ENDLINE EVALUATION

Sustainable Production and Consumption of Orange Fleshed Sweet Potatoes (OFSP) Project in Turkana and Samburu Counties

ChildFund Kenya

FRONTIERS CHILDREN

SAPCONE
EMPOWERING MARGINALISED COMMUNITIES

SAMBURU CHILDREN'S PROGRAMME
Transforming The Lives Of Children And Their Families

Contents

List of Tables

List of Figures

List of Abbreviations

CBO	Community Based Organizations
CHVs	Community Health Volunteers
ECDE	Early Child Development and Education
FAO	Food and Agriculture Organization
FCDO	Frontiers Children Development Organization
FGD	Focus Group Discussion
GoK	Government of Kenya
HH	Households
KALRO	Kenya Agriculture and Livestock Research Organization
KES	Kenya Shillings
KII	Key Informant Interviews
MoE	Ministry of Education
MoH	Ministry of Health
NDMA	National Disaster Management Authority
NGO	Non-Governmental Organization
OFSP	Orange Fleshed Sweet Potato
PSU	Primary Sampling Unit
SCP	Samburu Children Programme
SAPCONE	Sustainable Approaches for Community Empowerment
SMART	Standardized Method of Administering Research Tools
SME	Small and Medium Enterprise
TRP	Turkana Rehabilitation Project
UNICEF	United Nations Children Education Fund
VAD	Vitamin A deficiency
WASH	Water Sanitation and Hygiene
WFP	World Food Program

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Executive Summary

This is the endline evaluation report of the Sustainable Production and Consumption of Orange Fleshed Sweet Potatoes (OFSP) Project. OFSP was implemented with support from the BMZ, a German government-funded grant aimed at improving food security and private sector development in developing countries. The Project was a 3-year project that started in 2020 implemented by three national NGOs: Frontiers Children Development Organization (FCDO), Samburu Children's Program (SCP) and Sustainable Approaches for Community Empowerment, (SAPCONE). The project goal was to enhance resilience and livelihoods of women and children of vulnerable farming households in Turkana and Samburu counties. It aimed at improving the economic and nutrition status of 12,000 children, 3000 women and 2,200 youth are through adoption of OFSP innovative technologies in Turkana and Samburu counties by August 2023. The project target was to reach 600 farm households with Agri-Nutrition training in 3 sub-counties in Turkana and Samburu counties.

Purpose of the evaluation

The evaluation's overall purpose was to assess the intervention's design and management and achievement of results, according to the OECD criteria of relevance and appropriateness, coherence, effectiveness, efficiency, sustainability and impact. The research assesses the relevance of the intervention to its context, the linkage between activities and results, the planning and organizational framework and process of the intervention, and the impact of the intervention on the youth and women inclusion in sustainable value chains and environmental sustainability.

Methodology

The evaluation used a mixture of qualitative and quantitative evaluation methods including desk review, household surveys, semi structure interviews with project key stakeholders, and focus group discussions (FGDs) with all categories of participants. The evaluation field work was carried out between April 17, 2024, and May 5, 2024. The evaluation examined the achievement of the results developed by the project through the differences in outputs and outcomes between baseline figures, annual reports and the endline survey. The sampling frame included all project participants (farmers) in the OFSP Project area. The survey sampled respondents from 17 villages across the OSFP Project target area. The survey used a multi-stage cluster methodology using villages randomly selected from the three sub-counties, proportionate to population size. The sample represents the project areas and is not powered to give disaggregation by villages. Respondents were randomly selected from household lists for a total sample of 362 smallholder households.

Data collection tools utilized a module on exposure to and participation in the project's activities. Quantitative data was collected on tablets using *kobotoolbox* software application.

Data analysis procedures

Quantitative data were analyzed SPSS 23.0 while thematic and content analysis were used to analyze qualitative data generated from FGDs, KIIs and desk reviews. Analysis of household survey quantitative data entailed generating descriptive statistics such as frequencies, percentages, mean scores. All procedures followed ethical standards to ensure that participation was informed and voluntary and maintained confidentiality at all stages. The analysis was presented in three section: a process analysis which assesses the design of the intervention focusing on the planning and organization framework and the execution of the intervention including the financial mechanisms used for project management; a contextual analysis which assess how relevant the intervention is to the needs of participants, political, social and economic environment of the counties; and the achievement of project objectives which assesses the extent of the achievement of the results and objectives, the quality of indicators and reporting, forecasting impacts and emerging impacts in terms of their sustainability.

Findings

The endline evaluation triangulated different sources of information to verify and substantiate judgements and assessments. The use of a framework of common interview questions to identify questions/topics made it easier to triangulate interview evidence from different stakeholder groups.

The project adopted a hybrid design and approach, combining elements of livelihood diversification, market systems development approach (e.g., establishing producer groups, supporting development of community seed system, improving consumption of nutrient dense foods and diversifying agricultural production), promoting inclusive value chains for youth and women and elements of agricultural infrastructure rehabilitation (bringing more land and water into productive use). In a highly complex operating environment, the design was, overall, an appropriate response to some of the key constraints faced by women, youth and food producers, chiefly lack of alternative sources of livelihood to pastoralism, low participation by women and youth in high margin value chains, high production costs and low market returns due to limited value addition. Production constraints were addressed but market constraints less so.

The project design process was inclusive and interactive. The project adopted a logical framework model in its design which showed how activities will lead to the immediate outputs, and how these will lead to the outcomes and goal. In addition to the log frame approach, a well-developed Theory of Change (TOC) with assumptions, would have created a quick overall vision of change

pathways for the project. Equally, use of TOC could have effectively link results expected (outcomes) in a causal chain, and enhanced results and indicators for monitoring and evaluation (M&E) and reporting purposes. The baseline study, provided useful contextual information, but did not provide some initial benchmarks against which to measure progress towards achieving outputs and results expected. This however did not significantly compromise the effectiveness of M&E strategy and project performance reporting. There was a distinct feeling among local implementing partners that routine M&E activities at the implementers level were not adequately implemented since they were not supported by the budget. ChildFund's monitoring and evaluation field office in Samburu could not provide adequate routing M&E support but rather approving work already done However, the annual reports contain a wealth of analysis on results and impact.

Relevance

Target group and partner selection was appropriate for the achievement of project goals, and the beneficiary selection process and criteria developed proved acceptable to the target groups, including beneficiaries, who were involved in setting the selection criteria during the needs assessment conducted at the beginning of the project implementation. The selection of implementing partners was a key element in successful implementation. All stakeholders commended their experience with participating communities, practical skills and ways of working in the field.

Effectiveness

The results from the survey reveal that there have been very impressive improvements since the project started. This is confirmed by the high number of farmers reached with agri-nutriton trainings, farmers who have adopted production and consumption of OFSP compared to the baseline, increase in the value of sales of tubers and vines, increase in the acreage under improved technologies and the "crowding-in" by other development agencies to promote OFSP farming in the region. From the endline survey results, 98.4 percent of the participants cultivated OFSP, far greater than from the baseline where about 1 percent respondents were producing potatoes. As a result of the agri-nutrition promotion, 100 per cent households reported integrating OFSP including potato leaves in their diets signifying greater intake of Vitamin A by children and lactating mothers. On average, the mean value of yield of 211 kilograms (about twice the weight of a professional basketball player) per household increased. The study established that about 40 percent of respondents sold 72 tons (representing 79.2% of OFSP produced) to the markets earning income of KES. 5,760,000.

Sustainability

The sustainability of results for the individual farmer has great promise, if the strong sense of participant ownership created is supported by the additional promotion of the benefits of clean planting materials and good agronomic practices, the continued availability of extension services and the sustaining of learning networks among farmers through extension support visits. The sustainability of the longer-term results expected (increases in productivity and sustainable income from crop sales) will require further support in terms of marketing linkages, the provision of high-quality vines through community seed systems, including value addition, and innovative, commercially viable and environmentally friendly inputs.

Conclusion

The OFSP Project delivered multiple interventions for promoting the production, processing, utilization and commercialization of Orange Fleshed Sweet Potatoes (OFSP), in order to address various and intertwined factors affecting childhood malnutrition, women and youth empowerment, food security and resilient livelihoods in Turkana and Samburu Counties. Overall, the endline demonstrates generally positive results in each of the intervention areas to varying degrees, and an adoption of OFSP production and consumption indicating that the pastoral communities in these ASAL areas are embracing crop farming as alternative source of alternative livelihood.

Recommendations

- *Sequencing and adequate implementation period*

The 3-year implementation was too short a period to allow sufficient time for agriculture technology adoption and smallholder commercialization to take root. More consideration should be given to the sequencing of programme activities to ensure that outcomes can be monitored within the implementation period. Improving access to inputs through community systems, increasing productivity, establishing institutional arrangements and consumption promotion activities should commence at the beginning of the interventions so that farmers can be immediately exposed to the importance of collective action practices. In the same way, the commercialization of vines and marketing should be moved forward in the implementation cycle so that results of these interventions can be better monitored and evaluated.

- *Commercialization of OFSP*

Promote farmer-based aggregation centers near OFSP production areas for delivery to informal markets. Local implementing partners should promote the training of smallholder farmers to adopt bulking and OFSP aggregation for increased efficiency in sourcing of roots by institutional buyers and local traders. This is likely to attract local traders and lead to crowding-in since it has the effect of reducing transaction costs, improving quality and volumes. Aggregation centers are also likely to precipitate youth and participation in the OFSP value chains because they will

provide important services such as grading, cleaning, packing and transportation. The project should then link aggregators to the local traders and processor and provide capacity strengthening market strategies development.

- *Community seed system*

Although growing OFSP is gaining popularity in the ASAL areas potato growing areas, availability and access to quality seed potato remains a gap. Developing a localized community seed multiplication system particularly through groups, remains the most viable model to enable farmers access and maintain use of certified seed by farmers. Community vine multiplication should be accompanied with varietal evaluation plots to allow farmers select the best performing varieties suitable for their locations. There is need for every implementing partner to prioritize establishment of seed bulking sites to cut down the costs always being incurred during the purchase of vines from KALRO Kitale, Kakamega and Busia.

- *M&E Systems*

Some improvement is needed in the area of quality control of M&E products and results framework including baseline surveys and the development of indicators which are fully aligned with the results expected. Implementing partners should be allocated budgetary provisions to employ own M&E personnel while ChildFund field office should be facilitated with adequate resources to enable effective coordination of PI M&E field activities.

1. Introduction

1.1 Programme Context

Kenya's food security situation is deteriorating at an alarming rate with an estimated 4.4 million people (27% of the Arid and Semi-Arid Lands (ASAL) population facing high levels of Acute Food Insecurity – IPC AFI Phase 3 (Crisis) or above, of which about 774,000 people are in IPC AFI Phase 4 (Emergency) Kenya: IPC Acute Food Insecurity & Malnutrition Report-2023. Extremely Critical level (IPC Phase 5) of acute malnutrition has been reported in parts of Turkana while other areas like Samburu also projected to reach Extremely Critical levels of acute malnutrition. The deteriorating nutrition situation is mainly attributed to perennial and long periods of drought (declared a national disaster by the Government of Kenya in 2017) that has extended for more than 2 years with most parts of the country receiving below average rainfall hence worsening food insecurity in the country thus leading to massive death of livestock, water problems due to dried wells and boreholes, increased insecurity due to attacks by the bandits and high cost of living which has been exacerbated by high food and fuel prices sparking country wide demonstrations and riots.

According to the February 2020 Integrated Phase Classification for acute malnutrition (IPC AMN) among children under 5 years of age, Turkana was ranked as Critical (IPC Phase 4). All sub-counties were in the same phase classification. Acute malnutrition among women using MUAC was 9.1% as of June 2019, a deterioration from 7.5% in June 2018. The Short Rains Assessment Report (February 2020) ranked Turkana County at stressed phase, an improvement from Crisis phase in 2019. 1 in every 4 children in Turkana County are wasted (25.6%) or an estimated 78,311 children (SMART, Jun 2019) while 1 in 5 children in Turkana county are stunted (23.3%) or an Estimated 28,753 children (SMART, Jun 2019)

June 2019 integrated health and nutrition SMART survey conducted in Samburu County indicated a Global Acute Malnutrition (GAM) of 15.8% and a Severe Acute Malnutrition (SAM) of 2.4%. This means that there are approximately 16 severely and moderately malnourished children for every 100 and of these 2 are up to five times likely to die under similar circumstances than their well-nourished counterparts. These children are likely to experience increased and repeated chances of illnesses. Whereas the county has moved in the positive direction in management of severe wasting and stunting since 2017, the nutrition outcomes however remain poor and largely above the national thresholds of malnutrition. The high rates of malnutrition is further exacerbated by poor nutrition knowledge and practices among the communities, recurrent emergencies, emerging lifestyle and behavior such as alcoholism, Food and Nutrition insecurity, Disease and disease outbreaks. Unpredictable rainfall patterns in most parts of the County has led to low pasture coverage and minimal farming activities resulting to frequent migrations. Population migrations related to insecurity has also contributed to the poor nutritional status due to the interruption in the coping mechanisms and increased vulnerabilities.

Due to the persistent shortage of food in Turkana and Samburu counties, a significant proportion of children are put at risk. The National Drought Management Authority (NDMA) indicated almost 15.1% of the children were at risk in June 2019. To reduce the risk faced by children and vulnerable population emanating from food and nutrition insecurity, there is need for creation of safety nets assets to bolster sustainable food production systems. The SMART Survey team of both counties proposed that this can be achieved through promotion of Agri-Nutrition farms through irrigation; improving skills and awareness on agriculture technology; scaling up service delivery in hard-to-reach areas and managing and strengthening of food value chain. Other proposed interventions would include strengthening agricultural production and stabilizing food markets.

