BASELINE SURVEY

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

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ABBREVIATIONS AND ACRONYMS

CBO	Community Based Organizations
CHVs	Community Health Volunteers
COVID-19	Corona Virus Disease of 2019
ECDE	Early Child Development and Education
FAO	Food and Agriculture Organization
FCDP	Frontiers Children Development Program
GoK	Government of Kenya
HH	Households
KALRO	Kenya Agriculture and Livestock Research Organization
KES	Kenya Shillings
KII	Key Informant Interviews
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
TRP	Turkana Rehabilitation Project
UNICEF	United Nations Children Education Fund
US	United States
VAD	Vitamin A deficiency
WFP	World Food Program

EXECUTIVE SUMMARY

ChildFund Kenya is an affiliate of ChildFund International registered in 1960 as Non-Governmental Organization (NGO) by the NGO Coordination Board. The organization works in 26 out of the 47 counties in Kenya and implements its program through 12 Local Partners. ChildFund Kenya has a reach of more than 1.3 million people who include children, youth and caregivers. ChildFund Kenya and ChildFund Germany have had an excellent and growing relationship for several decades

The Orange Fleshed Sweet Potatoes Production Project Funded by BMZ-Germany is being implemented and coordinated by ChildFund through three community-based not-for-profit organizations including: Frontiers Child Development Program, Samburu Children's Program and Sustainable Approaches for Community Empowerment, (SAPCONE). They all focus on children and youth, and promote disadvantaged, marginalized and vulnerable children (0-14 years) and youth (15-24 years) so that they can bring about positive changes later in their respective communities as responsible adults. The project targets both direct and indirect beneficiaries, including children under 5 years (U5) mostly with Vitamin A deficiency as well, women as caregivers and *Bonafede* nutritional custodians of the children and families and the youth. The youths and women will be targeted in village saving, loaning groups and farmer organizations through Community Health Volunteers (CHVs).

The baseline survey purposely informs the establishment of realistic and achievable targets and provides a point of reference against which progress on or towards the achievement of outcomes will be assessed, monitored and evaluated. This will also inform project implementation performance review process, maintain accountability by informing what difference the project is making and provide justification to the stakeholders for programme intervention. The baseline report establishes benchmark against the project defined indicators related to project outcome, outputs and inputs. The established benchmarks (baseline) will be compared to results at the end of the project.

Research design

The baseline study adopted a mixed method approach which entailed qualitative and quantitative descriptive study design. This method allowed for triangulation and corroboration of information with each of the methods reinforcing each other.

Data collection and analysis

The study design allowed for the collection of qualitative and quantitative data. This mixed design saw quantitative data derived mainly from Loima 98(23.5%), Turkana Central 121(29.0 %) and Samburu North 198(47.5%) through household survey tool while qualitative data was derived from 20 Key Informant Interviews (KII) and 6 Focus Group Discussions. This triangulation-based approach required multiple analyses. Quantitative data from the questionnaire were entered and analysed in an established SPSS database after cleaning and data checks for internal consistency. Data was subjected to a non-

parametric test using chi-square for significance test at 0.05 confidence level. Qualitative data from the KII were typed in MS word from the notes taken during the sessions.

Key findings

1. **Introduction**: From the baseline survey, it's clear that in all three stations, Loima, Turkana Central and Samburu North, OFSP trial farming had occurred, with farms getting ready for planting. In all stations, the project underwent the initial stages of awareness creation and sensitization.
2. **Project Location:** This baseline study for the BMZ funded project was undertaken in the two sub-counties in Turkana County (Turkana Central, Loima) and one sub county in Samburu County (Samburu North).
3. **Socio Economic Profiles of the farmers**: Four hundred and seventeen (417) farmers interviewed from the three sub-counties: Loima 98 (23.5%), Turkana Central 121 (29.0 %) and Samburu North 198 (47.5%). The participants were evenly distributed across the age cohorts with more than 80% married. Loima 82 (83.7%), Turkana 103 (85.1%), Samburu 163(82. 7%)). Most of the participants had not attended school (Loma 77 (78.6%), Turkana Central 96(79.3%), and Samburu 145 (73. 2%)). Majority of the participants stated they were unemployed (Loima 65(66.3%), Turkana Central 110 (90.9%), Samburu 178(89. 9%)), with the main source of income varying as follows: crop farming 52(53.3%) in Loima; crop farming 31(25.6%) and fruits/vegetables selling 35(28.9%) in Turkana central; and vegetable/fruits vender 112 (56.6%) and livestock trade 67 (38. 8%) in Samburu North.
4. **Household sizes**: Most households are male headed as follows: Loima 60 (61.2%), Turkana Central 60(52.1%) and Samburu North 107(54%). The average family size is 6 per household for Loima and Samburu North and 5 people for Turkana Central with minimum and maximum household size of 1 to 12.
5. **Household incomes**: The main source of household income in the three months preceding the study was sales from vegetables and other fresh produce, livestock and animal products and charcoal burning with significant variation across the sub-counties. The mean monthly household income was KES 3,814, 3,828 and 788 among participants in Loima, Turkana Central and Samburu North respectively.
6. **Hunger Score**: The survey established moderate hunger to be among all households in Loima 89(100%), Turkana central 88(93.6%) and Samburu 67(77%) while Severe hunger was reported in 6(6.4%) and 20(23%) of households in Turkana central and Samburu North respectively.
7. **Dietary Diversity**: The survey established that 14(66.7%) and 14(73.7%) of children 0-23 in Loima and Turkana central achieved minimum dietary diversity (4 to 5 food groups) as compared to Samburu North where no child achieved minimum dietary diversity.

8. **Coping Strategy Index**: All the sub-counties experience high coping (CSI ≥10). Loima (34.8m) followed by Samburu North (18.7m) and lowest Turkana Central (13.0m)

9. **Land sizes on potatoes**: The Samburu North HHs used a mean of 0.82 acres (range from 0 to 2 acres) of sweet potato farming in 2020. This applies to HHs who planted sweet potatoes in 2020 and harvested in 2021, with an insignificant farming of the crop reported in Turkana Central and Loima. However, in Samburu North only 15(12.6%) of the HHs were aware of the amount of sweet potatoes they produced from their farms while 22(or 18.5%) were not sure. Most farmers grow potatoes in one field 100 (87.0%) while the rest (15 or 13%) have two or more fields using family labour (109 or 93.2%).

10. **Methods of Planting**: The farmers practiced either flat ground (87 or 75%) or ridge (29, or 25%) to plant sweet potato. A few (10 or 8.6%) reported an increase in number of plots under sweet potatoes; 24 (or 20.5%) reported increased acres of land under sweet potato while 92 (or 78.6%) reported to be farming under the same size of land in the last two years. There was an average change of 1.32 acres amongst farmers who increased their potato farm size in the last two years. The farmers who increased sweet potato farm size attributed this to increased demand of shorter maturing and higher yielding variety as compared to other crops.

11. **Decision making:** The decision on what and how much crop to plant was made by both husband and wife 63(54%), meaning both would be involved in promoting the sweet potato farming. Almost half of the participants reported no change in workload as result of potato farming among caregivers 49(41.9%) and their spouses 56(47.9%).

12. **Sources of water in the farms:** The dominant sources of irrigation water are Rivers 69(70.4%), Piped water 17(17.3%) and borehole 7(7.1%) in Loima; borehole 63(52.9%), piped water 36(30.3%), and Lake 19(16%) in Turkana Central; while Samburu North had diverse water supply. Most of the farmers in the three sub-counties had access to water for sweet potato farming. Reliability of irrigation water supply was confirmed by 45(38.8%) of the Samburu North farmers to whom the source was moderate to very reliable.

13. **Production for sale**: Only 39 HHs among those currently growing sweet potatoes in Samburu North do so for sale. One in ten (11.6%, n=39) sold a portion of their harvests at the beginning of 2020 as follows: within the home 9(31.0%); at the market 19(65.5%); and the town centre 1(3. 4%). In the last harvest Samburu North farmers sold an average of 7.5 Kgs of their potato produce in its raw form from the farm out of which they got a mean income of Ksh1356. Majority of the HHs 19(51.4%) made joint decision with the HH on the amount of the crop to be sold and how the proceed is spent.

14. **Use of sales proceeds**: These proceeds were spent on food 34 (54.8%), school fee 22 (35.5%), farm inputs 4 (6.5%), 2 (3.2%) hospital bill and land preparation.

15. **Marketing of produce**: All the days of the week have been slotted for market days in various areas within all the Sub-Counties with no preferred market day among the participants. Majority of the participants in Loima 62(63.9%), Turkana Central 92(76%) and Samburu North 68(65.7%) have access to at least one market where they can sell their farm produce. Most people walk to the market in Loima 62(63.3%), Turkana Central 92(76%) and Samburu North 68(34.3%) with the average time taken to the market in Loima and Samburu North being 35 and 34 minutes respectively. Sweet potato is consumed by more HHs in Loima 67(68.4%), and Samburu North 146(73.7%) as compared to Turkana Central 43(36. 8%). In Samburu North, most HHs 36(90%) consume at least half of potato harvest at home.
16. **Sale of potatoes**: More than half 117(59.1%) of the farmers in Samburu North had grown and harvested unquantified amount of at least one type of sweet potatoes in small scale as compared to very few in Turkana Central and Loima.
17. **Types of Potatoes**: The preference type of potato varies across the sub-counties. Orange flesh sweet potato is preferred by households in Loima 89(90.8%) and Samburu North 117(59.1%) while white flesh is proffered by households in Turkana Central 60(49.6%). Most HHs in Loima 98(78%), Turkana Central 116(78.9%) and Samburu North 191(93.6%) cook sweet potato by boiling. Roasting is done by 25(20%) and 25(17%) of households in Loima and Turkana central respectively. There was no traditional belief or norm related to consumption of sweet potato reported in any location.
18. **Feeding Under 5 children**: Less than 5% of the households in Loima and Turkana Central have embraced feeding under five children (U5) with sweet potato as compared to Samburu North registering 55(27.8%), 26(13.1%) and 44(22.2%) of the HHs feeding the U5 every day, once a week and twice a week respectively.
19. **Average Family consumption of sweet potato:** At the family level, the average weekly consumption is 2 days/week in Samburu North and at most one meal a day in Turkana central and Loima.
20. **Training of farmers: Only** a small proportion in Loima 2 (2.0%), Turkana central 14(11.6%) had been trained on preparation and cooking of OFSP. A similar training was conducted in Samburu North as indicated by 53(26.8%). These trainings were conducted 1-6 months before the survey by various organizations: AMREF, SAPCONE, Afya Timiza and Child Fund.
21. **Transfer of training**: In Samburu, only 23(11.6%) had tried to practice some of the lessons learnt about potato preparation at the HH level. Those who did not cite the following reasons: lack of sweet potato, a lot of household work and family taste preference. The other areas had not practised.
22. **Sources of potato vines**: The source of potato vines are non-governmental organisations (NGO), neighbour, famers groups and own farms. In Samburu

North farmers get their vine from farmer group 44(31.9%), neighbour and relatives 19(13.8%) and trained vine multiplies 24(17.4%) because 94.8% got their vines for free from farmers group and neighbours. Samburu North farmers 25(21.4%) plant potatoes in different time in every session due to spread production 23(92.0%), lack of materials 1(4%) and variation in maturity periods 1(4%). Less than half 48(24.2%) of those farming sweet potato conserve the vines. The farmers do not harvest part of the plots 19(39.6%) and keep vines in a small plot near the house 26(54.2%) to conserve the vine for future planting seasons. Those who do not conserve vines buy 15(18.8%), ask from relative and neighbours 41(51.0%), and use leftovers in the fields 24(30.0%). In Turkana Central and Loima, the project implementers are planning to obtain the vines from KALRO, Kakamega for planting. Almost all participants like all the traits except the trait on sweet taste leaves. Generally, most participant have positive attitude toward sweet potato; Loima 98(100%), Turkana central 100(84.0%), Samburu North 176(89.0).

