28,29,31,32]. However, they are applied more frequently to cereals and meat than to fruits and vegetables. In fact, very few people in the area knew that both fruits and vegetables could be dried as a way of preserving them. The other commonly used methods included sun drying accompanied by grinding and application of natural pesticides (ash and brown soil) before storage. Food preservation is still at a small scale and this results in high post-harvest losses of the produce and hence food insecurity and malnutrition.

3.5. Benefits of Indigenous Traditional Foods

A food mixture of wild yam, dessert banana and cassava) is mainly prepared and preferred by the Banyoro ethnic group in mid-western Uganda and is believed to provide lots of calories to the body. *Omukaro* is believed to provide proteins to the body. This is because it is made out of meat, a major protein source. *Enjwangya* is perceived to increase wisdom, memory and energy of the consumers. Bananas are a healthy source of fiber, potassium, vitamin B6, vitamin C, magnesium, manganese, and various antioxidants and phytonutrients. *Atapa* (millet bread) gives energy. *Kisikule* food is believed to strengthen the gallbladder. *Ekigude* is believed to provide energy and proteins. The *Ekitakuli- kyebisusu n'enswiga* mixture is a good source of energy and proteins. Millet provides starch, iron and is energy-giving. According to one female student at ARU, *eshabwe* is very nutritious and a good source of fats, vitamin A, vitamin B and B12 that cannot be found in vegetables. The *kalo* is rich in carbohydrates, copper, phosphorous, manganese, and Leucine. *Malakwang* is always prepared culturally at marriage ceremonies and women are advised to always prepare it during the time of challenges in order to remind them of their good moments thus interpreting sour and sweet taste of the *malakwang* delicacy. Boo sauce was traditionally cooked by women while men were on hunting trips. As a result, it was commonly thought of as a sauce for women, but that idea has changed. Now the sauce is believed to bring good luck in marriage, so it's often served at weddings throughout northern Uganda. Boo is a healthy sauce, because it is a vegetable, has fewer calories and is filled with nutrients like protein and carbohydrates a reason why there are fewer obese or malnourished people in northern Uganda.

According to other studies, traditional diets are also associated with traditional medicines. African foods are known to treat several ailments. For example, vegetable and wild foods treat abdominal pains, diarrhea, dysentery, hemorrhoids, wounds, malaria, intestinal worms, [4,17]. "Indigenous plants are more resilient to unfavorable environmental conditions. They shrive with minimum care unlike their exotic counterparts" (Male exhibitor, regional event - ARU Researchers). They are cheap sources of ascorbic acid (vitamin C), mainly from fruits and vegetables, vitamin A, carotenoids, folic acid, minerals, say, Calcium, Iron, Zinc, [16]. Fresh fruits provide carbohydrates, and fiber. African potato contains twice the protein of common potato and Calcium, vitamin A, iron [20,33]. Indigenous fruits are used for food as snacks, relish (sauce), and for medicine and rituals. Some crops like *Cleome gynandra* (*eyobyo* in Runyoro) are sold for income [10]. Serving and consumption of traditional dishes made from traditional recipes increases food heritage [25]. Indigenous foods have socio-cultural benefits [18,21,34]. They offer excellent nutritional benefits – more energy content from traditional foods among the arctic communities. The consumption of indigenous provides cultural benefits e.g. promoting sharing and cooperation among communities. In Alaska, traditional foods associated with language, traditional medicine and traditional events [19] spiritual benefits e.g. during worship events, nutrition benefits – they are high in protein, low in fat, healthier fats, more vitamins and minerals [19]. Researches have shown that traditional root tubers like wild yams species, potato, *Disa* spp., *Habenaria walleri*, and *Satyrium* spp. are important traditional crops and these are more superior than the conventional foods like cassava, potatoes, and sweet potato in tolerance against hard environmental conditions. Typical African diets are composed of mushrooms (of different types), which are rich in carbohydrates, protein, fiber, mineral elements like; Calcium, Iron, Copper, Magnesium, Manganese, and bioactive compounds.

3.6. Propagation of Local Foods and Seeds

The findings show that the cereals, legumes, vegetables, fruits, tubers, and rhizomes brought at the exhibitions were mainly propagated by seed and rhizomes. It was revealed by exhibitors that, traditional indigenous foods sometimes just grow on their own and grow in the wild or cultivated [10]. There are both asexual (vegetative) and sexual (seed) methods of propagation [11]. Vegetative methods include [12,14] cuttings, grafting, budding, layering, micro-propagation (meristem, axillary and embryo culture), splits, rhizomes, suckers, crowns, slips, tubers, bulbs, vines, corms, runners. In Ethiopia [13] the '*ensete*' are propagated using seed, suckers from rhizomes and traditional macro-propagation - this involves splitting the corm following the eyes to allow quick multiplication**.**

4. Conclusion and Recommendations

There is still a huge diversity of wild, traditional and indigenous foods in Uganda. The foods brought at the exhibitions were mainly of plant origin. These are

scattered with minimal conservation and utilization. There is need to organize such indigenous/traditional fairs more regularly that once a year to capture seasonal foods and create sites or areas for conservation of these endangered species of plants.

Integrated biodiversity conservation and environmental sustainability in all agricultural activities is necessary to boost the net output, enhance diversity of highly nutritious, cultural and medicinal foods, and at the same time enhancing agro-biodiversity through agro-ecological farming systems. It is necessary to conduct more scientific research; e.g. comparison of nutrient content of similar foods under different methods of preparation/cooking

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