It is within this context that the Orange Fleshed Sweet Potato (OFSP) project was borne so that it would provide nutritious food to most children at risk of nutritional disorders and vulnerable groups. Sweet potato, the seventh most important staple food globally, produces more edible energy per hectare per day than wheat, cassava or rice (Woolfe, 1992). Orange fleshed sweet potato varieties provide beta carotene, a precursor for vitamin A, that reduces vitamin A deficiency (VAD) in children and lactating mothers (Low et al., 2001). The crop is consumed as fresh roots or as leaves and is also processed into animal feed, starch, flour, candy and alcohol (Chiona, 2009). According to Woolfe (1992) sweet potato can be substituted for wheat in bread, cereals and in many tasty, nutritious recipes. Unlike cereals, sweet potato is harvested all year-round providing a long-term solution for vitamin A deficiency (Mwanga & Ssemakula, 2011). The crop is adaptable to diverse environments because it tolerates high temperatures, low fertility soils, can grow in areas with low annual rainfall and is easy to propagate (Stathers et al., 2013).

Orange fleshed sweet potatoes offer an alternative means of addressing vitamin A deficiency because they contain high levels of beta carotene. Through a project it implemented in the dry parts of Makueni county, ChildFund Kenya found that good yields of OFSP can be obtained even in areas that receive less rainfall. The project's results also showed that OFSP consumption can reduce Vitamin A deficiency, reducing chances of malnutrition among children and lactating mothers. This project aimed at scaling up the OFSP project success in Emali area of Makueni to two sub-counties in Turkana and one sub-county in Samburu.

1.1 OFSP Project Background and Overview

ChildFund Kenya is partnering with BMZ-Germany and implementing a project on Sustainable Production and Consumption of the Orange Fleshed Sweet Potatoes Project (SEWOH-BMZ Grant). The overall objective of the OFSP or SEWOH project is to build the resilience and livelihoods of women and children of vulnerable farming households in Turkana and Samburu counties. The project is implemented through collaboration between three local non-

governmental organizations (Frontiers Children Development Organization (FCDO), Samburu Children's Program (SCP) and SAPCONE) that work with women, children and youth in Turkana and Samburu Counties. They are supported by ChildFund Kenya, which oversees the project activities. The project was anticipated to reach 2,460 households, directly or 17,200 people (about the seating capacity of Madison Square Garden), including women, children and youth. It is expected to have an indirect impact on about 40,000 people who live in the same area. Most of the direct project participants (69%) are children under five years old, who are vulnerable to vitamin A deficiency (VAD). The project was expected to empower about 3,000 women and 2,200 youth by involving them in the OFSP value chain system, thus improve their livelihoods.

Project Goal: Enhanced resilience and livelihoods of women and children of vulnerable farming households in Turkana and Samburu counties.

Project Outcomes: Economic and nutrition status of 12,000 children, 3000 women and 2,200 youth are improved through adoption of OFSP innovative technologies in Turkana and Samburu counties by August 2023.

Project Outputs

(a) Sustainable adoption of appropriate OFSP production technologies by 600 farmers
(b) OFSP products are accepted as household diet in target communities.
(c) Improved economic opportunities for women and youth in OFSP value chain.
(d) Increased stakeholder awareness on nutrition and economic value of OFSP
(e) The staff of the three local partners are trained in the areas of governance, project management, child protection, gender and advocacy.

1.2 Purpose of the Evaluation:

This endline study seeks to assess the relevance, effectiveness, efficiency, coherence, impact and sustainability of the project.

1.3 Specific objectives

i. To assess the changes at the end of the project based on a comparison of the initial status as per baseline survey versus the current situation of women, youth and children of vulnerable farming households in Turkana and Samburu counties.
ii. Identify the best practices and lessons learned experienced and achieved during the project's implementation.
iii. Recommend suggestions that will improve similar future projects based on what went well/did not go well.

2. Methodology

2.1 Evaluation approach

The evaluation framework was structured in conformity with the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee (DAC) criteria of relevance, effectiveness, efficiency, impact and sustainability. Under each criterion, key evaluation questions were identified to interrogate specific indicators such as OFSP project's structure, approaches, successes, challenges and lessons learned. Multiple data sources were drawn to answer each evaluation question, thereby ensuring triangulation of data.

2.1 Evaluation design

In consonance with the baseline study, this end line evaluation used a cross-sectional design comprising quantitative household survey and an embedded qualitative study with implementing partners, collaborating partners and OFSP value chain actors. Participants were drawn from three levels: households, implementing and collaborating partners, and policy arenas at county and sub-county levels. The assessment was structured into three complementary modules to identify intervention-level impacts for beneficiaries (farmers, women and youth), program analysis and changes in the broader market systems influenced by the program. It should be noted that the 2020 baseline survey served as a population-based survey (PBS) designed to measure performance indicators for the two counties, and, similarly, the 2024 the end line survey serves two purposes:

- As a component of impact evaluation and end line survey (*ex-post-facto*) for OFSP, and
- As the impact evaluation baseline survey (ex-ante) of the subsequent phases of OFSP project.

2.1.1. Quantitative design and sampling

In order to make the most appropriate comparisons across time, the sample was restricted to program direct beneficiaries that were covered in both the baseline and end line samples. While the baseline sample was divided into three geographic strata defined at the county and sub-counties based on all households targeted in the planned project areas, end term survey focused on the beneficiaries reached in the target sub-counties rather than the entire target population to allow for a closer measurement of beneficiary households and to produce more valuable insights. This resulted in about 23 per cent decrease in the size from the baseline sample for farmers (Table 1). Specifically, enumeration areas (EAs) selected at baseline was sub-county level while end line used Probability Proportional to Size (PPS) at group level. However, at baseline, the sampling frame comprised targeted beneficiaries in a county, whereas the end line sampling frame only included direct beneficiaries in the implementing partners' M&E database.

The key issue in any impact evaluation is the 'what if' question: what would have happened if the participating groups had not received the OFSP programme? To make a valid statement about the impact of OFSP, a counterfactual, or comparison group is needed, which can accurately represent this 'what if' scenario. The gold standard of creating a comparison group is through randomized assignment, whereby some households are randomly selected to receive OFSP, while others are randomly allocated to a control group. Through randomization, the treatment and comparison group would be highly similar in terms of their characteristics, except for the fact that one group would receive OFSP while the other would not. Comparing these two groups over time would yield an unbiased estimate of the impact of the programme. However, in the case of the OFSP end line evaluation, randomization was not an option, since a control comparison group was not established at the baseline. Instead, the end line study adopted non-experimental and a theory-based evaluation design employing an appropriate alternative strategy focused on assessing pathways of change across targeted areas and the underlying assumptions along project logical framework or theory of change.

Household Survey

The household survey involved structured interviews with 372 farmers in the four sub-counties as presented in Table 1 who had participated in OFSP farmer group activities, to determine OFSP technology adoption, production, value addition, utilization and commercialization of OFSP. Participant sampling and recruitment was within participating households, as the survey's main purpose was to assess participation along OFSP value chains compared with baseline. To detect a net 5 percent change from the baseline values in the probability of OFSP adoption and consumption in the project areas, the end line evaluation calculated the minimum required sample of 192 households in Turkana and 80 households in Samburu counties.

Similar to the baseline, end line survey participants were identified in two stages. The first stage included all groups/villages in the baseline assessment that were included in programme interventions. The baseline assessment purposively sampled 17 villages based on their accessibility and security considerations given that the study was conducted during raining season when most roads in the two counties were already impassable. In the second stage, trained research teams worked with community guides to randomly identify participants in the sampled farmer groups.

Table 1: Probability proportion to size allocation for the assessment of households

County	Sub-county	Base line (2020)	End line (2024)
Turkana	Loima	98	91
	Turkana Central	121	122
Samburu	Samburu north	200	119
	Samburu Central	-	40
Total		419	372

In each identified household, the research teams briefly introduced the study to the participants, and if they agreed, the participating farmer was interviewed after obtaining their written informed consent. Interviews captured information on farmer's background characteristics (such as age, education, marital status, household assets and amenities), OFSP production, consumption, OFSP commercialization, marketing as well as adoption of general adoption of Good Agronomic Practices (GAP).

2.1.2 Qualitative design and sampling

Key Informant Interviews with programme implementers

In-depth interviews (IDIs) were conducted with 9 officers directly involved in management and implementation of OFSP programme drawn from the three implementing partners and Child Fund; 2 technical experts from collaborating technical state agencies - Kenya Plant Health Inspectorate Service (KEPHIS) and Kenya Agriculture and Livestock Research Organization (KALRO) and 3 extension officers from department of agriculture in Turkana and Samburu counties. This was intended to get insights on enabling and inhibiting factors on OFSP adoption and consumption, challenges and recommendations for sustainable intervention activities. In all sites, implementers were purposively identified by the research team, Child Fund field teams and the implementing partners based on their intervention roles. These In-depth Interviews (IDI) captured information similar to that collected from the IDIs with policy makers and health care providers and were conducted by the same research assistants who conducted the other IDIs and were audio-recorded with participants' consent.

In-depth interviews with technical government agencies

In-depth interviews (IDIs) were conducted with key informants from Kenya Agriculture and Livestock Research Organization (KALRO) and Kenya Plant Health Inspectorate Services (KEPHIS) to assess the program's input (vines) supply side. As with policymakers, two experts were interviewed— plant breeder and seed production inspector based in Kitale town who were involved in provision of technical backstopping to the program extension providers. IDI participants were purposively identified with the help of programme implementers, based on their intervention roles.

Focus group discussions with community service providers

Six (6) focus group discussions (FGDs) were conducted with OFSP producers: 4 FGD in Turkana and 2 in Samburu counties. FGDs for sessions included both genders, where each FGD had six to eight participants purposively identified with the help of programme implementers, based on their roles in the interventions. FGDs were conducted in Kiswahili and local languages by the same lead researchers who conducted IDIs, and covered similar topics, after written informed consent from participants. FGDs were audio-recorded and facilitated by a guide with pre-identified themes.

Programme desk review

Programme review constituted a one-day, on-site meeting with programme implementing partners along with a thorough review of programme documents, to understand the dynamics of implementation and programme performance. Documents reviewed included programme presentations and annual progress reports; county integrated development plans and county/national sector policies and strategies.

Case narratives with programme beneficiaries

4 case narratives were conducted with farmers who adopted OFSP production and put more than 2 acres of their land under production or those who made the most sales of tubers and vines during the project period. These cases were purposively identified with implementing partners' help, based upon varied experiences. Interviews were conducted in Kiswahili by the same lead researchers who conducted the KIIS and IDIs, using a guide with pre-identified themes, and were audio-recorded with participants' consent. Programme beneficiaries were asked to tell their stories, from the time they became aware of the OFSP project interventions, their experiences with the intervention, and their opinions about sustaining or scaling up the intervention.

Site visits for observation

The evaluation team visited project sites for all sampled groups to verify existence of documented outputs and observe on-going activities. An observation checklist was developed to facilitate verifications.

2.2 Training of Personnel

Similar to the baseline survey, interviewers in the end line evaluation were of both genders, and most participated in the prior evaluations of the programme. Interviewers were trained for three days, covering the study's background before addressing research and interviewing skills, research ethics, study methods including respondent sampling and recruitment, questionnaire review and pre-testing, and use of electronic data collection equipment (tablets and audio recorders).

2.3 Data Management and Analysis

Data from household interviews with farmers was collected using tablets, and the data were transmitted to a central server, whence it was downloaded and exported to Stata for analysis. Analysis of household survey data entailed generating descriptive statistics (frequencies, percentages, mean scores). Results were compared with those from baseline or annual reports—where baseline indicators were not captured—to assess changes in key programme performance indicators, as outlined in the programme log frame, by selected background characteristics, where available, such as age, education and marital status.

Qualitative data were captured on paper (as notes) and audio recordings, were translated and transcribed into MS Word for management and analysis. A thematic framework approach classified and organized data into key themes, and any emerging categories were identified during analysis. Initial coding was by two researchers with experience in qualitative data analysis. Initial themes were annotated using a set of transcripts, and the themes were used to code all data. Analysis charts were prepared for each theme and participant category and used to identify common themes for participants.

2.4 Ethical Considerations

Data collection was conducted following the principle of respect for persons, benevolence, and confidentiality. Strategies adopted included confidentiality and informed consent. A detailed consent form was developed and administered to every respondent. While executing this assessment, all the parties involved ensured effective protection of confidential and sensitive data and information in conformity with the humanitarian and protection principles and to applicable legal data protection standards. All data collection and processing activities were executed in accordance with the following principles:

- **Safeguarding individuals' personal data** is a crucial part of this assessment to protect the lives, integrity and dignity of beneficiaries and participants.
- **People-centered and inclusive:** All assessment activities respected the interests and well-being of the population, in all relevant phases of the assessment and all activities were sensitive to age, gender, and other issues of diversity. Inclusivity and special focus were paid to the needs of young people, women with disability and other vulnerable groups.
- **Do No Harm:** the assessment activities included a risk assessment, and steps were taken, whenever necessary, to mitigate identified risks. The risk assessment looked at negative consequences that may result from data collection and subsequent actions.
- **Defined purpose and proportionality**: The purpose of the assignment was clearly defined and explained to the participants in the data collection process.
- Informed consent and confidentiality: Personal information was collected only after the individual in question gave informed consent and was made aware of the collection's

purpose. Further, confidentiality was clearly explained to the individual before the information was collected. Consent given was assessed on its genuineness, based on the data subject's voluntary and informed decision.

