Strengthening Productive Capacity and Resilience of Smallholder Sweetpotato Producer Organizations in Uganda

REVISED TECHNICAL PROPOSAL

February 2023

Section 1: Basic Data

a. Project Name	Strengthening productive capacity and resilience of smallholder sweetpotato producer organizations in Uganda	
b. Country and Region	Uganda - Eastern	
c. Producer Organization (PO)	Soroti Sweetpotato Producers and Processors Association (SOSPPA)	
	Address: P.O. OMORRIO, Kyere Town Council, Serere District, Uganda	
	Registration SN/205/2019	Yes First registration: July 17, 2006 (Under Soroti district). Renewed: August 9, 2019 (Under Serere district Local Government).
	PO website or link to annual report	
	Primary Activities of PO	• Seed production and multiplication • Primary processing and value addition of cassava and sweetpotato into baked products • Training of farmers, farmer groups, and other institutions • Dissemination of technologies (sweetpotato, cassava, sorghum, groundnuts, green gram, and cowpea), knowledge and skills • Collaborate with research organizations - NaSaRRI in Serere - through on farm trials • Support saving and credit schemes • Provide linkage to markets and engage in group marketing
	Type of target farmers	Smallholder farmers, 50% women in rural and urban zones
d. PO Mission Statement	To promote a community-oriented civil society association in Teso Region promoting sustainable livelihood enterprises	
e. PO Focal Person (for this project)	Name: Okalebo Joseph Title: Coordinator Email: josephamikirot@gmail.com or sosppa2012@gmail.com	
f. SE Focal Person	1. Franklin Mutahakana (Senior Operations Officer; fmutahakana@worldbank.org) 2. Joseph Oryokot (Senior Agriculture Specialist; joryokot@worldbank.org)	

g. Total GAFSP Grant Funding Requested *(refer to Annex 1 – Project Budget Table)*	Amount Requested: US$ 2,330,000
h. Estimated project start and end date: February 2023 – January 2027	
i. Preferred Supervising Entity (Select only one) ☐African Development Bank (AfDB) ☐Asian Development Bank (ADB) ☐International Fund for Agricultural Development (IFAD) ☐Inter-American Development Bank (IDB) ☐Food and Agriculture Organization (FAO) ☒ World Bank (WB)	
☐World Food Programme (WFP)	
j. Has the PO previously received a GAFSP Missing Middle Initiative grant? ☐Yes, please complete *Annex 4* x☐No	

Section 2. Project Description (weighting 35%) (suggested 6-8 pages)

2.1 Project Development Objective (max. 2 sentences)

The Project Development Objective is **to increase production and consumption of sweet potato and build the resilience of the smallholder producers and processors for economic value addition in project areas.**

The proposed project will respond to the threat of COVID-19 to food, nutrition, and income security by supporting the Soroti Sweet potato Producers and Processors Association (SOSPPA) to increase its investment in production, processing, and value addition of biofortified orange-fleshed sweet potato (OFSP) products. This project will strengthen the organizational capacity and professional performance of the SOSPPA to support their member farmers through technical, business, and financial services to increase farm productivity and economic value of harvested crops and thereby build the resilience of the rural economy and livelihoods in the Teso sub-region of Eastern Uganda to shocks including COVID-19.

2.2. Description of the proposed project

COVID-19 has created unprecedented challenges to smallholder farm households and communities across the rural and urban food systems in Uganda. The inter- and intra-community movement restrictions through lockdowns and curfews imposed by governments have caused significant disruptions to the economic

connectedness that drive and sustain local, regional, and national supply and demand in output and input markets. Access to inputs (foundation/certified seed, credit, crop insurance) have been affected by transport restrictions and market closures. Immediate and midterm negative effects on commodity prices earned by farmers, household income, food security, and diet quality have been observed. These outcomes further compound pre-COVID challenges for smallholder-based agricultural value chains in Uganda stemming from high input and transaction costs in addition to limited investments in infrastructure and services. There is, therefore, urgent need to target technical and business development support to strengthen the capacity of key stakeholders to pursue new and promising market opportunities in these value chains.

In this regard, producer organizations (POs) play a pivotal role. POs provide farmers with reliable input and output markets and mitigate market failures which constrain their associated ability to do business. They can use collective bargaining to get discounted input prices and higher output prices for members. They can also facilitate farmers' access to distant markets through joint marketing. POs therefore play a critical role in building the resilience of rural communities in the presence of systemic shocks such as pandemics and droughts. However, in countries like Uganda, weak technical competence and management capacity and poor governance often severely limit the performance of POs and prevent them from harnessing collective action amongst their members to thrive and grow. These limitations must and can be overcome through targeted capacity strengthening of POs such as SOSPPA. In this case, there are strong market opportunities for expanding and diversifying production and value addition of sweet potato and other crops grown by its members. In particular, for sweet potato, SOSPPA can utilize technologies and management practices developed by its partners, including the International Potato Center (CIP), to accelerate product development and marketing on the basis of a solid understanding of market demand.

Sweet potato is a versatile and resilient crop with proven performance in diverse agro-ecologies including in low-input smallholder production systems and in rebuilding livelihoods of farm households and communities after droughts, floods, or displacement. It is climate-smart, matures in just three months, and has long underground storability of up to 6 months. The crop provides reliable yields of at least 8 t/ha under varying climatic and soil conditions, making it one of the fastest expanding food crops in Africa over the past 20 years. Biofortified orange-fleshed sweet potato (OFSP) varieties, rich in beta-carotene, are highly effective in combating vitamin A deficiency among children under 5 years of age and pregnant and lactating women. OFSP has been adopted by more than 6.5 million farmers in Africa and South Asia since 2010, including more than 300,000 farmers in Uganda. Thus, sweet potato as a crop is best suited for building back and better the livelihoods of communities affected by multiple disasters such as the ongoing COVID-19 pandemic and repeated droughts facing farmers and households most notably in Uganda.

Increasingly, OFSP is also used as an ingredient in the local food processing sector in Uganda, though volume and scope are still limited as compared to other OFSP producing countries like Kenya, Malawi, or South Africa. SOSPPA and its partners, specifically CIP, have been piloting a range of OFSP processing options including flour, buns, confectionaries, juices, and the manufacturing of animal feed (silage) from by-products. While all these options are technically feasible, the comparative advantage of OFSP as an ingredient lies in its novelty, low cost, and nutritional value which can fetch a premium in some market segments. In this regard, the production of fresh OFSP puree provides a high-value and versatile intermediary product that can be further processed (and combined with other local ingredients) into a range of foods from bakery items to porridges, juices, and spaghetti/pasta. Unlike flour, puree retains almost all of the nutritional value of OFSP throughout the processing cycle and these products are therefore also suitable for institutional markets that prioritize healthy diets, such as schools and hospitals. This project will identify the most promising market segments for specific

OFSP based products, and on this basis update and expand SOSPPA's current investments in processing and value addition.

The Uganda Multi-Sectoral Food Security and Nutrition Project (UMFSNP) and International Potato Center (CIP), together with the World Food Programme (WFP), under the Development and Delivery of Biofortified Crops at Scale (DDBIO) project, are promoting OFSP production and consumption in Eastern and Northern Uganda to strengthen the resilience of livelihoods and nutritious food supply chains affected by COVID-19.

The overarching goal of this project is to build the capacity and resilience of SOSPPA in Uganda to respond to the COVID-19 pandemic and other shocks by improving food, nutrition, and income security of its members. This will be achieved through processing and value addition and the promotion of profitable and sustainable sweet potato-based innovations and linkage to markets, financing, and weather insurance in Katakwi, Serere, Soroti, Bukedea, Ngora, and Amuria districts. The project will harness the experiences of UMFSNP and CIP/WFP's DDBIO projects, and build on the ongoing Agriculture Cluster Development Project's (ACDP) value chain development initiative, in pursuing the specific objectives of the proposed project including: (a) Improve market access and farm incomes for SOSPPA farmers through OFSP marketing, processing, and value addition supported by effectively managed facilities and trainings; (b) Increase productivity and production of sweet potato roots and vines, and other nutritious crops, amongst SOSPPA farmers with yield-enhancing inputs improved, and climate smart agricultural practices; (c) Promote diversified utilization and consumption of OFSP products amongst SOSPPA members and in current and new markets; and (d) Strengthen SOSPPA's governance and management capacities to deliver services to its members.

Project Components:

Component 1: Improve market access and farm incomes for SOSPPA farmers through OFSP marketing, processing, and value addition supported by effectively managed facilities and trainings.

Component 2: Increase productivity and production of sweet potato roots and vines, and other nutritious crops, amongst SOSPPA farmers with yield-enhancing inputs, improved and climate smart agricultural practices.

Component 3: Promote diversified utilization and consumption of OFSP products amongst SOSPPA members and in current and new markets.

Component 4: Strengthen SOSPPA's governance and management capacities to deliver services to its members.

Project Activities:

Over a four-year period, the project will implement a specific set of activities under each project component as described below.

Activities under Component 1: Improve market access and farm incomes for SOSPPA farmers through OFSP marketing, processing, and value addition supported by effectively managed facilities and trainings

Teso sub-region is the leading producer of sweet potato. Farmers normally harvest their crop at the same time (June-August and November-January). During these peak harvest seasons, high supply, and other endemic market failures, result in very low prices for fresh roots. Storing sweet potato roots underground for long is limited by weevil infestation that makes roots lose market and consumption value. Farmers therefore typically resort to preserving their surplus roots as *amukeke* (the chipped and dried roots). However, *amukeke* has little market beyond the region. It is also easily attacked and destroyed by weevil in the store turning it into flour and

further reducing its value. SOSPPA was established in 2004 to help its members overcome such constraints, and increase their farm incomes, by developing commercial value chains for sweet potato (especially OFSP) and cassava.

Building on past experience and the on-going ACDP/Ministry of Agriculture Animal Industry and Fisheries (MAAIF) and the National Semi Arid Resources Research Institute (NaSaRRI)'s cassava, sweetpotato, and millet value chain development projects, SOSPPA has pursued a three-pronged approach to OFSP value chain development namely, the production and sale of quality vines, production and sale of fresh roots, and cottage-based processing of fresh roots into dry chips and assortment of fried products. Vines and fresh roots are sold to institutional markets (schools, colleges, and NGOs), dry chips to private flour processors, while fried OFSP products (including mandazi, donuts, and small shortcakes (Figure 1 in Annex 6) are sold mainly locally to community members due to lack of Uganda National Bureau of Standards (UNBS) certification. Under this Component, the project will implement three broad sets of activities: i) upgrading OFSP value addition and processing into nutritious products for low, middle, and high-end markets; ii) expanding the market for fresh roots and quality vines; and iii) converting by-products of OFSP processing to nutrition animal feed (namely, silage).

Upgrading OFSP value addition and processing into nutritious products for low, middle, and high-end markets: To upgrade SOSPPA's current processing activities into profitable commercial businesses, this project will:

i) Prepare a market assessment to identify most promising and profitable market segments for specific OFSP products.
ii) Develop and test commercial value added OFSP products, including laboratory analysis to assess the nutritional composition of processed products.
iii) Construct a processing facility focused on OFSP-based commercial consumer products and managed by SOSPPA. That is, procure, install, and test equipment for production.

SOSPPA has been unable to reach local, middle, and high-end formal markets/retails stores (*duukas* and supermarkets) with its products mainly due to lack of certification by the Uganda National Bureau of Standards (UNBS). Past attempts failed because of detection of higher bacterial load in the processed products than the recommended threshold. The project will therefore:

iv) Train SOSPPA on equipment use and good food manufacturing practices, including hazard analysis and critical control points (HACCP).
v) Support SOSPPA to obtain UNBS certification implementing and complying with the requisite food industry standards including HACCP and UNBS.

Expanding market for fresh roots and quality vines:
To deepen markets access, SOSPPA will continue strengthening institutional markets (currently only focusing on primary schools and colleges in Serere district) while exploring new market opportunities by: i) expanding to other districts (Katakwi, Ngora, Soroti, Amuria, and Bukedea); ii) extending the list of institutional markets to include secondary and high schools, prisons, and hospitals; iii) targeting the expanded institutional markets with a wider portfolio of OFSP products; and iv) promoting the use of nutritious OFSP puree in the low-end informal markets, especially the *rolex* street vendors. Additionally, we will specifically establish market outlets (shops and dealerships) that promote availability and uptake of OFSP puree and final products (bread, spaghetti, rolex, daddies, donuts, etc). These outlets will be established in major commercial and trading centers in and

outside the projects (including, Soroti, Katakwi, Amuria, Mbale, Tororo, Busia, Gulu, Moroto, Kotido, Jinja, Kampala).