23. **Knowledge on benefits of OFSP**: It was established that only 52(53.1%), 34(28.6%) and 95(48.0%) of the participants from Loima, Turkana central and Samburu North respectively were aware of the benefits of orange flesh sweet potato. Sufficient knowledge of benefits of orange flesh potato was measured by participants mentioning at least any three of the benefits out of 6. A few participants in Loima 13(25.0%), Samburu North 11(11.6%) had good knowledge of orange flesh sweet potato. These were spread across the project sites, starting with the top farmer group leaders who got training, as well as the group members who attended the workshops officiated by the trained group members (ToT). In addition, the groups which planted the trail crop in the ECDE centres watched the crop grow, with them engaging the Ministry of Agriculture officials who also gave training and seeds.

24. **Knowledge of Deficiency of vitamin A**: measured by the participants' mention of any disease related to Vitamin A indicate very low knowledge. On vulnerability, 39(40.2%), 37(31.1%) and 68(34.3%) in Loima, Turkana Central and Samburu North were able to mention children as the vulnerable group to Vitamin A deficiency. Most HHs from Loima 79(81.4%) knew at least one food source of vitamin A as compared to low rates in Turkana central 54(46.2%) and Samburu North (61(31.0%).

Key conclusions and Recommendations

Livelihood Indicators: Currently, production of OFSP in the project areas is low and it's for household consumption and there is insignificant yield in incomes so far. The livelihood indicators are poor across the sub counties as evidenced by the hunger score, dietary diversity and coping strategy index outcomes.

Adoption of OFSP: The baseline shows that the project is appropriate and properly targeted working with local organizations with community touch. The community has positively embraced the OFSP project and are ready to be part of it. Appropriate

structures, including farmers groups have been formed and capacity built, and they have embraced the project. In addition, the stakeholders are available, ready and willing to give support. The ground is ready though some delays have been observed in terms of the laying of the water infrastructure. Twin key concerns of the key stakeholders are security (arising from unpredictable raids) and rainfall unreliability.

Improved economic opportunities for women and youth in OFSP value chain: From the survey, the value chain presents numerous economic opportunities as the product has ready market in the ECD centres being supported by the county governments. The opportunities include the need to fill in the single meal gap in ECDE, more so by the introduction of a mid-morning drink with Sweet potato being the side dish. At another level, the production of the crop shall give the communities in Samburu and Turkana alternative livelihoods, from farming, to product sale, to processing, and other aspects of value addition. The improved access to markets in the project areas will improve their livelihoods.

Increased community and stakeholder awareness on nutrition and economic value of OFSP: From the survey, the level of awareness on the nutritional value of OFSP is still low and this requires deliberate campaign and working with the health workers in the sub counties**.**

The key recommendations

1. **Prioritize awareness creation on OFSP**: Only 15(12.6%) of the HHs were aware of the amount of sweet potatoes they produced from their farms while 22(or 18.5%) were not sure. This means that the majority in the community are not aware of the benefits of OFSP.
2. **Knowledge of Deficiency of vitamin A**: From survey, the level of knowledge of deficiency of Vitamin A is very low in the three project areas. Therefore, there is need for a multi-faceted approach to community advocacy and campaign working with the heath personnel and community health volunteers in the sub counties.
3. **The need to understand the community life and household characteristics**: In order for the project to achieve optimally, the project implementers need to understand the farmers' household characteristics, production circumstances with emphasis on understanding the farmers' decision-making process in adopting the nutritionally improved OFSP in the project areas. There is needed to make efforts to follow the schedule to fully be with the community, whose local experience indicates there are valid fears if the schedule is not followed. Male involvement should be deliberate to enhance smooth decision making about farming.
4. **Develop partnerships with local initiatives and the county government departments**: From the survey, there is a lot of willingness by partners such as SAPCONE and FRONTIERS in Turkana County as well as the county government line ministries to work with the local organizations in the areas of extension services, demonstration plots and trainings of communities.

5. **Provide early maturing varieties and vines**: The major constraints for OFSP production in both Samburu and Turkana is the low and irregular rainfall during the growing season, resulting in high risk of crop failure. There is need for short-duration (early-maturing) varieties under rainfed potato growing.
6. **Support adoption of OFSP**: The uptake of OFSP is still very low in the project areas. In order to spur adoption of OFSP, there is need to allocate more resources on awareness creation, water provision and market opportunities for produced sweet potatoes. In addition, there is need to capacity build of the various farmer groups through field demonstrations, exchange forums and trainings.
7. **Train farmer groups on OFSP**: In as much as training on production of OFSP had been done in all the three sub counties where the project will be implemented, there is need of continuous involvement of the extension officers once the project commences to ensure maximum production. These should include production, value addition and marketing as well as agribusiness.

CHAPTER ONE: INTRODUCTION

1.1 Project Overview and background

ChildFund Kenya, with funding from BMZ-Germany, implements the Orange Fleshed Sweet Potatoes (OFSP) in Turkana and Samburu Counties. OFSP is a three-year project 2020- 2023 whose main objective is to enhance resilience and livelihoods of women and children of vulnerable farming households in Turkana and Samburu counties.

The project is implemented in two counties of Turkana and Samburu areas characterized by high temperatures and low rainfall. Being part of the Arid and Semi-Arid Lands (ASALs), they frequently experience long periods of drought. Poverty in these counties is very high (92% in Turkana life below poverty line- SMART Survey, 2019) and they depend on pastoralism and agro-pastoralism for their livelihood. Food insecurity is generally very high due to low productivity for farms and livestock, poor access to farm inputs; poor pasture management and low access to markets. Access to reliable water sources is another challenge that affects economic activities and the health and nutrition status of people living in Turkana and Samburu. (SMART Survey, 2019)

The project targets both direct and indirect beneficiaries. Under direct beneficiaries the project targets the key beneficiaries which are the children under 5 years mostly those who have Vitamin A deficiency which the project is determined to address. Women are key to the project because they provide parental love and care to the young ones therefore; they are the nutritional custodians of the children. Women are also the main producers and providers of food for their families. Other groups include but not limited to; the youths who will be targeted at group dynamics level, Provision of agricultural extension services, skills and positive attitudes towards the success of OFSP.

The youths and women will be targeted in Village Saving and Loaning groups and farmer organizations. Community health volunteers are also key in this categorization as they are the 'technical' people who will aid in attainment of outcome indicators.

1.2 Orange Fleshed Sweet Potatoes Production Context

Orange Fleshed Sweet Potato (OFSP) project provides 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 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.

1.3 Orange Fleshed Sweet Potatoes Project Expected Outcomes

The three-year OSFP project was developed to respond to the need's nutrition, livelihood and safe water with the aim of enhancing resilience and livelihoods of women and children of vulnerable farming households in Turkana and Samburu counties.
The expected outcomes included:

1. Sustainable adoption of appropriate OFSP production technologies by 600 farmers
2. OFSP products accepted as household diet in target communities
3. Improved economic opportunities for women and youth in OFSP value chain
4. Increased community and stakeholder awareness on nutrition and economic value of OFSP
5. Local partners trained in Good Governance, Project Management, Child Protection, Gender and Advocacy.

1.4 OFSP Project Partners

The Orange fleshed sweet potato (OFSP) project is being implemented by three community-based local independent not-for-profit organizations. These are: Frontiers Children Development Program, Samburu Children's Program and SAPCONE under the coordination of ChildFund. All three organisations focus on children and youth and promote disadvantaged, marginalised and vulnerable children (0-14 years) and youth (15-24 years) so that they can bring about positive changes later in their respective communities as responsible adults. The three organisations have many years of experience and the corresponding administrative and technical competence of successfully conducting such programmes.

The three local partners are responsible for the direct project implementation; networking with stakeholders at the county level; documentation, reporting, and sharing and dissemination of project's best practices and lessons learnt to other stakeholders. FCDP is responsible for the direct implementation of all project activities in Loima Sub County, SAPCONE in Turkana Central Sub County while SCP implements all activities in Samburu North Sub County. The three partners are responsible for managing the finances as well as administration and logistics, including procurement and staff management, project implementation in their respective target sub counties. The project is managed by a Project Manager based at Samburu Children's Programme.

ChildFund Kenya provides oversight and monitors the project's timely and planned implementation while also providing technical support in building the capacity of the partners in project management, organisational governance and other areas of identified gaps such as child rights and protection, Gender mainstreaming, and participatory approaches to project review. In addition, ChildFund provides project technical oversight that ensures high quality of project implementation; monitors and supervises the project,

reviews and documents of lessons learnt, undertake quality reporting and networking with stakeholders at the national level for advocacy.

1.4.1 ChildFund Kenya

ChildFund Kenya is an affiliate of ChildFund International which was registered in the country in 1960. Working in 26 out of the 47 counties in Kenya, it implements its program through 13 local partner NGOs. ChildFund Kenya has a complement of 55 employees with competencies in finance management, programme development and execution, grants acquisition and managing, sponsorship management, human resources and administration. ChildFund Kenya reaches more than 1.3 million people who include children, youth and caregivers

1.4.2 SAPCONE

SAPCONE is a local NGO which was started in 2006 and registered as NGO in 2014 to implement programs on governance and accountability, Peace building and conflict transformation, Children, displaced and vulnerable persons and sustainable community livelihoods. Food security and livelihood activities include increasing local capacities on environmental conservation and mitigation, disaster risk reduction, food security-agroecology and dryland irrigation. Other progammes implemented include public health, water and sanitation, promotion of Turkana culture, and support to local communities to access governments' devolved funds. SAPCONE's main target groups are vulnerable and marginalized farmers and pastoralists, youth (both kraal and village based), women, Orphans and Vulnerable Children, elders, Persons with Disabilities and the elderly in Turkana County.