- **Data protection and security**: The assessment process adhered to international standards of data protection and data security.
- **Competency and capacity:** Actors engaging in this assessment were accountable for ensuring that assessment processes were carried out by competent teams who had been trained appropriately.
- **Impartiality**: All steps of the assessment cycle were undertaken in an objective, impartial, and transparent manner while identifying and minimizing bias
- **Sensitivity:** Data collection tools were designed in a manner that was inclusive, culturally appropriate and did not create distress for respondents.

2.5 Limitations of the evaluation

Two limitations confronted this piece of research. First, connecting with potential interviewees was difficult in Samburu County specifically because data collection coincided with the onset of long rains and some roads were rendered impassible, making it impractical to reach out to farmers who may have benefited from the work in some parts. To mitigate this challenge, the evaluation extended the data collection period to reach all the sampled households.

Secondly and more broadly, qualitative data collection relied significantly on ChildFund and implementing partners' staff as the first line key informants. Substantiation was therefore a vital part of the process as it helps researchers identify what was valid versus what was merely desired. By their nature, qualitative interviews tend to generate additional insights, new questions/lines of enquiry, and potentially some conflicting or partially conflicting information. Therefore, an iterative exercise benefits from conducting several successive rounds of substantiation interviews, including going back to some of the original respondents. However, the time and budget available to conduct these successive interview rounds is always a limiting factor.

3. Analysis of Findings

3.1 Evaluation coverage

The OFSP's overall reach in its program areas is wide. For analysis purposes, a household was considered an "OFSP Beneficiary" if one or more of its members was a member of an OFSP farmer group-supported by the three Implementing Partners – SAPCONE and Frontiers Children Development Organisation in Turkana or Samburu Childrens Program in Samburu counties. However, there are a number of households that do not belong to OFSP farmer supported groups but have still participated in OFSP activities in Samburu County. **Table 2** highlights the broad range of OFSP's coverage across its program areas; 99.7 percent of sampled households have at least one household member participating in the OFSP supported farmer groups. The evaluation achieved a response from 362 participants; Turkana 213 (57 per cent), and Samburu 159 (42.7 per cent) Counties. The participants were proportionately distributed in 17 famer groups; 12 from Turkana and 5 from Samburu County. Out of the 17 sampled farmer groups 4 were under SAPCONE, 8 under Frontiers and 5 under Samburu Children Program.

3.2 Socio-demographic characteristics of evaluation participants

Selected participant household characteristics are documented in Figure 1. Household demographics did not change significantly from the baseline activity. The mean household size is 6.72 people; Turkana and Samburu at 6.96 and 6.39 people respectively. The mean age category of the beneficiaries between 30 to 49 years while majority 284 (76.3 per cent) of OFSP project participants are female despite the fact that majority 281 (75.5 per cent) of household are headed by male. This higher ration of female to male participation is indicative of female beneficiary participant's enthusiasm to participate in project activities as they seem more organized than men. Intuitively, it can be assumed that male headed household have delegated responsibilities to their spouses (female) thus increasing women access to economic resources. This reinforces the idea behind actively including male in promoting gender equity and increased sharing to productive economic resources. The data also reinforces the role of women in reducing rural poverty, improving household nutritional status, and reducing food insecurity among farming households.

Figure 1: Gender of OFSP participants

Majority of the beneficiaries are married 299 (80.8 per cent) as presented in Figure 2. Polygamous relationships account for seven percent of the survey population. Two percent of the population is either separated or divorced while 13% is widowed. Only 13.3 percent of household heads were single. This does not change significantly from baseline data where 80% of target participants were married across the sub-counties; Loima 82 (83.7%), Turkana 103(85.1%), Samburu 163(82. 7%).

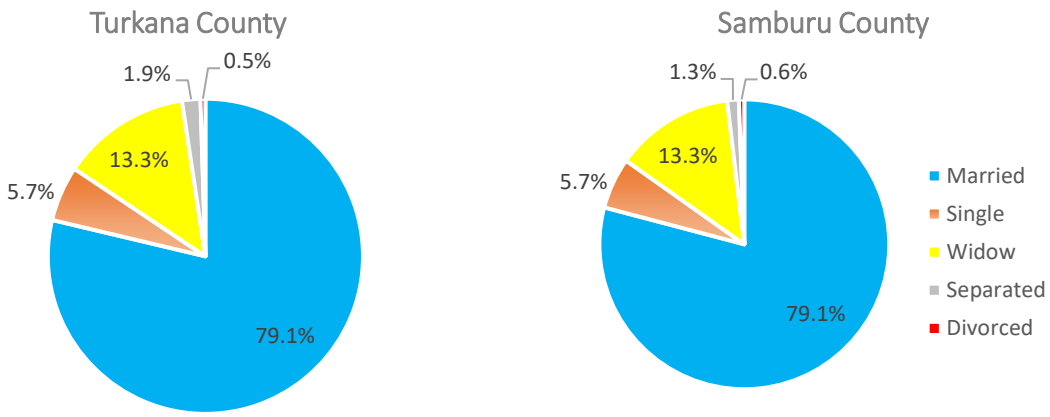

Figure 2: Marital status of the household head

The end line evaluation did not find significant difference in age of the farmers compared with the baseline survey despite the efforts of the project to deliberately reach the youth. This is a sign that there are intrinsic factors that hinder the participation of youth in potato value chain development. Alternatively, youth could be more productive in other nodes of the value chain other than production and marketing at farmer level that were not the main focus of the project.

3.3 Relevance

The evaluation assessed the extent to which the intervention objectives and design responded to beneficiaries' needs and continue to do so if circumstances change. The 'Relevance' criterion is the assessment of the significance of the needs of the target group the program was designed to address and the study investigated the extent to which OFSP project is suited to the priorities and policies of the target groups, ChildFund, respective county governments and the donor. This section begins with an overview of the key questions included in the evaluation to assess program relevance. The section then provides an assessment of the relevance of the program intervention, based on a review of the OFSP strategy, the intervention design, partner's selection and implementation approach. Further, the study team explored whether the needs being addressed are significant and whether the project's design is appropriate for addressing them.

Evaluation Questions

- Were interventions appropriate for the target group based on the nature of their vulnerabilities and their needs?

- How effective was the targeting approach in achieving the project goal?
- How have the project activities aligned with national/local policies and priorities?
- Were Program outputs, outcomes, goals properly set and aligned to the Program's overall objectives?
- How well have the program's intermediate outcomes reinforced each other?
- To what extent did the project leverage existing ChildFund investments in the same space to facilitate linkages with complementary services (for example, to layer with earlier investments and to implement an exit strategy)?
- To what extent did the project align with national and county government priorities for the target communities?
- How effective have the various community support structures been in sustenance of the gains of the project?

a. Meeting the needs of stakeholders

To assess the relevance of OFSP project to its stakeholders, the study sought to first understand what the needs of these beneficiaries were. While it is important to note that the beneficiaries are a diverse group in different counties, ChildFund identified common needs and challenges. A trend analysis of Global Acute Malnutrition (GAM) in Turkana and Samburu counties over the course of 7 years (2010 –2017) showed fluctuating prevalence rates but persistently exceeded WHO's emergency threshold (15%). In 2019 the National Drought Management Authority (NDMA) indicated that 15.1% of the children were at risk. The OFSP project activities were aimed at reducing the risk faced children and vulnerable population emanating from food and nutrition insecurity and creating safety net assets to bolster sustainable food production systems.

> *"The project has resolved hunger challenges at least for now we have something to eat. The kids were malnourished but right now they have improved with the reduction of the use of nutrition supplements … reduced the hospital visit by improving children's immunity. The OFSP has enlightened us to be dependent on farming"* **(FGD- Nalingangor Female Farmers in Baragoi).**

Additionally, the OFSP project proposal document indicates that stakeholder meetings for needs assessment conducted with government officials, community leadership and community representatives completed in April 2019, echoed an earlier request from community members through local implementing partners the issues earlier identified. Further, ChildFund leveraged these needs on the lessons learned during the COVID-19

Case study 1:
My name is Geoffrey Emune. I am one of the potato growers in Nadoto village. The way I live now is very different from how I used to live before I knew about OFSP. Last year I sold potato vines worth 1.4 million to an organization which was going to distribute to other farmers outside our village. I have improved my home significantly. I have paid school fees for my children, I have been able to build latrines and I have also bought goats, camel and my family is now living well.

Response program and other programming in the two counties. The fact that many households who were not initially targeted by the OFSP project started producing OFSP on their own both in Turkana and Samburu counties is sufficient demonstration that farmer participation in OFSP production is high, creating high beneficiary relevance. The study team observed some women buying OFSP flour from the processing factory and some eateries within Lodwar town selling boiled sweet potatoes make this study conclude the higher engagement levels beyond farmers make the OFSP package a more directly complementary and therefore more relevant offer for these communities.

b. OFSP strategy

The OFSP strategy was a transition from the emergency and relief response to building reliance. The picture is more mixed for beneficiary relevance. The core composition of OFSP, improving production of OFSP to promote consumption of Vitamin A rich foods at household level; address the strong market orientation and youth and inclusion of women and youth in the value chains; linking OFSP producer networks to markets and value addition through processing are highly relevant. However, the expected benefits depend on the production volumes and consistency, which varies. For instance, the smallholder farmers quickly embraced OFSP farming as alternative livelihood to nomadic pastoralism, there is only anecdotal and scanty evidence demonstrating youth participation in the OFSP value chains.

While ChildFund pre-existing programs interventions focused on partnership with the United Nations World Food Program (WFP) to support Asset Creation Food For Assets (FFA) aimed at improving pasture and browse production, improved diversification of food and income sources for communities and households through increased and diversified crop production, introduction of alternative sources of incomes, among others, OFSP moved beyond production to promoting consumption of OFSP, post-harvest management, value addition through processing and commercialization stages of the OFSP value chain ultimately tailored to empower communities to achieve long-term well-being outcomes and, where possible, transformational change.

The Orange Fleshed Sweet Potato (OFSP) project was a direct response to the recommendation of county SMART Surveys in 2016 which that GAM high rates of 30.30% in Turkana South and Turkana East Sub-Counties way above the WHO normal GAM rates of 15%. To reverse this trend, the Survey proposed Agri-nutrition farms interventions including improving skills and awareness on agriculture technology; scaling up service delivery in hard-to-reach areas and managing and strengthening of food value chain as a means to provide nutritious food to most children at risk of nutritional disorders and vulnerable groups.

> *"This project was well intended, and I can say that there has been no project more relevant than this one. It is addressing core areas of development especially with its focus on households producing their Vitamin A rich food to pregnant women and children. It addressed challenges that are known as malnutrition and food security."* — **(KII- County Director of Agriculture, Turkana)**

The evaluation however recognizes that, against a worsening backdrop of climate stress experience in Samburu and Turkana counties, this drought-resistant, highly adaptable and nutritious orange-fleshed sweet potato (OFSP) stands out as a sustainable food crop that provides the cheapest source of vitamin A (VA) supporting household resiliency, food and nutrition security.

The relevance of the Orange Fleshed Sweet Potato (OFSP) project was aptly captured during FGDs with participants thus;

> "*The community's initial condition was dire, with widespread malnutrition impacting many young children, pregnant and lactating women (PLWs), and the elderly. A majority of the children were enrolled in the Outpatient Therapeutic Program (OTP) and Supplementary Feeding Program (SFP)"* **(FGD -Natuntun Farmers Group in Turkana)**

c. Assumptions underlying the OFSP change pathways

In addition to assessing the relevance of the interventions with respect to the beneficiary needs, it is also important to interrogate the extent to which specific OFSP activities are relevant based on the local context of the program counties. This section examines specific instances where assumptions underlying the activities did not hold, thereby undermining their relevance in the context of this program. One assumption under the Market Systems Development outcome which did not hold, was that farmers would have quickly adopted good agronomic practices resulting into sufficient yields to satisfy home consumption needs and selling excess tubers to the of OFSP flour processing factory at Etic Women Milling plant in Nadapal, Turkana County within the 3-year period. Discussions with farmer groups showed that some smallholder farmers were not enthusiastic about selling tubers to the market because although yields improved, production was yet to satisfy home consumption and attain surplus for market.

> *"Producing enough potatoes to satisfy family consumption and sell excess to the market was not possible in the last two cropping seasons…and many households are just beginning to embrace OFSP production. Production is still under small plots barely enough to sustain running the factory"* **(KII - Project officer)**

This position was confirmed during discussions with government technical agencies such as KALRO and KEPHIS. The experts involved with OFSP project pointed out that the 3-years was too short for even farmers in high potential areas to adopt new technologies and good agronomic practices.

"The project was too ambitious. These are livestock keepers and potato production and even consumption was so new to them. Under ordinary circumstances, adoption of new technologies takes smallholder farmers a minimum period of 5 years or say 12 seasons…and here you are expecting people who have never been farmers to quickly embrace new form of livelihood as well. It should take the much longer time" **(KII – Plant Breeder - KALRO)**

3.4 Coherence.

The coherence OECD DAC evaluation criteria seeks to identify the extent to which duplication of efforts or non-complementary activities across various implementers undermine progress. Specifically, external coherence is concerned with two factors, alignment with external policy commitments and alignment with interventions by other actors. As such, the main research questions regarding the external coherence of the BMZ OFSP project are:

- To what extent were the project and its interventions consistent with and complementary to other interventions and policies?
- To what extent did the project adapt to changes in the policy environment?