Converting by-products of sweet potato processing into animal feed:

OFSP production and processing can generate large amounts of by-products, namely vines and non-marketable roots. At the farm, sweet potato vines and damaged, small-size, weevil-infected or other non-marketable roots are left behind during harvesting. Processing sweet potato by-products into silage is a proven win-win investment that produces nutritious low-cost animal feed and reduces the environmental footprint of sweet potato. Sweet potato vines contain 19-22% crude protein making it a high-quality animal feed. This project will process these by-products into nutritious animal feed through silage processing thus creating a market for the wastes and income for farmers. Specifically, the project will:

i) Establish sweet potato "silage hubs" based on the model developed by CIP, and currently in successful use in central and eastern Uganda by a youth group (the Bavubuka Twekembe Youth Group) providing employment and income to the youth. One silage processing hub will be set up in each of the six project districts to provide market for vines and waste roots generated by SOSPPA groups in the district.

ii) Train youth, women, and men farmers on silage production, management, and utilization. This will include theory and hands-on practical sessions covering topics such as animal feeds and feed management, supplementing, how to diversify animal feeding, other low-quality feeds such as forages and cereal crop residues for improved and cost-effective livestock productivity.

iii) Provide training to the hubs on business plan development and silage marketing to make them sustainable businesses.

iv) Train farmers on advocacy to empower them to lobby for a better business environment.

Training and hub development plan

Bavubuka Twekembe will initially train all 15 FTAs in a training of trainers' (ToT) course. The FTAs will work with district agricultural/production office staff to identify one youth farmer group (25 members, at least 50% female) in each project district that will be responsible for hosting and managing the silage processing hub. These groups will initially be trained by Bavukuba Twekembe Youth Group with support from the trained FTA on silage making, handling, utilization, and marketing. The groups will also be equipped with skills to provide mobile silage making services to other farmers and linked to other project services (i.e., credit and insurance schemes and the marketing program). Around each silage processing hub, 4 other farmer groups (each with 25 members, at least 50% women) will be trained on the benefits of silage in livestock feeding and feed supplementation, its utilization and marketing.

Activities under Component 2: Increase productivity and production of sweet potato roots and vines, and other nutritious crops, amongst SOSPPA farmers with yield-enhancing inputs, improved and climate smart agricultural practices.

Year-round supply of fresh roots and vines will be critical to ensure that the processing facility can receive a steady supply of roots and operate at full capacity. This project will target 1200 SOSPPA registered members organized in groups of 25-30 members, by building their resilience to the present and future pandemics.

To integrate the root production activities with the processing and value addition initiatives, manage weather risks and encourage investment, the project will implement the following activities:

Strengthen the capacity of vine multipliers to provide quality seeds/vines to farmers: The project will increase farmers' access to quality seed by strengthening the existing 10 vine multipliers in Serere district and recruiting

and training five new multipliers in the new project districts (i.e., Katakwi, Soroti, Amuria, Ng'ora, and Bukedea). The project will link the vine multipliers to: i) source of foundation seed; and ii) certification services. These will be provided as a loan and deducted from vine sales (i.e., an interlinked credit scheme). To reduce certification costs, the project will seek certification of all SOSPPA-affiliated vine multipliers collectively under SOSPPA (not as separate entities) thus reducing per multiplier/unit costs. Vine multipliers will also have access to a credit line and weather insurance scheme also paid through vine sales. The former will encourage investment in foundation seed, irrigation, and other complementary inputs (fertilizer and pesticides), increased yields and thus ensure year-round supply of vines and less dependence on rains. The weather insurance will enable multipliers hedge against risks of crop failure caused by inadequate rains.

Establish a digital interlinked gender responsive credit scheme by strengthening the capacity of SOSPPA's existing SACCO to better serve farmers, particularly women and youth, who need credit to invest in quality seed, irrigation facilities and/or to hire land. This scheme will be open to vine, silage and root producers and credit accessed will be repaid from crop sales. In addition, the scheme will support farmers to establish sweetpotato agro-based businesses focused on processing and utilization. At the micro-level, the credit scheme will support: i) production of sweet potato-based silage to reduce the costs of livestock feed and fish and spur investment in pig, fish, and other livestock production enterprises and ii) using puree for value-added baked products (e.g., rolex, cakes, bread/scones, mandazi, donuts, etc). The credit scheme will specifically tailor credit packages to strengthen youth-led enterprises (e.g., in the silage and baked/processed products value chains). SOSPPA, under the SeFaMaCo project, implemented a village-level savings scheme namely Village Savings and Loans Association (VSLA) in Ngora, Serere, Kumi, and Bukedea districts comprising 30-35 members. The COVID 19 pandemic led to market shutdowns which greatly stifled the operations of these VSLAs resulting in high default of the loan portfolio. This was further exacerbated by lack of monitoring. SOSPPA has since established a digital (smartphone) monitoring system which tracks loan issuance and repayment, currently operational in three farmer groups. The project will specifically expand the loan scheme to the remaining project districts (namely Katakwi and Amuria) and the use of this digital system to monitor loan closely and disbursement and repayments. The project will further strengthen the existing credit scheme and improve loan disbursement and recovery efficiency by: i) implementing practical/hands-on training of the loan management and field monitoring team to be delivered by Makerere University Business School (MUBS) and a microfinance organization with proven record in working with smallholder farmers such as Microfinance Support Center (MSC); ii) improving the marketing of sweetpotato fresh roots and processed products to increase farmers' sales revenues; iii) deducting loans at source – that is, from crop sales; iv) growing the market base through expansion by selling fresh roots and processed products through multiple outlets (schools, colleges, hospitals, supermarkets, street vendors, wholesalers, and bulk-purchasing distant traders); and v) forming strategic alliances and business linkages with other stakeholders in the value chain to expand the market base and exploiting existing marketing and distribution channels. These interventions will professionalize management of the credit scheme and enable SOSPPA to provide credit to farmers at a much lower interest rate in comparison to the prevailing market rate and to run an efficient and sustainable loan scheme. The project will hire a professional expert to manage the credit scheme to ensure that the scheme operates efficiently and sustainably.

Redesign and strengthen the crop insurance scheme: Similar to the credit scheme, members of SOSPPA will have access to a weather-based insurance scheme linked to sales of roots and vines. The insurance will be provided in partnership with a private provider. It will cushion farmers from weather shocks.

Program for provision of advisory/extension services: SOSPPA, with technical backstopping from CIP and MAAIF/government extension services, will recruit 9 technical field assistants (FTAs) to: i) provide technical

and advisory services on agronomic practices, pest, and disease management to farmers; ii) monitor and document crop outlook, root quality, credit and insurance loans repayment; iii) implement a traceability system; iv) oversee the grading/sorting of roots at group level to ensure that rejects/wastes are left at group level for silage making; and v) provide technical support to the silage hub operations and silage quality. To make them effective in their roles, the FTAs will undergo a 5-day training using the "Everything You Ever Wanted to Know About Sweet potato" manual developed by CIP for training trainers. They will also undergo a 3-day Training of Trainers course that will be provided by Bavubuka Twekembe specifically focusing on silage making, management, utilization (livestock feed supplementation with silage), and marketing. They will then step down the training to individual groups and silage hubs to build capacity of the farmers on agronomic practices, silage production and management and in commodity marketing. Linkage with MAAIF extension services will foster ownership of the project, hence ensure sustainability.

Promote crop rotation to sustain soil/plant health and cropping systems: The traditional farming system in the Teso region revolved around rotating groundnut, sorghum, and millet, two climate-smart crops that have been shown to perform well under low and variable rainfall conditions. To reinforce this crop rotation system, the project will work very closely with the government extension service to incorporate innovative crop rotation tips in the agronomic training as part of an integrated soil and crop management program. This project will specifically roll out training and routine extension services on crop rotation and other good agricultural practices (GAP) as well as methods for conserving sweetpotato planting material using guidelines developed by the Ministry of Agriculture and other available resources notably "Everything you ever wanted to know about sweet potato". The training will, among others, include field demos to illustrate the advantage crop rotation has over continuous planting, importance of incorporating crop rotation in the overall soil health and crop management strategy and the use of *Triple S* technology to conserve sweetpotato planting material during dry season. The latter, a shortened form for ***S**and, **S**torage and **S**prouting*, is a technology developed by CIP to conserve sweetpotato planting material over a dry period by storing good healthy sweetpotato roots (weighing between 100g – 150g) in sand over the dry period and then sprouting them just before the onset of the rains thus producing vines that are then ready early in the season for planting. The FTAs, working closely with government extension service in the project districts, will reinforce the training on crop rotation, conservation of planting material and pest and disease management through routine and regular extension visits to project members before land preparation period. Jointly with government frontline extension workers, the project will convene regular "plant clinics" to train farmers on the diagnosis of plant pests and diseases and use the training events to reinforce the need for crop rotation.

To address one of the key drivers of climate change, notably tree cutting usually for charcoal burning, the training will include a module on integrated crop and soil health management and environmental protection. Lemon (*Citrus limonand*) and tamarind (*Tamarindus indica*), locally known as *enimu and epeduru*, respectively, are important trees in the Teso community. They provide lemon juice (rich in Vitamin C) and tamarind pulp solvent (rich in Vitamins B2 and B3) which are popular nutritious ingredients in local food preparation. They are widely used in the project districts to prepare sweetpotato-based composite porridge and a popular local stiff porridge known as "*atapa*". Demand for lemon and tamarind fruits increased significantly at the height of the COVID-19 pandemic as people were encouraged to drink their juices to reduce COVID-19 symptoms such as cough and sneezing. Unfortunately, the felling of these indigenous trees to make charcoal and for use as firewood has greatly reduced their population in the project districts. The project will sensitize communities and households about the benefits of these trees and the need to conserve them and promote their re-planting by setting up seedling nurseries where farmers can easily obtain seedlings. In addition, the project will integrate the utilization and benefits of tamarind, *enimu*, and *atapa* in the nutrition training modules. To

further expand its use, hence conservation of these indigenous trees, the project will link with the NaSaRRI-funded initiative to develop tamarind-sweetpotato recipes and products and test their viability for home use and commercialization through consumer studies. Preservation of these trees, and promotion of local dishes made from them, will have the dual role of protecting the environment and promoting the consumption of local sweetpotato dishes thus strengthening the market for fresh and processed sweetpotato roots.

Promotion of high-yielding, drought-tolerant, early maturing, disease-resistant dual purpose processing varieties: CIP and partners have produced a wide range of OFSP varieties in Uganda. The project will promote selected best-performing varieties that are specifically bred for high root production and are also prolific vine producers. This will supply the needed roots for processing while also producing large amounts of vines for silage making. The early maturity (hence drought-escaping), drought tolerance and disease/pest resistance traits will reduce losses from rainfall shortage and disease and pests thus increase farmers' incomes.

These interventions are estimated to increase OFSP productivity of SOSPPA-affiliated smallholder farmers by 50% from the current 3.6 tons/acre. Linkage to the processing facility is expected to increase incomes from the sales of OFSP roots of affiliated farmers.

Activities under Component 3: Promote diversified utilization and consumption of OFSP amongst SOSPPA members and communities, and in current and new markets.
Commercialization of staples can divert food from the household to the market when production for market becomes lucrative. This can have a negative effect on household food security. Nutrition education and awareness creation targeting households and communities that are linked to the commercial value can be effective in addressing such negative outcomes. In collaboration with local government public health and agriculture departments in the target districts, this project will: i) develop and promote community-based nutrition initiatives focusing on maternal and young child feeding practices, hygiene and sanitation, and childcare; ii) design and implement a promotional campaign to create and/or grow and deepen new (and existing) markets for OFSP processed consumer products and silage; iii) leverage opportunities for market linkages with established businesses; and iv) promote post-harvest conservation of fresh roots and dried sweetpotato chips (i.e., *amukeke*) to extend the shelf life of these products.

Develop and promote community-based nutrition initiatives focusing on maternal and young (6-23 months) child feeding practices, hygiene and sanitation, and childcare: These initiatives will focus on: (i) SOSPPA member households and their communities through SOSPPA-coordinated or commissioned nutrition initiatives, and (ii) market segments that buy SOSPPA roots through broader education campaigns linked to SOSPPA's brand. It will use a food basket approach that encourages and supports households to diversify their diets using locally available foods through establishment of kitchen gardens that cultivate OFSP, vegetables and other nutritious foods. It will also broaden the range of products promoted in these markets and create demand for OFSP in hitherto unreached market segments. Specifically, the project will:

- Create awareness through training in OFSP handling, food preparation, and child feeding for vulnerable individuals in SOSPPA member households and communities.
- Scale out, among SOSPPA members and their communities, the use of improved nutrition sensitive feeding utensils (measuring bowl and slotted spoon) – healthy baby toolkit (Figure 2, Annex 6) – among SOSPPA member households and communities to support effective feeding of OFSP puree and other nutritious porridge.