1.4.3 Frontiers Children Development Program (FCDP)

The is a registered NGO working implementing child and youth focused program activities in food security and livelihoods, health, education, water and sanitation, emergency response and building resilience. Frontiers implements programs in the four sub counties: Turkana North, Turkana Central, Loima and Turkana South.

1.4.4 Samburu Children's Program (SCP)

SCP is a local NGO formed through the merger of five CBOs in 2017. SCP implements program interventions in areas focusing on child wellbeing including; Early childhood education, health, water sanitation and hygiene (WASH), adolescent reproductive health and youth and women economic strengthening and empowerment. The organisation actively participates in county level development activities through participation and collaboration with both Sub County and County steering committees. It also partners and collaborates with other local likeminded NGO's and CBO's working in the Samburu County

CHAPTER TWO: METHODOLOGY

2.1 Project context Area (North Samburu, Loima and Central Turkana Sub Counties)

The baseline was carried out in the three sub counties where the project is being implemented. The two counties of Turkana and Samburu where this project will be implemented are located in the northern part of Kenya. They are characterized by high temperatures and low rainfall. Being part of the Arid and Semi-Arid Lands (ASALs), they frequently experience long periods of drought.

2.2 Guiding framework

The baseline survey employed a participatory style of assessment and utilized a combination of suitable methodologies, as appropriate. The consultants engaged the client and the partners throughout the survey period. The survey was based on a comprehensive assessment protocol detailing the survey design as well as the sampling design and methods of data collection. Both qualitative and quantitative data collection approaches were used to investigate and analyze the key project indicators as laid out on the log frame.

2.3 Baseline Survey Process

2.3.1 Preparation of an Inception Report

The consultant prepared and presented an inception report which outlined the key proposed study methodology and proposed work plan. In addition, it detailed the consultant's understanding and interpretation of the TOR, review of document, sampling strategy and data collection instruments, tools and techniques, data collection process, data synthesis and analysis plan, and methodology implementation schedule. ChildFund reviewed the report and provided feedback. The consulting team incorporated the client comments, finalized and submitted the final inception report. In starting the field work, an introductory meeting was conducted with the client, in which the inception summary was shared and agreed, with minor adjustments on field schedule, sample size, and work plan to suit the ground situation.

2.3.2 Documents' review

The consultant conducted an extensive review of the documents related to the project made available by Child Fund and partners. This included comprehensive desk review of all documents relevant to the project, including the 2019 SMART survey report. Other government and peer reviewed data were also used.

2.3.3 Development of data collection tools

The consultants designed the survey tools, including the household survey tool (Questionnaire), Focus Group Guides (FGDs) and key informant interviews checklists, and guides. The tools were administered in all the project locations with purposefully selected sample of households, FGDs, key informants and relevant institutions.

2.3.4 Recruitment and training of research assistants

The team jointly selected appropriate research assistants from the host communities to serve as field enumerators. They thus lived and / or understood the local language, geographical and topography of the 3 project locations, Loima, Turkana Central and North Samburu. The enumerators had achieved at least a Form Four education, with an ongoing or completed college level of education. A total of 13 RAs were engaged, of whom 5 were from Samburu and 8 from Turkana)

2.3.5 Training and Pre-testing of tools

The team facilitated a two-day rigorous training of the research assistants RAs (including pre-test). The training covered general research, information about the project, tools (KII, FGD guides and questionnaires), as well as on how to electronically administer and transmit the completed questionnaire through the mobile based Kobo Collect. This was followed by a role play and pre-test to ensure that the team fully understood the whole concept and process of baseline. The piloting helped verify the reliability and validity of the tool, identify areas in the tools that the RAs required clarification, as well as gauge the level of understanding of the survey tools ahead of the actual data collection. In addition, it tested the efficiency of the whole process from tool opening, enumerator entry, the interview process (and translation wherever applicable), the finishing and online submission of the completed questionnaire. Each enumerator mandatorily had a functional mobile phone for use. The tools were thereafter refined and uploading done of the final tool on the Server in readiness for final data collection.

2.3.6 Collection of primary data

NAJJ Consultant used its robust data management strategy that ensured effective and efficient field data collection, processing, storage and retrieval of information. The baseline data collection process used triangulation as part of data quality. In that regard, we used methods, tools and approaches consisting of four interlinked but independent activities: 1) A HH survey, 2) Key informant interviews, and 3) Focus group discussions, 4) Field observation. The tools were used concurrently during the field work.

2.4 Baseline Survey sampling design

2.4.1 Survey design

In executing this survey, a mixed qualitative and quantitative descriptive survey design was adopted. This mixed method design and triangulation helped in the validation of data, bias reduction and enriching the findings.

This included both quantitative and qualitative methodologies to generate rich information to help fully explore each of the study objectives. The survey entailed conducting HH survey, Key Informant Interviews (KII) with project staff, the county government representatives and community leaders with knowledge of the project and FGDs with farmers in the community.

2.4.2 Sampling design

Since the primary beneficiaries for this project are women and children aged 0-23 months, the survey used household holds as the primary sampling unit (PSU) and Women (primary care giver) as the primary respondents for household data collection. Using IndiKit's Sample Size Calculator the minimum sample size was calculated at 375 households. To ensure safety of numbers, an additional 10% was added to make the sample size at least 400. A total sample of 419 households was reached. These were distributed by sub-county as summarised below.

Table 1: Sample sizes

Sub-County	Target population (Women)	Calculated Sample size (households)	Achieved Sample size (households	FGD	KII
Loima	840	105	98	2	4
Turkana Central	960	120	121	2	4
Samburu North	1200	150	200	2	12
Total	3000	375	419	6	20

Multistage random sampling method was used with the first stage involving selection of wards and clusters (villages) and second stage involved selection of households. 30% of clusters in the projects areas were randomly selected using probability proportional to population size (PPS). The second stage of sampling involved random selection of households per clusters from a complete and updated list of households as per the field guide.

2.5 Data Collection

The consultants used both qualitative and quantitative data collection methods to investigate and analyse the key project issues of the baseline study. Primary and secondary data were collected from the respondents in the three-project area. The survey was conducted in a consultative and participatory manner with the project team involved in the assignment in all stages of the survey. For this survey, the consultant used evidence-based evaluation methodology- interacted with various categories of target actors with the aim of generating relevant findings and make recommendations. The tools and methodology for conducting the Baseline Survey on Sustainable production and consumption of Orange Fleshed Sweet Potatoes Project in Turkana and Samburu Counties comprised standard questionnaires that can also be measured at the mid-line and end-line of the project since the questions constitute an integral part of the monitoring plan.

2.5.1 Quantitative data collection

Household / individual farmer data was electronically collected using the Kobo Collect mobile based technology. Questionnaires were administered to the HH respondents, largely caregivers. Data collection and entry took place at the time of interview using Kobo Collect platform on smart phones/tablets uploaded with the tool. The completed

questionnaires were checked and uploaded to the aggregate server at the end of each day. The data provided by the HH were downloaded daily from the servers for analysis on aspects of completion, reliability and efficiency of the data collection process. Feedback was given to the consulting team every day to help give tangible feedback to the RAs.

2.5.2 Qualitative data collection

a) KII- data collected using Key Informant Interviews

The team used key informant interviews (KII) as the main qualitative approach used for triangulation. The survey interviewed 20 key informants to gather more information to inform programing. The target key respondents were drawn from the community (Women and youth) representatives, as well as from the government (national and county) Ministry of Agriculture, Ministry of Education, Ministry of Health, Ministry of Interior, partners, religious leaders and ChildFund National and field staff.

b) ***Focus Group Discussions (FGDs)***

In addition, the team used Focus Group Discussion (FGDs) to gather information on the views of the community on the project. Two (2) FGDs were conducted in each area of study i.e., Samburu North, Turkana central and Loima, totalling to six (FGD). The total number of respondents were 52, with an average of 8 people for each FGD. These included women and youth groups who were interviewed while adhering to COVID-19 protocols.

c) Field Observation

The field observation was conducted through visits to the selected farms in the two project areas. Farms in Samburu's Lulu and Baragoi as well as Loima and Turkana central were visited and pictures taken. Check list of observation comprised the following: sanitation facility- availability, type and use; water source, home storage handling and use; crop / livestock condition; and housing and income discrepancies.

2.6 Data analysis

Quantitative data from the questionnaires were entered and analysed in an established SPSS database after cleaning and check-up of data for internal consistency. The qualitative data was subjected to content analysis which involved reading and re-reading of the notes to identify emerging themes, patterns and trends and placing the responses within the appropriate context. During analysis, the qualitative data was included to reinforce the quantitative findings and bring out the reason behind the numbers. In some instances, verbatim citations in their unadulterated form have been included in this report to give credence to the findings.

2.7 Ethical considerations

The survey was conducted fully guided by the ethical requirements based on international evaluation standards. Specific considerations were given to ethical issues of survey design, piloting of tools, data collection, reporting and storage. The enumerators were trained on ethical research, consent and coercion, non-judgemental data collection and ethical interviewing, as well as the specific use of the research tools, confidentiality

and secure data handling. Participants consented freely to be included in the study and they were made aware of the how they were identified and the objectives of the study. It is only upon consenting after the full briefing that they could participate.

2.8 Risks and challenges to the baseline study including COVID-19

The impact of the global spread of the COVID-19 has hit home in the region and Kenya not an exception. Although still lower in numbers than the epicentres in China, US and Europe, the continued testing is confirming a rise in number of infections with fear of the health systems being overwhelmed, with high morbidity and mortality rates. COVID-19 has resulted in travel restrictions, quarantine of those who have met confirmed victims, curfews and a partial lockdown. Government offices and businesses have either reduced working hours or are completely shut down. NAJJ consultants conducted a risk assessment of the impact of COVID-19 on the baseline study and worked with enumerators from the communities.

CHAPTER THREE: SURVEY FINDINGS

3.1 Overview

This section presents findings from the HH questionnaire, key informant interviews and the Focus Group Discussions. At total of four hundred and seventeen (417) farmers participated in this survey distributed in the three sub-counties: Loima 98 (23.5%), Turkana Central 121 (29.0 %) and Samburu North 198 (47.5%).

3.2 Demographic information

Table 2 presents the characteristics of primary participants (caregiver of under five children). Participants were evenly distributed across the age cohorts, amongst which more than 80% were married across the sub-counties; Loima 82(83.7%), Turkana 103(85.1%), Samburu 163(82. 7%). This is a very youthful and productive age who can still provide adequate labour in the farms. The marital status is attached to parenthood which gives them the impetus to work and provide for their families. Most of the participants have not attended school; Loma 77(78.6%), Turkana Central 96(79.3%), Samburu 145(73. 2%). However, the low levels of education may be a challenge in uptake of new ideas and understanding the aspects of nutrition and vitamin A. On employment, majority of the participants are unemployed, and farming would be one of the major sources of income for them; Loima 65(66.3%), Turkana Central 110 (90.9%), Samburu 178(89. 9%). The main source of income varied across the Sub-Counties. In Loima the main source of income is crop farming 52(53.3%) while in Turkana central the main source of income; crop farming 31(25.6%) and fruits/vegetables selling 35(28.9%) and in Samburu North the main source of income are vegetable/fruits vender 112 (56.6%) and livestock trade 67 (38. 8%). The other sources of income mentioned by the participants were charcoal burning, weaving, beads making and retail shops.

