A COMPREHENSIVE STUDY ON TRADITIONAL FOOD CROPS AND FARMER MANAGED SEED SYSTEMS

Hoima Caritas Development Organisation (HOCADEO)
Hoima Catholic Diocese

HOIMA,MASINDI & GREATER KIBAALE

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Horn Afric Development Consultants
Impact Through Knowledge, Training and Research

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Acronyms

ALS	Angular leaf spot
BCMV	Bean common mosaic virus
BR	Bean Rust Disease
CBB	Common bacterial blight
CBSD	Cassava brown streak disease
FGD	Focus Group Discussions
FGs	Farmer Groups
HOCADEO	Hoima Caritas Development Organization
KII	Key Informant Interviews
LSB	Local Seed Business
MADFA	Masindi District Farmers Association
NARO	National Agricultural Research Organisation
NASECO	Nalweyo Seed Company
NDUS criteria	New, Distinct, Uniform, and Stable
NGO	Non-Governmental Organisation
OWC	Operation Wealth Creation
PPB	Participatory Plant Breeding
PVP	Plant Variety Protection
PVS	Participatory varietal selection
QDS	Quality Declared Seed
ZARDI	Zonal Agricultural Research Institute

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Deputy Executive Director

Horn Afric Development (HAD) Consultants

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Executive Summary

This study report highlights findings of a Comprehensive Study on Traditional Food Crops and Farmer Managed Seed Systems, in the districts of Hoima, Masindi, Kagadi and Kibaale. The study was conducted as part of the Hoima Sustainable Agriculture Programme targeting small holder farmers in Hoima Diocese. The project recognized that indigenous foods were increasingly being replaced by mono-cropping of non-indigenous, high-yielding staples, a trend driven by policies and agricultural commercialization.

The purpose of the study was to document information regarding traditional food crops and seed systems being used by farmers and their general understanding. A mixed methods approach to data collection was used. This included literature review, stakeholder mapping, food crop, seed varieties and plant diversity mapping, 26 key informant interviews with experienced/elderly farmers, Agricultural, seed and herbal medicine experts and 6 focus group discussions with farmers managing community seed banks, farmer groups and individual farmers knowledgeable in a wide range of themes covered under the comprehensive study, visits to farms and herbariums and photography.

Findings show that districts of study were characterized with mainly three seed systems, these were; the formal seed system with private seed companies specializing in specific crops mainly maize hybrids, oil seeds (soya beans and sunflower), legumes (beans, cow peas, pigeon peas) and vegetables (cabbages, onions and tomatoes)..

The semi-formal seed system which is a blend of farmers and community seed organisations who multiply and sell small quantities of quality declared seed to other farmers within the region. Thirdly, informal seed system also known as local system or farmers' system characterised by traditional, semi-structured, operated at individual or community level, use a wide range of exchange mechanisms and usually deal with small quantities of seeds that are demanded by farmers. About 80% of seed used by the smallholder farmers is saved on-farm and purchased locally while the 10% is exchanged among farmers.

Findings further show that, there is a National Seed Policy enacted in 2018 that is geared to ensure availability, accessibility and affordability of high quality seed to all stakeholders for increased food and nutrition security, household income, wealth creation and high export earnings. However, little had been done to ensure implementation in most districts. Among the benefits of the regulatory framework is promoting the protection and preservation of indigenous knowledge of local varieties and effectively protecting the intellectual property rights of local communities on traditional varieties and traditional breeding. The greatest threat to farmer managed seed system was climate change that has affected resilience of seed to droughts, shortened seasonality, susceptibility to pests and diseases.

A number of existing seed varieties which were considered as traditional were documented; the seed were beans, other legumes such as pigeon peas, cow peas, ground nuts, cereals and root tubers.

In terms of marketability of the crops, different users of seed including farmers, traders, processors and consumers had diverse preferences based on their unique needs. Varieties reported as highly marketable were Nabe 19 (Nambale endaira), Nabe 17 (Nambale engufu), Small white Beans (NABE6) Nyakera engufu, long white Beans (Nyakera Endaira), NABE 15 (Kinyobwa) and Small

yellow beans (Naro bean 2). Description of the marketability of the different crops is detailed in tables 1, 2, 3, 4, 5, 6 and 7.

Findings also show that farming communities were becoming more market-oriented, leaving very little food for the households to consume. There was near extinction of some indigenous crops, particularly millet and some vegetables, which were being replaced with less nutritious exotic options. A number of food crops, fruits, vegetables, medicinal plants (grasses, climbers, shrubs, trees and herbs were documented as detailed in the main report.

During the focus groups discussions, emphasis was always put on HOCADEO providing a market for traditional food crops if it was to encourage farmers to grow traditional food crops, rather than emphasizing the benefits that would accrue.

It's therefore important that consented efforts are put in the promotion, sharing and documentation of farmers' indigenous knowledge and practices for cultivation, processing, cuisine and raise awareness among communities on the need to protect indigenous plant species.

Also, encourage farmers to grow for more than just the money but rather have the understanding of the crop; like nutritional value, so that they can inculcate in themselves the mindset to accept the importance of the product and its consumption, before going on to sell it.

It's therefore recommended that farmers groups are supported in improving and producing seeds of traditional varieties through selection and breeding in order to meet their production and food security needs. This includes the need to reduce risks to climate change impacts such as higher temperatures, droughts, heavy rainfall and new pests and diseases.

And also incorporating conservation / organic agriculture into the small holder farming system. This requires training on such practices and assessment of their performance in relation to increasing resilience of seed systems.

1.0 Introduction

This study report highlights findings of a Comprehensive Study on Traditional Food Crops and Farmer Managed Seed Systems, in the districts of Hoima, Masindi, Kagadi and Kibaale, including existing regulatory frameworks, benefits, current threats and challenges faced, existing traditional seed varieties and diversity of plants used as human herbal medicine, human edible plants, forest food products used by communities in the respective districts.

1.1 Background of study

Hoima Caritas Development Organization (HOCADEO) is a social and economic development arm of Hoima Catholic Diocese involved in supporting rural communities in Bunyoro region through its integrated development programmes focusing on agricultural development for food security, home hygiene, sanitation, nutrition, women empowerment, advocacy, HIV prevention and income improvement among the smallholder farmers and other rural development activities in Bunyoro sub region.

The organization implements the Hoima Sustainable Agriculture Programme, targeting small holder farmers in Hoima Diocese. The project recognizes that indigenous foods were increasingly being replaced by mono-cropping of non-indigenous, high-yielding staples such as rice and maize a trend driven by policies and subsidies promoting agricultural modernisation and commercialization. The consumption of indigenous foods, fruits and vegetables was currently low due to limited access. This called for promotion and conservation of indigenous foods and medicinal plants.

Seed is the soul of Agriculture. Locally adaptable agro-diversity based cropping patterns and timely availability of good quality seed in required quantities were essential for sustaining farming. Seed was a 'Community resource' carefully bred, shared, conserved and had evolved over thousands of years. Today the technological advancements, market manipulations and the changing policies and legal systems had made it a 'commercial proprietary resource' (Centre for Sustainable Agriculture, 2014). The advent of modern agriculture had deskilled the farmers and taken away their confidence in their traditional seeds hence making them passive consumers of industrial products including seeds.

This had not only resulted in increased economic and ecological costs but also made farmers lose control over their productive resources. Entry of the private sector in seed improvement culminated into laws which suppressed the informal system yet it provided the bulk of seed supply to the farming community. Uganda's seed sector was fully liberalized but was still in the early stages of growth. The seed sector still relied on a low performing public sector breeding program, the number of active breeders was very low and access to foundation seed was limited. Seed marketing contributed the biggest share in the seed systems (54%) followed by seed processing with 28% and seed production (8%). The scale of seed production was not exciting given that it was only seed companies that were key players in seed production.

Furthermore, in 2013, an intervention code-named 'Operation Wealth Creation (OWC)' was launched by the Ugandan government to improve household income through commercialization of agriculture and free distribution of 'improved' seed and other agro-inputs. This intervention had however been

largely ineffective due to inefficiencies within the systems that led to counterfeit inputs such as seeds, untimely deliveries and little quantities supplied to farmers among others. Such interventions also instilled a dependence syndrome (expecting to be given handouts) among farmers and led to loss of sustainable seed management practices for their traditional seed.

The study was geared towards provision of solutions to the challenges and was conducted in consultation with recognized research institutions and experts. The institutions helped in differentiating between indigenous varieties and improved, this was because the existing seeds in the communities were mixed up. The study established the existing agro-biodiversity and community seed management systems

2.1 Purpose of the Study

To document information regarding traditional food crops and seed systems being used by farmers and their general understanding of their performance. The study also solicited information on the reliable sources of indigenous seeds. This assisted in providing accurate and latest trends on the consumption, marketability, and yield, tolerance to climatic changes, taste and preference of the indigenous seeds.

2.2 Specific Objectives of the Study

The study was set out to achieve a number of specific objectives;

1) To document the different seed systems, their multiplication and preservation.
2) To assess the market opportunities for indigenous crops and vegetable seeds produced by smallholder farmers.
3) Establish the existing regulatory frameworks, benefits, current threats and challenges faced by farmer managed seed systems.
4) Provide comprehensive information about the existing traditional seed varieties (maize, beans, groundnuts, sweet potatoes, Irish potatoes, cassava, banana-cooking type and vegetables.) in terms of Maturity period, Yield per acre, Drought tolerance, pests, disease resistance, Taste & Processing.
5) Document the existing diversity of plants used as human herbal medicine, human edible plants, forest food products, fuel wood, animal fodder and animal herbal medicine.
6) Document strategies to enhance the conservation and consumption of traditional foods

3.0 Methodology used in comprehensive study

The comprehensive study of the traditional food crop and farmer seed systems employed a mixed methods approach to data collection. The method was chosen because of its strength in providing a broader spectrum of ways for better understanding of complexity in contexts around seed systems, traditional food crops and existing biodiversity. In addition, the method ensured triangulation of information collected. Specifically, the mixed method included;

- Review of relevant project documents; a wide variety of documents covering studies on farmer managed seed systems, National Seed Policy in Uganda 2016, traditional food crops, project reports and all other documents that were deemed relevant to the study.
- Stakeholder mapping
- Mapping of food crop and varieties and plant diversity
- Mapping of different seed sources
- Mapping of human herbal medicine, human edible plants, forest food products, and animal herbal medicine
- Key Informant Interviews with experienced/elderly farmers, Agricultural, seed and herbal medicine experts
- Focus Group Discussions with community seed bans, farmer groups and individual farmers knowledgeable in the wide range of study topics (traditional food crops, seeds systems, herbal and forest plants)
- Visits to farms and herbariums to observe, and document some of the traits of the seed crops/vegetables/medicinal plants
- Direct observations
- Photography

3.1 Literature review

A desk review of documents on general background on the seed systems, relevant internal strategic documents covering project design, project progress reports and community farmer seed systems, National seed policy and existing regulatory frameworks were reviewed to inform and triangulate the information collected.

3.2 Mapping of key stakeholders in the traditional food crops and farmer seed management system

A clear stakeholder mapping of key players in the seed sector in the target districts was conducted through consultations with the project teams, respective district and sub county agricultural offices in region. The stakeholders identified in seed systems in areas of intervention that were mapped and interviewed were;

- National Agricultural Research organization's staff (Bulindi ZARDI and NARO Namulonge)
- Traders who buy and sell seed in Hoima, Masindi urban centres.
- The private seed sector includes companies dedicated to producing or selling seed, NASECO, Grain pulse, FICA
- Farmer organizations and specialized seed producers Miika seeds and Masindi District farmers' federation.
- Extension workers in Hoima, Masindi and Kibaale districts
- Non-government Organisation workers; staff of Uganda Rural Development Training-Kagadi
- Farmers groups in Hoima, Masindi, Kibaale and Kagadi

- Seed bank players

3.2.1 Key informant Interviews

A total of 26 key informant interviews were conducted, these included, 2 Staff from the Research institution (NARO Namulonge and Bulindi ZARDI), 6 Agricultural Officers, 4 producer traders who trade in local seed, 4 private seed sector players, 4 herbal medicine experts, 3 private seed sector players, 3 community seed bank players. Information collected was about seed systems, their multiplication and preservation, market opportunities for indigenous crops and vegetable seeds produced by smallholder farmers, existing traditional seed varieties and their attributes, existing diversity of plants used as human herbal medicine, human edible plants, forest food products and strategies to enhance the conservation and consumption of traditional foods.