- Analyze food safety risks from increased use of locally available nutrient dense foods in young child (6-23 month) feeding in high-vulnerability contexts (within project target districts); and adapt guidelines for improved food utilization to these consumers.
- Undertake strategic research to bridge knowledge gaps on young child (6-23 month) feeding and adolescent diets in SOSPPA members communities, working with social science and nutrition research partners.

Design and implement promotional campaign to create and/or grow and deepen new (and existing) markets for OFSP processed consumer products and silage: This project will strengthen and expand demand for fresh OFSP roots in SOSSPA members' households and their communities through several demand creation activities. These activities will especially be important for introducing the nutritional benefits of OFSP to SOSPPA members in the new districts the project will work in, and in reinforcing existing knowledge. The household and community activities will include:

i) Nutrition education/messaging by project staff in close partnership with community health officials. These will be implemented in the form of farmer field days or as part of field demonstrations activities.
ii) Cooking demonstrations that provide recipes on how to prepare OFSP foods and incorporate it into popular local foods (*chappati*, *rolex*, porridge, etc.).
iii) Community radio/local FM talk shows.
iv) Training caregivers how to incorporate OFSP into children's complementary feeding.
v) Home-gardening and, following UMNFSP model, establish demos in selected schools for community outreach.

The project will also design and implement specific campaign programs aimed at launching the new OFSP processed products into informal/low-end retail markets (e.g., streets and wet markets – for fresh roots, boiled roots, *chappati*, and *rolex*) and the formal retail market (e.g., *duukas* and supermarkets – for bread, buns, mandazi, cakes, pasta). Specific promotional activities will include:

i) High-profile launch of the new/processed OFSP products into the markets.
ii) Using TV and community/local FM stations to advertise the products/explain benefits.
iii) Billboards in high-traffic areas (e.g., markets).
iv) Celebrity endorsements of OFSP products – recent studies have shown that such endorsements increase consumption of OFSP foods.
v) Displaying information on nutritional benefits of OFSP products in supermarket shelves where products are stocked.
vi) Distributing informational handling handouts to accompany the products.

Leverage linkages with other markets: The project will explore opportunities to link SOSPPA's processing and market investment with other businesses that can be a market for its products. For instance, OFSP puree is an ingredient that other businesses can use as raw material for making a variety of products (e.g., popular sauces, ketchup, and baby food). Hence, the project will seek opportunities for SOSPPA to partner with other companies which already have established market shares in processed products and exploit such markets by supplying them with sweetpotato puree, thus utilizing their capacity for greater returns for its members. It will also explore and develop linkages with companies in locations with better infrastructure and closer to major urban markets (e.g., Kampala) where demand for upper-end products (such as spaghetti and cakes) is higher.

Activities under Component 4: Strengthen SOSPPA's governance and management capacities to deliver services to its members

SOSPPA is well rooted in the rural economy of Serere district and has insight and understanding of the sweetpotato supply chain. However, the Executive Committee (ExCom) is accustomed to managing cottage-based processing activities run by a small group of staff that do not yet have the capacity to handle larger businesses. This project will therefore build the capacity of SOSPPA ExCom and operation staff by implementing capacity building activities in in three areas:

i) *Governance*: In partnership with MUK and/or business organizations with proven record in building capacity of agribusiness entities and start-ups, the project will: i) conduct a 5-day hands-on/practical training event on best practices in organizational governance in the first year; and ii) convene a 5-day refresher course for ExCom and operational staff at the mid-term to reinforce and deepen skills and best practices learned in the first course.
ii) *Managerial competence*: The project will: i) implement a 5-day business management training for ExCom and operational staff that will cover supply chain, inventory (raw material and finished products), finance and audit, and human resources management; and ii) a 5-day practical training event on marketing covering marketing, market intelligence, negotiation strategies, and product promotion. The course will be repeated at the midterm.
iii) *Technical capacity*: The project will conduct a 5-day training workshop on good agricultural practices (GAP) and compliance with industry standards (good manufacturing practices, hazard analysis and critical control points, Uganda National Bureau of Standards – UNBS). The training events will be repeated at the mid-term.

Contribution to 'Building Back Better' (BBB) Concept

This project will contribute to the BBB concept in multiple ways:

i) *Resilience* – as a climate smart, early maturing crop, sweet potato production will foster household and community adaptation to climate change effects manifesting as frequent droughts, erratic rainfall, and unpredictable rainfall patterns. Supporting the youth and project members to invest in business opportunities linked to sweetpotato processing and utilization and linking them to markets for fresh and processed products will strengthen household and community resilience to the frequent and recurring shocks. Inclusion of a module on conservation of indigenous trees that form part of the food system (namely tamarind and '*enimu*') will create the needed 'demand-pull' for sweet potato production and foster environmental sustainability. Farmer training on vine conservation using Triple S will strengthen current and future adaptation to rainfall and climate change.

ii) *Recovery* from COVID-19 – The pandemic has been associated with both loss of income and erosion of nutrition status of households and communities. This project will rebuild household and community productive capacity by increasing incomes (from sales of fresh roots and processed chips – *amukeke* and *inginyo*) and access to nutritious (vitamin A-rich) foods. This will allow them to "build back" from the disruptive effects of the pandemic on the markets, agri-food systems, and household/community welfare. Linking farmers to fresh root and vine markets will boost incomes. Supporting youth (especially girls) to invest in small business opportunities that utilize the puree from the processing factory and in silage making will rebuild the livelihoods shattered by the pandemic and repeated droughts.

iii) *Empowerment* – sweet potato is often referred to as a "woman's crop" owing to the disproportionately large participation of women in its production. The package of interventions (i.e., training on GAPs, credit and

insurance access, access to quality seed) will benefit women (including young female school graduates and dropouts) directly increasing their access to and control of incomes and improving business literacy. Gender trainings will improve women's agency in intrahousehold decision-making and access to benefits as well as the sharing of resources. These strategies will not only increase household purchasing power but will also result in economic empowerment of women farmers. Nutrition education and counselling will target young mothers (pregnant and breastfeeding). School girls will be targeted with school-focused interventions – OFSP school gardens and demo plots, cooking demonstrations empowering them to start small cottage-based OFSP processed products for sale during school holidays or upon school completion/dropout.

Project Implementation of Activities

Phase 1: **Diagnosis and refresh of SOSPPA's strategy** (**6 months**): In collaboration with CIP and MUK, the project will conduct a gender-focused feasibility study. This will focus on:
i) Participatory diagnosis of SOSPPA's capacity and performance development needs.
ii) Productivity increase and production strategy for SOSPPA farmers.
iii) Market segment analysis for SOSPPA products.
iv) Child nutrition gaps among SOSPPA members and customers and development of a SOSPPA nutrition strategy.

Phase 2: **Operational start-up (6 months, from 2nd half of yr 1)**: In this start-up phase, the project will: i) procure, install, and test the OFSP root processing equipment which will include: OFSP boiling units, steam pressurized cooking vats, puree processors (High fibre puree machine, Ribbon paste mixer), and bakery chambers; ii) procure, install, and test silage processing equipment; and iii) train factory workers on the use of the equipment.

Phase 3: Implementation of SOSPPA capacity development in key areas (42 months, from 2nd year half of year 1): The project will draw upon resources at MUK and CIP to support implementation of SOSPPA's strategic plans in the following areas:
i) Market access, processing, and value addition.
ii) Increase productivity and production of OFSP and other nutritious crops.
iii) Diversified utilization and consumption of OFSP products.
iv) Governance, management, and technical capacity building.

Phase 4: Launch OFSP consumer products (36 months, 2nd yr to 4th year): The project will launch OFSP baked and fried products and silage. The launch will be followed by an active program of promoting these products in current and new markets, targeting identified segments with specific products for rapid uptake. The project will work with CIP within the first three years to enhance their operational efficiencies and develop clear, forward-looking growth and competitiveness strategies.

Phase 5: Ensuring sustainability and growth (48 months; entire period): In this phase, focus will be on analysis of the operations of the different product components to ensure smooth running and steady growth of the business. CIP will therefore work with SOSPPA to: i) track and document key progress (output, outcome, and process) indicators in vine/root production, nutrition education, processing, and management; ii) conduct operational and strategic research that will generate data for evidence-based management decisions; and iii) develop plans/strategies for ensuring sustainable and vibrant growth of the business. To build sustainability the project will build capacity of SOSPPA in running the essential elements of the business (machinery operation,

loan, and crop insurance scheme management), diagnosis of problems and link them to reputable maintenance service companies. It will also ensure close collaboration with MAAIF extension service for continued support to SOSPPA after the project ends.

2.3. Target population and targeting strategy for the project

The Teso sub-region of Uganda has a population of about 2.5 million people, with 70% being youth (35 years or younger) (Akampumuza et al., 2020). The region has one of the highest poverty levels in the country with at least 53% living in abject poverty. More than 50% of agricultural households experience food shortages. This region is the highest producer of sweetpotato, the main food staple (UBOS, 2019).

This project will target 1,200 smallholder farmers in Serere district who are currently enrolled as members of SOSPPA. In addition, 1,500 new beneficiaries will be enrolled in the project in the five new districts of Katakwi, Bukedea, Ngora, Soroti, and Amuria districts. The current 1,200 members of SOSPPA comprise 50% women, 40% men, and 10% youth, and are organized in groups. The new farmers will also be organized into groups through which they will be reached with the project interventions. The project interventions will be implemented at group level by trained trainers (the ExCom/Operational staff/FTA). Following, the current SOSPPA membership eligibility criteria, a farmer (male or female) will be eligible for recruitment if they are within the geographical area covered by the Association, a grower of roots crops (cassava and sweet potato), and a smallholder farmer with 1 acre of land or less.

SOSPPA has been supplying schools and colleges with fresh roots benefitting, on average, 3,000 primary school and college students. These beneficiaries will continue to be targeted and the demand creation activities aimed at reaching schools and colleges in new districts used to grow this market segment. Apart from these institutional consumers, the project will, through market studies, identify and define new consumer market segments for processed products including assessment of the feasibility of supplying OFSP puree to street *rolex* and *chappati* vendors and high-end market pasta products to supermarkets, both in urban areas. In addition, following the UMNFSP project strategy, primary schools will be targeted with demand creation activities including setting up OFSP demonstration plots and school gardens. As in the UMNFSP project, this project will utilize the services of the agricultural extension workers from the sub counties in setting up and backstopping such school gardens and demonstrations alongside the project agronomist. This will create ownership in these government institutions, hence sustainability of the project.

2.4 Major obstacles to smallholder and related small business development in the food and agriculture sectors in the project area

Sweetpotato production in Teso sub-region, as in the rest of Uganda, is rainfed. During main harvest months, the supply of sweetpotato often far exceeds what the markets can absorb. Penetration of fresh roots into the middle- and high-income consumers is low mainly because of the perception that sweetpotato is “a poor man’s food”. Value addition into high-end products with extended shelf life (such as spaghetti) presents a potential solution for this. Sweetpotato production also suffers from the classic imperfect market information problem with the middlemen having more information about the price, supply conditions in distant markets, and quality preferences of consumers in retail markets than farmers. They use this information to take advantage of the farmers. At the processing and value addition end, producer organizations such as SOSPPA find it difficult to attain and maintain compliance with industry food safety standards, and if they do, to pay the yearly certification costs. They therefore get trapped in a “low-level equilibrium” state in which they can’t break out of the cottage-level business status into more lucrative and vibrant commercial ventures beyond their communities.

COVID-19 entrenched and even exacerbated the above situation. It disrupted both input and output market access. Specifically, sweetpotato seed multipliers who produce quality seed for SOSPPA root producers could not obtain foundation material from tissue culture labs in Kampala because public transport was shut down. Local wet markets and institutional markets (primary schools and colleges) that bought sweetpotato roots from SOSPPA were also shut down. Hence, commodity prices plummeted to unprofitable levels. Credit and crop insurance access were curtailed as financial institutions froze lending to farmers due to the uncertainty.