Table 2: Demographic information

Variable	Category	Loima (%)	Turkana Central (%)	Samburu North (%)
Age of Participants	20-24	3.1	2.5	6.6
	25-29	7.2	13.4	18.7
	30-34	8.2	29.4	26.3
	35-39	20.6	26.9	19.2
	40-44	15.5	14.3	12.6
	45-49	19.6	2.5	5.1
	50 & above	25.8	10.9	11.6
Marital status	Single	6.1	8.3	7.1
	Married	83.7	85.1	82.7
	Divorced	1	2.5	0.5
	Widowed	8.2	3.3	8.1
	Separated	1	0.8	1.5
	Not attended school	78.6	79.3	73.2

Level of education	Primary not completed	18.4	16.5	15.2
	Primary completed	1	2.5	1
	Secondary not completed	1	1.7	1.5
	Secondary completed	1	0	2.5
	Certificate/Diploma completed	0	0	5.6
	Bachelor's, Masters, PhD Completed	0	0	1
Employment Status	Unemployed	66.3	90.9	89.9
	Employed	33.7	9.1	4
	Self Employed	0	0	6.1
Main Source of income for participant	Crop farming	53.3	25.6	7.1
	Vegetable/fruit vender	20.4	28.9	56.6
	Livestock trader	12.2	3.3	38.8
	Others	12.4	4.2	33.3
Main Source of income for head of household	Crop farming	68.8	79.7	4.5
	Livestock farming	41.7	42.4	48
	Small scale business	5.2	5.1	6.1

3.2.1 Household Characteristics

Most household's heads are male across the sub-counties; Loima 60 (61.2%), Turkana Central 60(52.1%) and Samburu North 107(54%). However, women are more involved in farming activities as was established from FGDs in Turkana central and Loima Sub counties, as most men are still keen on livestock keeping in as much as there is an introduction of agro pastoralism. Since the project targeted the women who in turn feed the family, the involvement of women in production of OFSP is in line with the project plan and this is likely to make it a success.

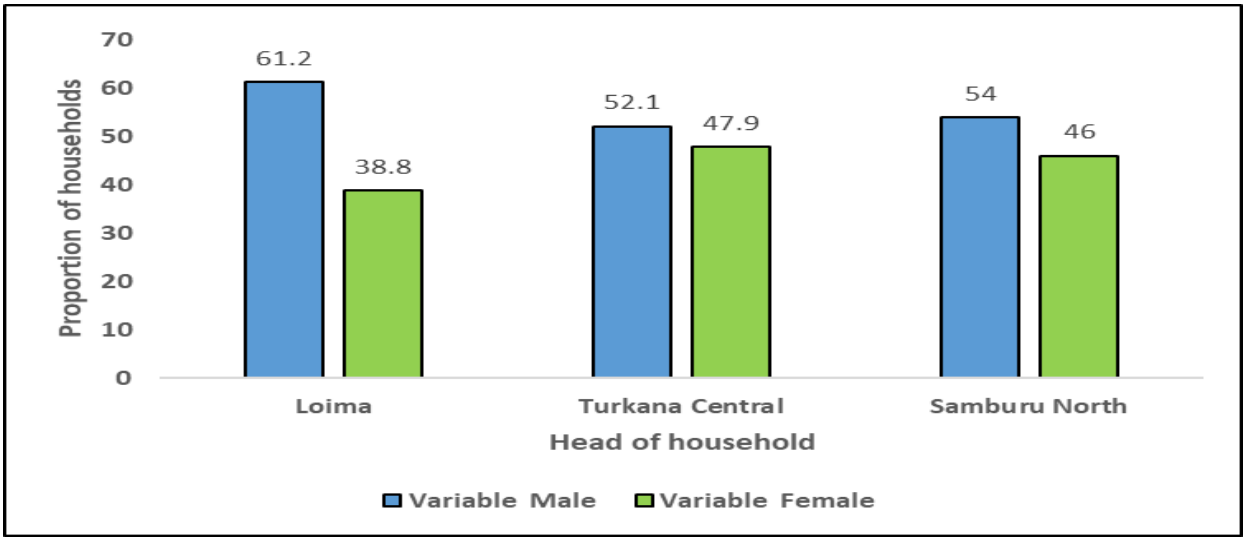


Figure 1: Household characteristics

3.2.2 Family composition

Table 3 provide a summary of family composition. The average family size is 6 per household for Loima and Samburu North and 5 people for Turkana Central with a minimum of one person per household across the sub-counties and a maximum of 11, 12 and 16 per household in Turkana Central, Loima and Samburu North respectively.

Table 3: Family Composition

Composition	Loima			Turkana Central			Samburu North		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Number of people	2	12	6.3	1	11	5.4	1	16	6.3
Children Aged 6-23 months	1	3	1.1	0	1	1.0	0	3	1.1
Children Aged 24-59 months	0	5	1.1	0	3	0.8	0	3	0.9

3.2.3 Source of income

The main source of household income in the last three months was sales from vegetables and other fresh produce, livestock and animal products and charcoal burning with significant variation across the sub-counties.

Table 4: Source of income

Source of income	Loima (%)	Turkana Central (%)	Samburu North
Participants -Caregiver			
Vegetables, Groundnut, tobacco, watermelon	88(91.7)	85(71.4)	(14)7.1
Livestock and animal products	26(27.1)	45(37.8)	78(39.6)
Casual labour	4(4.2)	2(1.7)	15(7.6)
Domestic labour	1(1)	4(3.4)	26(13.2)
Small scale business/kiosk	9(9.4)	21(17.6)	22(11.2)
Firewood and grass	5(5.2)	1(0.8)	18(9.1)
Charcoal burning	38(39.6)	31(26.1)	41(20.8)
Participants -spouse			
Vegetables, Groundnut, tobacco, watermelon	47(65.3)	74(71.8)	7(4.4)
Livestock and animal products	31(43.1)	43(41.7)	76(47.5)
Casual labour	3(4.2)	1(1.0)	11(6.9)
Domestic labour	2(2.8)	2(1.9)	25(15.6)
Small scale business/kiosk	4(5.6)	17(16.5)	17(10.6)
Charcoal burning	15(20.8)	28(27.20	23(14.4)

3.2.4 Remittance as source of income in the last three months

Table 5 show income from remittance from relatives, GoK and NGOs. The average amount received in the last three months is KES 3814, 3828 and 788 among participants in Loima, Turkana Central and Samburu North respectively.

Table 5: Remittance as a source of income

Remittance source /Amount	Loima (%)	Turkana Central (%)	Samburu North (%)
Relative or friends (Freq/ %)	12 (12.2)	13(10.7)	28(14.1)
GoK or NGO (Freq/ %)	20 (20.4)	12(9.9)	34(17.2)
Average Remittance -KES	3814	3828	788

3.3 Household food security and access

The survey established that most households are experiencing poor access to food across the three sub-counties. The result was based on 30 days' recall/4 weeks. Most household across the three sub-counties are experiencing Household Food Insecurity Access-related Conditions. From one of the KII, it was noted that Turkana County is prone to food insecurity due to the perennial droughts. This has been compounded by severe floods which sweeps all the crops when it rains. Most people rely on livestock which sometimes are wiped by the drought, thus leading to food scarcity. At the same time, it has been noted that most people rely one meal a day.[1] Further discussions revealed that the government has in that past put measures in place to ensure food security.

> *"…This region, Turkana County is very vulnerable to food insecurity. The feeding programmes in the ECDE are basically meant to sustain the children in school, without which none of them would come to school because of hunger. Many community members survive on one meal per day or sometimes they go without food. There are very many cases of malnutrition among children and adults"*
> *…Directorate of ECDE*

Key among them is the campaign for diversification of sources of livelihood because the climate change makes the lives of pastoralists unsustainable and capacity building initiatives to help the community members to learn how to diversify into agriculture and other businesses. In addition, there have been several initiatives to develop irrigation schemes in areas around rivers and lakes. Other initiatives included the Turkana Rehabilitation Project (TRP) which implemented blanket feeding then later on changed to food for work. There has been restocking after drought by Oxfam, National Disaster Management Authority (NDMA) and the Turkana County Government in order to help the pastoralists have a sustainable livelihood.

[1] http://www.fao.org/fileadmin/user_upload/eufao-fsi4dm/doc-training/hfias.pdf

Table 6: Household food security index

Household Food Insecurity Access-related Conditions	Households experiencing condition often-more than 10 times		
	Loima	Turkana North	Samburu central
Did you worry that your household would not have enough food?	8.2	5	21.2
Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	11.6	2.1	35.5
Did you or any household member have to eat a limited variety of foods due to a lack of resources?	9.2	5.1	25
Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	10.8	4.1	22.7
Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	5.2	3.2	20.3
Did you or any household member have to eat fewer meals in a day because there was not enough food?	1.1	4.9	19
Was there ever no food to eat of any kind in your house because of lack of resources to get food?	0	5.1	15
Did you or any household member go to sleep at night hungry because there was not enough food?	0	2	15.9
Did you or any household member go a whole day and night without eating anything because there was not enough food?	0	1.7	7.1

From the assessment participants most from Samburu North Sub-counties more often experience Household Food Insecurity Access-related Conditions as compared to Loima and Turkana Central. From the FGD in Naipa, Turkana Central, it was noted that the situation has improved and nowadays families can have three meals in a day as compared to yester years when most families survived on one meal a day. The situation has been improved by the uptake of farming activities which has somehow improved food security. The table above shows that the food security situation seems to have deteriorated within the one year between the SMART survey of 2019 and this baseline of 2021.

To improve the situation, the community members can engage in activities like fishing, keeping livestock and selling to buy other food stuffs and to prevent massive losses during drought. They can also get involves in activities like weaving and beadwork which they gave been doing in the past. Those who are along the lake are involved in fishing. External support that can help them is capacity building on natural resource

management, identification of the natural resources, protection of natural resources and sustainability. There is also need of capacity building on different options of livelihood, like bee keeping. These 2020 food insecurity results resonate well with the 2019 SMART Nutritional survey in which only 37.6% consumed at least 5 food groups, up from 35.5% in 2018.

3.4 Household Hunger score

Household hunger score was therefore calculated using the three questions. In the past 30 days, was there ever no food of any kind to eat in your house because of lack of resources to get food? In the past 30 days, did you or any household member go to sleep at night hungry because there was not enough food? In the past 30 days did you or any household member go a whole day and night without eating anything at all because there was not enough food?