3.2.2 Focus group discussions

A total of 6 farmer groups with a total of 49 (27 females and 22 males) participate in the focus group discussions. The discussions mainly centred on crops and varieties as well as additional semi-domesticated and wild food plants used in the community, current crop and variety diversity available in the community. Specifically, the data was collected on;

- Crops cultivated or local food plants maintained by few farmers on small plots
- Crops and other food plants that are no longer cultivated
- Farmer managed seed systems (Farm-saved seed, from own farm and farm-saved seed, obtained from other farmers in the community, Seed bought in farmer seed markets, that was provided by other communities and current seed storage in the community).
- The different ways and sites where and by whom seed was stored in the community
- Wild food plants, collected from river beds, road margins, forests, etc.
- Types of seed bought from registered seed sellers or seed companies
- Diversity of plants used as human herbal medicine, human edible plants, forest food products and
- Strategies to enhance the conservation and consumption of traditional foods.

During the focus group discussions the farmers categorized each of the identified crop/seed under the different thematic areas, focusing on varieties within each crop mentioned. The intention was not to select one or few crops and varieties only, but to include all crops and varieties including wild foods and herbal plants.

Following the focus groups discussions, farmers took the study team to guided farm tours where samples of the different study items were photographed. These were different food crops, seeds, wild foods and medicinal plants. In some cases, farmers collected samples of some of the traditional crops and seed varieties to guide the discussions which guided the discussions. The study team also collected samples of the seed varieties from the farmers and community seed banks.

3.3 Sampling

Purposive and snowballing sampling was utilised in the selection of both farmer groups that participated in focus group discussions and key informants to ensure knowledgeable and experienced

respondents were interviewed. All interviews were conducted at convenient places of respondents. Confidentiality of the information collected was ensured.

3.4 Data Processing, Analysis and Interpretation

The key informant and focus group data generated were analysed thematically and content analysis tracked any patterns and trends, which were well compiled and accurately documented. Photographic information was well documented to guide the detailed descriptions of the different seed varieties and the existing biodiversity compiled.

4.0 Findings

The study findings were clustered around five study themes. The first gives an overview of the different seed systems, multiplication and preservation. The market opportunities for indigenous crops and vegetable seeds produced by smallholders were documented for the second theme. The existing regulatory frameworks, benefits, current threats and challenges faced by farmer managed seed systems is the third theme of focus. Existing traditional seed varieties is the fourth theme and existing diversity of plants used as human herbal medicine, human edible plants, and forest food products, animal fodder and animal herbal medicine are also documented.

4.1. Existing Seed systems, multiplication and preservation

Seed systems, if working well, can deliver multiple and diverse benefits to smallholder farmers: enhanced food security and income, better nutrition, and greater resilience to climate stress. To function well, seed systems have to offer a wide range of crops and varieties, with seed of acceptable quality, and these products have to reach farmers, no matter how remote, stressed, or poor they may be.

The districts of study were characterized with mainly three seed systems, these were;

a) The formal seed system which is called formal because it is mainly a government supported system and public institutions are also involved in it. The major actors for the formal system were private seed companies specializing in specific crops mainly maize hybrids, oil seeds (soya beans and sunflower), legumes (beans, cow peas, pigeon peas) and vegetables (cabbages, onions and tomatoes). The key private seed companies were FICA seeds Ltd, Equator seeds, Nalweyo seed company (NASECO), Grain Pulse, Miika seeds and Victoria seeds. These private seeds companies dealt in specific seeds mainly hybrid maize, rice, legumes (beans, ground nuts, and cowpeas), oil seeds (soybean, sunflower and sesame) and vegetables (onions, cabbages, carrots, eggplants, cucumber, and tomatoes) and water melon. Multiplication of seed was through own farms, farmer cooperatives and well established out growers for crops like maize, rice, beans, sunflower and soya beans. Seed of vegetables was imported mainly from Kenya. The driving interest of the companies was profit, hence the focus was put on seeds that were more marketable.
b) The semi-formal seed system which was a blend of the formal and informal systems. Farmers and community based organisations multiplied and sold small quantities of quality declared seed of fortified varieties to other farmers within a restricted area. This system was practiced by local seed companies like the Miika seeds and Masindi District Farmers Association

(MADFA). For example Masindi District Farmers Association (MADFA) in partnership with Masindi Seed and Grain Growers Limited, and Masindi Seed Company supported their members with seed, agro inputs, farmer advisory services and financial loans to facilitate agronomical practices such as timely planting, weeding, harvesting and post harvesting handling. The seeds produced, processed and distributed by MADFA among others were Maize, beans, soya bean and sunflower.

c) Informal seed system also known as local system or farmers' system which was called informal because it operated under non-law regulated and characterised by farmer-to-farmer seed exchange. Five key features of informal seed systems were: traditional, semi-structured, operated at the individual community level, used a wide range of exchange mechanisms and usually dealt with small quantities of seeds that were demanded by farmers. The informal seed system comprised of home-saved seed, seed obtained from social networks (family and friends), informal seed multiplication groups and the local grain market was reported as extremely important for seed security. The bulk of seed supply was provided through the informal system. About 70% of seed used by the smallholder farmers was reported as saved on-farm, 10% purchased locally from market, 6% obtained from social networks and about 4% of seed was received from local organisations. The informal seed system (either self-saved seed or farmer-to-farmer seed exchange) accounted for about 90% of the seed used by smallholder farmers.

During the focus group discussions, it was reported that for commercial crops especially maize, farmers purchased hybrid maize from the agricultural input dealers because farmer saved seed from hydride maize produced very low yields. The rest of the crops that were not for commercial purposes farmers either used their own grown seed or purchased locally from the grain markets.

The high level of seed autonomy among farmers masked the fact that, almost everywhere, local seed systems were under stress. Many farmers had become more individualized in terms of decision-making and deployment of knowledge, labour, capital and seeds. Traditional seed exchange relationships had become weaker. Farming practices were more market oriented, and the increased involvement in markets had both benefits and costs depending on local context. To some extent it resulted in the feminization of agriculture, increasing the workload and responsibilities of women in many rural areas.

4.1.1 Existing regulatory frameworks on farmer managed seed systems

The Government passed a National Seed Policy, 2018, to ensure availability, accessibility and affordability of high-quality seed to all stakeholders for increased food and nutrition security, household income, wealth creation and high export earnings. Government intended to achieve this goal by strengthening research and development; building capacity of seed value chain actors, ensuring seed quality control and enhancing knowledge and information in order to create awareness among stakeholders.

The critical aspect of the seed policy's implementation was the introduction of quality declared seed. This is seed produced by a registered seed producer (individual or a group of farmers) from basic seed. This seed conforms to the minimum standards for variety purity and germination. Most of the certified

seed was found expensive and was imported into the country. Given the challenge, the policy emphasized the production of quality declared seed at a fair and affordable price for farmers.

Implementation of the policy however required the enforcement of the Seed Act 2006, which provided for the promotion, regulation and control of variety release, multiplication, conditioning, marketing, importing and quality assurance of seeds and planting materials.

The Plant Variety Protection (PVP) Act 2014 also provided for the promotion of development of new plant varieties and their protection as means of enhancing breeders' innovations and rewards through granting of plant breeders rights and other related matters.

Overall, the National Seed policy's goal was to guide, promote, develop and regulate the seed sub-sector in order to ensure availability and access to safe and high-quality seed to all stakeholders for increased food and nutrition security, household income, wealth creation and export earnings.

Despite the drafting of the Seed Policy, little had been done to ensure that the policy guidelines were implemented in most districts despite the presence of extension workers in the districts.

4.1.2 Benefits of the regulatory frameworks on farmer managed seed systems

The National seed policy strategy highly was found to focus on interventions that supported the farmer managed seed systems, some of areas of focus were;

i. promoting the protection and preservation of indigenous knowledge of local varieties and effectively protecting the intellectual property rights of local communities on traditional varieties and traditional breeding under a new legal framework
ii. supporting the development of community seed banks
iii. supporting the mapping and creation of variety registers within communities and at national level
iv. promoting local seed selection and preservation methodologies
v. developing a system which enables different rights on public varieties through exclusive rights, shared rights or any other inclusive system that is deemed most beneficial to increase the adoption rates of new varieties by farmers
vi. strengthening modalities for coordination of public and private research and extension service providers for effective transfer and dissemination of seed related technologies
vii. supporting and strengthening linkages between seed research and plant breeding programs and farmer groups producing and marketing food security crops
viii. promoting participatory research and variety improvement to increase productivity and market development of farmer preferred varieties
ix. promoting and building capacity of farmer and community groups including those led by women or youth to conserve crop varieties that have a high food security value
x. Facilitating youth, women and other vulnerable groups to strategically intervene in enhancing availability of quality seed.

4.1.3 Current threats to farmer managed seed systems

There were various threats to farmers managed seed systems some of which could be exacerbated with the implementation of the national seed policy guidelines, these were;

- Introduction of new seed varieties replacing indigenous ones due to market pressures and genetic modification
- The threat of declining efforts of farmers towards production or storage of farm-saved seeds in preference for new quality seed creating 'seed market dependency' and less self-reliance
- The possibility of farmer institutions replacing or duplicating the role of agro-dealers and knocking them out of business.
- Rapidly changing trends in the seed science and generation of new varieties that may require sustained awareness creation which was expensive to disseminate
- Maintaining seed banks was capital intensive requiring higher investment at community levels and ZARDI levels
- Replacement of local crop varieties by introducing commercial varieties with disease resistance (e.g., disease-resistant varieties of banana, instead of traditional banana species; some of cassava landraces had become scarce mainly "Bukalasa variety" because of cassava mosaic disease).
- The rampant poverty in the villages, which forced people to sell the best of their produce and minimum or low quality was conserved
- Increasing problems of invasive crop weeds threatened the resilience of farm saved seeds or local varieties.
- Climatic change, leading to drought, diseases, pests, famine, among others.
- The information gap on traditional and indigenous foods threatened their extinction as it limited their use and further action to promote them. For example, Kibaire Community Seed Bank members reported that some of the community members laughed at them for growing traditional seed varieties.
- The unrecognized role of women in indigenous food systems, coupled with injustices and marginalisation faced by women in many rural areas, had exacerbated the loss of indigenous plant and varieties

4.1.4 Challenges to farmer managed seed systems

Farmer managed seed systems were found to be faced with a number of challenges, among which were;

- Climate change impacting smallholder farmers as drastic temperature changes and increased vulnerability to pests and diseases affected harvests.
- The rainy seasons were marked by shifts in the start and cessation of rains, poor rainfall distribution, and fairly long drought periods, coupled with higher risks of attacks from pests. Farmers were being forced to change their planting cycles as seasons had changed and become more unpredictable
- Communities in the region especially in some of the dry Corridor in Masindi and Buliisa were faced with increasing droughts and higher temperatures, leading some to largely abandon

cassava production, despite its importance as a one of the staple crops. Some of the farmers reported seed loss from increased in temperature.

- The resulting climate induced crop failures and loss of household seed supply led to the disappearance of local varieties. Some traditional varieties also struggled under the new conditions created by climate change
- The rampant land grabbing and the dispossession of land in some areas, traditional and smallholder farmers were forced to remain ploughing exhausted soils, or the least favorable lands, while commercial farms and sugar occupied the best lands.
- Farmers were not allowed to legally sell their seeds without formal registration and certification. They may be faced repression if they sold or label their packages as seeds without certification. The lack of traceability certification limited their access to good seed prices.
- Despite the fact that local varieties were adapted to a number of biotic and abiotic stresses, and possessed valuable traits useful for the development of new varieties. Some of the local varieties had been appropriated outright or with few changes. There were reported cross pollinations that had altered the genome of local varieties of maize and sorghum.
- National registration procedures were designed for varieties developed by formal research institutions with capacity to comply with associated breeding methods and technical requirements. The variety proposed for registration needed to meet NDUS criteria (new, distinct, uniform, and stable) in terms of genetic, morphological and agronomic traits. While farmers select and maintain high quality seeds, and can maintain these criteria, the registration process is challenging to follow as it is data intensive, bureaucratic and centralized. Quality Declared Seed (QDS) procedures have proved challenging to small holder farmers to access the formal seed market
- The purpose of seed certification was to safeguard against the sale of poor-quality seeds, especially informal seed systems where vendors and buyers often do not know each other. However, certification usually only permitted with registered varieties, which excluded most local and farmer-bred varieties. It therefore limited options to varieties produced by conventional breeding, which rarely took care smallholder preferences into account and produced seeds with low genetic diversity and high dependence on agrochemicals.