The Government of Uganda has identified value addition and processing as key priorities for the commercialization of commodity value chains. ***The National Development Plan III*** of 2020 identifies value addition as a major vehicle for "increased household incomes and improved quality of life…". It specifically highlights the role of agro-industrial processing in upgrading value chains. The ***Uganda Food and Nutrition Policy***, on the other hand, states that "… goal of Government in the area of food processing and preservation is to promote adequate, safe, high quality and nutritious foods with a long shelf-life for local, regional and international markets". Moreover, the 2021-2026 ***National Resistance Movement's (NRM)*** manifesto states that "NRM will continue to prioritise industrialisation and its pace doubled with initiatives to attract more investments in agro-processing to add value to primary products". This project is therefore well-aligned with Uganda's national development priorities.

In the Teso sub-region, commercialization of root crops (especially sweetpotato and cassava) is a top priority for national and local governments. The sub-region is the leading producer of these crops nationwide. For instance, the government recently awarded the applicant ACDP funds to invest in cassava processing and value chain development. Relatedly, the government has prioritized investment in fish farming and provides free fish fingerlings to farmers. However, the local government fisheries departments in the region have identified high feed cost as a major constraint [Pers Comm, Amuria Fisheries Sector Head] and see the potential in manufacturing fish feed from root crops. The evidence is still anecdotal, but points to the existence of an unexploited business/investment opportunity that can be filled by processing sweetpotato into animal feed. Sweetpotato-based fish feed is a possible product for SOSPPA, but will require rigorous market assessments, experimentation, and formulation of different types of feed regimes, and cost assessments, to ascertain its potential. This project therefore proposes, as the first activity, to conduct an in-depth market feasibility study to provide evidence on such market opportunities.

2.5 Proposed linkages between POs and private sector actors

The proposed project will build on UMFSNP's approach to using schools as avenues for improving household and community nutrition status. **CIP** will offer technical support through capacity building and financial and grant management backstopping. **Makerere University's Department of Food Technology and Nutrition (MUK-DFTN)**, working with CIP, will support SOSPPA in procurement, installation and testing of processing equipment, OFSP product formulation and training on HACCP. **MUK Business School** will build SOSPPA's management and technical capacity. **Bavubuka Twekembe Youth Group** will implement silage processing hubs in each of the six project districts and build the capacity of SOSPPA through training to run the hubs efficiently and sustainably. **Microfinance Support Center** and **Equity and Post Bank** will provide credit to farmers while **Ensibuuko Tech** will provide crop insurance.

2.6 Expected results of the project and how they will be measured at output, outcome, and impact levels

The overall goal of this project is to build the capacity and resilience of the Soroti Sweet Potato Producers and Processors Association (SOSPPA) and its members in Katakwi, Serere, Soroti, Bukedea, Ngora, and Amuria

districts to respond to the COVID-19 pandemic and other shocks by improving their food, nutrition, and income security.

Table 1 provides a summary of the project's output-outcome-impact logic. We expect that under each project Component, the project will deliver specific technology, training, and information sharing outputs. These outputs will result, as direct outcomes, in processing and value addition, increased productivity, and production of OFSP products by SOSPPA. These changes will lead to increased production of OFSP roots and vines, and other nutritious OFSP value-added products, and increased availability, consumption, and sale of these products. The expected impacts of these changes are improved capacity and resilience of the Soroti Sweetpotato Producers and Processors Association (SOSPPA) and its members to respond to the COVID-19 pandemic and other shocks, higher incomes for farmers, improved dietary quality, specifically higher intake of vitamin A, among women and young children (6-23 months) and pregnant and breastfeeding mothers.

Table 1: Project Outcome Logic

Objectives	Outputs	Direct Outcomes	Development Outcomes	Impacts
Component 1: Improve market access and farm incomes for SOSPPA farmers through OFSP marketing, processing and silage production supported by effectively managed facilities and trainings	1 Processing/manufacturing facility focusing on OFSP-based commercial consumer products, established. 6 silage hubs established to provide silage making services and information on supplementation regimens for improved livestock rearing.	Increased knowledge on sweetpotato and technical capacity in key organizations for program implementation. "Business case" for each technology developed for different farmer types and consumers Stronger awareness of alternative animal feed	Availability of vitamin A rich OFSP based products on the market. Increased availability of improved and affordable animal feed (silage) to for livestock industry. Markets for OFSP vines, fresh roots, and value-added products strengthened and expanded to new districts.	Increased investments in scaling-out OFSP technologies beyond target districts Increased gender equity to access to OFSP technologies among SOSPPA members.

Objectives	Outputs	Direct Outcomes	Development Outcomes	Impacts
Component 2: Increase productivity and production of sweetpotato roots and vines, and other nutritious crops, amongst SOSPPA farmers with yield-enhancing inputs, improved, and climate-smart agricultural practices	21,000 (105,000 indirect) reached with training in OFSP handling, food preparation and child feeding for vulnerable households. 17,500 caregivers (male/female) reached with healthy baby toolkits and trained on its use to improve feeding of OFSP puree and other nutritious diets (porridge) through community level activities 1 research study on food safety risks from increased use of OFSP in young child feeding in high-vulnerability contexts (project target districts); and adapt guidelines for improved food utilization to these consumers. 1 strategic research to bridge knowledge gaps on young child feeding and adolescent diets, working with social science and nutrition research partners.	Increase availability of OFSP roots in selected markets Increased gender equitable income opportunities for OFSP farmers	Reduction of on-farm post-harvest losses OFSP fresh root markets profitably supplying nutritious foods	Increased agricultural incomes in sweetpotato value chains, with at least 50% of this income accruing to women.
Component 3: Promote diversified utilization and consumption of OFSP amongst SOSPPA members and communities, and in current and new markets	8 DVMs strengthened and refresher trained in 7 project districts and link them to producers of basic seed and certification services. 9 technical field assistants (FTAs), affiliated with SOSPPA root and vine producers, recruited, and provided with technical and advisory services on the recommended agronomic practices for sustainable production of OFSP roots to provide these services to farmers. 4 interlinked gender responsive credit scheme strengthened and to provide better SACCO services to farmers, particularly women and youth, who need credit to invest in quality seed, irrigation facilities and/or hire land. 1 crop insurance (and weather insurance) scheme redesigned and strengthened in partnership with a private sector provider and link with the SACCO credit scheme to the sale of roots and vines to the processing facility and managed by SOSPPA.	Planting materials of nutritious and productive OFSP varieties widely available Male and female smallholder farmers plant quality OFSP vines & apply improved agronomic practices Caregivers have improved knowledge of nutritional importance of OFSP and Vitamin A. Households have improved capacity to utilize OFSP for all members with focus on infant nutrition.	Increased production and availability of nutritious OFSP in households and local markets Increased productivity and intensification of OFSP within diversified cropping systems Increased intake of OFSP and other Vitamin A rich foods by vulnerable household members.	Improved dietary diversity, in particular improved levels of vitamin A intakes and among vulnerable households

Objectives	Outputs	Direct Outcomes	Development Outcomes	Impacts
Component 4: Strengthen SOSPPA's governance and management capacities to deliver services to its members	2 technical trainings on production (agronomic practices) and manufacturing (good manufacturing practices) offered to SOSPPA management. and members 2 technical trainings offered to SOSPPA on governance. 2 management trainings (modern professional skills) provided to SOSPPA management and ExCom 2 financial technical trainings provided to SOSPPA ExCom, management and members		SOSPPA ExCom and management are able to efficiently handle credit and crop insurance and business grants. SOSPPA members enabled and empowered to participate in planning and reviews and exercise their rights	Improved capacity and resilience of the Soroti Sweetpotato Producers and Processors Association (SOSPPA) and its members to respond to the COVID-19 pandemic and other shocks.

2.7 Evidence that the proposed approach and activities will successfully address the issues identified

Government: This project complements several ongoing government interventions in Serere district through the ACDP/MAAIF project. Its objectives are closely related to the UMFSNP project. It also aligns with National development Plan III strategy on agro-industrialization and with the government's initiative promoting COVID-19 recovery and resilience in the district. Further, the project aligns with the Government's "Operation Wealth Creation (formerly NAADS) Program of promoting the use yield-enhancing agricultural technologies (including climate-smart technologies, hence OFSP varieties), value addition and processing.

Development organizations: The project will build on interventions SOSPPA has co-implemented with several development partners, namely: i) Farm Africa – promotion of OFSP for nutrition intervention, field extension, business plan development training; ii) HarvestPlus - linkage to source of basic seed (i.e., Senai Laboratories Ltd and the Kenya Plant Health Inspectorate Service), OFSP vine multiplication, vines (and roots) marketing; iii) CIP – introduction of nutritious climate smart OFSP varieties, sweetpotato processing (CIP bought SOSPPA's first sweetpotato chipping machine), value addition into fried OFSP products (confectionaries); and iv) Farm Concern International – sale of fresh roots to schools and colleges, training on good agricultural practices, investment in screen nets for vine multiple, cottage-based OFSP processing into baked products.

Private sector: i) Wind Wood Millers (WWM) – purchaser of cassava dried chips, provision of drying technology, credit line to farmers for investment in processing; ii) Eastern Agriculture Development Company Ltd (EADC) - farmers training on root quality requirements for export fresh root export market, how to harvest, varieties to grow. This project will build on previous training on root quality and variety selection by EADC and use lessons from the WWM in the designing the credit scheme.

SOSPPA started as sweetpotato production, processing, and marketing farmer association. It pioneered commercial production of quality seed of OFSP and processing of OFSP root into quality dry chips for sale processors and composite flour sold locally (see link). In 2003, SOSPPA and NARO published a sweetpotato recipe booklet. Its nutritious composite flour won FAO and University of Pretoria awards in 2010 and 2013, respectively. SOSPPA also produces valued-added OFSP fried products including mandazi, shortcakes, cakes, and donuts for sale locally. Most of these activities were disrupted by COVID-19 as the lockdown prevented access to foundation seed for multiplication, gathering to process sweetpotato, and market (due to closure of schools and colleges).

The proposed project will build on and scale up some of the earlier and on-going initiatives (e.g., production of fried OFSP products) that have been disrupted by COVID-19. It will at the same time introduce new nutritious commercial OFSP-based products. It will address the pre- and COVID-19 induced market failure as follows: i) farmers will be linked directly to sweetpotato root processing and value addition market; ii) low unprofitable prices will be resolved through stable/guaranteed negotiated prices; iii) the project will support a credit and crop insurance scheme which will enable farmers to expand production and provide a buffer to future shocks; and iv) access to quality inputs (e.g. certified seed from DVMs) to increase productivity and hence incomes for SOSPPA members.

2.8 Reasons for GAFSP to provide grant funding to the proposed project

This project will complement SOSPPA's ACDP/MAAIF-funded project to develop cassava value chains currently being implemented. It will also build on the GAFSP-funded UMFSNP project in strengthening community nutrition outcomes and resilience to COVID-19. It is therefore aligned with the Government of Uganda's strategy of agricultural value chain development and strengthening farmer resilience to the COVID-19 pandemic. SOSPPA has a long history and experience with the sweetpotato value chain and has the main goal of commercializing and transforming the sweetpotato subsector and improving the livelihoods of its members and their communities.

This funding will help scale up processing and value addition of OFSP, enhance market access through product certification, and bring in high-end customers who consume or demand products like spaghetti and wedding cakes, based on evidence of existence of a profitable market, and animal feeds thus contributing to GAFSP objectives of improving food, nutrition, and income as well as supporting COVID-19 recovery. SOSPPA has long experience and understanding of the sweetpotato value chain dating back to 2004 that will be harnessed to implement the proposed project effectively and efficiently. In addition, the technical support from CIP guarantees success in achieving the PDO above. Strengthening SOSPPA's capacity to upgrade and scale up its current cottage-based value addition activities will improve its members access to reliable input and output markets, increase their productivity and income, and hence strengthen resilience to COVID-19 and other shocks while addressing the changing dietary preference of the growing youth market segments towards high value processed products in the targeted districts. Processing sweetpotato into versatile OFSP puree and puree-based products will also tap into growing consumption of baked and fried products (especially bread, donuts and chapati) and *rolex* (i.e., chapati rolled together with egg omelette) which is on a sharp increase in Uganda, and institutional markets (schools, colleges, universities, prisons, and hospitals). Empowering SOSPPA to strengthen the sweetpotato value chain in Uganda will pave the way for an inclusive farmer-oriented commercialization of the crop. It will enhance sustainability of work supported by GAFSP investments in Uganda by fostering linkage with schools as a demand source of OFSP roots and other nutritious crops in school gardens, thereby creating avenues for improving household and community nutrition status.