Figure 2 show hunger score per sub-county. The survey established moderate hunger to be among all household in Loima 89(100%), Turkana central 88(93.6%) and Samburu 67(77%) Severe hunger was reported in 6(6.4%) and 20(23%) of households in Turkana central and Samburu respectively.

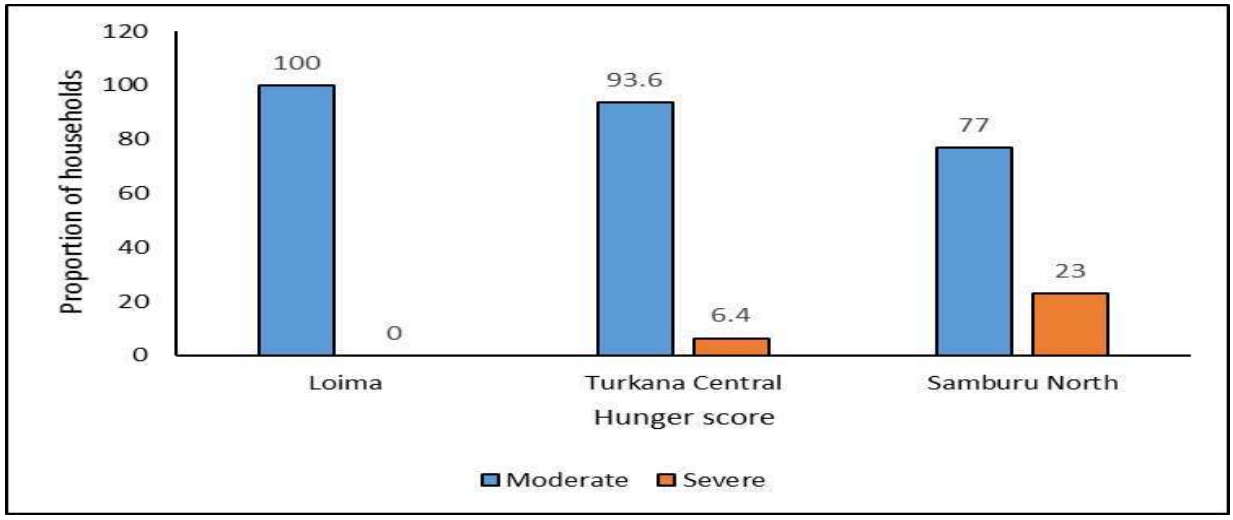


Figure 2: Household hunger score

3.5 Coping strategy Index

The table below presents the coping strategy index for the three sub counties. All the sub counties are experiencing high coping (CSI ≥10). In Loima, the CSI is the highest at 34.8, followed by Samburu North at 18.7 and lastly Turkana Central at 13.0. This shows that the communities in Loima is more food insecure at the time of survey as compared with Turkana Central and Samburu North. The coping strategy is only applicable where there is hunger, it means there is more hunger in Loima, and least in Turkana central to warrant the need for a coping strategy.

Table 7: Coping strategy Index

Sub-county		N	Range	Mini	Max	Mean		SD	Variance
		Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Loima	CSI	97	198	0	198	34.8	4.3	42.4	1797.1
Turkana Central	CSI	119	86	0	86	13.0	0.9	9.9	97.2
Samburu North	CSI	197	114	0	114	18.7	1.0	13.8	189.3

Max-Maximum, Min-Minimum SD-Standard Deviation

3.6 Dietary Diversity

The indicator of dietary diversity for children 0-23 months was defined as the percentage of children 0-23 month who received foods from ≥ 5 food groups the previous day or night[2]. The survey established that 14(66.7%) Loima and 14(73.7%) Turkana Central of children 0-23 achieved minimum dietary diversity (4-5) as compared to Samburu North where no child achieved minimum dietary diversity. In the 2019 SMART survey in Samburu, 37.6% of households consumed at least 5 food groups per day, in the last 24 hours. This had no sub-county aggregated data, making it difficult to say where North Samburu fell. Either way, the fact 2020 figures are gloomy in Samburu is the best reason the project should take root in the area.

3.7 Orange Flesh Sweet Potato Production / Farming

Figure 3 shows the proportion of farmers who planted orange flesh sweet potato in the year 2020 and harvested in 2021. More than half of the farmers in Samburu North reported to have grown and harvested sweet potatoes 117(59.1%) as compared to 3(1.7%) in Turkana Central and Loima where 2(3.1%) of farmers had not grown the crop, citing that only demonstrations farms had been put up. They further indicated that some of the demonstration farms were destroyed by drought and animals, so no harvest was realized. The Turkana county government agriculture department whose mandate is food production and utilization, storage, marketing, utilization] assisting the farmers to adopt the growing of OFSP, stating that this would help them in diversification of their sources of income. They are willing to offer Agriculture Extension services and this has been supported the government through purchase of motorbikes to improve

> *…. We are one of the implementing partners of this project and as per my knowledge, the project has not started. The only activity that had been done in areas like Naipa, Naotin, and Nang'olekuruk (Kerio), We had done capacity building and established the demonstration farms…Livelihood Officer, SAPCONE*

[2] https://www.indikit.net/indicator/27-food-security/21-coping-strategy-index-csi

mobility to meet the farmers. There is also capacity building on good farming practices to ensure that the farmers do not incur losses.

This project is also supported by the directorate of ECDE in Turkana who said that OFSP farms will be set in the ECDE centres across the counties. This will help in providing food for the children in the centres at the same time improving the uptake of vitamin A among the under-fives in the Centres.

> *"…. This value chain was not there before in the county, we have selected a number of women groups to implement this OFSP. The group farms are used as demonstrations while the family farms are used for household production…." Chief of Loima*

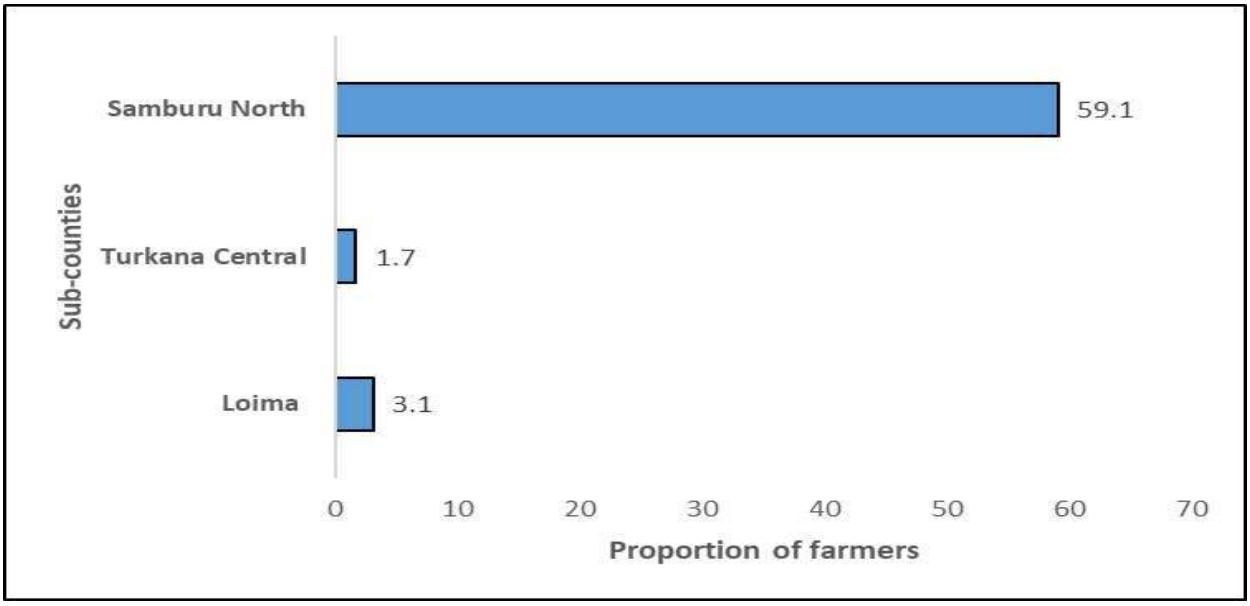


Figure 3: Orange flesh sweet potato farming

3.8 Size and management of sweet potato farms in Samburu North

The average acres of potato farming in Samburu North in the year 2020 was 0.82 acres with the range of 0 to 2 acres among those who plated in 2020 and harvested sweet potatoes in 2021.The survey reports insignificant potato farming on Turkana North and Samburu Central. Amongst the farmers, only 15(12.6%) were aware of the amount of sweet potatoes they produced from their farms while 22(18.5%) were not sure. Most farmers reported to have grown potatoes in one field 100(87.0%) while the rest (15(13%) had grown in two or more fields using their own/family source of labour (109(93.2%). The farmers practiced both flat ground 87(75%) and ridge29 (25%) farming method of potato planting. Smaller proportion, 10(8.6%) of farmers reported an increase in number of plots under sweet potatoes where 7(70%) and 2(20%) reported an increase of one plot

and four plots respectively. However, 24(20.5%) of farmers reported increased acres of land under sweet potato while 92(78.6%) reported to be farming under the same size of land in the last two years with the average change of 1.32 acres amongst farmers who increased their potato farm size in the last two years. The farmers reported increased demand, shorter period to mature and higher production as compared to other crops as the reasons for increased farm size under sweet potato. In terms of work done by the family members in the sweet potato farms.

> *"…. For crop produce, the women have a leeway in terms of decision making on production, sale and use of the money generated. The men hardly follow up on the sale of farm produce except for the sale of livestock…"*
> *Kitur, Agri Business Officer, Maralal*

3.9 Decision making on amount of potatoes to be grown

Figure 4 shows level of decision making on sweet potato growing at the household level. The decision was made by both husband and wife 63(54%) and therefore the both wife and husband should be involving in intervention promotion sweet potato farming. This was echoed by a group leader in Kang'alita in Loima Sub County who said that sensitization has been done to the farmers and are now have a participatory kind of approach in decision making in the family unlike in the old day where the husband was the final in decision making. This enhances ownership of the projects thus good yields.