4.1.5 Market opportunities for indigenous crops and vegetable seeds

Marketability of the different crops and vegetables varied among crops and to some extent locations. Vegetables were more marketable in urban areas than rural markets.

Different users of seed including farmers, traders, processors and consumers had diverse preferences based on their unique needs. These included resilient varieties, seed colour such as red, white, black, red-mottled, cream, creammottled or yellow; small or large grain size, bush or climbing growth habits and their use either as dry bean, fresh, canned, or green/snap bean and flour. Varieties reported as highly marketable were Nabe 19 (Nambale endaira), Nabe 17 (Nambale engufu), Small white Beans (NABE6) Nyakera engufu, long white Beans (Nyakera Endaira), NABE 15 (Kinyobwa) and Small yellow beans (Naro bean 2). Those whose marketability was low were Mucuna black Beans (NAROBEAN7) locally known as Kyobote and Naro bean 1 mainly associated with the dull colours

Diseases were a major constraint to bean production in the region among which were root rots caused by a complex of pathogens *(Fusarium, Pythium, Sclerotium and Rhizoctonia spp),* and foliar diseases such as anthracnose *(Colletotrichum lindemuthianum),* angular leaf spot *(Pseudocercospora griseola),* rust (*Uromyces appendiculatus)* and bean common mosaic virus and its necrotic strain, bean common mosaic necrotic virus (BCMV/BCMNV).

Ground/pea nut of the Serere nut 2 series (Paidha) and Red beauty were reported highly marketable because of their deep red colour. Local maize varities with multiple colours are less preferred by millers because of their color which affects the colour of the flour produced. The local Finger Millet remains highly marketable however the production remains low because it's regarded as a labour intensive crop. Description of the marketability of the different crops is detailed in tables 1, 2, 3, 4, 5, 6 and 7.

4.2 Existing local Seed varieties

A number of existing seed varieties which were considered as traditional were documented; most of these varieties have undergone bio fortification[1] by the Research institutions however they were regarded as local due to the length of time local communities have planted them. The seed were beans, other legumes such as pigeon peas, cow peas, ground nuts, cereals and root tubers. Detailed and attributes for each of the different seed varieties were detailed in the tables 1,2,3,4 and 5 below;

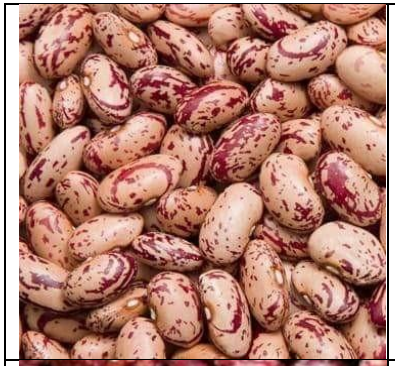
4.2.1 Beans (Phaseolus Vulgaris)

Table 1: Existing Local Seed Varieties of Beans

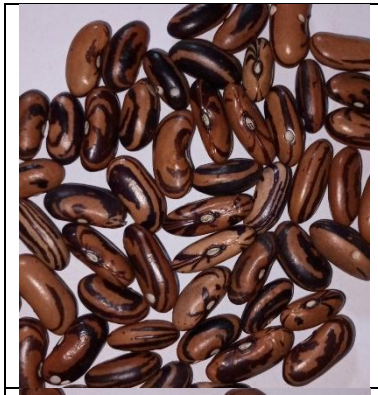
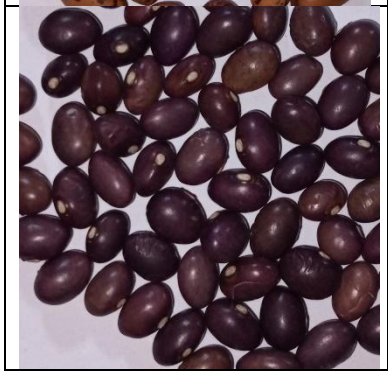
Photo	Name	Attributes	Specifications
	Common: Nabe 19 Local: Nambale endaira	Maturity: 61-70 days Seed rate: 25-30 kg/acre Expected yield: 2.0 - 2.5 ton/ha Growth habit: Erect (Type I) **Source:** Readily available in local markets	Withstands adverse weather conditions, tasty, can be stored for long periods without being destroyed by weevils, Late maturing (four months to harvest) Resistant to anthracnose, BCMV, ALS, and tolerant to most of other diseases Popularly grown in most parts of Uganda **Marketability:** High
	Common: Nabe 17 Local: Nambale engufu	Maturity: 80-85 days Seed rate: 90-100 kg/ha Expected yield: 1.5-2.0 ton/ha Growth habit: Erect **Source:** Readily available in local markets	Large red mottled seed. Resistant to major bean diseases. Popularly grown in most parts of Uganda but Susceptible to root rot, ALS, CBB and anthracnose **Marketability:** High

[1] Bio fortification is a process of breeding crops with higher levels of vitamins, minerals, proteins, and fat content

	Common: Small white Beans (NABE6) Local: Nyakera engufu	Maturity: 90 days Seed rate: 50-60 kg/ha Expected yield: 1.5-2 ton/ha Growth habit: Trailing **Source:** Readily available in local markets	Small white seed, resistant to BR but susceptible to root rot, ALS, CBB and anthracnose. cooks fast but does not keep long after cooking **Marketability:** High
	Common: Long white Beans Local: Nyakera Endaira	Maturity: 90 days Seed rate: 50-60 kg/ha Expected yield: 1.5-2.5 ton/ha Growth habit: Trailing **Source:** Kibaire Community Seed	Long white seed, resistant to BR but susceptible to root rot, ALS, CBB and anthracnose. cooks fast but does not keep long after cooking **Marketability:** High
	Common: Mucuna black Beans (NAROBEAN7) Local: Kyobote	Maturity: 90 days Seed rate: 50-60 kg/ha Expected yield: 1.5-2.5 ton/ha Growth habit: Trailing **Source:** Kibaire Community Seed	Tolerant to anthracnose, root rot, CBB rust and BCMV **Marketability:** Medium

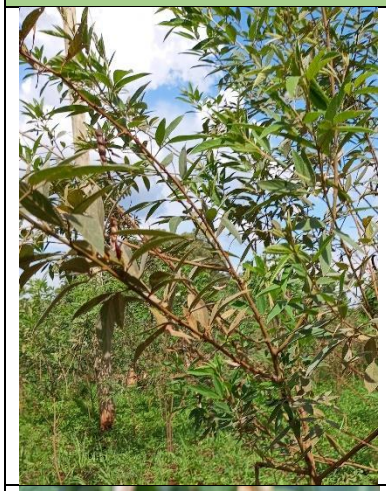
	Common: NABE 15 Local: Kinyobwa	Maturity Period: 60 - 65 Days Yield: 1.8 - 2.0 Tons/Ha; 0.7 - 0.8 Tons/Acre Seed Rate: 20 - 25 kg/acre **Source:** Readily available in local markets	Resistant to anthracnose, rust and halo blight matures early (2.5 months), Tasty and swells when cooked, cooks quickly due to the soft testa (1.5 hours). Susceptible to weevils **Marketability:** High
	Common: NAB 16 Local:	Maturity Period: 60 - 70 Days Yield: 1.8 - 2.0 Kg/Ha; 0.7 - 0.8 tons/acre (under good management) Seed Rate: 20 - 25 Kg/Acre Seed Size: Medium Seeded **Source:** Readily available in local markets	Pink with red stripes Resistant to anthracnose, rust and halo blight Suitable for all regions Tasty and swells when cooked **Marketability:** Medium
	Common: Local: Nambale	Maturity: 80 days Seed rate: 90-100 kg/ha Expected yield: 1.5 - 1.8 ton/ha Growth habit: Erect (Type I) **Source:** Readily available in local markets	Resistant to BR but Susceptible to anthracnose, ALS, CBB and root rot. High market value, withstands adverse weather conditions, tasty, can be stored for long periods (four months) without being destroyed by weevils **Marketability:** High

	Common: Small yellow beans Scientific: Naro bean 2 Local: Yellow	Maturity Period: 58 - 68 Days Yield: 600 - 800 Kg/Acre **Source:** Readily available in local markets	Tasty, especially when cooked as katogo (mixture of beans, bananas, cassava or sweet potatoes), matures early (2.5 months), cooks quickly due to the soft testa (1.5 hours) Susceptible to weevils **Marketability:** High
	Common: Army green beans Local:	Maturity Period: 90-120 Days Yield: 600 - 800 Kg/Acre **Source:** Kibaire Community Seed	These beans make delicious dishes like katogo. **Marketability:** Low (Not well known)
	Common: Jugo bean Local: Bambara	Maturity Period: 90-120 Days Yield: 600 - 800 Kg/Acre **Source:** Kibaire Community Seed	It grows in unfavorable conditions and is drought tolerant, which makes it a good choice for farmers in low water areas with poor soil qualities. Bambara beans are considered highly nutritious, and have been termed a complete food **Marketability:** Low (Not well known)

	Local: Kanyamunyu	Maturity Period: 60 - 70 Days Yield: 1.8 - 2.0 Kg/Ha; 0.7 - 0.8 tons/acre (under good management) Seed Rate: 20 - 25 Kg/Acre Seed Size: Medium Seeded **Source:** Kitaara Community Seed Bank	High yielding, can be stored for long periods without being attacked by weevils (four months) Long cooking time due to the hard Testa (five hours) **Marketability:** Medium
	Common: Naro bean 1	Maturity Period: 60 - 70 Days Yield: 1.5 - 2.0 Kg/Ha; 0.7 - 0.8 tons/acre (under good management) Seed Rate: 20 - 25 Kg/Acre Seed Size: Medium Seeded **Source:** Kitaara Community Seed Bank	Resilience to the impacts of drought **Marketability:** Medium
	Common: Local: Mampulike purple	Maturity Period: 80 Days Yield: 600 - 800 Kg/Acre **Source:** Kibaire Community Seed	Tasty, especially when cooked as katogo, matures early (2.5 months), cooks quickly due to the soft testa (1.5 hours) Susceptible to weevils **Marketability:** Medium

4.2.2 Other Legumes

Table 2: Existing Local Seed Varieties of Other Legumes

Photo	Name	Attributes	Specifications
	Common: Pigeon peas Scientific: Cajanus cajan Local: Enkuuku 	Maturity: 6–9 Months Seed rate: 20-25 Kgs/ha Expected yield: 250-500 Kgs/ha Growth habit: Perennial shrub **Source:** Available in urban markets (Hoima and Masindi)	Pigeon pea cultivation ranges from 18 to 38 degrees Celsius and it does not tolerate waterlogged soils. It is sensitive to high salinity and to water logging. It flowers well where rainfall is 1500 to 2000 mm. Commons diseases are Fusarium wilt which may cause wilting at flowering stage **Marketability:** Medium
	Common: Cowpeas Scientific: Vigna unguiculata Local: Goobe 	Maturity: 80 – 90 days Seed rate: 16-20 Kgs/ha Expected yield: 200-400Kgs/ha Growth habit: Climber/needs a pole or fence during growth **Source:** Available in urban markets (Hoima and Masindi)	Some farmers prefer to uproot a whole plant and sell it in the market as it is. The end consumer will remove the leaves for cooking. Other farmers prefer harvesting a few leaves from the plant. Both leaves and seeds are marketable Scab (Sphaceloma sp.) which is a seed-borne disease is one of the major constraints of cowpea production **Marketability:** Medium