Section 3. Context for the Proposed Project

3.1 The state of the agriculture and food system in the project area and impacts and disruptions caused by COVID-19 in project activity areas and on the target populations

Teso sub-region has two cropping seasons from March to June and from September to December. Farming is mostly for subsistence, with most farmers primarily pursuing self-sufficiency goals. Harvesting falls in the same period resulting in depressed prices and low returns/income. Smallholder farmers mostly sell produce, including sweetpotato, in local markets and/or to traders at farm gate, and hence have limited bargaining power on prices. OFSP was either consumed at home or some surplus sold by SOSPPA members to the association for processing into dry chips or mashed and mixed with wheat flour to make various baked products (Figure 2 in Annex 6).

As in other rural regions in Uganda, COVID-19 has greatly stymied agricultural production and marketing, and inadvertently, the livelihoods of the people in Teso sub-region. Labor shortages resulting from fear of being

infected impacted production and processing of food. The lockdown and closures of local commodity markets and schools have disrupted food supply systems leading to depressed prices and loss of income. Access to inputs from outside the immediate local community/market is difficult for farmers who rely on public transport. Financial institutions limited lending to farmers due to the uncertainty arising from COVID-19 restrictions. Access to commodities produced outside the community also became difficult, negatively impacting household diets, especially those of low-income households. These COVID-19 disruptions have been exacerbated by the 2021 poor weather conditions that greatly affected the crops, hence harvest in the Teso sub-region.

3.2 How the proposed project will address medium- to long-term COVID-19 response and recovery of the agriculture and food sectors in a changing climate and support the principle of 'building back better1

Three key lessons SOSPPA has learned:
(i) Value addition can minimize loss of livelihood opportunities for smallholder farmers/farm workers.
(ii) Food systems are fragile and can be greatly disrupted by systemic shocks (COVID-19 and poor weather); leading to adverse effects on household diets.
(iii) A functional and efficient market information system is important for obtaining market intelligence, linkage to external markets, and strengthening collective action.

Actions SOSPPA has taken:
(i) Operating a savings and credit scheme (SACCO) - started during COVID-19 - to support members and is supported by Microfinance Support Center (MSC). MSC lends to SOSPPA at a low interest rate (2%). SOSPPA then provide loans to farmers at 5%, lower than the prevailing market rate of 18% or higher.
(ii) Linking farmers to a crop insurance scheme that compensates farmers in the event of climate change induced droughts.
(iii) Training farmers on crop diversification in response to climate change and to improve household diets.
(iv) Aligning SOSPPA's implementation strategies to complement government policy and strategy on value chain development.

How the project will address effects of COVID-19:
The project will address the following short- and medium-terms effects of COVID-19 and climate change based the lessons learned:
(i) Loss of livelihoods opportunities for farmers and farm workers - Linking farmers to commercial value chain with guaranteed prices provides market for produce, stable income, and farm employment for project participating and non-participating households.
(ii) Disruption of input access - The project will provide farmers with access to quality planting material, credit, and crop insurance hence enabling farmers to invest in farming, increase productivity, and earn higher incomes.
iii) Disruption of local and regional food systems - Loss of local and institutional markets through closure will be resolved through sale of sweetpotato to the processing facility, adding value (thus reducing food losses).

[1] Deriving from its origins in disaster recovery, the term 'build back better' in the context of the present COVID-19 pandemic and recovery encompasses attention to economic recovery while addressing today's global environmental threats: https://www.oecd.org/coronavirus/policy-responses/building-back-better-a-sustainable-resilient-recovery-aftercovid-19-52b869f5/

iv) Increased demand for quality food - Food basket approach social behaviour change community (SBCC) will promote diet diversification among SOSPPA members and targeted communities using locally available foods, including OFSP, hence responding to increased demand for quality food as consumers became more aware of role of such food in boosting immunity to COVID-19.
v) Inadequate rainfall/drought - The project will promote drought tolerant, early maturing OFSP varieties that can still perform well under inadequate rainfall and provide food to households. In addition, these varieties are resistant to pests and diseases that have become more prevalent because of climate change.
vi) This project will also strengthen SOSPPA's market information and communication systems to enable it efficiently collect market intelligence (crop outlook, volumes, prices) and disseminate it to project members.

3.3 Linkages between the proposed project activities and the strategic priorities that are relevant for the involved PO

A major proposed project activity is value addition of OFSP through processing into nutritious consumer products and animal feed (silage) and increasing production of sweetpotato (OFSP) by smallholder farmers to provide a year-round supply of raw materials for processing. This is linked to the main priority of the PO, SOSPPA, namely value addition of OSFP and increasing sweetpotato productivity. The proposed project will link farmers to quality certified planting materials/vines from vine multipliers. Further, the project will provide advisory services through training, establish demonstration fields, and undertake field visits.

The second strategic priority of SOSPPA is product development of a wide range of fried OFSP value-added products. To upgrade these cottage-based productions to a more profitable commercial business, the project will establish a processing facility focusing on OFSP-based commercial consumer products. Additionally, the establishment of silage hubs to utilize the by-products of sweetpotato aligns with a priority of SOSPPA in sustainable production practices, that is, environmentally friendly production and value addition activities. The silage production will lower the environmental footprint by converting processing waste (rejected roots and leftover vines) into a profitable and lucrative product.

3.4 Alignment of project activities with national priorities and proposed linkages to government programs

This project is aligned with the Government of Uganda's **National Development Plan III** on agro industrialization which seeks to promote value addition. It is also in line with the National Resistance Movement 2021-2026 manifesto and the Uganda Food and Nutrition Strategy - both of which emphasize the role of value addition for improving food, nutrition, and income security. At project level, it is aligned and will build on the Uganda Multi-Sectoral Food Security and Nutrition Project (UMFSNP) funded by GAFSP. Additionally, this project aligns with the Government's strategy of value chain development targeting key staple commodities. It will complement the cassava value chain development currently being implemented by SOSPPA with funding from the World Bank through MAAIF as part of the Agriculture Cluster Development Project (ACDP). In line with the proposed project, the objective of ACDP is to increase production, productivity, marketing, and value-addition of a selected agriculture commodity.

Section 4: Cross-cutting Themes

4.1 GAFSP priority crosscutting themes

The project will directly address three GAFSP crosscutting themes and will measure and report on impacts/outcomes in the project monitoring framework such as the log frame or Results Framework. These themes are:

- gender and empowerment of women and girls.
- climate resilience; and
- improved nutritional outcomes.

4.2 How the project will address the identified thematic focus areas

Improved nutritional outcomes: The orange fleshed sweetpotato (OFSP) grows well on marginal land, provides plenty of calories per hectare, and is an excellent source of vitamin A. The prevalence of vitamin A deficiency in children under 5years in the proposed project intervention area (Teso sub-region) is about 30%. Vitamin A deficiency increases young children's risk of infection and blindness. Yet just one small orange-fleshed sweetpotato, or 125 grams, can provide the vitamin A needs of a pre-schooler. Under this theme, the project will specifically: i) Improve young child feeding in vulnerable households and communities utilizing OFSP and other nutritious foods, supported by the Healthy Baby Toolkit (HBT) for children under 2 years of age; and (ii) Improve sustainability of community and institutional nutrition support programs, including school feeding, through utilization of fresh boiled roots and locally manufactured shelf-stable OFSP puree (and purees combining OFSP with other nutritious local ingredients). We will work along three main pathways, corresponding to our specific objectives above: i) targeting schools and colleagues as markets for fresh roots and nutritious processed products, ii) nutrition support for improved young child feeding using the Healthy Baby Toolkit developed by CIP and partners; and iii) linking the growing capacity for nutritious food processing in target communities to institutional markets such as school feeding, starting with shelf-stable OFSP puree as well as fresh nutritious produce (Figure 3, Annex 6).

Gender and empowerment of women and girls: Women of reproductive age are inherently at risk of undernutrition due to biological, socio-economic, and cultural factors (Serwanja et al 2020). Yet, this age bracket coincides with their highest economically productive stage where they are primarily responsible for the wellbeing of their families. This greatly affects agricultural productivity at the regional level given that women in Teso contribute close to 70% of the labour (Akampumuza et al, 2020). Increased OFSP production and processing into nutritious consumer products and livestock feed will contribute to addressing this problem by contributing to better diets (through consumption of roots and leaves), increasing productivity, providing access to markets and income generation opportunities.

Climate resilience: This project will promote cultivation of OFSP varieties. These varieties are drought-tolerant and are also pest- and disease-tolerant and therefore will be more resilient to climate shocks compared to cassava and other root and tuber crops. It is also short maturing and hence drought escaping varieties. In addition, the project with redesign and roll out a robust crop/weather insurance scheme that is aimed at reducing losses farmers incur from climate change-related droughts. Further, the project will provide loans and encourage farmers, especially the seed multipliers, to utilize the facility to invest in irrigation equipment boosting their ability to cope with seasonal rainfall fluctuations

4.3 Increased participation and role of women smallholder producers in POs and smallholder producer groups as a result of the proposed project

Gender and cultural issues pervade smallholder farming in the Teso sub-region. In Kumi district, for example, women provide more than 70% of agricultural labour, yet only 30% have control over means of production, and only 7% own land (KUMI District Hazard, Risk and Vulnerability Profile Report 2014). Twenty-one percent of women in Uganda are not paid for the work they do. Women engaged in agricultural work are less likely (33%) to be paid for their work compared to women working in other sectors (9%). Given their limited access to agricultural resources and low decision-making power, women are more vulnerable to the numerous systemic (e.g., weather pandemic) shocks. In Uganda, the proportion of women who have completed secondary school or higher increases with increasing wealth. Only 8% of women in the age bracket 18-49 years have attained secondary education in the Teso sub-region. Other limiting factors are access to information and market intelligence. Rural women are less likely than their urban counterparts to obtain regular exposure to any form of mass media. In Teso, up to 38% of women did not have access to media in 2016. Given the importance of information in VCD, targeting women will require protracted gender responsive strategies. In an intervention aimed at promoting sweetpotato seed technology in Sub-Sahara Africa, women were found to prefer face to face communication channels such as demonstrations, but also appreciated video shows (Mayanja et al, 2020).

All the above call for an in-depth understanding of the gender dynamics that could impede the project. Thus, a Gender Action Plan will be carefully designed to guide development of a project gender strategy. Elements of this plan will include:

i) Gender landscape studies – these will be mainstreamed within the proposed feasibility study to assess gender-based constraints and opportunities related to participation in the selected sweetpotato value chain and formulate adaptable solutions to address the constraints so as to harness the opportunities.

ii) Gender strategy highlighting the gender-based indicators of change and corresponding actions required to attain the desired change. In particular, the strategy will elucidate a gendered access and will be mainstreamed into project services. monitoring learning and evaluation (MLE) plan to guide activity implementation.

iii) A comprehensive training and communication strategy cognizant of women's lower literacy levels, seasonal calendars, and mobility limitations, among others to improve recruitment and retention of women actors as producers, processors, and consumers.

iv) Gendered business to business learning, mentoring, coaching, and networking plan to support budding women entrepreneurs peer learning but also to strengthen through attachment to mentors and or incubation programs.

Section 5. Project Implementation, Sustainability and Budget

5.1 Risks to achieving the proposed project's objectives and potential negative externalities or spill overs that could result from the proposed project activities and targeting

As an agricultural project, this project is anticipated to face a wide range of risks. These include drought, price fluctuations, and loan default. The possibility of these occurring vary from low to medium-(see detailed discussion in Table G, Annex 3). For each risk, the project has identified mitigation strategies to prevent them from derailing the project, also discussed in Annex 3. For instance, to hedge against weather risk, the project will link farmers to crop insurance and credit for purchase of irrigation facilities. Anticipated externalities include increased use of pesticides for disease control and women losing out to men who typically control income, as the value of sweetpotato increases. To mitigate these negative externalities, the project will implement pesticide safe use training and mainstream gender awareness in project activities.

Details of other externalities are discussed in Annex 3

5.2 Design measures that will be incorporated to increase the likelihood of sustainability of the project activities or outcomes

CIP and the Department of Food Technology and Nutrition of Makerere University in Kampala (DFTN - MUK) will support SOSPPA in the sourcing of sweetpotato puree processing equipment, their installation, and maintenance; and provide training on recipe development, good manufacturing, and processing practices in accordance with the Uganda Bureau of Standard (UNBS) regulations and ensure stringent HACCP in food processing by the PO and other project partners, all within the first three years. They will build the capacity of puree processors including those on postharvest handling of OFSP roots, food safety and hygiene practices. The OFSP puree can be used as a partial substitute for wheat flour (20% - 40% of wheat flour), enhancing the vitamin A content of baked and fried products (Figure 4, Annex 6). The project envisages supplying 1.5 million pieces (over 3 years) of OFSP chapati dough and chapati to the urban and peri-urban informal settlements of the project districts targeting youth and single mothers who are the main vendors of these products. That amounts to reaching approximately 700,000 consumers (assuming a consumer eats 2 chapati each).