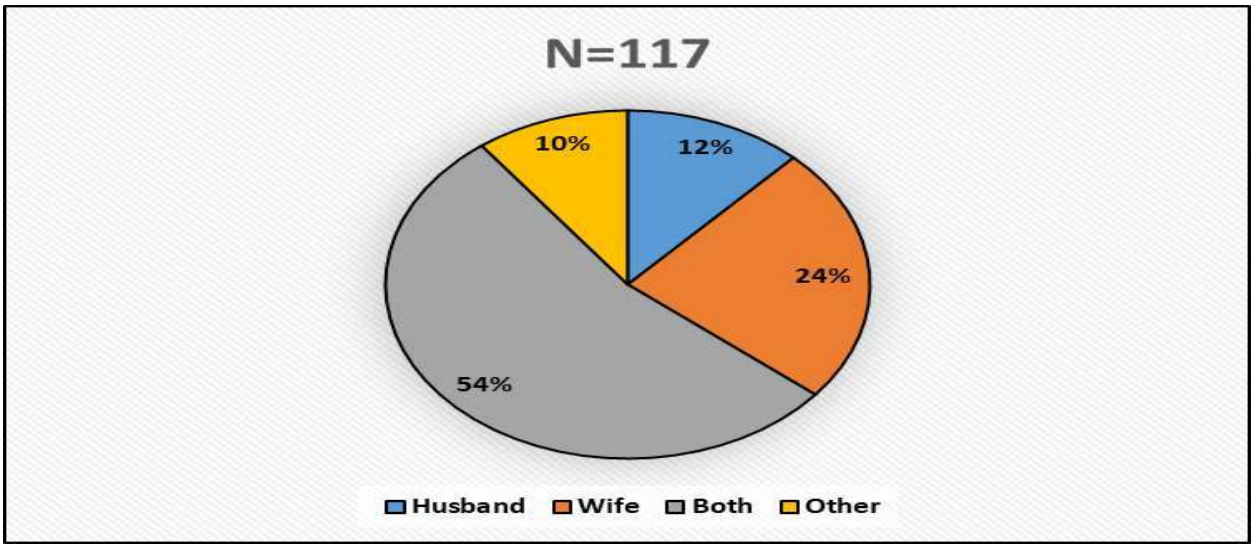


Figure 4: Decision making on amount of potatoes to be grown

3.10 Change in amount of work due to sweet potato farming

Almost half of the participants reported no change in workload as result of potato farming among caregivers 49(41.9%) and their husbands 56(47.9%).

Table 8: Change in the amount of work due to sweet potatoes farming

Change in workload	Participant (Caregiver)	Husband
No change	49(41.9)	56(47.9)
Increased	22(18.8)	19(16.2)
Decreased	5(4.3)	3(2.6)
Don't Know	41(35)	39(33.3)

3.11 Source of water for Agriculture

The sources of water for agriculture vary across the sub-counties. The sources water is river 69(70.4%), Piped water 17(17.3%) and borehole 7(7.1%) in Loima central, borehole 63(52.9%), piped water 36(30.3%), and lake 19(16%) in Turkana Central while Samburu North has diverse water supply as shown in table 8. The perennial water problem is targeted by the project through drilling of 2 boreholes in Naotin and Nang'olekuruk (Kerio) in Turkana Central and rehabilitation of a borehole in Naipa. In Loima, majority of them are supplied by River Turkwel which transverses Turkana county.

Table 9: Sources of water

Source water	Loima (%)	Turkana Central (%)	Samburu North (%)
Piped water	17(17.3)	36(30.3)	36(18.6)
Borehole	7(7.1)	63(52.9)	37(19.1)
Dam	1(1)	1(0.8)	29(14.9)
River	69(70.4)	19(16)	80(41.2)
Lake	0	0	1(0.5)
Others	4(4.1)	0	11(5.7)

3.12 Water Accessibility and reliability for agriculture

This was defined by the ability of farmers to collect or supply water within 30 minutes. As shown in figure 5 Most of the farmers in the three sub-counties have access to water for sweet potato farming. Water reliability for growing sweet potato was only measures for Samburu North where they have started growing sweet potatoes. Reliability of water supply was confirmed by 45(38.8) of the farmers who reported the source of water for agriculture to be moderately or very reliable.

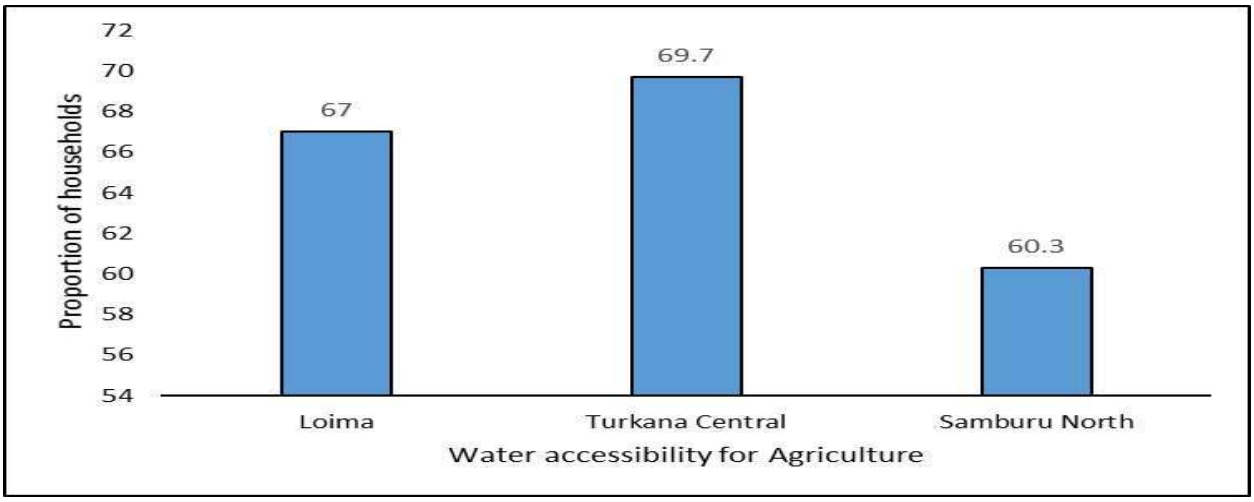


Figure 5: Water accessibility and reliability

3.13 Sale and marketing of sweet potato

3.13.1 Sale of Sweet potatoes

Only 39 participants responded to the question on sale of potato among Samburu North participants who currently growing sweet potatoes. 23(11.6%) reported to have sold a portion of their harvests at the beginning of 2020.The farmers reported to have sold their sweet potato within the home 9(31.0%), at the market 19(65.5%) and the town centre 1(3. 4%). In the last harvest farmers from Samburu North Sub-county sold an average of 7.5 Kgs of their potato produce in its raw form from the farm out of which they got an average income of Ksh1356. Majority of the participants 19(51.4%) made joint decision with the household on the amount of sweet potato to be sold and how the proceed is spent. These proceeds were mainly spent on food 34(54.8%) and school fee 22(35.5%) and farm inputs 4(6.5%) and 2(3.2%) on hospital bill and land preparation.

3.13.2 Market availability and access

All the days of the week have been slotted for market days in various area with the all the sub-counties with no preferred market day among the participants. Figure shows the number of market accessible to the participants. Majority of the participants in Loima 62(63.9%), Turkana Central 92(76%) and Samburu North 68(65.7%) have access to at least one market where they can sell their farm produce.

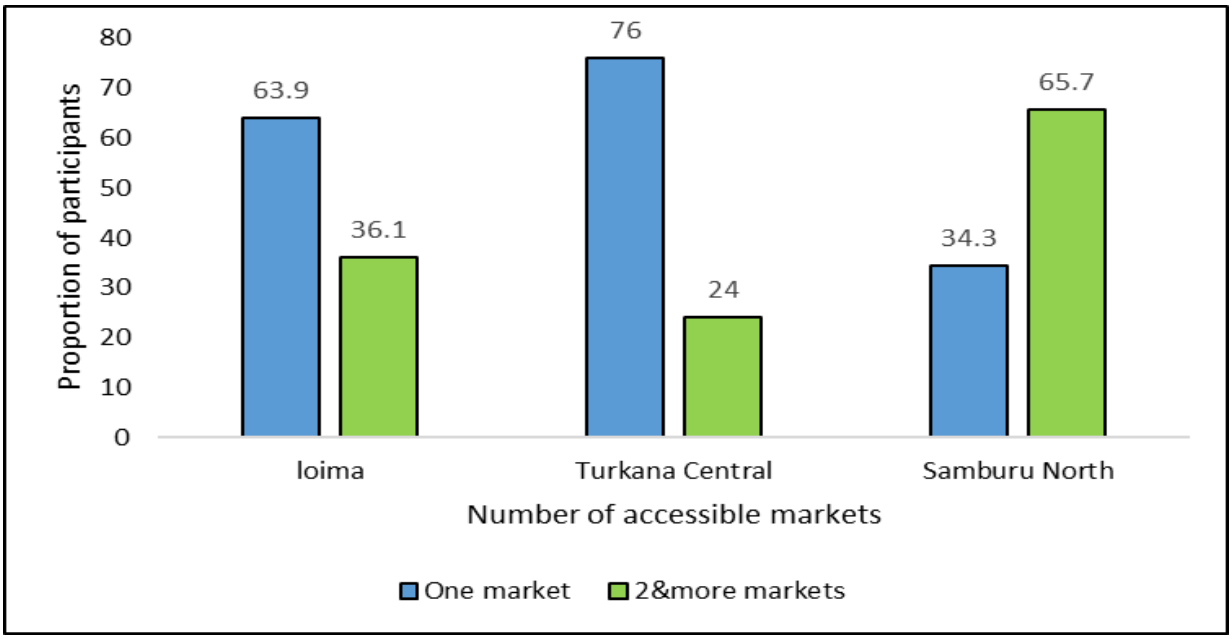


Figure 6: Market Availability

3.13.3 Mode of transport to the market

Table 9 show mode of transport used by participant to the market. Most people walk to the market in Loima 62(63.3%), Turkana Central 92(76%) and Samburu North 68(34.3%) with the average time taken to the market in Loima and Samburu North to be 35 and 34 minutes respectively.

Table 10: Mode of transport to the market

Mode of transport	Loima (%)	Turkana Central (%)	Samburu North (%)
Walking	62(63.3)	92(76)	68(34.3)
Motorbike	16(16.3)	21(17.4)	58(29.3)
Matatu/Public Service	17(17.3)	7(5.8)	42(21.2)
Private Vehicle	2(2)	1(0.8)	30(15.2)

3.14 Consumption of Orange flesh potato

3.14.1 Household consumption

Sweet potato is consumed by more households in Loima 67(68.4%), and Samburu North 146(73.7%) as compared to Turkana Central 43(36. 8%). In Samburu North Sub-county, most household 36(90%) consume half and more of potato harvest at home. The preference type of potato is varying across the sub-counties as shown in figure 7. Most households in Loima 89(90.8%) and Samburu North 117(59.1%) prefer orange flesh potato while in Turkana Central white flesh sweet potato is preferred by most households 60(49.6%). Most households in Loima 98 (78%) Turkana Central 116 (78.9%) and Samburu North-191 (93.6%) cook sweet potato by boiling. Roosting is done by 25(20%) and 25(17%) of households in Loima and Turkana central respectively. Participants reported no

traditional belief or norm related to consumption of sweet potato. This consumption is supposed to be scaled up by increase in production of the crop. Information from KII interviews revealed that scaling up of consumption will be done through introduction of OFSP farms in ECDE centres. The produce will be used for supplementing feeding programs in the schools, thus boosting consumption, resulting in improvement of Vitamin A among the children in the ECDE centres.