	Common: Ground/pea nut Scientific: Serere nut 2 Local: Ebinyowa (Paidha)	Maturity: 90 days Seed rate: 95-100 Kgs/ha Expected yield: 200kg/acre **Source:** Readily available in local markets	Highly susceptible variety to GRD and Rosette Highly marketable. Yield is currently low **Marketability:** High
	Common: Ground/pea nut Scientific: Arachis hypogaea Local: Ebinyowa (Red beauty)	Maturity: 90-110 days Seed rate: 95-100 Kgs/ha Expected yield: 720kg - 800Kgs/ha Growth habit: Erect **Source:** Readily available in local markets	Red Beauty, which was first released to farmers in 1966 and has been home saved ever since, has been improved to resist against rosette virus. Highly susceptible variety to GRD and Rosette Highly marketable **Marketability:** High

4.2.3 Cereals-Maize, sorghum and Millet

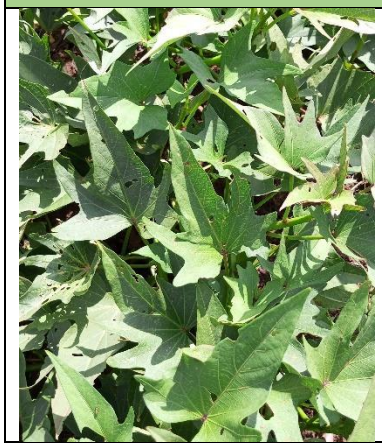
Table 3: *Existing* ***Local seeds of Cereals***

Seed photo	Name	Attributes	Specifications
	Common: Maize Scientific: Zea mays Local: Ebikyoli Obulele	Maturity: 4–5 Months **Expected yield:** 300-500 Kgs/acre **Source:** Kibaire Community Seed	Drought resistant, takes longer to mature but very tasty especially when roasted **Marketability:** Low (Millers don't like coloured maize)
	Common: Sorghum Scientific: Sorghum bicolor Local: Omugusa	Maturity: 5 – 6 Months Expected yield: 400Kgs/acre **Source:** Bagamba Kamu Group –Kasozi Kagadi	Third most important staple cereal food crop in Uganda after maize and millet. Tolerant to drought but with low yields, very good for brewing local banana brew (Tonto) **Marketability:** Medium (among brewers)

	Common: Finger Millet Scientific: Panicum miliaceum Local: Oburo obunyoro	Maturity: 120-135 days **Expected yield:** 300-400kg /acre **Source:** Kibaire Community Seed	Millet growing is done on a small scale mainly by the elderly because it's considered larbour intensive and its long maturity. Very marketable **Marketability:** High

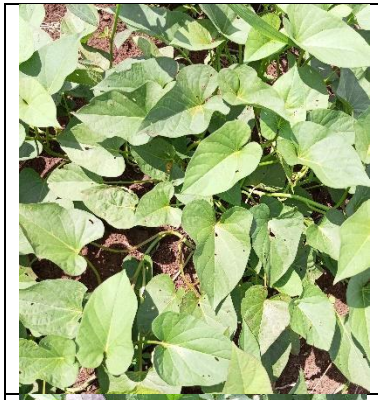
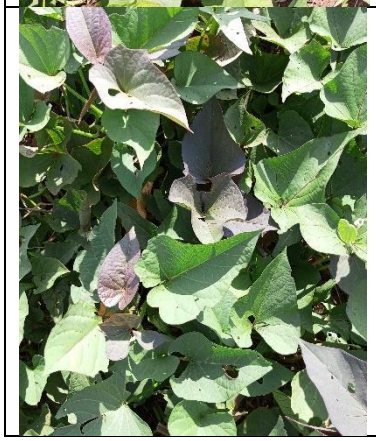
4.2.4 Sweet Potatoes (Ipomoea batatas (L.)

Table 4: Existing Local varieties of Sweet Potatoes

Photo	Name	Attributes	Specifications
	Local: Kyabulindi	Maturity: 3 months **Expected yield:** 12tons/ha **Source:** Kyabigambire Potato Vine Group	Reddish tuber, white inside **Marketability:** Medium

	Local: Kyabendula	Maturity: 4 – 5 months **Expected yield:** 15tons/ha **Source:** Kyabigambire Potato Vine Group	Local sweet potato with a purplish skin color and purely white inside. Sometimes when it is kept for a long time in the soil, the skin of the tubers turns brownish and develops some elongated scars. Variety can last up to 8 months after first harvest **Marketability:** High
	Local: Rwoyarwasega	Maturity: 3-4 months **Expected yield:** 14tons/ha **Source:** Kyabigambire Potato Vine Group	Whitish, in and out tubers High yielding. **Marketability:** Medium
	Local: Kahuki	Maturity: 3 -6 months **Expected yield:** 12tons/ha **Source:** Kyabigambire Potato Vine Group	Red coloured tuber and yellowish inside Good yield in six months **Marketability:** Medium

	Local: Kakira Kembeba	Maturity: 3 months **Expected yield:** 15tons/ha **Source:** Kyabigambire Potato Vine Group	Reddish tuber, white inside **Marketability:** High
	Local: Kahogo	Maturity: 5 months **Expected yield:** 12tons/ha **Source:** Kyabigambire Potato Vine Group	Tasty, doesn't go bad easily and Tuber is of yellowish cover. **Marketability:** High
	Local: Kayuki	Maturity: 3 -6 months **Expected yield:** 12tons/ha **Source:** Kyabigambire Potato Vine Group	Red coloured tuber and yellowish inside Good yield in six months **Marketability:** Medium

	Local: Budunka	Maturity: 3 months **Expected yield:** 10tons/ha **Source:** Kyabigambire Potato Vine Group	Tuber with yellowish skin, white inside. **Marketability:** Medium
	Local: Bwana bwasomero	Maturity: 3 months **Expected yield:** 12tons/ha **Source:** Kyabigambire Potato Vine Group	Yellow tubers and yellowish inside. **Marketability:** Medium

4.2.5 Cassava

Table 5: Existing local varieties of Cassava

Vines photo	Name	Attributes	Specifications
	Common: Cassava Scientific: Manihot esculenta Crantz) Local: Musabampale	Maturity: Seed rate: Expected yield: Growth habit: Shrub **Source:** Kyabigambire Potato Vine Group	Cassava brown streak disease [CBSD] is an important virus disease that damages the starch-bearing tuberous roots of cassava **Marketability:** High

4.3 Existing diversity of plants for human utilization

While the rise in consumer demand for indigenous foods in Uganda indicated growing consumption in urban areas, there was limited documentation of consumption trends of indigenous foods amongst poor communities. In general, leafy indigenous and traditional vegetables were much more frequently consumed than fruit or other indigenous foods. The most popular vegetables included Enswiga (Solanum nigrum), Enjagi (Solanum gilo), Ekisuusa (Cucurbita maxima leaves) and the Amaranthus species. Farming communities were more market-oriented and very little was left for food for the households to consume. There was near extinction of some indigenous crops, particularly local maize, millet, local sorghum and some vegetables, which were being replaced with less nutritious exotic options. During the focus groups discussions, emphasis was always put on HOCADEO providing a market for traditional food crops if it was to encourage farmers to grow them, rather than emphasis being put on the benefits that would accrue.

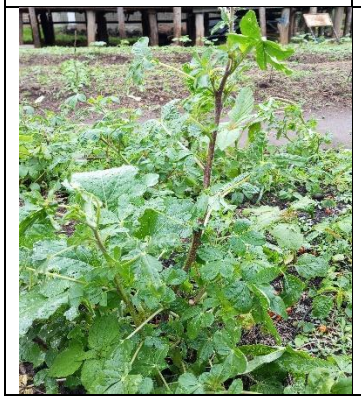
4.3.1 Yams (Dioscorea spp)

Table 6: Existing Varieties of Yams

Vines photo	Name	Attributes	Specifications
	Common: Yam Local: Mayuni-Ndaggu 	Maturity: 9-10 months **Expected yield:** 2.0 - 2.5 ton/ha Growth habit: Erect (Type I) **Source:** Poverty Warriors Group Mirya Cell Masindi	Steamed Ndaggu with Peelings Long lasting in the soils. Normally used for food security, consumed during food scarcity (dry seasons) **Marketability:** Medium
	Common: Arrow Yam Local: Mayuni –Bwaise 	Maturity: 9-10 months **Expected yield:** ton/ha **Source:** Maria Birikira Farm – Isunga Kibaale District	Usually planted in wetlands. Very marketable especially in urban centres. **Marketability:** High
	Common: Climbing yam (Dioscorea bulbifera) Local: Balugu 	Maturity: 10-14 months **Expected yield:** 2.0 - 2.5 ton/ha **Source:** Maria Birikira Farm – Isunga Kibaale District	Climbing yams become productive after nine months and the tubers vary greatly in size, from less than 5 kilograms up to 80-100 kg Not very marketable **Marketability:** Low

4.3.2 Vegetables

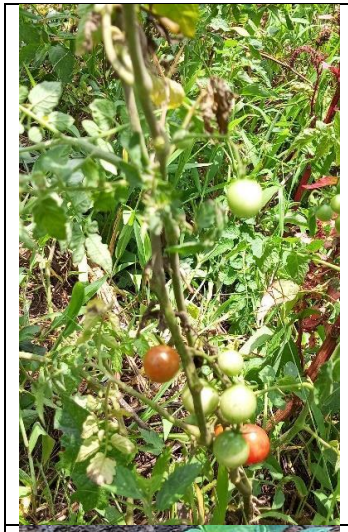
Table 7: Existing vegetable varieties

Photo	Name	Attributes	Specifications
	Common: Black nightShade Scientific: Solanum nigrum Local. Enswiga	Maturity: 30–60 days **Expected yield:** 3 tons/ha **Source:** Wandera Moses Farm –Hoima District	The parameters assessed at maturity include; number of leaves, number of fruits, number of branches, shoot length, plant height, leaf area. Hand picking is used during harvesting. Both the fresh young leaves, shoots are used as vegetables. Ripened fruit is also edible. The most common diseases attacking black nightshade are among others, leaf blight, bacterial wilt, powdery mildew, etc. **Marketability:** High
	Common: Spider plant Scientific: Cleome gynandra L. Local: Eyobyo	Maturity: 20 – 40 days Expected yield: 1 ton of leaves/acre **Source:** Wandera Moses Farm –Hoima District	Spider plant is used as a vegetable, and as such adds important nutrients to the diet. The leaves are usually cooked when fresh but may also be dried and stored for up to two years although this practice greatly reduces the crop's nutrition value Pests and diseases are rare in spider plants. Aphids are the major pest. They cause the leaves to curl and unattractive to customers **Marketability:** Low

	Common: Jute leaves Scientific: Corchorus olitorius Local: Nyamusiri	Maturity: 30 to 90 days Expected yield: 3-4tons of green plants/hectare **Source:** Wandera Moses Farm –Hoima District	Jute leaves are very popular and versatile vegetables. They're rich in immune- and bone-supporting nutrients like calcium and vitamins A and C. Most important disease of jute is Stem rot. **Marketability:** Low
	Common: Redroot Scientific: Amaranthus retroflexus) Local: Doodo	Maturity: 18 to 30 days Expected yield: 10-20 tons/ha Growth habit: Erect, branched, 2–10 ft **Source:** Wandera Moses Farm –Hoima District	An indigenous (local or home grown variety), Fast vegetative growth. Egg-shaped (ovate) leaves red in colour. Maturity period depends on management, weather and soil type. White rust (Blister) is the most devastating disease for dodo in Uganda **Marketability:** Medium
	Common: Pigweed Scientific: Amaranthus Local: Doodo	Maturity: 18 to 30 days Expected yield: 40tons/ha of fresh leaves Growth habit: Erect, branched, 2–10 ft **Source:** Wandera Moses Farm –Hoima District	It is drought tolerant and can grow on marginal soils, however, with adequate management; it can produce about 40 tons/ha of fresh leaves White rust (Blister) is the most devastating disease for dodo in Uganda **Marketability:** High

	Common: Green Garlic Scientific: Allium sativum L. Local: Tungulucumu	Maturity: 60 to 120 days Expected yield: 3tons/ha of fresh leaves **Source:** URDT[2] Demo farm	Garlic can be a very easy-to-grow herb in the garden, however it is also prone to several diseases. These include, Basal Rot, White Rot and Downy Mildew **Marketability:** Medium
	Common: Onions Scientific: Allium cepa Local: Obutunguru	Maturity: 120 to 150 days Expected yield: 8 tons/acre **Source:** URDT Demo farm	This vegetable is typically grown as an annual. The dry bulb onions are harvested after the leaves have dried back and the bulbs fully matured. The local onions have small bulbs with a strong aroma and can be stored for longer periods. Thrips is the most destructive pest and Downy Mildew is the most common diseases for onions **Marketability:** High
	Common: African Egg plant Scientific: Solanum aethiopicum Local: Enjagi	Maturity: 100 to 120 days Expected yield: 16-32 tons/acre Growth habit: Strong growth **Source:** URDT Demo farm	The fruit should be harvested before the skin changes color from white to pale yellow when the skin becomes tough. Fruits should be harvested regularly to encourage maximum fruit production. Common diseases include blossom end rot, wilt diseases, and various types of blight. **Marketability:** Medium