Internal coherence has two considerations, the alignment with wider policy frameworks of the ChildFund and the alignment with other interventions implemented by ChildFnd. The primary research question related to internal coherence is:

- Did the project achieve coherence, interlinkages, and synergies between the different interventions and across the food and nutrition security pathways supported?
- To what extent was the project interventions linked with the ChildFund Kenya Country Strategic Plan priorities and interventions?
- To what extent was the project interventions linked with the FCDO, SCP and SAPCONE other interventions such as annual operating plan activities?
- Was the project intervention consistent with other actors' interventions in Turkana and Samburu counties?
- What were the areas of complementarity, harmonization and co-ordination with others, and how did these avoid duplication of effort?

The intervention is externally coherent and compatible with other food and nutrition security interventions in the project areas. As well, it successfully created internal coherence with other interventions being undertaken by LIPs and other agencies to contribute to the UN Sustainable Development Agenda. Although there were issues around its coordination at the beginning owing to COVID19 restrictive measures, the project model and joint programming approach were designed to create coherent programmatic connections along the food security-women economic empowerment-nutrition nexus. It focused on the inter-linkages between irrigation infrastructure development, extension service provision and improved OFSP production based on an understanding women and youth participation in OFSP value chains cannot come about in the absence of extension services partnerships and that community seed systems undergirds any OFSP technology adoption process. In addition, the project is coherently aligned with the global

development efforts set by the 2030 Agenda for Sustainable Development. The most directly applicable Sustainable Development Goals (SDGs) under the 2030 Agenda is Goal 1, 2, 3, 8 and 12, which calls for improving food production to eliminate hunger, malnutrition, decent job opportunities for women and youth.

Alignment of the OFSP with County and National Government Strategies

The assessment sought to assess the extent to which the OFSP project is aligned to the existing county and national government plans and strategies. Review of progress reports shows that the OFSP project worked with and supported capacity building programs of county government extensions in efforts to strengthen existing government structures for ensuring sustainability. At a strategic level, the policy relevance of OFSP is high: the objectives of OFSP are in line with the overall development and growth priorities set out by the county and national governments in a range of policy documents, including the Vision 2030 documents and the Agricultural Sector Transformation and Growth Strategy 2019-2029; Ministry of Agriculture, Livestock, Fisheries and Irrigation, 2019) and the County Integrated Development Plans (CIDP). For instance, the Turkana CIDP 2018-2022 identifies that poverty, food insecurity and the difficulty of making a livelihood from pastoralism are causing many Turkana to adopt alternative livelihoods and identified Improved access to quality seeds and rehabilitation and expansion of existing irrigation schemes as priority interventions. The CIDP point out that women are more traditionally linked to small-scale manufacturing and petty trade, and youth who do not have access to livestock assets, which demonstrates aspirations to engage in alternative livelihoods such as irrigated crop production. Therefore, shared priorities include increasing small-scale farmer incomes, raising the contribution of agro-processing while increasing added-value, and reducing the number of food-insecure Kenyans. At the project design level, according to stakeholders, relevant components included the strong and concrete OFSP productivity improvement; market orientation; the irrigation infrastructure investment; the connection to and innovations in existing county government extension networks; and the financial inclusion of rural smallholders through the VSLA models.

> *"Our mandate as KALRO is to take innovations and technologies to communities so that small scale producers can improve productivity. This project created direct linkages between us and the farmers through training and provision of OFSP vines''*
> **(KII-Breeder at KALRO)**

The endline project evaluation established that the sustainable production and consumption of the Orange fleshed sweet potatoes project was very relevant to the project beneficiaries and aligned with both the county and national government priorities in addressing food insecurity and malnutrition particularly among vulnerable children and lactating mothers in Turkana and

Samburu counties. For example, in the 2018-2022 CIDP the County government of Turkana acknowledged that addressing food security, provision of safe and adequate water, poverty, malnutrition, education, gender inequities and ecosystem degradation are critical for Turkana County in terms of its development ambitions and economic, social, environmental and political potential.

Similarly, in December 2022, the Turkana National Drought Management Authority also noted that elevated malnutrition rates were a major concern with the considerably pronounced food deficits as reflected through the high proportion of households (about 62 per cent) that were categorized as having a poor food consumption score being the main driver with a significant percentage equally resorting to application of severe consumption based coping strategies.

The Samburu County National Drought Management Authority Drought Early Warning Bulletin for May 2023 also observed that the prevalence risk of malnutrition among under – five children remained high with 37.8 percent of children being at risk of malnutrition during the month of May 2023. The high risks of malnutrition for under five is linked to limited nutritious diets, defaulting or non-attendance of antenatal care, exposure to infectious diseases and diarrhoea.

Therefore, to reduce the risk faced by children and vulnerable population emanating from food and nutrition insecurity, there was need for creation of safety nets assets to bolster sustainable food production systems. It is in this regard that the Orange Fleshed Sweet Potato (OFSP) project was initiated to provide nutritious food to most children at risk of nutritional disorders and vulnerable groups. The consumption of OFSP could reduce Vitamin A deficiency, reducing chances of malnutrition among children and lactating mothers.

The end line evaluation team also held discussion with project implementing partners who also acknowledged the extent to which the Orange Fleshed Sweet Potato (OFSP) project was relevant to the beneficiaries. For instance, the Nurse-in-Charge of Nadoto Dispensary in Turkana County observed that;

> "*Before the project several children suffered malnutrition but since June 2023 the problem of malnutrition has significantly reduced. The community members have conducted 2 harvests and the women have formed groups where they interact with trained mentors. Some mothers have even saved money which they can use to diversify dietary intake and to meet other household requirements such as payment of school fees*" (**KII-Nurse-in-Charge of Nadoto dispensary)**

3.5 Effectiveness

The Effectiveness criterion provides, "The extent to which the intervention achieved, or is expected to achieve, its objectives, and its results, including any differential results across

groups." It draws from existing annual progress reports, the end line household survey compared with the survey findings conducted at baseline, and the responses in the KIIs and FGDs. The section then reviews OFSP's achievement of objectives, which includes progress against set targets. This section also presents successes and challenges in meeting objectives.

Evaluation Questions

- Were the outputs and outcomes achieved and to what degree (assessed through a baseline-end line indicator data comparison, monitoring data, and data collected in the evaluation)?
- Was the programme logic well thought through and did the activities lead to the desired outcomes?
- Did the programme have any unintended and unexpected consequences (positive and negative), and if so have these been addressed in the programme and how?
- What factors promoted or inhibited adherence to plans and targets? How have external factors affected the program in achieving its intended results?
- To what extent has management set the right tone for adaptive management? How has management adapted the project design or implementation based on monitoring information and feedback from the target population?

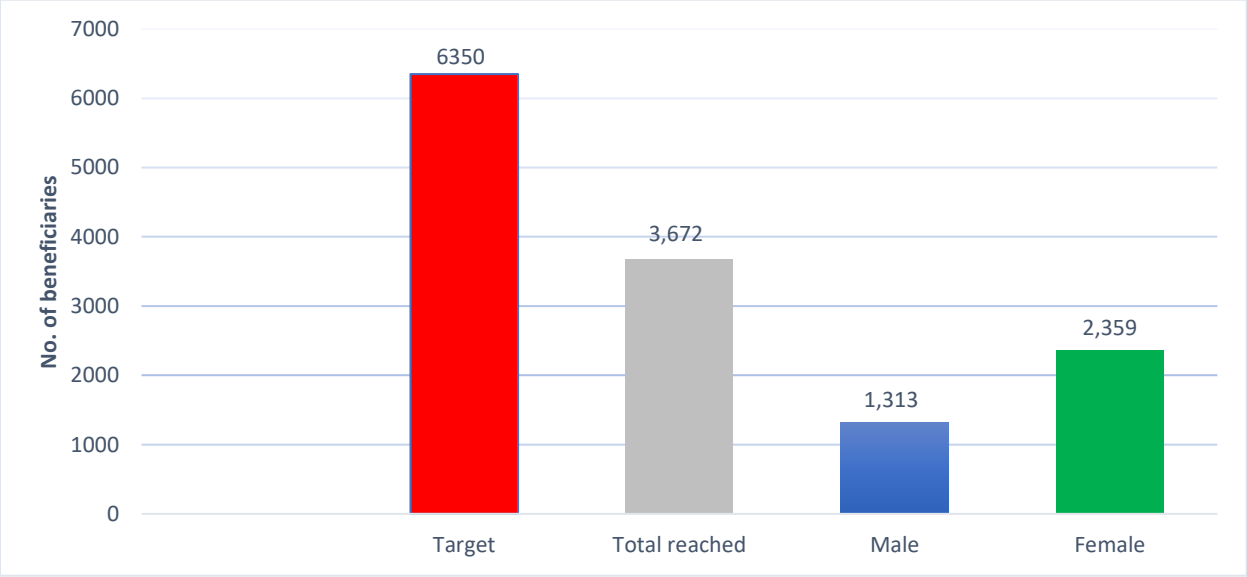

Figure 3: Number of households reached with agriculture extension programs

The evaluation presents quantitative comparative analysis of baseline and end line results of the project key outcomes triangulated with qualitative data to demonstrate achievements attributed to project interventions. However, the baseline survey does not fully mirror the evaluation in geographical coverage, especially for Samburu County where Samburu North and Samburu

Central sub-counties are referred to interchangeably making comparison of benchmark data difficult. For instance, baseline data on household characteristics for Samburu County is from Samburu North while baseline data on Household food security index is from Samburu Central Sub- County.

3.5.1 Orange Flesh Sweet Potatoes Production

The evaluation assessed whether the beneficiaries planted and harvested OFSP in the year 2022, 2023 and early 2024. Almost all 366(98.4 per cent) of the beneficiaries reported to have planted OFSP within the last 12 months preceding the evaluation; Turkana 210(98.6 per cent) and Samburu 156 (98.1 per cent). Desegregated by Sub-Counties, all beneficiaries in Samburu North, 37(92.5 per cent) in Samburu central, 97(98.2 per cent) in Turkana central and 113 (99.1 per cent) in Loima reported to have planted OFSP. The study noted that farmers were organized into groups and farmed within group plots. This by itself made it difficult to estimate acreages under production for individual farmers.

As shown in Figure 4 a significantly higher proportion 342 (76.3 per cent) of the beneficiaries reported to have planted and harvested OFSP among the beneficiaries at end line as compared to the less than 5% of farmers reported at baseline.

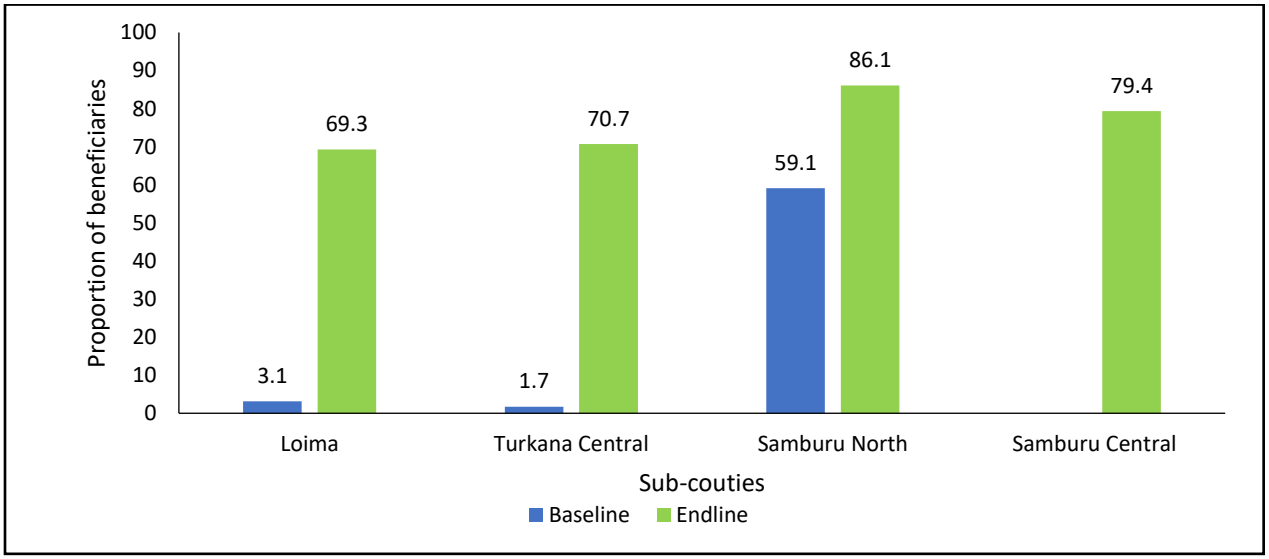

Figure 4: Proportion of farmers adopted OFSP production

This can be rated as a huge success in terms of introducing OFSP production to traditional pastoralist and agro-pastoralist communities. With the high number of farmers being introduced to OFSP production within a short period of time, it is anticipated that they will be able to continue with potato production even after the closure of the project with assistance from the county extension system and other development agencies. The successful adoption of OFSP by participating farmers has is already yielding “crowding in” effect as evident by other NGOs

replicating and promoting adoption of OFSP production with other households as part of their food and nutrition security interventions.