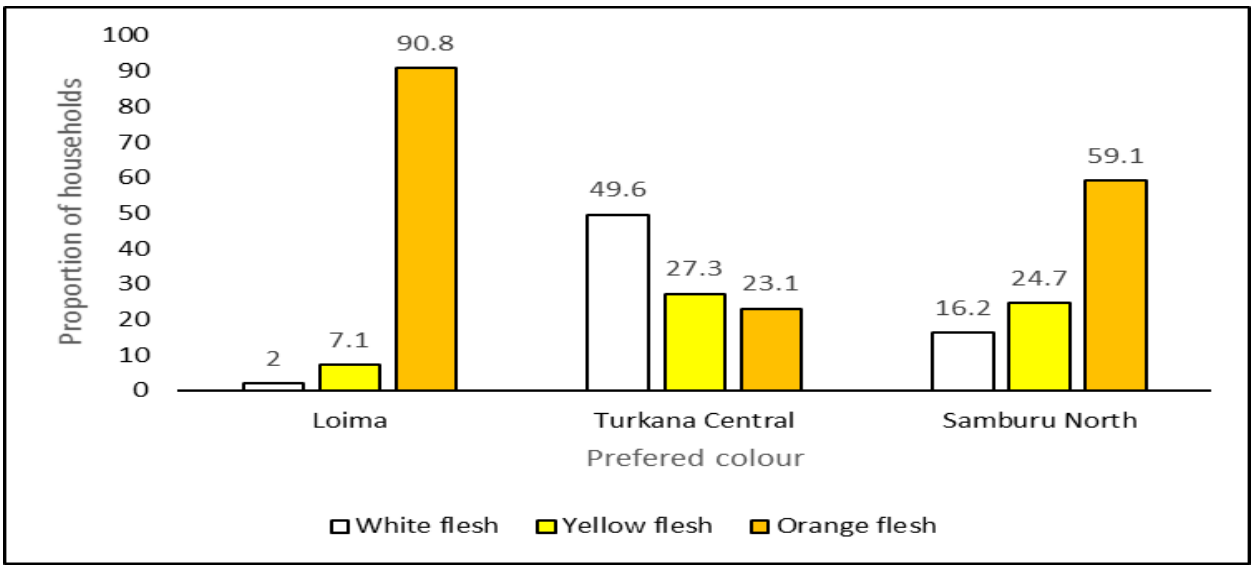


Figure 7: Consumption of orange fleshed sweet potatoes

3.14.2 Feeding practices of sweet potato for family and under five

Table 10 shows the weekly frequency of under-five feeding practice on sweet potato. Majority of households in Loima and Turkana North have to embrace feeding under five children with sweet potato. In Samburu North 55(27.8%), 26(13.1%) and 44(22.2%) of the household were reported to be feeding the under-five every day, once a week and twice a week respectively.

Table 11: Feeding practices of sweet potatoes for family and under fives

Frequency of feeding	Loima	Turkana Central	Samburu North
Everyday	2.0	2.5	27.8
Once a week	3.1	2.5	13.1
Twice a week	11.2	2.5	22.2
Once a month	16.3	12.4	5.6
I don't know	67.3	80.2	31.3

At family level, the average weekly consumption is 2 two days per week in Samburu north and less than a day in Turkana central and Loima.

3.14.3 Knowledge and practice on Orange flesh potato and Vitamin A

The survey measured the proportion of participants who have been trained in preparation and cooking of sweet potato. Only 2(2.0%) of the participants had been trained in Loima Sub-sub-County. However, KII by the field officer revealed that a complete training on OFSP had been done. This included production, consumption and benefits as well as marketing of the crop. A similar training had been conducted in Turkana central as indicated by 14 (11.8%) and Samburu North as indicated by 53 (26. 8%). These trainings were conducted between one to six months before the survey amongst which in Samburu sub county only 23 (11.6%) have tried to practice some of the lessons learnt about potato preparation at the household level due lack of sweet potato, a lot of household work and family taste preference.

In Turkana central, there is the plan to obtain the vines from KALRO in Kakamega. The ministry of Agriculture had also supported the production of the potatoes in Kakuma, Turkana West Sub County, where there are ready vines for planting.

On Vitamin A, the survey established that only 52 (53.1%), 34 (28.6%) and 95 (48.0%) of the participants from Loima, Turkana central and Samburu North respectively were aware of the benefits of orange flesh sweet potato. The survey further measures their knowledge on the benefits, Vitamin A deficiency, vulnerable groups and source of food for vitamin A. Sufficient knowledge of benefits of orange flesh potato was measured by participants mentioning at least any three of the benefits out of 6. Therefore, a score of 0-2 was categorised as insufficient knowledge and a score of 3-6 was categorised as sufficient knowledge.

Minority of the participant in Loima 13 (25.0%), Samburu Central 11 (11.6%) had sufficient knowledge of orange flesh sweet potato while all the participant from Turkana central had sufficient knowledge of orange flesh sweet potato. Knowledge of Deficiency of vitamin A was measured with by asking the participants to mention any disease related to Vitamin A but the positive response was very scanty indicating very low knowledge. On vulnerability, 39 (40.2%), 37 (31.1%) and 68 (34.3%) in Loima, Turkana Central and Samburu North were able to mention children as the vulnerable group to Vitamin A deficiency. Figure 8 proportion of participant who know at least one food source of Vitamin A. Majority of participant from Loima 79 (81.4%) recorded to have known at least one food source of vitamin A as compared to below half in Turkana central 54 (46.2%) and Samburu North (61 (31.0%).

It was also noted from FGD discussions that the farmers had been informed on the value addition that they can do to OFSP to increase the shelf life. These included slicing and drying as well as grinding the dried potatoes into flour. The flour is basically ideal for making porridge for children. To add on the machine for grinding the dried potatoes have been purchased, waiting installation.

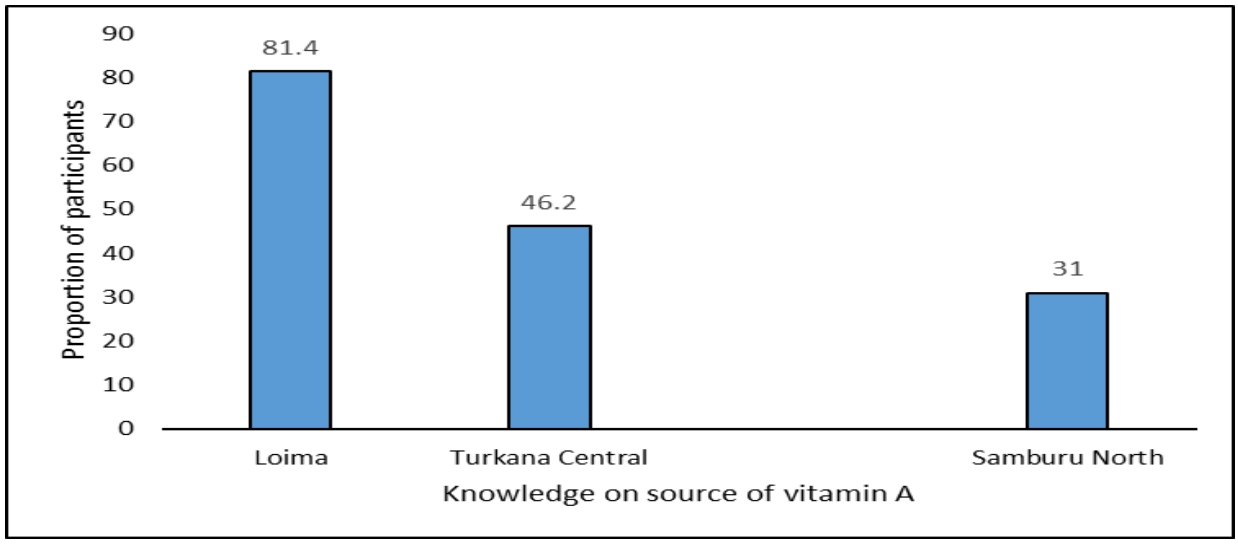


Figure 8: Knowledge and practice on Orange flesh potato and Vitamin A

3.14.4 Main source of information on Vitamin A

The main source of information about Vitamin A was through the NGOs as shown in table 11 Loima 47 (48.5%), Turkana central 36 (30.3%) and Samburu North 26 (13.1%). The information provided by the NGOs was mainly through AMREF, SAPCONE, Afya Timiza and ChildFund. It was also noted from KII that information from on vitamin A also provided by NGO offering feeding programs like WFP, Mary's Mill, a Scottish organization feeding children in the region as well as UNICEF.

Table 12: Main Source of information on vitamin A

Source of vitamin A information	Loima	Turkana Central	Samburu North
Health workers	26.8	5.9	9.6
Agricultural officers	6.2	25.2	7.6
Community members	1.0	5.9	8.6
NGOs	48.5	30.3	13.1
Do not know anything about Vitamin A	17.5	32.8	61.1

3.15 Orange flesh sweet potato seed and vine diffusion

The source of potato vines are NGOs, neighbour, famers groups and own farms. In Samburu North famers get their vine from farmer group 44(31.9%), neighbour and relatives 19 (13.8%) and trained vine multiplies 24 (17.4% with the preferred source of vine reported to be farmers group and neighbours where 111(94.8%) of the farmer got their vines for free. Some Samburu North farmers 25 (21.4%) plant potatoes in different time in every session due to spread production 23 (92.0%), due to lack of materials 1 (4%) and variation in maturity periods 1(4%). In Turkana central, there is the plan to obtain the vines from KALRO in Kakamega. The ministry of Agriculture had also supported the

production of the potatoes in Kakuma, Turkana West subcounty, where there are ready vines for planting.

Community knowledge on conservation of potato vines was only relevant for Samburu North where the farmers have started growing sweet potato. Less than half 48 (24.2%) of those farming sweet potato conserve the vines. The farmers do not harvest part of the plots 19 (39.6%) and keep vines in a small plot near the house 26 (54.2%) to conserve the vine for future planting seasons. Those who do not conserve vines buy 15 (18.8%), ask from relative and neighbours 41 (51.0%), and use leftovers in the fields 24 (30.0%).

3.16 Characteristics of sweet potato liked by farmers

This section is only relevant to Samburu North where farmers are currently growing sweet potatoes. Table 12 shows proportion of farmer who like the traits. Almost all participants like all the traits except the trait on sweet taste leaves.

Table 13: Characteristics of sweet potato liked by farmers

Characteristics of potatoes	Participants (%)
Early maturing (less than 4 months)	113(96.6)
Resist disease	111(94.9)
High yielding	106(90.6)
Easy to establish when there is little rain	114(98.3)
Once it is growing it's easy to keep if the rains stop in the middle of the season	112(95.7)
Easy to conserve vines during long dry period	108(92.3)
Vines spread out when they grow	116(99.1)
Gives lots of sweet potato roots and lots of vines at the same time	112(95.7)
Easy to store in the ground	108(92.3)
Cook easily	114(98.6)
Roots tastes sweet	118(80.8)
Leaves tastes sweet	98(67.1)
Very little sugar	136(93.2)

The trait of early maturing in less than 4 months is particularly appealing to farmers. In Naling'ang'or and Logetei villages of Baragoi, the trial crops planted in January in the ECD schools were closely monitored by the community. At exactly 3 months, they did a test harvest. Unfortunately, there was no harvest. This was a disappointment, and the community is keen to be assured that the variety is the right one lest to warrant their investment of time, resources and land for the OFSP project.