[2] Uganda rural development and training

	Common: Cherry tomatoes Scientific: Local:	Maturity: 30 to 45 days Expected yield: 10-15tons/acre Growth habit: Climber **Source:** URDT Demo farm	Indeterminate variety keep growing taller and taller. Fruits grow in clusters of up to a dozen, much like grapes, and have very thick walls and few seeds, giving them a meaty texture. Plants show good disease resistance, especially to wilts. Can survive 2 -5 years. **Marketability:** Medium
	Common: Cowpeas Scientific: Vigna unguiculata Local: Goobe	Maturity: 80 – 90 days Expected yield: 200-400Kgs/ha **Source:** URDT Demo farm	Some farmers prefer consuming cow peas as a vegetables. They harvest a few leaves from the plant which are consumed either boiled or pasted with groundnuts **Marketability:** Medium
	Common: Bitter berries Scientific: Solanum anguivi Local: Obujabara	Maturity: 60 – 90 days Expected yield: 800-1500Kgs/ha **Source:** URDT Demo farm	Sundried, grinded into powder, boiled with other foods, it's a spice, immune booster and normalizes blood pressure, and treats diabetes and strengthens bile. **Marketability:** Medium

4.3.3 Fruits

Table 8: Existing local fruit varieties

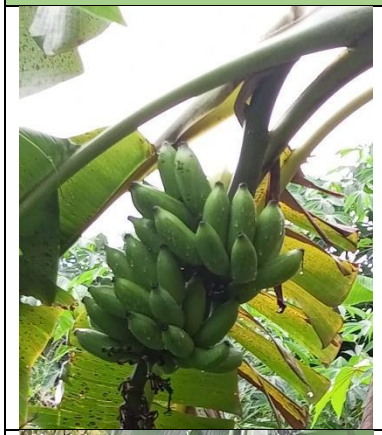
Seed photo	Name	Attributes	Specifications
	Common: Wild sweet calabash Scientific: Passiflora maliformis Local: Obutunda obutaito	Maturity: 12–18 Months Expected yield: 3 tons/ha Growth habit: Climber **Source:** Wandera Moses Farm – Hoima District	Fast-growing vine grows best in somewhat cooler than tropical climates. The rind is particularly hard, and tougher than most passion fruits
	Common: Passion fruit Scientific: Passiflora edulis Sims. Local: Obutunda	Maturity: 12 to 18 months Expected yield: 10-20 tons/ha Growth habit: Climber **Source:** URDT Demo farm	The purple grandilla passion fruits are small, round with a diameter of approximately 4cm. They are green in colour when young and turn to a purple colour when mature and ripe. Common diseases are anthracnose, scab, septoriosis and alternaria spot. Pests are mites and bugs
	Common: Lemon Scientific: Citrus limon Local: Nnimu	Maturity: 150– 160 days Expected yield: 10-12 tons/ha/year. Growth habit: Tree **Source:** Wandera Moses Farm – Hoima District	Citrus can be grown in a wide range of soil types. However, for best results, they should be grown in well-drained soils, which are fertile. Lemons usually develop lesions on leaves caused by citrus Canker, sooty mold caused by Aphid and brown spots.
	Common: Tomatoe Scientific: Solanum lycopersicum Local:	Maturity: 30 to 45 days Expected yield: 10-20 tons/ha Growth habit: Climber **Source:** URDT Demo farm	Indeterminate variety keep growing taller and taller, setting and ripening fruit. When nurtured in ideal or controlled growing conditions indoors, tomato plants can survive between 2-5 years.

	Common: Pumpkin Scientific: Cucurbita maxima Duch Local: Ekisunsa	Maturity: 90 to 120 days Expected yield: 20-45 tons/acre Growth habit: Climber **Source:** URDT Demo farm	Pumpkins are hand harvested at their mature stage. Multiple harvests are so common because individual fruits are pollinated at different times.
	Common: Tree Tomato Scientific: Cyphomandra betacea Cav Local: Ekidodoima	Maturity: 1.5-2.5 years Expected yield: 20-30 tons/acre Growth habit: Tree **Source:** URDT Demo farm	The plant is day length-insensitive. Fruits do not mature simultaneously unless the tree has been pruned. Anthracnose and root-knot nematodes most common diseases
	Common: Mango Scientific: Mangifera indica L. Local: Omuyembe	Maturity: 5 – 8 years Expected yield: 200 fruits per year/tree **Source:** Bagamba Kamu Group –Kasozi Kagadi	The mango fruit takes three to five months to ripen after the tree has flowered. The color of the ripe fruit depends on the variety. The major diseases are anthracnose and powdery mildew.
	Common: Avacado Scientific: Persea americana Mill. Local: Avacado	Maturity: 6 – 8 years Expected yield: 600 fruits per season/tree **Source:** Bagamba Kamu Group –Kasozi Kagadi	Locally known as Ova, and the fruit trees are widely found farms and home gardeners. There are varieties created from unrecorded crosses, creating a vast amount of genetic diversity. Affected by root rot and anthracnose.
	Common: Common guava Scientific: Psidium guajava L. Local: Amapera	Maturity: 3 – 4 years Expected yield: 75 kg/tree **Source:** Bagamba Kamu Group –Kasozi Kagadi	Guava fruit generally takes about 17-20 weeks from fruit set to reach maturity. At the time of harvest, you will see a clear change in the color and aroma of the ...

	Common: Cape Gooseberry Scientific: Physalis peruviana L. Local: Entuutu	Maturity: 14 – 16 weeks Expected yield: 1-5 kg/plant **Source:** Bagamba Kamu Group –Kasozi Kagadi	Cape gooseberries are self-pollinated but pollination can be improved by a gentle shaking of the flowering stems or giving the plants a light spraying with water. After pollination the fruit takes 70 to 80 days to mature

4.3.4 Suckers (Bananas)

Table 9: Existing Local Banana varieties

Photo	Name	Attributes	Specifications
	Common: Scientific: Local: Kabarokole	Maturity: 16 Months Seed rate: 400 suckers/acre Expected yield: 0.5- 1 ton/acre/ month **Source:** Maria Birikira Farm – Isunga Kibaale District	Its leaves are whitish and narrow. The stem is rich in sap. Banana fingers of this variety are short. This variety is often used for juice production. In appearance it looks like the apple banana (ndiizi) It is highly susceptible to banana bacterial wilt Status: Banana plants are poor managed, produce very low quality bunches **Marketability:** High (Juice)
	Common: Apple Banana Scientific: Local: Kivuvu	Maturity: 4-6 Months Seed rate: 400-450 suckers/acre Expected yield: 0.5- 1 ton/acre/ month **Source:** Maria Birikira Farm – Isunga Kibaale District	They are stout and plump, with a thick taut peel Kivuvu (Apple Banana) is another form of matooke that is steamed on top of the main meal that is cooked when it is unpeeled and it can be eaten for breakfast or dessert. The cultivars have considerable resistance to Panama disease caused by Fusarium **Marketability:** Low

	Common: Scientific: Local: Mbwa zirume	Maturity: 3-4 Months Seed rate: 400-450 suckers/acre Expected yield: 0.5- 1 ton/acre/ month **Source:** Poverty Warriors Group Masindi	The cultivars have considerable resistance to Panama disease caused by Fusarium Less marketable compared to other bananas **Marketability:** Medium
	Common: Apple banana Scientific: Ney Poovan Local: Sukaali ndiizi	Maturity: 3-4 Months Seed rate: 400-450 suckers/acre Expected yield: 0.5- 1 ton/acre/ month **Source:** Maria Birikira Farm – Isunga Kibaale District	Ndiizi is the most resistant variety in the poor soil and arid climate. The plant can survive for up to 30 years if well maintained. Hampered with the spread of Fusarium wilt (Fusarium oxysporum f. sp. cubense) Very marketable both locally and internationally **Marketability:** High
	Common: Scientific: Local: Kisubi	Maturity: 5-6 Months Seed rate: 400 suckers/acre Expected yield: 0.5- 1 ton/acre/ month **Source:** Maria Birikira Farm – Isunga Kibaale District	Kisubi bananas have small, light yellowish trunks that are 2-3 meters tall. Kisubi generally has smaller, pointed, and straighter leaves than other banana varieties. The kisubi has been produced in Uganda for centuries. The bunches of this variety grow more slowly than other varieties: Once the flower blooms at the end of the trunk it takes 5 months **Marketability:** Medium

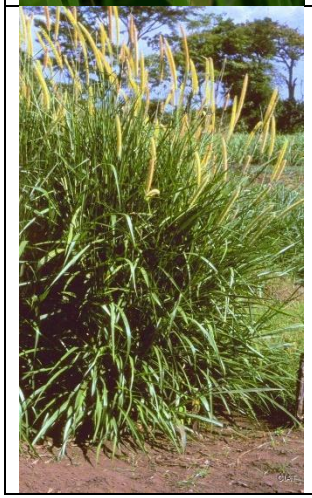
	Common: Scientific: Musa paradisiaca L. Local: Gonja	Maturity: 3-4 Months Seed rate: 400 suckers/acre Expected yield: ton/acre/ month **Source:** Maria Birikira Farm – Isunga Kibaale District	Gonja is propagated vegetative. The types of planting materials used are peepers, sword suckers and maiden suckers. Plantains are more resistant to pests (banana weevil) than other banana species. Status: Farmers have taken it for commercial farming especially in areas of Kibale **Marketability:** High
	Common: Beer banana Scientific: Local: Mbire	Maturity: 3-4 Months Seed rate: 400 suckers/acre Expected yield: 0.5- 1 ton/acre/ month **Source:** Maria Birikira Farm – Isunga Kibaale District	Physical characteristics which distinguish it from other varieties of banana. It also has a mid-rib and male bad (bell) are pink, and its banana bunch weighs 20 to 25 kilograms. Mbire banana is disease and drought resistant. Status: Very scarce among farmers There is a great need to protect this particular type of banana because it holds very important traditional and cultural values. **Marketability:** Medium
	Common: dessert banana 'Gros Michel' Scientific: Local: Bugoya	Maturity: 16 Months Seed rate: 400 suckers/acre Expected yield: ton/acre/ month	The long and bare peduncle hangs vertically and is distinctively curved below the bunch. The fruit is long (18-23 cm) and straight for most of its length. The fruit apex is slightly tapered Susceptible to Fusarium oxysporum f. sp. Cubense Status: Farmers have plants within their plantations Highly marketable

4.4 Traditional plants used for medicinal purposes

4.4.1 Grasses

Table 10: Grasses used for medical purposes

Plant Photo	Name	Attributes	Diseases	Processing
	**Common:** Signal grass Scientific: Brachiaria decumbens Stapf **Local:** Ejubwa	Growth habit: Grass Habitat: Grassland Status: Wild and available	Heart disease, diarrhoea, yellow fever, malaria	**Fresh leaves:** Chew or decoction drunk. Give 500 ml once a day
	**Common:** Lemon grass Scientific: Cymbopogon citratus Stapf **Local:** Kalifuha	Growth habit: Grass Habitat: Homestead Status: Cultivated	Yellow fever	**Fresh leaves:** Boil with Bidens pilosa and Melanthera scandens and drink
	**Common:** Citroneella grass Scientific: Cymbopogon nardus (L.) Rendle **Local:** Etete	Growth habit: Grass Habitat: Grasslands Status: Wild	Infertility in men	**Fresh leaves:** Boil with Albizia coriaria bark in local brew and drink