> *''Last year some two international NGOs approached some of our lead farmers and bought OFSP vines worth more than one million shillings. The vines were distributed to farmers in other wards within the county and we can see that more and more farmers are expressing interest in the production of OFSP''* **(KII respondent – Turkana)**

3.5.2 Acreage under OFSP production

The baseline data indicates that total area of land under OFSP cultivation in the 3 sub counties was zero. It was challenging to estimate individual farm size due to the group approach of farm sub-division from season to season. Nevertheless, the annual project annual reports document that acreage under OFSP production increased from zero to 70 acres in Turkana and Samburu counties by the end of 2023. This was a huge achievement at 78% of the 90 acres targeted by the end of the project.

3.5.3 Production yields

The evaluation estimated the average production in kilograms as was reported by the beneficiaries. The evaluation estimated production an average of 288(211.88 kilograms) amongst beneficiaries who reported to be aware of their production amount in the previous harvest preceding the survey; Turkana 140(268 kilograms) and Samburu 148(157.61 kilograms). Disintegrated by Sub-counties, the production was reported to be 116(139.72 kilograms) in Samburu North, 32(222.47 kilograms) in Samburu Central, 50(458.30 kilograms) in Turkana Central and 90(162.62 kilograms) in Loima Sub-counties. It should also be noted that the baseline survey averred that there was no production of OFSP prior to the project in Samburu and Turkana counties. The evaluation established that a total of 92.4 tons of OFSP had been attained by the end of the project.

A number of factors could have contributed to the low production. For instance, the study team observed that a lot of farms were lying idle/fallow and FGD showed that many farmers had suffered production losses and were reluctant to engage in further OFSP production. The main reason for the losses was reported by majority 255(89.2 per cent) of the farmers to be *Cylas formicarius* pest infestation (sweet potato weevil); Turkana 150(93.8 per cent) and Samburu 106(84.1 per cent). The infestation was only realized by the farmers at harvesting time when the loss could not be averted.

3.5.4 Technologies application and adoption

At the start of the project, the baseline reported that only 69 farmers reported to have been reached and trained by agricultural advisors/TOTs, and mostly on other crops such as maize, sorghum and vegetables. The project targeted 600 farmers to be reached and trained by agriculture extension workers/TOTs on OFSP and apply the knowledge in practice. This evaluation established that 3,012 (female=1,800 and male=1,212) farmers were reached and trained by agriculture extension workers/TOTs with OFSP technology. This was more than 5 times the targeted numbers of targeted farmers. Instructively, more women were reached thereby achieving the objective of empowering women with alternative sources of livelihood. The potato value chain promotes a bundle of technologies applied by farmers at different nodes of the value chain by smallholder farmers. Technologies promoted by potato value chain include crop genetics, cultural practices, irrigation, post-harvest handling, pest and disease management. Crop genetic is an aggregation of the respondents who planted good quality seed and use of apical rooted cuttings, whereas cultural practices included application of crop rotation, seed plot technologies and other seed selection strategies.

Ridges in planting of Orange Flesh Sweet Potatoes were reported the most adopted GAPs by farmers across the two counties. As shown in Figure5 beneficiaries reported increased ridge planting of OFSP from 29(25 per cent) to 340 (91.4 per cent) among project beneficiaries; Turkana 211(99.1 per cent) and Samburu 129(81.1 per cent). The study found low uptake of crop rotation practices where 61 per cent of the respondents reported that they planted OFSP continuously on the same plot without breaking.

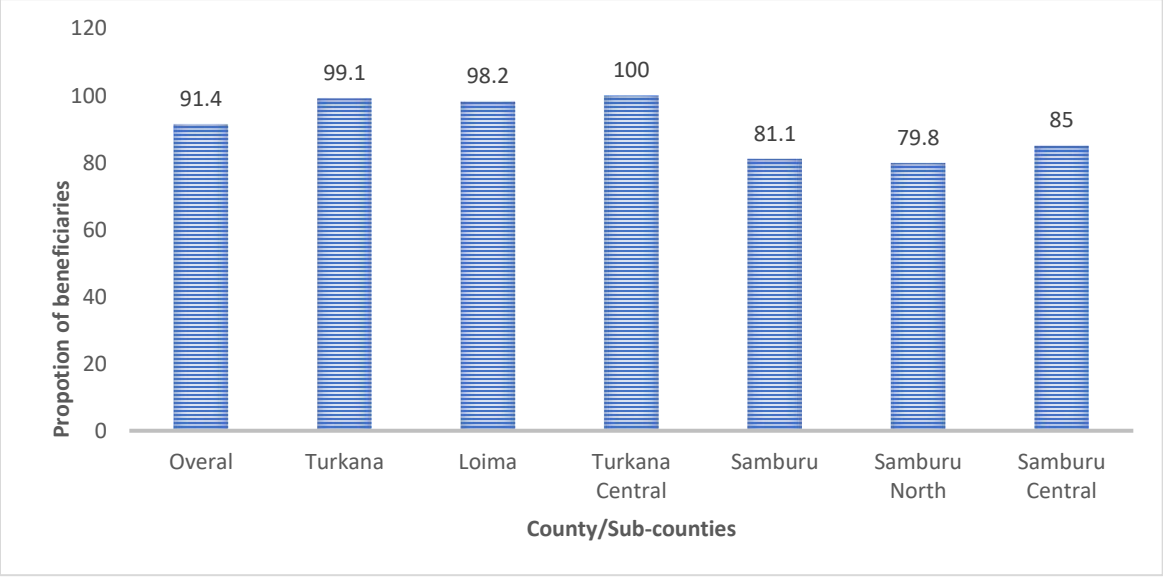

Figure 5: Proportion of farmer adopting GAPs

3.5.5 Orange flesh sweet potato seed system (use of quality seed)

Vine conservation was established to be still low 182(49.7 per cent) among the beneficiaries; Samburu 101(64.7 per cent) and Turkana 81(38.6 per cent). However, a higher proportion 28 (75.7 per cent) of beneficiaries from Samburu central practice OFSP vine conservation as compared to Samburu North 73(61.3 per cent), Turkana Central 30(30.9 per cent) and Loima 51(45.1 per cent). The beneficiaries reported practicing vine conservation by having section of the farm dedication for vine multiplication. Those who do not practice vine conservation report to always buy, ask from relatives or neighbours, or use left over after harvesting for subsequent planting seasons. The business in planting material is not strong yet considering that 99% of the participants got vines for planting for free with less than 5% buying planting material from other farmers. Nevertheless, this is a good indicator that the planting material business exists and is likely to grow once OFSP tubers become a raw material for value added products. Discussions with experts from KALRO and KEPHIS expressed seed/vine quality concern with the current community seed system.

> *"When there are no community vine multiplication plots in place, farmers will not be guaranteed quality vines and in many such cases, farmers will be planting all manner of potato vines which are not necessarily OFSP"* **(KII-KEPHIS)**

3.5.6 post-harvest management Orange Flesh Sweet Potatoes

A significant proportion 86(23.1 per cent) of farmers reported to have experienced OFSP post-harvest losses; Turkana 53(24.9 per cent) and Samburu 33(20.8 per cent). The main reason for the losses was reported by majority 255(89.2 per cent) of the farmers to be *Cylas formicarius* pest infestation (sweet potato weevil); Turkana 150(93.8 per cent) and Samburu 106(84.1 per cent). The infestation was only realized by the farmers at harvesting time when the loss could not be averted. The other reason for losses mentioned was to be rotting which could still be related to the weevil infestations. Various approaches used by farmers for post-harvest preservation were mentioned to be sorting and grading 308(32.9 per cent), washing and cleaning 326(34.8 per cent), chipping and drying 295(31.5 per cent) while a few did not do anything 7(0.7 per cent. Gunny gags (35.2 per cent), pots and buckets (31.1 per cent) and traditional granaries were reported to be the main storage facilities. Other farmers (4.6 per cent) reported to be using tight containers, tarpaulins and hematic bags.

3.5.7 Training and capacity building

There were several questions in the structured questionnaire designed to capture the extent and nature of farmers' participation in training at the learning farms. Training provided through extension workers was deemed to be a key driver in exposing farmers to technologies and nutrition messaging. This exposure was expected to improve adoption of technologies promoted by the project and nutritional status of the households. Results from the endline survey reveal

that over 339(91.1 per cent) of the participants attended at least one training activity on good agronomic trainings and nutrition training from extension workers. High proportion 339(91.1 per cent) of beneficiaries reported to have received training extension services to support OFSP farming; Turkana 192(90.1 per cent), 108 (94.8 per cent) in Loima and 84(84.8 per cent) in Turkana central while 147 (92.5 per cent) in Samburu County; Samburu Central 30(75.0 per cent) and 117 (98.3 per cent) in Samburu North. The content of the training as was reported by the beneficiaries are as shown in **Figure 6.**

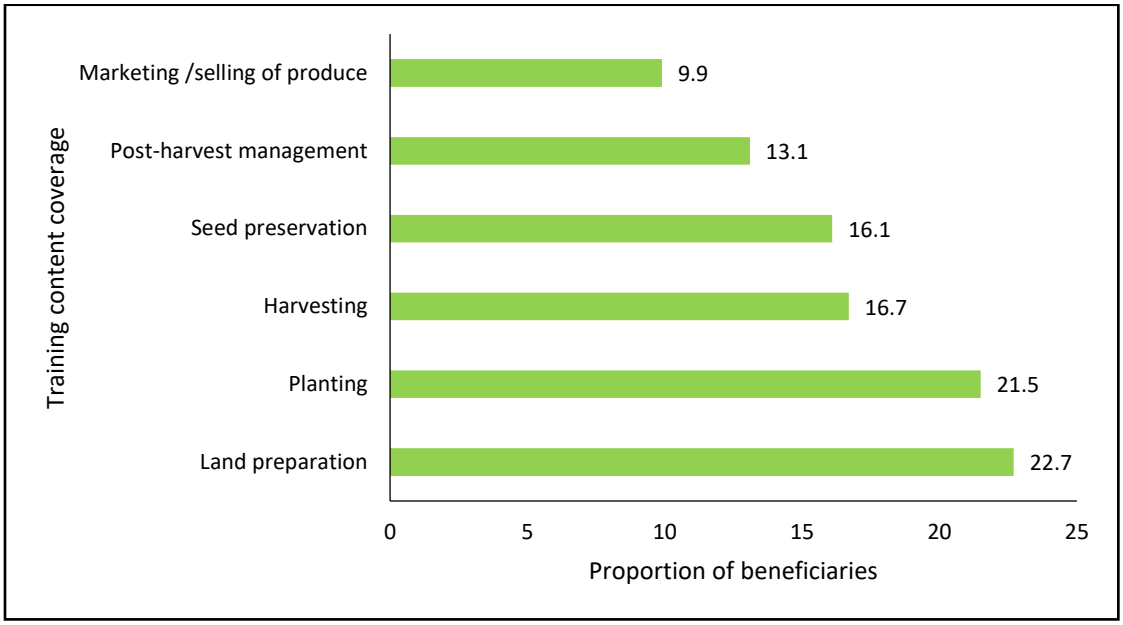

Figure 6: Proportion of farmers reporting different trainings

The trainings were supported and conducted at the demonstration farms by field extension officers from the SAPCONE, FCDO and Samburu Children Program working together with Agricultural extension officers from the respective County Government as was reported by the beneficiaries.

3.5.8 Marketing and household income from OFSP

The study established significant income from OFSP compared to the baseline period when no household ever reported any income from OFSP. Although the main source of household income from farming remained sale of vegetables at 39.6 per cent compared to baseline at 47.1 per cent, there was significantly higher number of participating households at 38.5 per cent that reported earning income through the sale of OFSP either as tubers, vines or leaves consumed as vegetables within the last 12 months.

3.5.9 Farmers participation in collective action

Collective action is defined a group of farmers who are driven by a common interest to attain a certain specific goal. The OFSP project adopted a group approach in implementing project activities from seed distribution for multiplication, delivery of agri-nutrition training and extension service trainings on good agronomic practices. Such a model for farmer service delivery is expected to culminate in formation of an umbrella body such as OFSP cooperative to run activities on behalf of the farmers. From the survey results no respondent reported participating in collective action whereas only 2% were not group members indicating that they may have benefited from project activities through their own initiative without any mobilization from the OFSP partners.

All respondents indicated that their group benefited from seed packs promoted by the project whereas at the start of OFSP. Intuitively, these farmers may have been inactive in collective action activities, they have benefited from other project activities/ interventions such as participating in the trainings within the learning farms or through Agri-nutrition training. As envisaged in project design, this active participation provides an indication of the role of collective action in future project intervention as a major driver of dissemination of technologies and other information passed to the farmers.

3.5.10 Source of water for irrigation

Almost equal proportion of beneficiaries reported two main sources of water, borehole 187(50.3 per cent) and river canal irrigation 185(49.7 per cent) for OFSP farming as shown in **Figure 7**.