5.3 Stakeholders involved or consulted in the development of the Proposal

1. *Sweetpotato vine multiplier in Bukedea district* – neighbour to SOSPPA's home district – discussed availability of suitable varieties for processing, multiplication strategy and reach (clientele coverage), government certification of vines for sale. Insights used to enrich Component 2 of the project.

2. *Department of Food Technology and Nutrition of Makerere University in Kampala (DFTN-MUK*), key informant interview (KII) via phone – provided information on past investments in processing located in rural areas (Mango processing in Soroti); interventions targeting farmer organizations (e.g., honey processing in Ntingano). Emphasized need for feasibility study of the market to determine size of market, potential segments to target, hence equipment capacity needs. Views incorporated in Component 1 design.

3. *MUK, Department of Extension & Innovation Studies*, KII via phone, currently implementing a OFSP intervention in OFSP value chain - provided information on the operational weaknesses and strengths of producer organizations: their weakness in operating as a business, delicacy balancing social (collective) and

commercial (profit-making) goals, need for capacity building in over-sighting business entity, need to hire trained professionals to manage key business aspects. Views enriched Component 3 and 4.

4. *Local government in catchment area* – in-person KII with commercialization officer, head Department of Agriculture, Crop sector head, fisheries sector head and entomology head in Amuria district – identified district as major sweetpotato producers and animal feed constraint. Also, a phone KII with agriculture officials & local COVID -19 response taskforce in Serere district – explained challenges and local response strategy. Led to inclusion of Amuria as a project district.

5. *Bavubuka Twekembe Youth Group*: Dr Jolly Kabirizi (Livestock and Forage Specialist) and Ms. Zainah Nampijja (Animal Scientists) - both officials of a silage manufacturing youth group that is commercially making silage- via phone discussed silage making, market potential, equipment costs, and potential for the Group to provide technical training to SOSPPA.

6. *In-person KII* with sweetpotato farmers (non-SOSPPA) members in Serere and Amuria districts – to gauge awareness of and cultivation of OFSP. Learned that little is known about the crop in Amuria and some farmers in Serere. Revelation used to argue for need for training of field technical assistants (FTAs) to provide routine advisory/extension services in agronomy, compliance with processing quality parameters.

5.4 Structure of the PO, including membership, and services offered by the PO

SOSPPA has an ExCom comprised of nine members including chairperson, secretary, and treasurer. In the most recent project – preceding the COVID-19 disruption – SOSPPA had 15 salaried staff working under the supervision of the coordinator. These included Agronomist, Production Center Manager, and Accountant. Direct beneficiaries of SOSPPA services are its members. In 2019, SOSPPA had 1,200 members that were actively involved in its different activities including vine multiplication, OFSP root production for processing into composite flour and fried products, and cassava chipping and processing into flour. In 2020 and 2021, due to COVID-19, member participation in group activities declined due to lockdown and fears of being infected, with active participation in SOSPPA/group activities declining from more than 90% to only 40%. The project will target these to build their resilience.. Fees for membership are paid at the affiliate group level: UGX 10,000 for registration and annual subscription of UGX 10,000. Each affiliate group then pays UGX 50,000 to the Association.

Assets owned include: 3 plots of land, 1 motorcycle-Yamaha DT, 2 root chippers (@ 1MT per hour capacity), solar drier (100kg of chips/day, warehouse (150MT capacity), 2 chips graters, 2 wheelbarrows, 5 tarpaulins, printer, 1 laptop, 2 phones, and office furniture – all valued at about UGX 300 million.

SOSPPA has two other aggregation and processing sites operated by farmer groups but need to be rejuvenated to handle larger volumes. The sites are Abuket center in Kyere Sub-County and Odapaeta center Kateta Sub-County.

5.5 Proposed project implementation arrangements

Project lead: SOSPPA will be the Project Lead responsible for overall implementation of the components/activities and will provide the premises (land) for construction of the processing factories. SOSPPA operations management, led by SOSPPA Coordinator (Mr. Joseph Okalebo, B.Sc. in Social Work and

Administration), will provide oversight to the project operations in consultation with the ExCom. SOSPPA will be accountable for the implementation of the project, coordination of partners, and day to day operations of the project. The Coordinator will, with technical support and financial oversight from CIP PMU, be responsible for overall implementation, financial and administrative oversight of the project, and will serve as principal liaison to World Bank as the SE. The Coordinator will represent the project and be responsible for managing all project staff, monitoring, and reporting of the project progress. The Coordinator will also be responsible for the monitoring of credit and weather insurance loan schemes. In addition, the project will hire trained and experienced professionals to manage key operations. They will include a puree processing officer (1), silage processing officer (1), marketing officer (1), accountant (1), agronomist (1), M&E coordinator, and field technical assistants (20). These professionals will be competitively recruited. SOSPPA's ExCom, including Mr. Gabriel Adipu (Chairman), Mr. Charles Oile (Secretary) and Ms. Florence Agujo (Treasurer), will provide general oversight to overall SOSPPA operations.

Project partners:

***International Potato Center (CIP)*:** Within the first three years, CIP will provide overall technical support to SOSPPA in implementing the project and will coordinate the capacity building activities aimed at developing the technical, governance, procurement and management skills of the ExCom, dedicated management team, field technical assistants (FTAs) and farmer members. CIP will also be responsible for providing technical advice to SOSPPA and overseeing the installation, and maintenance of the processing equipment for root and silage processing. CIP's Food and Nutrition Evaluation Lab (FANEL) at BecA lab, Nairobi, will provide food science, new product development and training support working with established and new commercial partners in the project target districts. CIP's Project Management Unit (PMU) will provide technical and managerial support, as well oversight, to SOSPPA in grant financial management and build SOSPPA capacity to efficiently handle these roles on its own. This support will include overseeing project accounting, including budgeting, annual work planning, monitoring budget spending, ensuring compliance with WB/GAFSP financial regulations, and all relevant CIP financial policies and procedures. Specifically, CIP finance will provide close financial assistance to the accountant to be hired by SOSPPA in terms of training-on-the job and oversight to enable her/him execute financial responsibilities efficiently. CIP will also support SOSPPA in the execution of annual financial audits for the first 2 years. CIP will also provide training and support to SOSPPA's treasurer to support some of the financial management functions and takeover oversight role when CIP exits after three years of project lifespan. Dr Julius Okello is an Agricultural Economist & Impact Assessment Specialist with expertise in managing and evaluating impact of agricultural development interventions. He will serve as the CIP-Lead Scientist and will oversee the overall implementation of the project, design, and technical aspects of the project, SOSPPA ExCom's capacity building activities and design of systematic assessment of project impact. Dr Fred Grant, CIP Regional Nutrition Scientist & CIP-Uganda Country Manager, will oversee the design and implementation of a nutrition education program aimed at improving nutrition status of SOSPPA members' households, with reducing participation in the last 2 years of the project. Ms. Sarah Mayanja, CIP Gender and Value Chain Senior Associate, will contribute expertise in gender dimensions of the project interventions. Dr Sam Namanda, Agronomist & Associate Scientist, will build technical capacity of FTA, member farmers, and vine multipliers in agronomic practices and compliance with root quality parameters. His responsibility will also decline (in project year 3) as SOSPPA learns and takes over the roles and responsibilities of providing agronomic support to its own members. The district agricultural and nutrition departments will continue providing the technical support needed in these areas to SOSPPA.

***Makerere University*:** The Department of Food Technology and Nutrition (DFTN) and MUK Business School will be resource partners and consultants supporting SOSPPA under a sub-grant arrangement. DFTN, through Dr Gatson Tumuhimbise, will provide technical capacity building to the SOSPPA ExCom and key staff on food processing, good manufacturing practices, industry food safety standards, hazard analysis and critical control points, and Uganda National Bureau of Standards. DFTN will, jointly with CIP, provide technical advice and support to SOSPPA procure, install, and test the processing equipment, and will train SOSPPA ExCom and processing staff on equipment use and maintenance. The MUK Business School will provide capacity building to SOSPPA ExCom, FTAs, and processing staff on market intelligence gathering, product marketing, promotion strategies, and good practices in project accounts management. The school will also train ExCom and SOSPPA on governance of the Association as a group and a business.

***Bavubuka Twekembe Youth Group (BTYG)*:** This group is an innovative youth-led business-oriented silage making group based in Luwero district. The group produces silage from sweetpotato vines and sells to dairy and pig farmers. They are linked to industry associations including Dairy Farmer Network and the Livestock Development Forum. Ms. Zainah Nampijja (Animal Scientist and BTYG Secretary General) and Dr Jolly Kabarizi (Livestock and Forage Specialist, and BTYG Patron) will provide technical training to silage hubs and FTAs on silage formulation, raw material production and processing, and marketing. BTYG will also foster linkages to unmet market potential.

***Ministry of Agriculture Animal Industry and Fisheries (MAAIF)*:** The project will work in close collaboration with the Local Government's Department of Agriculture. CIP will build the capacity of the Crop Sector staff who, together with the CIP agronomist, provide backstopping to the FTAs. SOSPPA will also collaborate with the Department in recruiting new farmers and mobilizing them into producer groups. It will also work closely with the Fisheries and Livestock Sector Heads and staff in promoting sweetpotato silage as feed, thus generating a sustainable market for this product. SOSPPA will closely engage with the Commercialization Sector Head and staff in the silage market demand creation within the project districts and in linkage to other markets. MAAIF will also do the certification of seed multipliers.

ENSIBUUKO Tech, in collaboration with Agro-insurance consortium, will spearhead crop insurance and provide weekly updates on weather patterns through text messages to farmers in the different project zones. They will also be responsible to settle those farmers affected by either droughts or heavy rains. An MoU has been signed between SOSPPA and ENSIBUUKO Tech Ltd.

World Bank (Uganda): The World Bank will supervise SOSPPA and partners, and the grant in regard to this proposed project.

SENAI Bioscience Laboratories, will supply foundation material/seed to the certified seed multipliers. SENAI undertakes research on plant, soil, and water management.

***Atop Local FM Radio*:** Atop will be used for dissemination, advertising, promotions, and mass mobilisation of the farmers and consumer education on benefits of OFSP consumer products and silage**.**

5.6 Proposed financial and implementation arrangements between the SE and the PO
The SE will supervise the PO (SOSPPA) and its implementation partners.

5.7 Present the overall project budget using the Tables A, B and C in Annex 1. Please respond in Annex
Please reference Annex 1.

5.8 PO's readiness: Provide information regarding the PO's:

Previous experience managing funds from the preferred SEs and/or other international entities such as development agencies or international NGOs, e.g., law 6

- 2017-18 - Farm Africa - UGX 200,000,000 on effective production, processing, and marketing of OFSP in Serere, Ngora, and Kumi.

- 2015-17 - Farm Concern International - UGX 200,000,0000 for commercialisation of sweetpotato based on SeFaMaCo model in the five Districts of Soroti, Serere, Kumu, Ngora, and Bukedea.

Main activities carried out by the PO in the past 5 years and external funders for those activities; and

Project and activities
- 2020-2021: Agriculture Cluster Development Programme (ACDP) (UGX 450,0000,000) by MAAIF and World Bank; for cassava value chain development in Serere district.

- 2014-2019: Cassava Add value for Africa (CaVa) (UGX 74,000,000); by Africa Innovation Institute (AFRI); for increasing the capacity of farmers, farmer groups, and cassava processors in Serere district.

- 2017-2018: Sweetpotato for Prosperity Project (UGX 200,000,000); by Farm Africa for training of 2,000 farmers Kumi, Nora, and Serere on effective crop production, processing, and marketing.

- 2016-2017: Cassava Community Action Research Project (in-kind); by RUFORUM for developing a community-based cassava seed system for increased productivity and market linkages.

- 2015-17: SeFaMaCo Project (UGX 200,000,000) by Farm Concern International for value chain development and smallholder farmer commercialization of sweetpotato in Serere, Ngora, Kumi, and Bukedea.

Experience in managing contracts, not limited to grant agreements.
Grants and contracts managed by SOSPPA:
- 2021 - MAAIF-ACDP - Grant for cassava value chain development in Teso sub-region.
- 2018 – Soroti Catholic Diocese Development Organization (SOCADIDO) – grant for cassava and sweetpotato value addition and processing in Kapelebingo District.
- 2016-2017 - MoU with CaVa to supply clean planting material of cassava.