	**Common:** Couchgrass Scientific: Digitaria abyssinica **Local:** Orumbugu	Growth habit: Grass Habitat: Bush Status: Wild	Malaria yellow fever, stop bleeding	**Fresh leaves:** Decoction drunk and bathed pound and apply on fresh wound
	**Common:** Spear grass Scientific: Imperata cylindrica (L.) P. **Local:** Ensojo	Growth habit: Grass Habitat: Bush Status: Wild	Worms	**Fresh leaves:** Chew and drink 250 ml three times a day
	**Common:** Elephant grass Scientific: Pennisetum purpureum Schum **Local:** Orubingo	Growth habit: Grass Habitat: Bush Status: Wild	Heart disease	**Fresh leaves:** Roast leaves, add water and drink

4.4.2 Climbers, Creepers and Scandents

Table 11: Existing Climbers, Creepers and Scandents used for herbal medicine

Photo	Name	Attributes	Diseases Treated	Processing perfomed
	**Common:** Tiger grass Scientific: Centella asiatica (L.) Urb **Local:** Embutami	Growth habit: Creeper Habitat: Grass Status: Wild	Stomach ache	**Fresh leaves:** Infusion drunk
	**Common:** Malabar Spinach Scientific: Basella alba L. (Basellaceae) **Local:** Enderema	Growth habit: Climber Habitat: Bush Status: Wild	Measles	**Fresh leaves:** Decoction drunk. 500 ml given three times a day for adults and 250 ml to children for three days or apply on the body
	**Common:** Burning bush or forest flame-creeper Scientific: Combretum paniculatum Vent Local: Akakoigo akataito	Growth habit: Scandent Habitat: Bush Status: Wild	Diarrhoea	**Fresh leaves:** Infusion drunk. 500 ml given two times a day for adults for five days
	**Common:** Pumpkin Scientific: Cucurbita maxima Duch **Local:** Ekisunsa	Growth habit: Climber Habitat: Homestead Status: Cultivated	Cough	**Fresh Leaves:** Decoction drunk

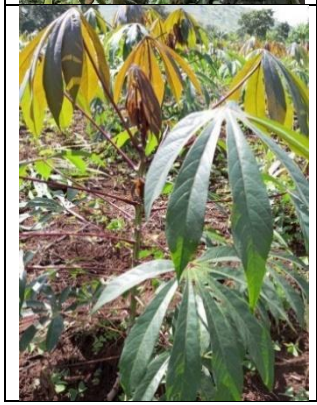
	**Common:** Sweet potato Scientific: Ipomoea batatas (L.) Lam. **Local:** Enkoora	Growth habit: Vine Habitat: Garden Status: Cultivated	Diarrhoea	**Dry leaves:** Pound with Passiflora edulis, Coffea canephora add water
	**Common:** Tonic root Scientific: Mondia whitei Skeels **Local:** Emirondwa	Growth habit: Scandent Habitat: Bush Status: Wild and rare	Aphrodisiac	**Fresh roots:** Chew
	**Common:** Passion fruit Scientific: Passiflora edulis Sims. **Local:** Obutunda	Growth habit: Climber Habitat: homestead Status: Cultivated	Diarrhoea, cough	**Fresh leaves:** Pound add water, drink
	**Common:** Bread and cheese Scientific: Paullinia pinnata L. **Local:** Emizigambogo	Growth habit: Climber Habitat: Bush Status: Wild	Diarrhoea	**Fresh leaves:** Decoction drunk
	**Common:** Common madder Scientific: Rubia cordifolia L. **Local:** Akaramata	Growth habit: Climber Habitat: Bush Status: Wild	Eye infection, tape worms	Apply sap

	**Common:** Secamone africana Scientific: Secamone africana (Oliv.) **Local:** Akateganende	Growth habit: Scandent Habitat: Bush Status: Wild	Constipation, menstrual pains, malaria	**Fresh leaves:** Infusion drunk. 500 ml given three times a day for adults and 250 ml to children
	**Common:** Senecio hadiensis Scientific: Senecio hadiensis Forssk. **Local:** Omugino	Growth habit: Scandent Habitat: Garden Status: Cultivated	Stop miscarriage	**Fresh leaves:** Squeeze and mix with water and drink 500 ml once.
	**Common:** Black eyed susan Scientific: Thunbergia alata Bojer ex Sims **Local:** Wankura	Growth habit: Climber Habitat: Bush Status: Wild	Clean foetus, quicken delivery	Fresh leaves: Decoction drunk. 500 ml given three times a day for three days
	Common: Vanilla Scientific: Vanilla planifolia Jacks.ex Local: Vanilla	Growth habit: Climber Habitat: Garden Status: Cultivated	Fresh wound	Squeeze and apply
	**Common:** Wild Cucumber Scientific: Zehneria scabra Sond **Local:** Kasunsa	Growth habit: Climber Habitat: Bush Status: Wild	Meat allergy	**Dry leaves:** Powder mixed with meat

4.4.3 Shrubs

Table 12: Existing Shrubs used for herbal medicine and some for fodder

Plant Photo	Name	Attributes	Diseases Treated	Processing performed
	**Common:** Bushman Tea Scientific: Catha edulis Forssk. **Local:** Amairungi	Growth habit: Shrub Habitat: Homestead Status: Cultivated	Cough	**Fresh leaves:** Chew and swallow liquid
	**Common:** Night Jesmine Scientific: Cestrum nocturnum Lam **Local:** Bamulyekiro	Growth habit: Shrub Habitat: Homestead Status: Cultivated	Ring worm	**Fresh leaves:** Squeeze and smear on affected area
	**Common:** Popcorn Lavender Scientific: Lantana trifolia L. **Local:** Omusekera	Growth habit: Shrub Habitat: Bush Status: Wild	Malaria, yellow fever, diarrhoea, cough	**Fresh leaves:** Decoction drunk. 500 ml given three times a day Mix with black salt and chew
	**Common:** Tree Tomatoe Scientific: Cyphomandra betacea Cav **Local:** Ekidodoima	Growth habit: Shrub Habitat: Homestead Status: Cultivated	Ulcers	**Fresh leaves:** Decoction mixed with Crassocephalum vitellium and drunk

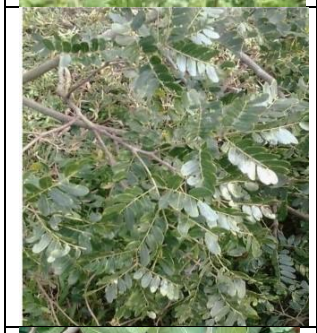
	**Common:** Sex Tree Scientific: Citropsis articulata Swingleand Kellerman **Local:** Katimboro	Growth habit: Shrub Habitat: Forest Status: Wild	Infertility in men	**Fresh roots:** Chew fresh roots for three days
	**Common:** Ebony fruit tree Scientific: Diospyros abyssinica (Hiern) **Local:** Omuhoko	Growth habit: Shrub Habitat: Woodland Status: Wild and rare	Fresh wounds, fungal infection on the foot	**Fresh leaves:** Squeeze and apply and apply on affected area
	**Common:** The loquat Scientific: Eriobotrya japonica **Local:** Ensaali	Growth habit: Shrub Habitat: Garden Status: Cultivated	Cough	**Fresh leaves:** Decoction drunk
	**Common:** Cassava Scientific: Manihot esculenta Crantz **Local**: Muhogo	Growth habit: Shrub Habitat: Garden Status: Cultivated	Fever	**Dry leaves:** Boil and bath or mix with Elymus repens (L.) Gould, Sonchus oleraceus boil and steam the body

	**Common:** Egyptian Pea Scientific: Sesbania sesban (L.) Merr **Local:** Omubimba	Growth habit: Shrub Habitat: Bush Status: Wild	Malaria	**Fresh leaves:** Decoction drunk
	**Common:** Misty plume bush Scientific: Tetradenia riparia (Hochst) **Local:** Kacuucu	Growth habit: Shrub Habitat: Homestead Status: Cultivated	Tape worms, constipation, cough	**Fresh leaves:** Decoction drunk
	**Common:** Luckynut Scientific: Thevetia peruviana (Pers) **Local:** Akasitani	Growth habit: Shrub Habitat: Homestead Status: Cultivated	Cough	**Fresh leaves:** Decoction drunk
	**Common:** African Senna Scientific: Cassia didymobotrya Fresen **Local:** Omuchora	Growth habit: Shrub Habitat: Bush Status: Wild	Constipation, fever, ring worm	**Fresh stem bark and Fresh leaves:** Decoction drunk. Give 500 ml once

4.4.4 Trees

Table 13: Trees used for herbal medicine, some for food and fodder

Photo	Name	Attributes	Diseases Treated	Processing performed

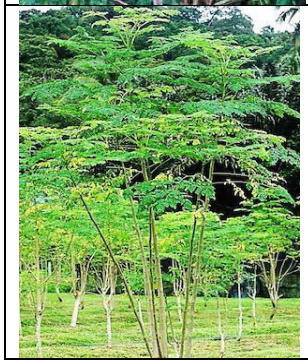
	**Common:** Shittim wood Scientific: Acacia hockii De Wild Local: Engando	Growth habit: Tree Habitat: Grass land Status: Wild and Available	Athletes foot	**Fresh leaves:** Squeeze and apply to the affected area
	**Common:** Worm-cure Albizia tree Scientific: Albizia coriaria Welw **Local:** Omusisa	Growth habit: Tree Habitat: Bush Status: Wild and available	Cough	**Fresh stem Bark:** Decoction drink. 500 ml given three times a day for adults and 250 ml given once for children until recovery
	**Common:** Triangle-tops Scientific: Blighia unijugata Bak Local: Omwataibale	Growth habit: Tree Habitat: Bush Status: Wild and Rare	Headache, malaria	**Fresh stem and Bark**: Decoction drunk. 500 ml given once a day until recovery
	**Common:** Mitzeeri sweetberry Scientific: Bridelia micrantha Baill **Local:** Omubaragaza	Growth habit: Tree Habitat: Bush Status: Wild	Hernia, malaria	**Dry stem bark:** Decoction drunk

	**Common:** Tea plant Scientific: Camellia sinensis (L.) Kuntze **Local:** Amajani	Growth habit: Tree Habitat: Plantation Status: Cultivated	Yellow fever, stomach ache	**Fresh leaves:** Chew or decoction with Bidens Pilosa and Myrica salicifolia and drunk
	**Common:** Citrus Lemon Scientific: Citrus limonum Risso **Local:** Endimo	Growth habit: Tree Habitat: Homestead Status: Cultivated	Malaria	**Fresh leaves:** Decoction drunk
	**Common:** Drum Tree Scientific: Cordia millenii Bak. Local: Omutumba	Growth habit: Tree Habitat: Forest Status: Wild	Diarrhoea	**Fresh stem Bark:** Decoction drunk
	**Common:** Lucky-bean tree Scientific: Erythrina tomentosa Buch. Ham. (Leguminosae) **Local:** Omuko	Growth habit: Tree Habitat: Bush Status: Wild	Tonsillitis, malaria	**Leaves:** Decoction drunk
	**Common:** Eucalyptus Tree Scientific: Eucalyptus grandis W.Hill Local: Kalitunsi	Growth habit: Tree Habitat: Homestead Status: Cultivated	Cough	**Fresh leaves:** Decoction drunk. 250 ml taken twice

	**Common:** Fig tree Scientific: Ficus natalensis Hochst **Local:** Omutoma	Growth habit: Tree Habitat: Homestead Status: Wild	Heart disease, stomach ache, throat infection	**Fresh leaves:** Decoction drunk
	**Common:** False assegai, Scientific: Maesa lanceolata Forssk. **Local:** Omuhangabagenzi	Growth habit: Tree Habitat: Bush Status: Wild	Ulcers	**Dry seed:** Dry, pound and take in tea
	**Common:** Mango Scientific: Mangifera indica L. **Local:** Omuyembe	Growth habit: Tree Habitat: Homestead Status: Cultivated	Malaria, Cough	**Fresh leaves, Fresh stem and bark:** Decoction drunk
	**Common:** Nile tulip Scientific: Markhamia lutea K.Schum. **Local:** Omusambya	Growth habit: Tree Habitat: Homestead Status: Wild	Diarrhoea, gonorrhea	**Dry leaves:** Pound add water and drink