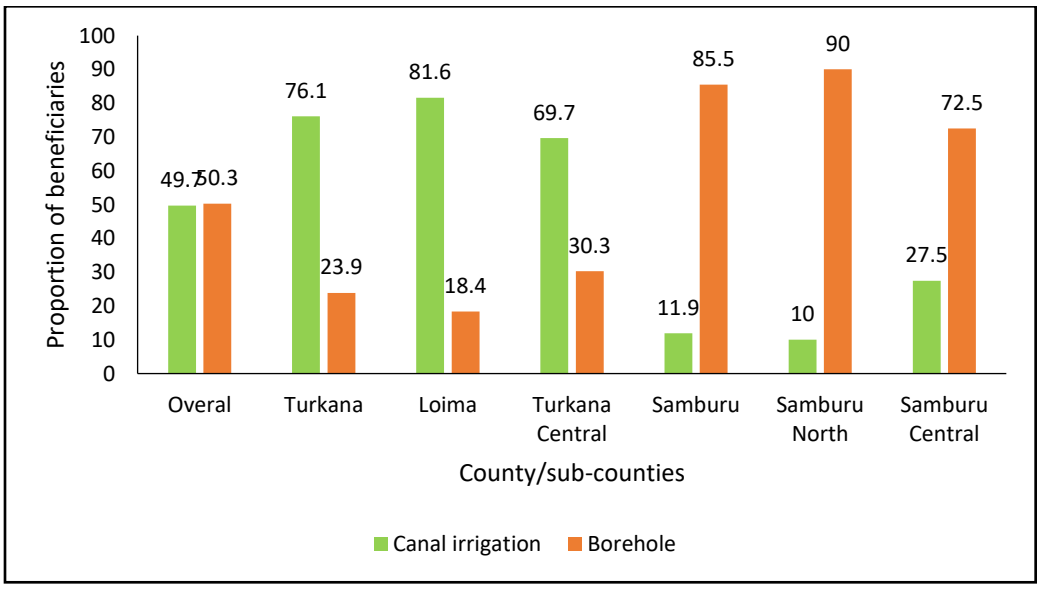

Figure 7: Source of water for irrigation

Sustainability of water supply remains to be challenging due to the seasonality of river Turkwel and inadequate water discharge from the boreholes during dry seasons.

3.5.11 Marketing and sales of Orange Flesh Sweet Potatoes

High proportion 305(80.2 per cent) of beneficiaries reported to have sold OFSP for income in the previous year; Turkana 171(80.2 per cent) and Samburu 134 (84.3 per cent) as compared to baseline where only 23(11.6%) of the targeted beneficiaries in Samburu North and none in Turkana reported to have sold OFSP for income. In addition, (34.1 per cent) and (45.9 per cent) of farmers mainly sold their produce within the villages and the nearest market respectively as shown in **Table 2**.

Table 2: Market channels and preferred buyers of OFSP

Buyers	Overall	Turkana	Loima	Turkana Central	Samburu	Samburu North	Samburu Central
Neighbors in the community	34.1	24	32.3	12.5	47	52.9	26.7
Middlemen selling in the local markets	12.5	17	4	34.7	6.7	4.8	13.3
Brokers	1	1.8	3	0	0	0	0
Traders taking to distant markets	3.9	5.3	6.1	4.2	2.3	1.9	3.3
Schools	1	1.8	3	0	0	0	0
Hotels	1.6	2.9	2.1	4.2	0		0
Buyers at the local market	45.9	47.2	49.5	44.4	44	40.4	56.7

The production as at the time of evaluation does not meet the local market demand especially Turkana and Samburu North. In Samburu Central a good proportion (13.3 per cent) reported to have sold to the middlemen who are likely to have targeted markets beyond Samburu County.

As reported by the beneficiaries, the quantity sold in the previous year (2023) was estimated to 305 (191.95 kilograms) at a total average cost of Ksh 305(8485.04 Kenya shillings); Turkana 171(161.52 kilograms) at 171(8188.6 Kenya shillings) while Samburu is 134 (230.78 kilograms) at 134(8863.34 shillings) which is a significant increase as compared to the baseline where they reported to have sold an average 7.5 kilograms out of which they got 1356 Kenya shillings.

3.5.12 Knowledge on Orange Flesh Sweet Potatoes

More than half 230(61.8 per cent) of the beneficiaries reported to have attended cooking lessons on OFSP as shown in **Figure 8**. It was reported by 159(69.1 per cent) of the beneficiaries that the training was attended at least 6 months preceding the evaluation.

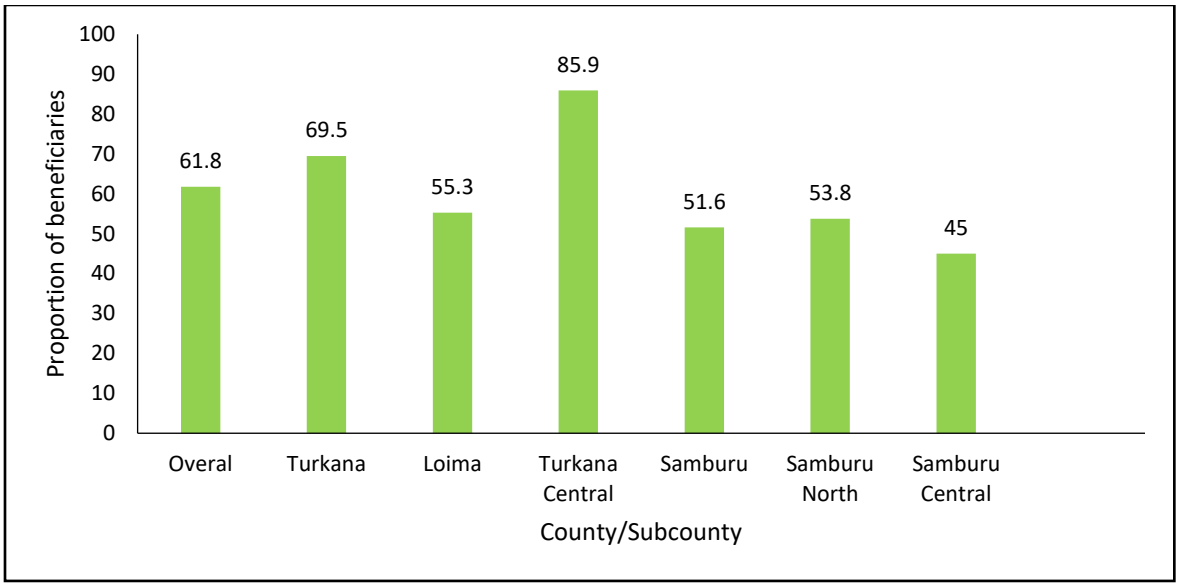

Figure 8: Proportion of farmers trained on OFSP utilization

Further analysis indicated that almost all 229(99.6 per cent) those who attended the training were able to practices the cooking approached covered during the training at lest one in a week when the potatoes are in season. Higher proportion148(94.9 per cent) of beneficiaries also reported to be aware of the nutritional value of OFSP as compared to baseline from 52(53.1 per cent) to 111(97.4 per cent) in Loima, 34(28.6 per cent) to 97(98.0 per cent) in Turkana Central and 95(48.0 per cent) to 108(90.8 per cent) in Samburu North. Sources of information on benefits of OFSP was reported to be form field officers from Samburu Children's program, SAPCONE, FCDO and Agricultural extension officers.

3.5.13 OFSP products accepted as household diet in target communities

All household reported have integrated boiled OFSP as part of their diet as compared to consumption at baseline; Turkana central 43(36.8 per cent), Loima 67(68.4 per cent) and Samburu North 146(73.7 per cent). Minority reported to eat the potatoes as roosted 61(16.4 per cent), deep fry 40(10.8 per cent), mashed 64(17.2 per cent) and porridge 122(32 .8 per cent) and no social or traditional belief was reported to be associated with the household members' consumption of OFSP. In addition, almost all 97(99.0 per cent) of beneficiaries with children aged 6-59 months reported to be feeding them on OFSP. At the baseline, no child was consuming OFSP in the target counties. The end line data show that 5,800 children have been reached with OFSP school meals program against the projected target of 12,000 children in ECD centres.

3.5.14 Household Hunger Score

A good proportion 88(23.7 per cent) of household reported no hunger as at the time of evaluation as compared to baseline where the households reported either severe or moderate hunger as shown in **Table 3.**

Table 3: Hunger score

Hunger score	Overall		Loima		Turkana Central		Samburu North		Samburu Central	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
No hunger	N/A	23.7	0	15.8	0	53.5	0	14.3	N/A	97.5
Moderate Hunger	N/A	28.8	100	44.7	96.3	27.3	77	23.5	N/A	2.5
Severe Hunger	N/A	47.6	0	39.5	6.4	19.2	22	62.2	N/A	0

N/A: Overall baseline data not comparable to endline due to missing baseline data from Samburu central

3.5.15 Coping Strategy Index

The score was categorised into three; 0-50 – as low, 51-100-moderate and >100 as high CSI. Almost all 353 (94.9 per cent) the beneficiaries were established to experience low CSI with none repotting high CSI as shown in **Figure 9**. However, the baseline data reported mean coping strategy index and unlike end line data which categorizes the results in accordance with the logframe requirement.

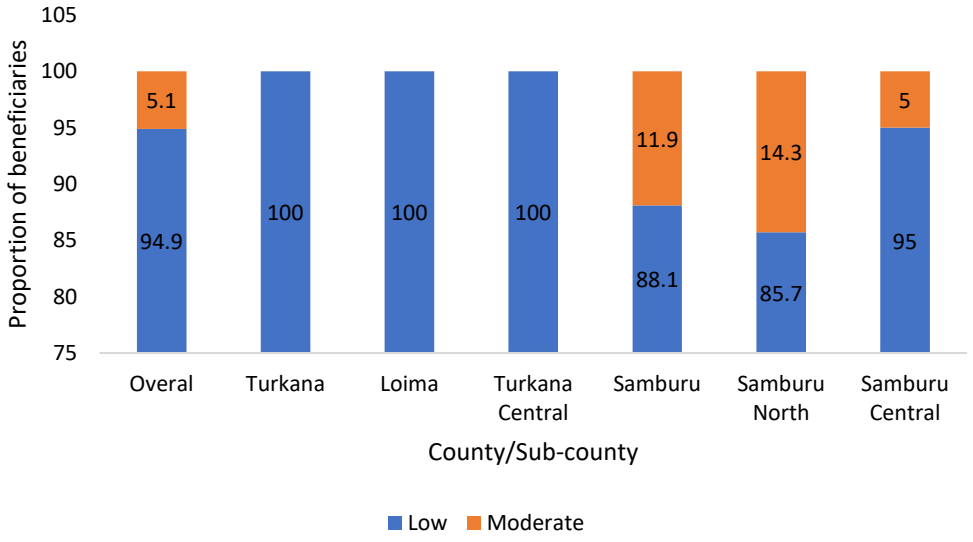

Figure 9: Coping Strategy Index

3.6 Efficiency

The efficiency of the OFSP project was measured in terms of the quality of outputs achieved as a result of inputs (in terms of timeliness). This generally requires comparing alternative approaches to achieving an output, to see whether the most efficient approach has been used.

3.6.1 Timeliness, sequencing and quality of implementation

The implementation of the project was managed by the three implementing partners. This has greatly contributed to meeting project deadlines. Project inputs were delivered in a timely manner. This may be a result of the OFSP needs assessment that was conducted before the start of the project. In addition, procurement of projects inputs was coordinated and handled by the implementation partner and that shortened the bureaucratic chain compared to if the project was to have been handled by ChildFund itself. It was however observed that the project did not follow the laid sequencing of activities resulting into crowded and overlapping activities. For instance, the projected promoted OFSP technology adoption, adoption of GAPs, increased consumption and commercialization all at the same time within a short period of 3 years. However, government stakeholders mentioned that there were some delays in training of farmers and that some irrigation kits used within borehole water not very durable and therefore unsuitable to the harsh conditions in the ASAL areas.

> *"During the first year, we the project coordinator then was not effective as expected. The project experienced delays in the implementation of some critical activities such as laying out demo plots. Some activities that ought to have been implemented during year 1 in the first quarter were actually implemented in year 3"* **(KII, ChildFund national office).**

3.6.2 Financial efficiency and cost-effectiveness

The endline evaluation found that the project largely met the standards for financial efficiency. Overhead expenditures accounted for less than 2 per cent, which is in line with corporate standards for many UN agencies. Another 29 percent of the budget was allocated to personnel expenses, meaning that over 65 per cent of the project budget was dedicated to programming. All budget lines have been fully exhausted. Further, most project funds were used as was planned in the project budget. Where changes were made, appropriate justifications were given and procedures followed. In terms of operational efficiency – how well the intervention was managed – there were some notable delays and budgetary reallocations. For example, the budget for establishing 2 processing factories was consolidated to establish only OFSP processing factory in Turkana after it emerged that cost estimates were lower than market rates.

3.6.3 Appropriateness of the implementation approach

The project adopted an innovative implementation approach by engaging local NGOs as implementing partners. This contributed to managing project activities in an efficient manner and according to plan. This has contributed positively to the timeliness of the project implementation. Government stakeholders were involved in the planning of project activities, in particular in the identification, needs assessments and farmer training. However, government stakeholders have limited information about the details of the project implementation plan and

budgets. Evidence on cost effective planning and implementation was not documented, even not at the level of governmental implementing partners.

3.6.4 Appropriateness of the monitoring approach

The development and use of log frames for the design of programmes of this degree of complexity, without an accompanying Theory of Change, has several risks attached. The log frame does not work well for designing programme strategy as it is designed to be more linear in relation to one specific outcome, rather than a collection of outcomes that programme strategy typically is. As a result, the linkages between the outcomes and their synergies are difficult to see, the distinction between immediate, intermediate and long-term outcomes is often lost, and indicators tend to be more activity-focused than outcome-focused. A TOC enables one to look at a strategy on one page with all the linkages and causal pathways clear. The drawbacks of using a log frame approach for programme design without the initial step of developing a TOC, is evidenced in the Programme log frame where indicators are developed that are too activity-focused, like milestones and completion, rather than indicators of intermediate or precursor results that come from individual tasks or steps in the activities.