- 2013-14 - MoU with World Vision Tororo Branch to supply clean planting to farmers in Busia and Bugiri.
- 2013 - MoU with Wind wood Milliers to supply quality Chips of 20Mts.
- 2008 - Agreement with NAADS for a processing center in Soroti district.
- 2002 – Contract with Food and Agriculture Organization (FAO) to supply OFSP to internally displaced people in Teso and Karamoja Region.

Annex 1 – Project Budget Tables

Table A: Summary of Overall Project Funding

Funding Source	Amount					Has this funding been secured (Yes/No)?
GAFSP grant amount requested	2,330,000					n/a
PO co-financing	0					
Other Funding Sources *(SE, ODA, international NGOs, etc.)*	0					
CIP	92,925					No
Total Project Funding	2,422,925					

A Detailed Budget is below.

Table B: Detailed Project Budget (for each component indicate who will administer the funds and manage procurement – SE or PO)

Components	Activities	Amount USD				GAFSP Funding Requested		Other Funding Sources Amount
		Year 1	Year 2	Year 3	Year 4	Amount Requested (US$)	Fund management and procureme	
Component 1: Improve market access and farm incomes for SOSPPA farmers through OFSP marketing, processing, and value addition supported by effectively managed facilities and trainings. (USD 792,412)	Activity 1: Establish a processing/manufacturing facility focusing on OFSP-based commercial consumer products.	45,835	38,351	35,432	17,589	137,207	SE	30,975
	Activity 2: Convert by-products of sweetpotato processing into livestock and/or fish feed through silage processing.	45,835	38,351	35,432	17,589	137,207	SE	
	Activity 3: Establish sweetpotato silage hubs in project implementation districts to provide silage making services and information on supplementation regimens for improved livestock rearing.	45,835	38,351	35,432	17,589	137,207	SE	
	Activity 4: Strengthen and expand markets for OFSP vines, fresh roots, and value-added products.	45,835	38,351	35,432	17,589	137,207	SE	
	Activity 5: Equipment Requirements	207,000	-	-	-	207,000		
	Activity 6: Field & Operational Support	16,733	8,916	8,339	2,596	36,584		
	Sub-Total Component 1	**407,073**	**162,321**	**150,066**	**72,953**	**792,412**		
Component 2: Increase productivity and production of sweetpotato roots and vines, and other nutritious crops, amongst SOSPPA farmers with yield-enhancing inputs, improved and climate smart agricultural practices. (USD 519,681)	Activity 1: Strengthen the existing 10 vine multipliers in Serere district and enrol (and train) two multipliers (1 male, 1 female) in each of the 6 new districts and link them to producers of basic seed/foundation material and certification services.	42,704	27,812	20,129	35,076	125,720	SE	30,975
	Activity 2: Provide technical and advisory services on the recommended agronomic practices for sustainable production of OFSP roots to SOSPA-affiliated root and vine producers. Fifteen (15) technical field assistants (FTAs) will be employed to provide these services to farmers.	42,704	27,812	20,129	35,076	125,720	SE	
	Activity 3: Revamp and implement an interlinked gender responsive credit scheme by strengthening the capacity of the existing SACCO to better serve farmers, particularly women and youth, who need credit to invest in quality seed, irrigation facilities, and/or hire land.	42,704	27,812	20,129	35,076	125,720	SE	
	Activity 4: Redesign and strengthen the crop insurance scheme in partnership with a private sector provider and link the weather insurance scheme and the SACCO credit scheme to the sale of roots and vines to the processing facility and managed by SOSPPA.	42,704	27,812	20,129	35,076	125,720	SE	
	Activity 5: Equipment Requirements	16,800	-	-	-	16,800		
	Sub-Total Component 2	**187,615**	**111,246**	**80,516**	**140,304**	**519,681**		
Component 3: Promote diversified utilization and consumption of OFSP products amongst SOSPPA members and in current and new markets. (USD 645,094)	Activity 1: Awareness creation and training in OFSP handling, food preparation and child feeding for vulnerable households.	49,565	36,239	34,093	16,639	136,536	SE	
	Activity 2: Scaling out the use of improved utensils (measuring bowl and slotted spoon) - healthy baby toolkit - to support effective feeding of OFSP puree and other nutritious porridge.	49,565	36,239	34,093	16,639	136,536	SE	
	Activity 3: Analysis of food safety risks from increased use of OFSP in young child feeding in high-vulnerability contexts (project target districts); and adapt guidelines for improved food utilization to these consumers.	49,565	36,239	34,093	16,639	136,536	SE	
	Activity 4: Equipment Requirements	165,600	-	-	-	165,600		
	Activity 5: Field & Operational Support	20,033	8,916	8,339	32,596	69,884		
	Sub-Total Component 3	**334,329**	**117,634**	**110,617**	**82,514**	**645,094**		
Component 4: Strengthen SOSPPA's governance and management capacities to deliver services to its members. (USD 272,806)	Activity 1: Build technical capacity of SOSPPA on production (agronomic practices) and manufacturing (good manufacturing practices).	15,791	13,311	14,961	9,309	53,372	SE	30,975
	Activity 2: Build technical capacity of SOSPPA on governance – focusing on how to govern the new outlook of SOSPPA given the added commercial business venture.	15,791	13,311	14,961	9,309	53,372	SE	
	Activity 3: Build technical capacity of SOSPPA on management – providing new, modern professional skills needed to manage and/or oversee healthy, efficient, vibrant and profitable commercial processing of roots and vines into consumer products and animal feed.	15,791	13,311	14,961	9,309	53,372	SE	
	Activity 4: Build the financial capacity of SOSPPA to handle credit and crop insurance and business grants efficiently.	15,791	13,311	14,961	9,309	53,372	SE	
	Activity 5: Equipment Requirements	6,000	-	-	-	6,000		
	Activity 6: Field & Operational Support	26,860	12,568	11,295	2,596	53,320		
	Sub-Total Component 3	**96,024**	**65,812**	**71,138**	**39,833**	**272,806**		
Indirect Costs		**45,401**	**28,907**	**25,698**	**-**	**100,007**		
TOTAL BUDGET FOR ALL COMPONENTS		**1,070,442**	**485,920**	**438,034**	**335,604**	**2,330,000**		**92,925**

B.1. **Clarify the underlying assumptions for the proposed budget:** For example, indicative unit costs for major investments including how derived, training and workshops, program coordination costs, additional budget notes, etc.

Personnel: All costs associated with staff assigned as project direct staff are considered related to the project they support. The budget uses estimated loaded rates calculated according to CIP's official cost accounting and cost recovery policies, People and Culture administration guidelines and policies, and applicable labor law. CIP, as legal employer and responsible for duty of care of staff assigned to projects, will mitigate stress and resilience issues that affect personnel in high operational stress environments through staff care and other responses as appropriate, therefore CIP reserves the right to update salaries and benefits to employees, coordination with donors will follow the terms of the agreement.

Travel: Travel expenses follow CIP's travel policies and include costs for lodging and per diems for meals and incidental expenses (M&IE). Travel will include 3 major international trips from CIP technical experts and additional travel will be domestic and national for CIP, SOSPPA, Makerere University, and Bavubuka Twekembe Youth Group.

Equipment: Major equipment will be required such as (9) Puree processing equipment, (6) Equipment for Sileage Processing, (1) Vehicle Landcruiser, (1) Vehicle pickup, (3) Motorcycles, (1) Generator, (1) Solar Panel, (1) Panel Mini Truck, (1) Puree Processing Spaghetti Equipment.

Supplies and Services: The project will include 3 feasibilities studies (market assessment, nutrition studies and agronomical studies) that will be done in the first year, different protocols for OFSP puree processing, 5 impact studies and monitoring & evaluation, basic seed and vines supply and production, nutritional education and promotional activities, and laboratory analysis and designs.

Trainings: About 3 capacity building events will be organized (governance, management and technical on agronomical practices and compliance) during the first and last year. One ToT each year and trainings for farmers on processing food safety, agronomical practices, nutrition practices, and sileage processing will be conducted.

Other costs: A standard contribution to maintaining office services to support personnel is charged that contributes to rent, IT services, regular campus maintenance and general services and utilities., network infrastructure, internet connectivity, helpdesk, etc. Likewise, there is a standard charge for operational support services for personnel.

CIP Indirect Costs (USD 100,007): The Indirect Costs are business support costs that cannot be associated directly to research activities. CIP applies a standard administrative cost rate (of 18.4%) to all grants that is consistent, duly documented, and supported by its most recent audited financial statements (prepared in accordance with its charter and governance structure) and current budget estimates. This rate includes 16% of institutional costs and 2% of CGIAR System Cost fee.

As part of the CGIAR, CIP is required to support it through the Policy on CGIAR System Cost Financing. The CGIAR requires all participating centres to collect as part of the overall project costs a 2% fee on all grants received by CGIAR centres. These cover a range of institutional functions provided by system level (CGIAR) as requested by its System Council, which include but are not limited to, governance, system level evaluation, fund raising etc.

The CGIAR Cost Principles and Indirect Cost Guidelines form part of CIP's formal policies and procedures, approved by the Board of Directors. The cost principles require CIP to have consistency of application across all projects. CIP Indirect Costs rate may be adjusted after Board of Trustees approval of 2023 budget. Any necessary updates to ensure full cost recovery will be communicated to World Bank.

This budget is presented using USD. However, reimbursement of grant expenses is expected to be at cost in CIP's functional currency and converted to the grant's currency exchange rate at the time of the transaction. It is understood that both inflation and currency fluctuation may affect the effective budget funds available in relation to actual costs, and that the budget will be adjusted as necessary, and in consultation with the donor when deliverables may have to be adjusted if the proposal currency exchange rate or hyperinflation no longer supports the assumptions made at time of proposal.

B.2. Will the PO provide any financial or in-kind contribution to the project?

Yes, it will provide land for construction of the processing factory.


GAFSP
global agriculture & food security program

Annex 2 – Proposal Stage Results Monitoring Matrix

Review *Table D* below for the list of GAFSP Tier 1 (impact) and Tier 2 (output and outcome) indicators and select the indicators that are relevant to the Proposal. The selected GAFSP Monitoring & Evaluation (M&E) indicators should be included in the Results Monitoring Matrix presented in *Table E* and should feed into the project Results Framework or Log Frame if the Proposal is approved.

Present a Proposal stage Results Monitoring Matrix in *Table E*. This should include indicators for the project as a whole and for all components, as well as indicative end-of-project target values. Refer to the GAFSP M&E Plan for requirements to be followed for any approved proposals. Refer to the list of Tier 1 and Tier 2 indicators in *Table D* and include those selected in *Table E*. Note that the GAFSP M&E Plan is currently undergoing revision and there may be changes to the current set of core indicators. Specifically, there may be new indicators to be used by PO-led projects to capture results around the institutional capacity of the POs and access to financial services provided by POs for its members. These changes (once finalized) will be communicated to successful recipients for incorporation into the Results Monitoring Matrix in the SE project design document.