	**Common:** Candleberry Scientific: Myrica salicifolia Hochst **Local:** Omujeje	Growth habit: Tree Habitat: Swamp Status: Wild	Yellow fever, cough	**Fresh leaves:** Mix with leaves of Musa sp + tea leaves boil and drink. Boil leaves and drink
	**Common:** Lace-leaf Scientific: Neoboutonia macrocalyx Pax **Local:** Ekihora	Growth habit: Tree Habitat: Forest Status: Wild	Stomach ache and Malaria	**Fresh stem and bark:** Decoction drunk
	**Common:** Avacado Scientific: Persea americana Mill. **Local:** Avacado	Growth habit: Tree Habitat: Homestead Status: Cultivated	Cough, kwashiorkor, high blood pressure, yellow fever	**Fresh leaves and seed:** Decoction or infusion drunk
	**Common:** African cherry Scientific: Prunus africana Hook.f. Local: Engote	Growth habit: Tree Habitat: Forest Status: Wild	Malaria	**Fresh stem and Bark:** Decoction drunk. 250 ml given three times a day
	**Common:** Common guava Scientific: Psidium guajava L. **Local:** Amapera	Growth habit: Tree Habitat: Homestead Status: Cultivated	Yellow fever, fever	**Fresh leaves:** Infusion drunk

	**Common:** Castor oil plant Scientific: Ricinus communis L. **Local:** Ekisogasoga	Growth habit: Tree Habitat: Bush Status: Wild	Fresh wounds	**Sap:** Sap applied on affected area
	**Common:** African tulip tree Scientific: Spathodea nilotica Seem **Local:** Omunyarra	Growth habit: Tree Habitat: Bush Status: Wild	Ear infection	**Fresh leaves:** Squeeze and apply the juice
	**Common:** Honeysuckle-tree Scientific: Turraea africana (Welw.) **Local:** Embahira	Growth habit: Tree Habitat: Forest Status: Wild	Tape worms	**Fresh leaves:** Decoction drunk. 500 ml given three times a day for three days
	**Common:** Bitter leaf Scientific: Vernonia amygdalina Del. **Local:** Ekibirizi	Growth habit: Tree Habitat: Bush Status: Wild	Malaria, worms, skin problems	**Infusion drunk.** 250–500 ml given three times a day for three days

	**Common:** Vernonia wild Scientific: Vernonia auriculifera Hiern **Local:** Ekyesembya	Growth habit: Tree Habitat: Bush Status: Wild	Placenta removal	**Fresh stem and bark:** Infusion drunk
	**Common:** African satinwood Scientific: Zanthoxylum gilletii (De wild.) **Local:** Mutatembwa	Growth habit: Tree Habitat: Forest Status: Wild	High blood pressure, cough	**Fresh stem and bark:** Infusion drunk
	**Common:** Drumstick tree Scientific: Moringa oleifera Lam. **Local:** Moringa	Growth habit: Tree Habitat: Garden Status: Cultivated	Tape worms	**Fresh leaves:** Squeeze, add, water drink

4.4.5 Herbs

Table 14: Existing herbs for medicine, some for food and fodder

Photo	Name	Attributes	Diseases	Processing performed
	**Common:** Black berries (Wild Rosaceae) Scientific: Rubus pinnatus **Local:** Amakerere	Growth habit: Herb Habitat: Bush Status: Wild and available	Tonsillitis	**Fresh leaf**: Chew and swallow liquid
	**Common:** Scientific: Acmella caulirhiza Delile **Local:** Ensoimya	Growth habit: Herb Habitat: Homestead Status: Wild and Available	Eye infection	**Fresh roots:** Squeeze and apply to the affected area
	**Common:** Wild cardamom Scientific: Aframomum angustifolium K.Schum **Local:** Amatehe	Growth habit: Herb Habitat: Bush/Swamps Status: Wild	Measles	**Fresh fruit:** Squeeze add banana brew and drink
	**Common:** Billygoat weed Scientific: Ageratum conyzoides L. **Local:** Omunywaniwenkanda	Growth habit: Herb Habitat: Bush Status: Wild and Available	Wound	**Fresh leaves:** Squeeze and wrap on fresh wound

	**Common:** Garlic Scientific: Allium sativum L. **Local:** Tungulucumu	Growth habit: Herb Habitat: Garden Status: Cultivated	Cough	**Bulb:** Pound with ginger, add water and drink
	**Common:** Aloe vera Scientific: Aloe vera (Aloaceae) **Local:** Enkokorutanga	Growth habit: Herb Habitat: Garden Status: Cultivated	Malaria, yellow fever	**Fresh leaves:** Decoction drunk. 500 ml and 250 ml given three times a day for adults and children respectively for three days
	**Common:** Bush asparagus Scientific: Asparagus africanus Lam. Local: Akakwatango	Growth habit: Herb Habitat: Grassland Status: Wild	Muscle pains Measles	**Fresh leaves:** Squeeze and smear on the skin
	**Common:** Black Jack Scientific: Bidens pilosa L **Local:** Nyabarasana	Growth habit: Herb Habitat: Bush Status: Wild	Eye infection, nose bleeding Yellow fever, diarrhoea, fresh wounds, ulcers	**Fresh leaves:** Squeeze and drop in the eyes/nose

	**Common:** Pigeonpea Scientific: Cajanus cajan (L.) Millsp. **Local:** Orutendigwa	Growth habit: Herb Habitat: Bush Status: Wild	Quicken placenta removal, diarrhoea, relieve menstrual pains, stomach ache measles	**Fresh leaves:** Squeeze, add water and drink
	**Common:** Indian shot Scientific: Canna indica L. (Cannaceae **Local:** Amaranga	Growth habit: Herb Habitat: Homestead Status: Cultivated	Infertility in men Pneumonia	**Fresh roots:** Decoction drunk
	**Common:** Mountain flat bean Scientific: Cassia mimosoides Linn. **Local:** Mukuru ataitabye	Growth habit: Herb Habitat: Grass Status: Wild	Paediatric cough	**Fresh leaves**: Decoction drunk. Give 500 ml twice a day

	**Common:** Coffee Senna Scientific: Cassia occidentalis L. **Local:** Omwitanjoka	Growth habit: Herb Habitat: Bush Status: Wild	Snake bite, tape worms	**Fresh leaves:** Decoction drunk. Give 500 ml three times a day
	**Common:** Seaport goosefoot plant Scientific: Chenopodium opulifolium **Local:** Omwetango	Growth habit: Herb Habitat: Homestead Status: Cultivated	Malaria	**Fresh leaves:** Squeeze, add water and drink
	**Common:** Goosefoots Scientific: Chenopodium procerum Hochst.ex Moq. **Local:** Omujumbajumba	Growth habit: Herb Habitat: Bush Status: Wild	Muscle pains, headache	**Fresh leaves:** Squeeze and smear
	**Common:** Wild clematis Scientific: Clematis hirsuta Guill. **Local:** Akanyankamba	Growth habit: Herb Habitat: Bush Status: Wild	Flu, pneumonia, cough	**Fresh leaves:** Squeeze and sniff

	**Common:** Spider plant Scientific: Cleome gynandra L. **Local:** Eyobyo	Growth habit: Herb Habitat: Garden Status: Cultivated	Snake bite	**Fresh leaves:** Infusion drunk
	**Common:** Ragleaf Scientific: Crassocephalum mannii **Local:** Ekigango	Growth habit: Herb Habitat: Bush Status: Wild	Fever	**Fresh leaves:** Decoction mixed with leaves of Vernonia amygdalina, S. oleracius bathed
			Poisoning, snake bite	Infusion drunk. 500 ml given once
	**Common:** Thickhead, Scientific: Crassocephalum montuosum (S. Moore) **Local:** Ekiinami	Growth habit: Herb Habitat: Bush Status: Wild	Diarrhoea	**Fresh leaves**: Infusion with passion fruit, Coffea canephora and Brachiaria decumbens drunk
	**Common:** Tournesols Scientific: Crassocephalum vitellinum S. Moore. **Local:** Embiribiri	Growth habit: Herb Habitat: Bush Status: Wild	Eye infection, boils anemia, poisoning, diarrhoea, fresh wounds	**Fresh leaves**: Squeeze and drop in eyes
	**Common:** Tall fleabane Scientific: Conyza floribunda Kunth. **Local:** Ekinyansambu	Growth habit: Herb Habitat: Bush Status: Wild	Tonsillitis, ringworm	**Fresh leaves:** Chew

	**Common:** Smooth Hawkbeard Scientific: Crepis sp. **Local:** Omuribata	Growth habit: Herb Habitat: Bush Status: Wild	Cough	**Fresh leaves:** Roast leaves and squeeze juice in mouth
	**Common:** Beggar lice Scientific: Desmodium repandum **Local:** Omunyampata	Growth habit: Herb Habitat: Bush Status: Wild	Diarrhoea	**Fresh leaves:** Squeeze and drink
	**Common:** Silver leaf desmodium Scientific: Desmodium uncinatum **Local:** Otansigahanu	Growth habit: Herb Habitat: Bush Status: Wild	Worms, yellow fever, diarrhoea, toothache	Dry leaves and flowers: Decoction bathed or smear
	**Common:** Dicliptera laxata Scientific: Dicliptera laxata C.B. Clarke **Local:** Omufoka	Growth habit: Herb Habitat: Bush/Forest Status: Wild and rare	Skin infections	**Fresh leaves:** Boil and bath the baby/drink

	**Common:** Bicolor Buttonweed. Scientific: Dichrocephala integrifolia **Local:** Omubuza	Growth habit: Herb Habitat: Bush Status: Wild and rare	Boils Cough	**Fresh leaves:** Squeeze and apply Decoction drunk
	Common: Corn plant Scientific: Dracaena fragrans Ker.Gawl. Local: Akaramura	Growth habit: Herb Habitat: Homestead Status: Cultivated	Ear infection	Fresh leaves: Squeeze and drop the extract in the ear
	**Common:** Chickweed Scientific: Drymaria cordata Willd ex Schult. Local: Bunjune	Growth habit: Herb Habitat: Bush Status: Wild	Induction of labour	**Fresh leaves:** Infusion drunk. 500 ml given once
	**Common:** White goat Scientific: Erlangea cordifolia S. Moore Local: Entooma	Growth habit: Herb Habitat: Bush Status: Wild	Stomach upsets in newborns.	**Fresh leaves:** Squeeze and give two tea spoonsful

	**Common:** Rubber-hedge Scientific: Euphorbia tirucalli L. Local: Enkoni	Growth habit: Herb Habitat: Grazing land Status: Cultivated	Snake bite	**Fresh leaves**: Roast, squeeze and drunk
	**Common:** Gallant soldier Scientific: Galinsoga parviflora Cav **Local:** Karandaranda	Growth habit: Herb Habitat: Bush Status: Wild	Memory enhancement	**Fresh leaves:** Decoction drunk
	**Common:** Sunfleck Scientific: Guizotia scabra Chiov. **Local:** Ekiterankuba	Growth habit: Herb Habitat: Bush Status: Wild	Yellow fever	**Fresh leaves:** Decoction drunk
	**Common:** Rosemallow, Scientific: Hibiscus fuscus Garcke Local: Ensingasinga	Growth habit: Herb Habitat: Bush Status: Wild	Muscle Pull	**Fresh leaves:** Squeeze with ghee and apply
	**Common:** Roselle Scientific: Hibiscus subdariffa Rottl. **Local:** Musayi	Growth habit: Herb Habitat: Homestead Status: Cultivated	Anemia	**Fresh leaves:** Decoction drunk. 500 ml given once.