Although commendable efforts were made to undertake regular M&E activities aligned with the M&E planning matrix by implementing partners, the absence of M&E budget for each partner in the overall design of performance measurement systems meant that the actual results achieved on the ground and systemic changes may not have been sufficiently reflected in the reporting and lessons learned from monitoring efforts may have not been adequately integrated into the project cycle over time.

> *"The M&E component was not catered for in the budgets. It was expected that the Child Fund M&E person based in Samburu County would adequately cover both counties. Considering these are two vast counties and logistical requirements are huge, it was not possible for the M&E personnel to make routine field visits and provide adequate coordination. As a matter of fact, the M&e officer could only manage one field visit every quarter. This meant that we relied on our M&E resource person who was also committed to other projects''* **(KII, LIP respondent).**

Table 4: Indicator Performance Matrix Summary

Specific objective (Outcome)	Indicator	Baseline	Target	Endline evaluation	Deviation narrative/comment
Economic and nutrition status of 12,000 children, 3000 women and 2,200 youth is improved through adoption of OFSP innovative technologies in Turkana and Samburu counties by April 2024.	Proportion of target households with increased monthly income by at least 50%	6%	60%	85.5%	2,103 of the households reported increase in monthly by at least 50%. This was 15% above the targeted 1,500 households indicating an overachievement
	Percentage of targeted households reporting **improved** hunger score	Moderate hunger at 9.9%	N/A	28.8%	There was no target set and the reported achievement is a huge leap from the baseline representing 291%
		Severe hunger at 1.05%	N/A	47.6%	No target was set and the reported achievement is 470% improvement
	Proportion of cases of malnutrition detected in under 5-year-olds (6-59 months) in the affected households	Turkana: 26%, Samburu: 15.8%	Turkana: 20% Samburu: 10%	Turkana 18% Samburu 10%	
	Number of farmers supported by trained Agriculture extension workers on OFSP	0	600	3,612	Endline achievement represents 602% improvement. Project should review and adjust targets upwards.
	Percentage increase in number of farmers trained in the agricultural + food sector - incl. advisory services	0	100%	100%	100% achievement
	Number of youths employed in OFSP value chain - Proportion of youth with increased monthly income	0	2,200	1,586	72% achievement. Very impressive considering that youths even in high potential areas in Kenya shun participation in agriculture

Specific objective (Outcome)	Indicator	Baseline	Target	Endline evaluation	Deviation narrative/comment
	Percentage increase in the income of small-scale farms in project rural areas	0	60%	50%	83% achieved
	Number of women reporting improved quality + diversity of food	N/A	3,000	2,242	75% achievement.
Outcome 1 (Output): Sustainable adoption of appropriate OFSP production technologies by 600 farmers	Number of small-scale farms reporting improved productivity in project rural areas	0	19	28	147% achievement indicating that more farmers are interested in the production of OFSP. New farmers were established in Smaburu Central
	Increase in the acreage under OFSP cultivation in the 3 sub-counties in Turkana and Samburu counties	0	90	70	This is 78% achievement. Impressive achievement considering that this is a relatively new form of alternative to pastoral livelihood activities
	Percentage increase in productivity of small-scale farms in project rural areas	N/A	100%	80%	
	Farmers reached and trained by agriculture extension workers/TOTs on OFSP.	69 farmers	600	3,012	500% achievement where 1,800 Female and 1,212 Male farmers were reached. More women are embracing production of OFSP
	Amount of OFSP is produced in the project region produced by 600 farmers	0.	4,000 tons	92.4 MT	harvested by 2,045 Households (this is harvest for 2023. Cumulative figure not provided)
	Number of stakeholder officers trained in the sustainable	0	120	119	Total achievement where a total of 40 male and 79 female officers were trained and

Specific objective (Outcome)	Indicator	Baseline	Target	Endline evaluation	Deviation narrative/comment
	promotion of adoption of OFSP technologies				shown capacity to sustainably promote adoption of OFSP technologies
Result 2 (Output): OFSP products accepted as household diet in target communities	Number of children in ECD centres benefitting from improved quality and diversity of food (inclusion of OFSP meals - at least twice per week during harvest time)	0	12,000	8,000	67% achievement. This is very impressive. It was reported by SAPCONE that introduction of OFSP in ECD diets has improved school attendance and retention in project areas
	Number of households and frequency of consumption OFSP per week as staple foods of the household.	0	At least 3 days	3 days a week	100% achievement. OFSP was reported consumed by 2,145 Households in Samburu and Turkana Counties during harvest time
	Number of households reporting reduced number of **hunger days** reduced	N/A	2,460	2,145	87% achievement
	Number of households reporting increased food diversity consumed in the house	N/A	2,460	2,145	87% achievement. OFSP was reported consumed in Samburu and Turkana Counties during harvest time. This is indicative of seasonal consumption. Explore value addition activities to ensure consumption throughout the year
Result 3 (Output): Improved economic opportunities for women and youth in OFSP value chain	Proportion of trained women and youth participating in at least one OFSP value chain activity	0	60%	69%	115% achievement. 2,145 participants comprising of 1,244 women and 901 youth participated in at least one OFSP value chain during the period.
	Volume of OFSP produced by farmers by end of project	0	1.5 – 2 tons	92.4	

Specific objective (Outcome)	Indicator	Baseline	Target	Endline evaluation	Deviation narrative/comment
	Volume of OFSP sold to markets by farmers by end of project	0	1.5 – 2 tons	72	Out of the 92.4 tons produced, 72 tons representing 79.2% of OFSP was sold fresh to the markets by the farmers during the period yielding KS. 5,760,000, each kilogram selling at Kes. 80- on-farm price
Result 4 (Output): Increased community and stakeholder awareness on nutrition and economic value of OFSP	Proportion of community members aware of OFSP and its nutritional benefits (KAP survey)	0	75% of	75%	100% achievement.
	Proportion of value chain actors producing OFSP blended products apply KeBS Standards	0	50%	N/A	Harvested OFSP tubers were consumed by farmer households and sold in the market raw. Etic women group applied for KEBS certification for their processed OFSP flour in December 2023. The process is at an advance stage towards approval
Result 5 (Output): The staff of the three local partners are trained in the areas of governance, project management child protection, gender and advocacy	Number of board members and staff of local implementing partners trained in the areas of governance, project management child protection, gender and advocacy	0	At least 6 board members	23 board members	383% achievement. The 3 local implementing partners (SCP 7, FCDO 9, SAPCONE 7) have been trained each provide meaningful overviews of budgets and financial reports as well as guidance for financial management and decision-making.
	Local partners provide timely project reporting both technical & financial	Local partners have no experience in reporting to the BMZ.	Project reporting (technical/financial) takes place on time and in the	Implementing Partners reports to BMZ show improvement each	

Specific objective (Outcome)	Indicator	Baseline	Target	Endline evaluation	Deviation narrative/comment
			desired form.	reporting period.	
	The staff of the local partners prioritize the gender aspect in their work, leading to greater involvement and participation of women and girls in project activities.	Awareness of the equal rights of men and women in daily activities is hardly developed	The staff of the local partners prioritize the gender aspect in their work,	119	1,244 women are currently supporting activities implementation in the farms and providing leadership in key discussions pertaining their community welfare, health, and nutrition.
	Number of partnerships between LP and local stakeholders formed to jointly carry out advocacy and lobbying activities	No active partnerships	Partnerships between LP and local stakeholders are formed.	2 Partnerships project partnered with, USAID NAWIRI and County Governments	Capacity of 150 farmers (90F, 60M) strengthened in OFSP and early maturing fruits and vegetables value chains. 100 Haas Avocado tree seedlings, other trees and a variety of traditional vegetables promoted. The project in partnership with the county Government and the Kenya Forest Service supported planting of 80,000 tree seedlings in Kirisia forest aimed at contributing to reduced impact of climate change, conserving the environment and creating platforms for carbon sequestration.

3.7 Emerging impacts

3.7.1 Logframe vs Theory of Change

The report has grouped the evidence of emerging impacts into the broad areas of project objectives, providing some idea on the efficacy of the employed strategies. The report underpins its summaries with quotes from beneficiaries and other stakeholders, sections of monitoring reports as evidence of the changes occurring and the possible constraints to impact. Overall, because the project focused on the production and promoting consumption of Vitamin A rich OFSP, all participants felt they had benefitted from an intervention, even if they had not started selling tubers to the market. The project also motivated other farmers to start engaging in the production of OFSP.

3.7.2 Impact of Programme Activities on Agricultural Production

In all FGDs, farmers reported a significant increase in the consumption of OFSP tubers at household level. It was also reported that many farmers consumed OFSP leaves as green vegetables. This was not anticipated outcome but greatly improved dietary diversity at household level. The irrigation infrastructures enable the farmers to increase their level of effort in agricultural work. The example of the programme also encouraged other farmers in the areas who were not direct beneficiaries of the activities to do their own land rehabilitation and engage in OFSP production. This was witnessed in Central Samburu where a large number farmers are now producing OFSP while in Turkana, other NGOs bought vines from OFSP participants to distribute to farmers in other areas.

3.8 Sustainability:

The evaluation sought to answer these critical questions: To what extent do the benefits of the project (outcome & impact level) continue after ChildFund-funding ceased and how was this influenced by the business case model? Did the project/intervention lead to systemic change and/or was the intervention scalable?

3.8.1 Production of OFSP

The study established that by the final year of the project, OFSP participant farmers achieved significant productivity gains, a distinct improvement from the baseline and end of year one results. However, sustainability indicators provide a mixed picture. A potential sustainability concern for the OFSP processing factory which at the time of the study was not operating at full capacity. It was observed that farmers are not producing enough OFSP to satisfy home consumption and demands from the local markets. Equally, the study team observed that OFSP production is not continuous throughout the year despite use of irrigation technology. Farmers prepared their land for OFSP production around rainy seasons. They argued that there are

massive potato weevil pest infestations during dry seasons. As a result, some farmers in Turkana are discouraged from producing OFSP citing massive losses due to pest infestation.

> *"We lost a lot of potatoes due weevils attack. These pests are normally very many during dry season. Some farmers are now reluctant to plant potatoes until it is raining again"* **(FGD, Turkana).**

3.8.2 Community Seed Multiplication

It is acknowledged that seed is an important component of potato value chain. End line survey results indicate that approximately 49% of the respondents planted either certified or OFSP vines obtained from on-farm saved seeds up from baseline value of less than 1%. This huge increase was due to community vine multiplication as one of the activities promoted by the project. Although use of quality seed is gaining popularity in potato growing areas, availability and access to quality seed potato remains a gap. A large percentage of respondents (69%) recycled their seed while 31% acquired the seed from other unregulated sources. However, this extensive use of regenerated vines from own-farm without farmers collectively accessing certified seeds will result in lower productivity in the long run. Discussions with plant breeders from KALRO expressed this concern and advised that farmers should not use regenerated vines after 5 cropping seasons.

> *"It is still challenging for the farmers to access certified seed from the 2 counties owing to their geographical location from the certified seed breeders in Kitale town. Without proper functional community vine multiplication plots, farmers will have to travel long distance to acquire certified seed. High transport cost will increase the cost of acquiring certified seed and may affect farmers journey to self-reliance in terms of access to quality seed"* **(KII- ChildFund program team member)**

The GAP training especially, the community seed (vine) multiplication started well, but was mainly focused on individual progressive farmers commercializing this model. Even though the project has hailed the commercialization as resulting into huge profits to some early adopters, such an approach poses great danger to sustainable seed system because such multipliers will have no incentive to pursue certification for producing clean vines.

> *"One aspect that interfered with the community seed multiplication approach is emphasis on commercialization. A few farmers quickly realized they can make money from selling the vines and jumped into it. The project team celebrated the huge amount of money these farmers reported and encouraged them. One farmer was aired on TV which is not bad but it appears that the project team spent less efforts in promoting community seed multiplication system. This will have great effects on access to clean vines since many farmers cannot afford to buy these vines yet"* **(KII-KALRO expert)**

3.8.3 Resource for funding OFSP project activities

The private-sector partnership pathway outputs envisaged in the OFSP project establishment through market linkages with institutional buyers and contracts are still unattained. A concern mentioned by the implementing partners and collaborating agencies like KEPHIS and KALRO is that certain aspects of OFSP, including input (vines) access and collective output marketing (processing factory), were largely organized through the project and may require continued support.

> *"The main concern I have is that the implementing partners have not demonstrated efforts towards new funding mechanisms for financing OFSP activities beyond support from ChildFund. It will be even a much bigger challenge for the Departments of Agriculture from county governments fund OFSP activities"* **(KII-ChildFund technical team)**

The selection of trainers from county government extension staff means the capacity is there to provide farmer training and extension support after the end of the project. OFSP supported the facilitation of trainings, and provided allowances for the extension staff to visit the producer groups. There is some concern by ChildFund field staff whether the trainings will continue without project support.

3.8.4 OFSP Processing and farmer market participation

Marketing of OFSP and processed products will remain limited until larger, consistent volumes are supplied. This might require working with larger, more commercially-oriented producers and other farmer groups outside project participants.