Table D. GAFSP Tier 1 and Tier 2 Core Indicators

#	Tier 1 impact indicators for all GAFSP projects	Check if Yes
1	Food and nutrition security ▶ Mandatory Food Insecurity Experience Scale (FIES) indicator and optional indicators are Food Consumption Score (FCS), Minimum Dietary Diversity-Woman (MDD-W) and Minimum Dietary Diversity -Children (MDD-C)	x☐
2	Household income	x☐
3	Crop yield (apply only to those projects with explicit productivity gain goals)	x☐
#	**Tier 2 indicators for all GAFSP projects, *Mandatory Breakdowns*† (unit)** ▶ Indicator notes	
1	Number of beneficiaries reached, gender disaggregated, percentage who have been helped to cope with impact of climate change†† ▶ People receiving benefits from the project. ▶ Disaggregation for gender and those receiving Climate-Smart Agriculture (CSA)-specific support.	x☐
2	Land area receiving improved production support, *percentage of these that are climate smart* (ha) ▶ Area that adopted new inputs/practices, new/rehabilitated irrigation services, land registration, etc. ▶ Disaggregation for climate-smart interventions.	x☐
3	Number of smallholders receiving productivity enhancement support, gender disaggregated, climate-smart agriculture support ▶ Number of end-users who directly participated in project activities. ▶ Includes technology/technique adoptees, water users with improved services, those who had land rights clarified, people offered new financing/risk management services. ▶ Using CSA approaches.	x☐
4	Number of producer-based organizations supported (number) ▶ Relevant associations established or strengthened by project.	x☐
5	Volume of agriculture loans that are outstanding. ▶ Volume of outstanding loans for agriculture and agribusiness in a financial institution	☐
6	Percentage of beneficiaries with secure rights to land, property, and natural resources (percent of total beneficiaries) ‡‡ ▶ Measured as those with legal documentation or recognized evidence of tenure and those who perceive their rights are recognized and protected.	x☐
7	Roads constructed or rehabilitated, percentage resilient to climate risks (km) ▶ All-weather roads built, reopened, rehabilitated, or upgraded by project. ▶ Percentage that are designed to withstand changes in climate.	☐
8	Number of post-harvest facilities constructed and/or rehabilitated (number) ▶ Includes markets, agro-processing/storage/quality control facilities.	x☐
9	Volume of agricultural production processed by post-harvest facilities established with GAFSP support, *by food group* (tons) ▶ Tons of total produce processed sorted by 10 major FAO food groups.	x☐
10	People benefiting from cash or food-based transfers, *gender disaggregated* (number of people) ▶ Number of people who benefited from cash or food transfer interventions.	☐
11	People receiving improved nutrition services and products, *gender disaggregated, age disaggregated* (number of people) ▶ Number of people who received nutrition counselling/education, recipients of Ready-to-use Therapeutic Foods, bio-fortified foods, and Vitamin A and micronutrient supplements. ▶ Number of people receiving extension support for nutrition-relevant techniques (e.g., homestead gardens, Farmer Field School support, etc.).	x☐

12	*Direct employment provided; gender disaggregated* (full-time equivalent) ▶ Number of direct employees in a client company. ▶ Part time jobs aggregated to full-time equivalent.	x☐
13	Persons receiving capacity development, *gender disaggregated*, *organization type* (number of people) ▶ Agricultural and non-agricultural rural training and capacity building support provided. ▶ Distinguishes between individual producers/household members, civil society organization staff, and government officials.	x☐
14	Number of substantive deliverables on food security processes completed (number) ▶ Measures "soft support" for institutional development provided through discrete deliverables. ▶ Deliverables include policy studies, strategies and plans, best practices, and lessons learned, among others.	☐

Table E. Proposal Stage Results Monitoring Matrix

Indicators[2]	Unit of measurement	Baseline[3]	End-of project target	Data sources (Data collection instruments)
Project level indicators				
Project's highest-level indicator: Number of SOSPPA-affiliated beneficiaries reached, gender disaggregated, percentage who have been helped to cope with impact of COVID-19 pandemic and other shocks	# new technologies made available for transfer as a result of GAFSP assistance	TBD	50% increase over baseline	Project reports, monitoring database, surveys
Component level indicators[4]				
Component 1: **Improve market access and farm incomes for SOSPPA farmers through OFSP marketing, processing, and value addition supported by effectively managed**			70% increase over baseline	
- Outcome Indicator 1	# Vitamin A rich OFSP based products on the markets	TBD		Project training reports, monitoring database, survey
- Output Indicator 1	# Processing facility focusing on OFSP-based commercial consumer products, established.	TBD	1 increase over baseline 80% increase over baseline	Project training reports, monitoring database, survey
- Outcome Indicator 2	# Improved and affordable animal feed (silage) to for livestock industry	TBD		Project training reports, monitoring database, survey
- Output Indicator 2	# Silage hubs established to provide silage making services	N/A	6 increases over baseline	Project training reports, monitoring database, survey
- Output indicator 3	# Research study on food safety risks from increased use of OFSP in young child feeding in high-vulnerability contexts (project target districts); and adapt	TBD	1 research study	Operational research

[2] If any cross-cutting themes were selected in Section 3.1, this table must include some indicators that correspond to the selected theme(s).

[3] If this is unknown, write TBD (to be determined).

[4] Please identify indicators that can clearly represent the causal links in the results chain that bridge the gap between the current status and the objectives (desired high-level indicator). Ideally, under each component there is at least one outcome indicator and correspondent output indicator(s).

	guidelines for improved food utilization to these consumers.			
- Output indicator 4	# of new institutional markets established	7 markets	8 schools increase over baseline	Monitoring data
Component 2: **Increase productivity and production of sweetpotato roots and vines, and other nutritious crops, amongst SOSPPA farmers with yield-enhancing inputs, improved and climate smart agricultural practices**				
- Outcome Indicator 3	# increased OFSP roots in selected markets	2 markets	4 markets increase over baseline	Project training and monitoring reports
- Output Indicator 5	# DVMs strengthened and refresher trained in 7 project districts and linked to producers of basic seed and certification services	6 DVMs	16 DVMs increase over baseline	Project training reports
- Outcome Indicator 4	# in reduction of on-farm post-harvest losses of OFSP	TBD	50% decrease over baseline	Project training and annual reports
- Output Indicator 6	# technical field assistants (FTAs), affiliated with SOSPPA root and vine producers, recruited, and provided with technical and advisory services on the recommended agronomic practices	3	17 FTAs increase over baseline	Project training and annual reports
- Outcome Indicator 5	# Increased gender equitable income opportunities for OFSP farmers	TBD	60% increase over baseline	Project training and monitoring reports
- Output Indicator 7	# interlinked gender responsive credit schemes strengthened and to provide better SACCO services to farmers, particularly women and youth	1	4 increase over baseline	Project training and monitoring reports
- Outcome Indicator 7	# OFSP fresh root markets profitably supplying nutritious foods	N/A	6 increase over baseline	Project training reports, monitoring database, surveys
- Output Indicator 8	# crop insurance (and weather insurance) scheme redesigned and strengthened in	N/A	1 increase over baseline	Project training reports, monitoring database, surveys

	partnership with a private sector provider			
Component 4: **Strengthen SOSPPA's governance and management capacities to deliver services to its members**				
- Output Indicator 9	# Technical trainings on production (agronomic practices) and manufacturing (good manufacturing practices) offered to SOSPPA management.	1	3 increases over baseline	Project training and annual reports, monitoring database, survey
- Outcome Indicator 10 -	# SOSPPA ExCom and management are able to efficiently handle credit and crop insurance and business grants.	1	3 increases over baseline	Project training and annual reports, monitoring database, survey
- Output Indicator 10	# Management trainings (modern professional skills) provided to SOSPPA management and ExCom	N/A	3 increases over baseline	Project training and annual reports, monitoring database, survey

Annex 3 - Risks and Negative Externalities

Describe important potential risks to *achieving the project's development objective(s)* based on the scale, complexity, duration, and magnitude of proposed project activities and operations. Provide an assessment of the likelihood (probability) and risk rating (severity, impact) of the risks, and proposed mitigation measures. Add additional rows to the table for additional risks, if needed.

Table F: Risks

Risk	Likelihood (L, M, H)	Risk rating (L, M, H)	Risk description	Proposed mitigation measures
Technical design[5]: Risk that technical design could affect the project from reaching its objectives	L	L	Possibility that equipment running at less than full capacity.	Feasibility study; and Linkage with MUK Extension & Outreach Department for technical backup.
Institutional capacity for implementation[6]: Risk that there is insufficient capacity to implement the project	M	M	Possibility of SOSPPA failing to manage its growth sustainably	Capacity building on governance; and Hire trained professional to manage key operations.
Farmer capacity	H	H	Farmers are not able to purchase quality/certified sweetpotato vines/seed due to lack of money (i.e., equity capital constraints) and the tradition of getting vines free from neighbours and family. This is likely to result in poor yields, production, and income, hence reducing anticipated	Sensitize and educate farmers about the yield advantage arising from use of quality/certified seed; Provision of credit to farmers under closely monitored interlinked credit scheme.

[5] Indicative list of risks to assess: the technical complexity of the project; the extent to which project design is informed by analytical work; adequacy of number of components and subcomponents; past experience in designing and implementing similar operations; whether the design incorporates or relies on untested or unfamiliar technologies and processes; the extent to which project benefits dependent on external factors beyond the scope of the project.

[6] Indicative list of risks to assess: the complexity of the institutional arrangements (at central and local levels) such as number of implementing entities involved; geographical spread of project intervention areas and remoteness of these areas; experience of proposed implementing agency with similar scaled projects with international organizations.

			nutrition and monetary impact.	
Climate change	M to H	M to H	Drought (a systemic risk)- dry conditions destroy the crop and leading to i) loss of income to farmers; and ii) inadequate supply of fresh roots and vines for the processing facilities - hence operation at less-than-optimal capacity.	Roll out a crop insurance scheme provided by a named private provider, under an interlinked scheme (i.e., premium deducted directly from farmers' sales); and Diversify production base to different locations -hence unaffected areas act as buffers, smoothing supply.
Strategic default on loans	M to H	M to H	This risk occurs when farmers borrow knowing that they don't intend to pay back. This can occur when a farmer stops growing sweetpotato after taking a loan	Institute an incentive mechanism that foster group members' monitoring on one another ii) require member guarantors and group endorsement of loan application.
Price fluctuation	M	M	Price of roots in the local market (or offered by traders) increase making SOSPPA's agreed purchase price unattractive and resulting in side-selling. This risk can seriously foment default in repayment loans (i.e., credit and crop insurance).	Close monitoring of crop outlook by the FTAs; Design purchase pricing (for root and vines) that is flexible and can be adjusted based on supply conditions; and Institute an incentive mechanism for punishing side selling and rewarding loyalty.
Political instability	L	L	Political instability - this can arise during and after elections and affects: i) distribution of processed products and built up of inventory' and ii) access to raw materials for processing and sourcing of production inputs (fertilizer, pesticides).	Maintain a storage facility that can hold products for a specified duration; and Maintain an inventory of raw materials.

Table G: Evaluation of Negative Externalities

Potential Negative Externalities	Likelihood (L, M, H)	Risk rating (L, M, H)	Description of potential negative externalities	Proposed mitigation measures
Environmental[7]	L	L	Increased pesticide use - Pest build up due to repeated growing of sweetpotato and lucrative price leading to increased reliance of pesticides for disease and pest control with attendant health and environmental effects.	Increased training on crop rotation to break disease and pest cycles; Training on safe use of pesticides.
Social[8]	M to H	M to H	Cultural norms that limit access to land by women and youth.	Support women and youth to access loans to use for hiring land for sweetpotato production
Gender	M to H	M to H	Exclusion and displacement of women and youth in the sweetpotato value chain.	Support women and youth participation in capacity strengthening activities; Gender responsive loan terms to ensure women obtain loans for improving sweetpotato based enterprises; Improve visibility of cottage-based products and promote business to business learning, coaching, and mentoring.

[7] This could include the potential effects on natural resources such as water sources, forests, and protected areas; potential effects on biodiversity; and where appropriate, potential impacts on the climate arising from unchecked anthropogenic emissions of greenhouse gases (GHGs) and short-lived climate pollution (SLCPs).

[8] This could include the potential effects on human health and safety; the nature, scale, and duration of social effects such as the need for land acquisition and/or involuntary resettlement; potential impacts on, equity, and indigenous peoples; and potential impacts on physical cultural resources.

Annex 4 - Prior GAFSP Grant(s)

Provide details about each prior GAFSP grant (from the GAFSP Missing Middle Initiative) the PO has received (if applicable).

Project Name	**N/A**
Country	
Responsible Implementing Entity	
Responsible Supervising Entity	
GAFSP Grant Amount and Amount Disbursed	Total Grant: US$ Amount Disbursed (date): US$
Grant Approval Date	
Project Status (active or closed)	
Project Closing Date	
Project Implementation Update *(implementation progress, results, challenges, etc.)*	
Most recent/last SE Implementation Rating for (i) achieving project objectives and (ii) implementation progress.	
Will the project proposed under this proposal build on or be linked to this prior GAFSP grant? If so, in what way?	

(copy table in case of multiple prior grants)

Annex 5 - Proposal Preparation Team

List the names, titles, organizations, and email addresses of the core members of the Proposal preparation team (including private consultants and Supervising Entity staff, if any, who directly contributed to completing the Proposal Template). Do not include individuals who participated in wider consultation meetings or workshops held as part of the preparation of the Proposal; their participation and influence in proposal development will have been described in 5.3.

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Annex 6: Figures

Figure 1: SOSPPA assortment of value added OFSP products

Figure 2: Healthy Baby Toolkit (HBT) for improving young child feeding

Biofortified sweetpotato

= *Nutritious food systems*

- Fresh roots traded country-wide
  - Among most affordable foods
- Puree (cold chain to shelf stable)
  - Versatile use (school meals, food industry innovations)
  - >95% of nutrients

= *Nutrition for all*

- Vitamin A and other micronutrients
- Calories
- Easy fit in local diets

Guidelines for household utilization
Healthy Baby Tool Kit (6-23 mo)
As part of healthier diets

Figure 3: Nutrition-sensitive pathways for OFSP utilization in improving nutrition and food security

OFSP puree

Frozen OFSP puree

Ready-made dough containing OFSP puree and chapati made with OFSP puree

Figure 4: OFSP puree baked and fried products