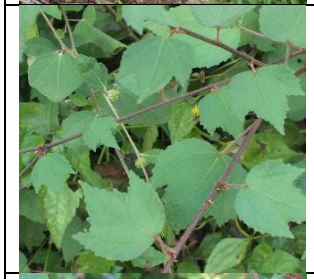
	**Common:** Bird gooseberry Scientific: Hoslundia opposita Vahl **Local:** Orutotoimya	Growth habit: Herb Habitat: Bush Status: Wild	Worms, diarrhoea, yellow fever and skin blisters	**Fresh leaves:** Decoction or fresh liquid drunk and bathed
	**Common:** Bearing indigo Scientific: Indigofera erecta Thunb **Local:** Omusororo	Growth habit: Herb Habitat: Grazing land Status: Wild	Skin diseases, malaria	**Fresh leaves:** Squeeze and apply on skin or drink
	**Common:** White Shrimp Plant Scientific: Justicia betonica Linn. **Local:** Kwinini entoro	Growth habit: Herb Habitat: Homestead Status:	Malaria	**Fresh leaves:** Decoction drunk. 500 ml given three times a day.
	**Common:** Life plant Scientific: Kalanchoe pinnata (Lam.) **Local:** Enyondo	Growth habit: Herb Habitat: Homestead Status: Cultivated	Cough	**Fresh leaves**: Roast, squeeze and drink. 2 table spoons three times a day for children. 250 ml given three times a day
	**Common:** Salt Marsh Mallow Scientific: Kosteletzkya adoensis Mast **Local:** Omuzigambogo	Growth habit: Herb Habitat: Bush Status: Wild	Diarrhoea	**Fresh leaves:** Squeeze and drink

	**Common:** Winged Stem Laggera Scientific: Laggera alata (DC.) Oliv. **Local:** Ireme	Growth habit: Herb Habitat: Bush Status: Wild	Cough	**Fresh leaves:** Decoction drunk
	**Common:** Christmas candlestick Scientific: Leonotis nepetifolia (L.) R. Br. **Local:** Ekicumucumu	Growth habit: Habitat: Status:	Fresh wound	**Fresh leaves**: Squeeze and apply on the affected area
	**Common:** Whitewort Scientific: Leucas martinicensis (Jacq.) **Local:** Omucunda	Growth habit: Herb Habitat: Bush Status: Wild	Burns, boils	**Fresh leaves:** Squeeze and apply on the affected area
	**Common:** Tomato Scientific: Lycopersicon esculentum Mill **Local:** Enyanya	Growth habit: Herb Habitat: Garden Status: Cultivated	Skin problems in babies	**Fresh leaves:** Squeeze and apply on the affected area

	**Common:** Yellow water daisy Scientific: Melanthera scandens Schumach. and Thonn **Local:** Enkarwakarwa	Growth habit: Herb Habitat: Bush Status: Wild	Malaria, yellow fever	**Fresh leaves:** Decoction drunk. 500 ml given three times a day.
	**Common:** Watermint Scientific: Mentha aquatica L. **Local:** Ehohwa	Growth habit: Herb Habitat: Swamp Status: Wild and rare	High blood pressure	**Dry leaves:** Take in tea
	**Common:** Aneilema simplex Scientific: Murdannia simplex Vahl. **Local:** Muhinduka	Growth habit: Herb Habitat: Grassland Status: Wild	Snake bite	**Fresh leaves**: Squeeze and drink
	**Common:** African basil Scientific: Ocimum gratissimum L. **Local:** Ekijaaja	Growth habit: Herb Habitat: Bush Status: Wild	Cough	**Fresh leaves:** Infusion drunk. 500 ml given three times a day for adults for five days
	**Common:** Clove basil Scientific: Ocimum rothii Bak. **Local:** Omweya	Growth habit: Herb Habitat: Bush Status: Wild	Cough, stomach ache, yellow fever, Fungal infection (entunuka)	**Fresh leaves:** Roast, squeeze, add water and drink 500 ml three times a day Apply juice on affected area

	**Common:** Wood sorrel Scientific: Oxalis corniculata L. **Local:** Akanyunyambuzi akataito	Growth habit: Herb Habitat: Homestead Status: Wild	Cough, syphilis candida, Suture left after normal delivery	**Fresh leaves:** Roast and chew Decoction bathed Pound and press at the wound
	**Common:** Garden pink-sorrel Scientific: Oxalis latifolia Kunth. **Local:** Obunyunyambuzi	Growth habit: Herb Habitat: Homestead Status: Wild	Vomiting in children Meat allergy	**Fresh leaves:** Squeeze, add water and drink Powder mixed with meat
	**Common:** Cape Gooseberry Scientific: Physalis peruviana L. **Local:** Entuutu	Growth habit: Herb Habitat: Bush Status: Wild	Skin problems in babies	**Fresh leaves:** Boil with Solanum esculentum, Solanum melongena and bath
	**Common:** Forskohlii Scientific: Plectranthus barbatus Andrews **Local:** Ekinyamunsunga	Growth habit: Herb Habitat: Homestead Status: Wild	Cough, tape worms, malaria	**Fresh leaves:** Infusion or decoction drunk. 4 teaspoonsful given three times a day for adults and 1 teaspoon to children for four days
	**Common:** Velvet bean Scientific: Pseudarthria hookeri WightandArn **Local**: Ekiragi	Growth habit: Herb Habitat: Bush Status: Wild	Diarrhoea, yellow fever, cough	**Fresh leaves:** Infusion drunk, mixed with C.cajans for diarrhoea.500 ml given three times for one day.

	**Common:** One-rowed watercress Scientific: Rorippa microphylla **Local:** Akasaga	Growth habit: Herb Habitat: Bush Status: Wild	Stomach upsets in babies	**Fresh leaves:** Squeeze and give
	**Common:** Sinhala Scientific: Sida cuneifolia Roxb. **Local:** Akasoroigano	Growth habit: Herb Habitat: Road side Status: Wild	Chest pain, muscle pains	**Fresh leaves:** Pound, add cow ghee, boil and apply 2–3 times a day for three days
	**Common:** Poison berry Scientific: Solanum anguivi Lam **Local:** Obujabara	Growth habit: Herb Habitat: Garden Status: Cultivated	High blood Pressure	**Fresh/Dry Fruit:** Eat fresh or dry, pound and take as tea
	**Common:** Egg plant Scientific: Solanum melongena L. **Local:** Enjagi	Growth habit: Herb Habitat: Garden Status: Cultivated	Fresh wounds, skin problems in babies	**Fresh leaves:** Squeeze and apply Boil with Solanum esculentum Physalis peruviana and bath
	**Common:** Sowthistle Scientific: Sonchus oleraceus L. **Local:** Ekizimyamurro	Growth habit: Herb Habitat: Bush Status: Wild	Malaria	**Fresh leaves:** Mix with Manihot esculenta, E. repens leaves and steam the body

	**Common:** Diodia stipulosa whole Scientific: Spermacoce princeae (K.Schum.) **Local:** Kisakimu	Growth habit: Herb Habitat: Bush Status: Wild	Quicken delivery, fresh cuts	**Fresh leaves:** Squeeze and drink 500 ml once
	**Common:** Southern Cone Marigold Scientific: Tagetes minuta L. **Local:** Omukazimurofu	Growth habit: Herb Habitat: Bush Status: Wild	Appetite, healing after delivery	**Fresh leaves:** Apply pound with Chenopodium procerum and drink in millet porridge
	**Common:** Scientific: Triumfetta rhomboidea Jacq **Local:** Oruhugura	Growth habit: Herb Habitat: Bush Status: Wild	Stomach ache, diarrhoea	**Fresh leaves:** Pound, add water and take
	**Common:** Diamond burbark Scientific: Vigna unguiculata (L.) Walp Local: Empindi	Growth habit: Herb Habitat: Garden Status: Cultivated	Eye infection	**Fresh leaves:** Squeeze and drop in the eyes

	**Common:** Ginger Scientific: Zingiber officinale Roscoe **Local:** Tangawuzi	Growth habit: Herb Habitat: Garden Status: Cultivated	Cough	**Fresh tuber:** Decoction drunk

4.4.6 Strategies to enhance conservation

- Strengthen capacity building in plant inventory techniques, developing and maintaining plant databases, boosting law enforcement, and plant conservation and sustainable use at national and community levels.
- Build awareness among communities on the need to protect indigenous plant species.
- Promote sharing and documentation farmers indigenous knowledge and practices for cultivation, processing, cuisine and protection of indigenous species.
- Support domestication of local and indigenous plants.
- Implement strategies to protect indigenous (and endangered) plants both in public and private spaces.
- Improve local facilities for conservation of plant and animal genetic resources.
- Development of farmer led and private seed banks thereby mitigating negative effects seed shortage, panic purchases and seasonal crop failure

4.4.7 Strategies to enhance consumption of Traditional foods

- Build the farmers' confidence in what they are growing. "It is different to grow, but it is also different to grow with confidence" In perspective of whether what they are growing is real or authentic. This would help them be consistent instead of growing whatever new thing they find.
- Encourage the farmer to grow for more than just the money but rather have the understanding of the crop, like nutritional value, so that they can inculcate in themselves the mind set to accept the importance of the product and its consumption before going on to sell it.
- It is better to select a few competent people for a program than many incompetent ones. The few competent farmers will serve as good examples for the rest of the communities to appreciate or even adapt skills or products that have been seen to successful work for the few chosen farmers. Make it less about the numbers when designing such programs.
- Although the traditional varieties might now be commercially viable, looking at the nutritional value would be reason for advocacy for their growth, and this would also help in the endeavour of promoting food security.
- Improve on market and product information. Formal markets include large organised markets such as supermarkets, wholesale, retail groceries, as well as free markets in rural and urban centres. Informal markets are characterised by several market players, and lack product information and formal market institutions.
- Improvement on the packaging to attract buyers. In terms of packaging, most indigenous foods, especially vegetables, are sold loose in heaps, bundles, baskets, buckets, bags and sacks. Packaging is minimal, consisting mostly of string which traders use to tie up the produce in bundles when sold to final consumers. Fruit and vegetables such as African eggplant, pumpkin and okra are sold either in heaps, bowls or buckets
- They also train the farmers on value addition on the crops they have grown but also the other disposable parts of the crops like seeds. The farmers should be encouraged to advocate for and grow traditional seed, with a deliberate use of local prepared organic manure.

5.0 Recommendations

In light of the challenges arising from climate change, farmers suggested that the strategies to improve the resilience potential of their local seed systems to climate change hazards would include

- Incorporating conservation / organic agriculture into the smallholder farming systems. This requires training on such practices and assessment of their performance in relation to increasing resilience of seed systems.
- Enhancing Local Seed Business (LSB) knowledge about drought resistant crop varieties and how/where to access them
- Capacity building interventions needed to develop climate resilient LSBs
- Upon, exploration of the climatic hazards and identification of the seemingly adaptable crops, farmers suggested that for such resilient crops to be integrated into the LSBs, there is need to:
    - Establish demonstration plots to evaluate crops for the particular hazards of selected varieties.
- Carry out participatory varietal selection (PVS) to allow farmers to test and select plant varieties (including formally released new plant varieties and local varieties that are new to the community) using their own preference criteria and production practices. PVS is highly innovative and adaptive to local needs
- Support farmers to improve and produce seeds of traditional varieties through selection and breeding to meet their production and food security needs. This includes the need to reduce risks to climate change impacts such as higher temperatures, droughts, heavy rainfall, and new pests and diseases.
- Support participatory plant breeding (PPB) to promote the leadership of model farmer groups in breeding locally-adapted and preferred new plant varieties. Drawing on their knowledge of how different varieties perform under different conditions and their preferences for different traits, other farmers can be able to breed and select varieties to enhance performance and yields under variable conditions.
- Support to Community Seed Banks as they are increasingly recognized as an important in situ conservation strategy that complements household seed-saving. They are an important component of farmers' seed systems and provide an institutional mechanism to achieve Farmers' Rights. By supplying locally adapted varieties at the appropriate time, CSBs provide a crucial service to communities affected by climate change, especially in post-disaster recovery where seed supply and food security are threatened.
- Support interventions that encourage seed exchanges. Seed exchange happens regularly in farmers' seed systems at individual and community levels. It is common to share seeds from one region with farmers with similar growing conditions in another community. Farmers' seeds are in high demand because they meet diverse needs. Farmers exchange and market their seeds using diverse mechanisms including cultural practices and networks, such as seed swaps, barter, and donations; social networks, including relatives and neighbours; local markets and fairs; community seed banks; and seed savers networks. Seed fairs are a very effective and increasingly popular method for seed exchange. These events are often

organized by local farmers' committees, farmers' cooperatives, or community seed banks. Seed fairs are cultural events where farmers bring their seeds and share knowledge with other farmers. These events encourage and celebrate the exchange of farmers' seeds and biodiversity in general.

- Agricultural extension workers reported that some of the government lead extension programs had lost the gist or importance because of being politicised, farmers came to the meetings to receive free things that they would end up selling off, or were more motivated to attend meetings due to the allowances received. There is therefore more deliberate need to evaluate and choose which farmers attend these extensions or receive the incentives within the different represented programs. The process of identification of the farmers targeted for such qualify needs to be strengthened.