3.9 Project Challenges/Constraints and possible interventions

The end line evaluation established that the project implementation also witnessed some challenges. Discussions with project implementation team and the project beneficiaries identified the following challenges;

a) The commercialization of OFSP was rather too overambitious more efforts needed to be put on adoption, vine multiplication and production of OFSP. The focus of many farmers was OFSP raw tubers for home consumption and not for commercialization. During the end line evaluation, the majority of the factories lacked the supply of OFSP. The commercialization was further negatively affected by seasonality in the production of OFSP production and the limited ability of OFSP farmers to adopt staggered planting of OFSP to ensure steady supply to the factories. The project implementation team felt that there was a lot of running around trying to marketing the product, promoting production, and raising awareness.

b) Unsustainable supply of certified vines and limited multiplication of OFSP vines for local farmers. At the moment most of OFSP farmers depend of vines from Kitale. Kitale is

several kilometres away and many local farmers do not have the capacity to travel all the way to Kitale to get certified vines. The focus should have been to seed bulking at the community levels to enable the OFSP farmers to access the necessary seeds for planting. The lack of certified seeds forced some OFSP farmers to plant uncertified seeds which led to some losses.

c) In adequate supply of water from the existing boreholes. This was occasioned to increased drought which lowered water levels in most boreholes in Turkana and Samburu counties. The drought also increased demand for water for animal and domestic consumption. There was also increased breakdown of borehole water pumping systems for many boreholes. The supply of water to OFSP farms near Rive Turkwel was also affected by clogged canals as many farmers were not keen at desilting the canals to improve water flow.

d) There was also the challenge of crop pests and diseases particularly by prosopis plant, sweet potato weevil, sweet potato black rot disease, and wildlife interference. The project introduced crop rotational as a way to managing OFSP pest rather late when a number of farmers had suffered losses which discouraged them from planting OFSP vines. Among the interventions is; crop rotation, solarization and sanitization of land, use of clean planting materials, use of Food for Work to support farmers in clearing prosopis, desilting of water canals and increase in farm surveillance.

4. Conclusions

From the annual progress reports and this endline results, it is evident that there was significant improvement in most of the project indicators as compared to baseline values;

i. Project Design

The programme adopted a hybrid design and approach, combining elements of a market systems development approach (e.g., establishing producer groups, supporting development of input enterprises, smallholder commercialization, value addition and market linkages) and elements of agricultural infrastructure rehabilitation to build livelihood resilience. In a highly climate fragile and complex operating environment, its design reflects and builds on ChildFund rich and accumulated experience in resilient livelihood programming in ASAL areas and is an overall appropriate response to some of the key constraints of high production costs, climate change and low participation by women and youth and food producers. Production constraints were well-addressed but market constraints less so. The OFSP project was too ambitious to achieve the outlined outcomes with 3-years. The aims of OFSP required it to (1) manage a diverse group of stakeholders to implement a broad package of interventions in totally new OFSP value chains, including the setting-up aggregation, processing, marketing and supply channels; (2) get farmers to participate in training, adopt techniques, use information and increase production; (3) get

farmers to organize into institutional arrangements so as to sell more, increase profits and farm incomes; and so (4) improve their food security; while (5) effecting community seed system and extension changes. The literature shows that programs that successfully manage to achieve (2) and (3), especially at scale, are rare. Implementing partners should focus projects on lower level and more realistic outcomes in the results chain.

ii. Target group and partner selection

Target group and partner selection was appropriate for the achievement of project goals, and the participant selection process and criteria developed proved acceptable to the target groups, including beneficiaries. The selection of SAPCONE, Frontiers and SCP as implementing partners was a key element in successful implementation. All stakeholders commended their experience, practical skills and ways of working in the field.

iii. Adoption of agricultural-nutrition technologies

A major interest of any agricultural-nutrition intervention like OFSP is knowing whether sets of technologies that are aimed at improving the welfare of poor rural households are being adopted and bringing about the intended changes among the targeted beneficiaries. Comparative results from the baseline and the endline surveys evaluating the impact made by OFSP show great progress towards the production and utilization of nutritious OFSP in the intervention sub-counties. This is evidenced by the significant changes in key areas of: number of household producing OFSP, knowledge on sweet potato and OFSP production and farming practices among households; knowledge on Vitamin A and Vitamin A rich foods including OFSP; contribution of OFSP to improved Vitamin A intake among households; and consumption of OFSP by caregivers and children aged 6-59 months old. The positive agriculture-nutrition outcomes documented through the two studies came about because household members had been empowered and capacitated by the project by way of providing them with the necessary set of technology options.

iv. Resilience capacities livelihood diversification

Livestock production and sales was the most common livelihood activity of all households in both surveys. At endline, project participants cited OFSP farming as most highly adopted alternative livelihood activity. Qualitative focus groups indicated widespread desire to diversify into small scale OSFP farming; for some, however, recent investments in small-scale OFSP production have been undermined by droughts and pests. Of note was a slight but significant increase in reliance on harvesting wood for charcoal production has become a primary activity across study sites, despite its illegality and advocacy against charcoal production. The quantitative data suggest a shift in livelihood strategies among households in the programming areas. In particular, households are “stepping out” and “moving out” of livestock activities by complementing them

with OFSP as additional sources of food and income. This finding is supported by qualitative data, which suggest that frequent drought, tension between land use for pasture and farming, modernization, and government policy have combined to reduce the viability of the traditional pastoral livelihood and to usher in an altered livelihood scenario. Overall, livelihood diversification was still very low in the two counties. This should be expected for communities whose livelihood has been nomadic pastoralism and especially given the short period for which OFSP project has been implemented.

v. Project M&E system

The programme design process was inclusive and interactive but the use of the log frame approach, in the absence of a well-developed TOC with assumptions, presented significant challenges to creating an overall vision of change for the programme which could more effectively link results expected (outcomes) in a causal chain, to develop more appropriate results and indicators for M&E and reporting purposes. The baseline study, while producing useful contextual information, did not provide some initial benchmarks against which to measure progress towards achieving outputs and results expected. This inhibited the development of a more effective M&E strategy and programme performance reporting. The excellent annual progress monitoring report reviewed from field offices contained a wealth of analysis on results and impact. In the absences of a budget line M&E activities for implementing partners, there was a distinct feeling that the role of the ChildFund M&E field office was reduced to approving work already done, rather than proving useful guidance and input to overall project performance. The M&E strategy was compromised at the outset by the absence of some initial benchmarks as well as inefficient M&E field support.

vi. Impact

Impact at the level of women's empowerment were particularly impressive, considering the cultural norms that confine women from ASAL communities to limited livelihood options. Capacities and capabilities have been built; new skills and knowledge imparted, and attitudes and behaviors have shifted. Evidence of improved income, particularly among women and youth from participating in OFSP value chain was largely anecdotal, but it is clear that production and consumption increases have occurred. The impact of the increased access to land and water, especially among women has already diversified and shifted livelihood opportunities towards OFSP production. Local networks are being built which is setting the foundations for future market participation.

5. Recommendation

- **Sequencing and adequate implementation period**

The 3-year implementation was too short a period to allow sufficient time for agriculture technology adoption and smallholder commercialization to take root. More consideration should be given to the sequencing of programme activities to ensure that outcomes can be monitored within the implementation period. Improving access to inputs through community systems, increasing productivity, establishing institutional arrangements and consumption promotion activities should commence at the beginning of the interventions so that farmers can be immediately exposed to the importance of collective action practices. In the same way, the commercialization of vines and marketing should be moved forward in the implementation cycle so that results of these interventions can be better monitored and evaluated.

- **Community seed system**

Although growing OFSP is gaining popularity in the ASAL areas potato growing areas, availability and access to quality seed potato remains a gap. Developing a localized community seed multiplication system particularly through groups, remains the most viable model to enable farmers access and maintain use of certified seed by farmers. Community vine multiplication should be accompanied with varietal evaluation plots to allow farmers select the best performing varieties suitable for their locations. There is need for every implementing partner to prioritize establishment of seed bulking sites to cut down the costs always being incurred during the purchase of vines from KALRO Kitale, Kakamega and Busia.

- **Commercialization of OFSP**

Promote farmer-based aggregation centers near OFSP production areas for delivery to informal markets. Local implementing partners should promote the training of smallholder farmers to adopt bulking and OFSP aggregation for increased efficiency in sourcing of roots by institutional buyers and local traders. This is likely to attract local traders and lead to crowding-in since it has the effect of reducing transaction costs, improving quality and volumes. Aggregation centers are also likely to precipitate youth and participation in the OFSP value chains because they will provide important services such as grading, cleaning, packing and transportation. The project should then link aggregators to the local traders and processor and provide capacity strengthening market strategies development.

- **M&E Systems**

Some improvement is needed in the area of quality control of M&E products and results framework including baseline surveys and the development of indicators which are fully aligned with the results expected. Implementing partners should be allocated budgetary provisions to

employ own M&E personnel while ChildFund field office should be facilitated with adequate resources to enable effective coordination of PI M&E field activities.

6. References

1. Annual Progress Report, 2023. SEWOH promotion of sweet potato cultivation (OFSP)
2. Annual Progress Report, 2024. SEWOH promotion of sweet potato cultivation (OFSP)
3. Baseline Survey report. Orange Fleshed Sweet Potato (OFSP) Project in Turkana and Samburu Counties
4. ChildFund, 2023. Concept Note for the Orange Fleshed Sweet Potato (OFSP) Project in Turkana and Samburu Counties
5. ChildFund, 2021. BMZ OFSP Approved Project Proposal 2020-08-26 Part II
6. ChildFund, 2021. BMZ OFSP Baseline report
7. Gorstein, J., et al. Indicators and Methods for Cross-Sectional Surveys of Vitamin and Mineral Status of Populations. 2007.
8. OFSP – ECD Kitchen Garden Project Activity Progress eport Jan-Apr 2024
9. OFSP Project DIP Sept 2020 – Aug 2023
10. Okuku, H.S., R. Kakuhenzire, and F. Grant, Baseline survey report of orange-fleshed sweet potato knowledge, farming and consumption, and dietary practices among households with children aged 6-59 months in selected districts of Morogoro, Iringa and Mbeya regions of Tanzania. 2016, International Potato Centre (CIP)
11. Samburu County Integrated Development Plan, CIDPD II – 2018-2022
12. Turkana County Integrated Development Plan, CIDPD II – 2018-2022
13. United Nations Sustainable Development Goals

7. ANNEXES

ANNEX 1: Key stakeholders interviewed

a. List of Key Informants Interviewed

Key Informant	Position	Institution	Contact
Turkana County			
Aaron Nanok	Director of Agriculture	County Government of Turkana	
Wilson Ejie	Deputy Director of Trade	County Government of Turkana	
Vitalis Juma	Mechanization Officer	County Government of Turkana	
Peter Eregae	Turkana Central Sub-county Crops Devlopment Officer	County Government of Turkana	0719856189
Daniel Eoyi	ECD teacher	Nadapal	0712601254
Wislson Silate	Turkwel Ward Extension Officer	County Government of Turkana	
Mr. Shemmy Ebulon	Director of Cooperatives	County Government of Turkana	0723697577
Mary Ekwom	Group Leader	Etic Women	
Daniel Ekal	Programme Manager	Implementing partner SAPCORN	0710890020
Rebeca Akiru	Manager	Chomazone Hotel - Turkana	
Samburu County			
Letuke Benjamin	Livelihood and Food Security officer	Mercy Corps	
Lily Letiwa	Lead Farmer	Farmer – Samburu Central	
Pamela Nyaenya	Lead Farmer	Farmer – Samburu Central	
Marion Cherotich	Project officer	Samburu Children program	
Richard Rentile	M&E Officer	Samburu Children program	
Micah Lekisaat	Agricultural Extension Officer	County Government of Samburu	
Local Implementing Partners			
Mr. Maurice Lokwaliwa	CEO	Frontiers Children Organization	
Mr. Wallace Kasemboti	Chief of Party	SAPCORN	0713046991
David	CEO	Samburu Children program	0720432375
Daniel Ekal	Programme Manager	Implementing partner SAPCORN	0710890020
Peter Hereng	Field Extension Officer	SAPCONE	
Collaborating Partners			
Mr. Meshack Okware	Field Inspector	KEPHIS	0723785550
Evance Kisgei	Procurement and Logistic	Concern Worldwide	
John Mpapale	Plant Breeder	KALRO	0724348213
ChildFund Field Office			
Faith Nzivo	Snr. Project Coordinator	ChildFund - Turkana	0701439548
George		ChildFund - Turkana	
Richard Rentile		ChildFund - Turkana	
ChildFund Nairobi Office			

Dr. Issa Kapera	Programs and Sponsorship Director	ChildFund - Nairobi Office	0721 121501
Cyprian Muruki	Area Manager, Western Cluster Partners	ChildFund – Nairobi Office	0726539859
James Miriti	Multigrants Accountant	ChildFund - Nairobi Office	0724397525

b. Focused Group Discussions Conducted

County	Group Name	Number of participants	Location
Samburu	Nalin'gangor	8	Baragoi
	Nyuat	8	Maralal
Turkana	Nadapal women group	8	Nadapal
	Etic Women group	11	Nadapal
	Ateni Women Group	8	Kerio Delta
	Natuntun Women Farmer Group	8	Turkwel ward

ANNEX 2: Data collection instruments

a. Questionnaires for Household surveys
b. Key informant interview guide for collaborating partners
c. Key informant interview guide for implementing partners
d. Key informant interview guide for lead farmers
e. Key informant interview guide for ChildFund country managers
f. Key informant interview guide for M&E leads
g. Focus Group Discussion guide for farmers
h. Observation Checklist