In Turkana central and Loima, the intended variety is Kabode. This has been tested in Kakuma, Turkana west, where it has been found to be ding well as was indicated by Ministry of Agriculture representative during a KII session.

3.17 Attitude of the community towards farming

The community attitude was assessed using a Likert scale of 1-5 defined as: Strongly disagree, Disagree, neutral, Agree and strongly agree. The results, as shown in figure 9 shows proportion of participant with positive attitude towards orange flesh sweet potato. Generally, most participant have positive attitude toward sweet potato; Loima 98 (100%), Turkana central 100 (84.0%), Samburu North 176 (89.0).

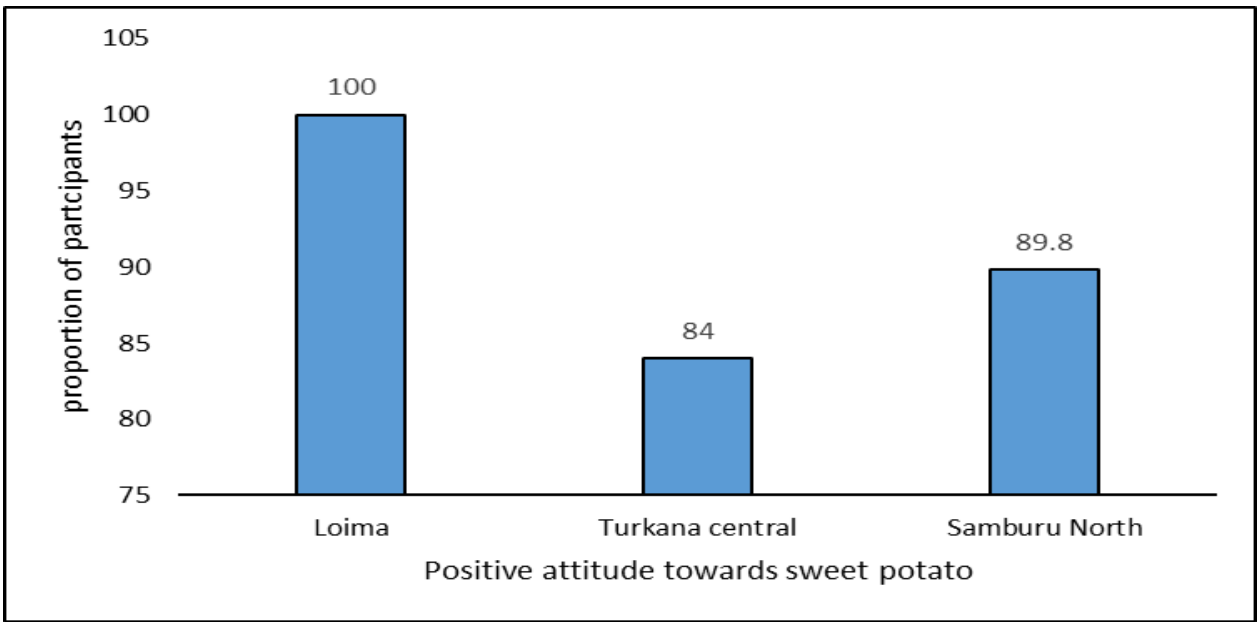


Figure 9: Community attitude towards farming of OFSP

The community is largely of livestock orientation, with patches doing crop farming. A few times there have been conflicts between the two due to cultural attachment to livestock, and the attitude that farming is an inferior and a women's job. The same feeling was identified in both Loima and Turkana central, however, there is change due to the capacity building they are receiving and more so, there is the uptake of diversification rather than relying on one means of income which livestock keeping.

The currently heavy rains are unreliable as it sometimes stops earlier than expected. As such long maturing crops such as maize never perform even though some farmers keep trying them. Instead, the community produces beans, green peas and cowpeas with the available rainfall. The challenge of unreliable rainfall is planned to be sorted by irrigation from a borehole. Even then, the community was hoping that they could have access to seeds to plant with the ongoing March-April 2021 rains so that when the borehole is ready, they shall be having a crop already and just continue irrigation….." (Wainganga Area Chief)

CHAPTER FOUR: OFSP PROJECT IMPLEMENTATION AND LESSONS LEARNT

4.1 The project introduction and progress

The OFSP project is in the initial phase of implementation with all the project areas ready for the implementation. Demonstration sites have been identified, community awareness on OSFP has been done in some areas and land preparation is on-going in most of the project sites. Women and farmer groups have been identified and trained on the production of orange fleshed sweet potatoes as was highlighted by a KII below.

> *…. the overall farming groups leader for OFSP, the program was to start in January 2021; people responded to this date by preparing their field in anticipation, only to be disappointed that its march already, and there is nothing on the ground even as it rains heavily. Fortunately, some technical processes have been going on behind the scenes, such as the hydrogeological survey for the farm where enough water was identified of good quality at an estimated 150-200m deep. Then in February, NEMA visited and gave the project a clean bill of health. When the project started, the community prepared some land which they were later to be told was small. As such they had to prepare extra land in February 2021; they are awaiting the fencing in the main shamba (the nursery one is already fenced); water source sourcing and development to avoid drought..."*

4.2 Project purpose, targeting and preparedness

From the KII and the FGDs, the project purpose of enhanced resilience and food security in the project sites is clear among the farmers. The nutritious and economic value of the project on the target group is clear among the group leaders, the county government officers and project implementers.

It was noted that the OFSP is the right crop for the areas identified. The key objectives of the project were to diversify household livelihoods, raise income, offer a source of vitamins (and therefore nutrition and health) to lactating mothers and children, and improve area food security. The potato was already known to many families, as it is often brought to the local market from Nyahururu. The idea was introduced to the community in November 2020, and a training done. A series of other community meetings took place (also confirmed by the area chief and the secretary, Nalingangor group) to sell the idea.

In both the regions the communities have wholeheartedly embraced the idea and has gone ahead to set aside land for the crop; commit to avoid pastoralists and farmers conflict; use the local ECDE schools as seed multiplication centres. The key challenges identified were seed and water. In Samburu North, seeds were to come from the county government which has farms with sweet potatoes. To manage the crop during drought, irrigation water is to be sourced from boreholes to be drilled and developed within the areas of operation. Already, a geologist and NEMA expert have technically assessed the

site and produced hydrogeological and NEMA EIA reports respectively. A worry is past record of failing and abandoned boreholes (sustainability). To circumvent this, the water source management is left in the hands of a water management committee (already in place) to ensure its sustainability. There was already a positive experience in Barsaloi where the seed sweet potato matured and was used by the children.

As at the time of the baseline, there was a good level of preparedness for the project, except the completion of the water infrastructure and vines / seeds were late.
There is also high preparedness in both Loima and Turkana Central. Some of the clogged water canals which were blocked has been cleared and water is flowing to the farms. Land preparation is in the process, and of course there are other farming activities going on. The Ministry of agriculture through the county government of Turkana is committed to support the project. Tractors have been purchased to help in ploughing of the lands, and the extension workers have been equipped with motorbikes to help them in accessing the farmers and providing extension services. There is also plan by the implementing partners working closely by the ministry of water to rehabilitate the boreholes which are broken down as well as drilling new ones to support the farmers. The clogged canal will be cleared and more canals be dug to ensure steady water supply.

In Baracoa, individual land was prepared and to date is ready for planting, while the community land is planned to be ploughed in March. To plough, the community members are to contribute KES 100 each, totaling 5000 from the 50 members. However, the seeds and water are not yet available. The borehole was ready though small, and they were informed the sponsor was planning to expand it. Water from the targeted Baragoi laga is of good irrigation quality, with no much salt or other undesirable ingredients or properties to cause irrigation quality concerns.

4.3 Planting material, project infrastructure and community expectations on the OFSP

As part of the project, water infrastructure, sweet potato vines and capacity building on the OFSP is to be provided to the various farmer groups, ECDE centres as a demonstration plot.

4.4 Community contributions to the OFSP project

The survey found out that in all the three sub counties the level of community acceptance and ownership of the project was found to be very high exhibited by the levels of community contribution. In some of the project sites the communities have made in kind contributions. The project sponsor, Child fund, donated a 10,000 litres tank while the Naling'an'gor ECDE community (Samburu North, had donated sand and ballast for the installation of the tank. (*See appendix V for photos*)

4.5 Anticipated direct Benefits of the project on the community

All the while, Baragoi community has never got a chance of having a borehole or piped water for that matter. The community has always relied on Baragoi River as the main water source for household and livestock. The OFSP project if successful shall be first to bring such a facility to the community. The plan to expand and develop the laga[3] as a water source and piping it to the ECDE and primary school, as well as to the community project farm for irrigation, shall go a long way helping the community see the first major fruit in the water sector. In addition, once the project successfully pipes the water to the ECDE and primary schools, the children shall no longer have the burden of carrying water to school every day, a burden they have shouldered all the years to avail water for cooking and drinking. The proposal is to have a water kiosk in the neighborhood of the two schools for community water access to avoid too much community traffic within the institutions.

In Naipa and Naotin, Turkana central, where there will be rehabilitation and drilling of boreholes respectively, the community will have access to clean water for drinking and other domestic use. This will also help the pastoralists to water their animals with ease. There will be establishment of small gardens next to the houses/ homesteads for the growing of vegetables since water will always be available to the community.
The community have also been taught on how to prepare and handle the ripe sweet potatoes. Other than selling fresh and boiling, they have been taught on value addition on the harvest. The project has budgeted for the machines which will be used to grind the dried sweet potato into flour as a form of value addition as well as increasing the shelf-life of the harvest.

4.6 The community views on project schedule and crop variety

The three project areas are generally vulnerable in many respects. Rainfall is unreliable and short when it comes. This gives a very small window to act, failure to which a whole cropping and / or livelihood year is lost. The community is aware of the short and unreliable rains in the area, and as a coping strategy, they have learnt to make quick informed decisions and take quick actions whenever necessary. This has been achieved by planting drought resistant crops like sorghum. The community source of livelihood is largely livestock, with spokes of tomato, onion and kale farms along the rivers. The wet seasons come from early march to late April / early may, and a second short one in late September / November.

[3] Valleys with water during rainy seasons only

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

From the baseline survey, it's clear that in all stations, Loima, Turkana Central and Samburu North OFSP trial farming had occurred, with farms getting ready for planting. In all stations, the project underwent the initial stages of awareness creation and sensitization.

Livelihood Indicators: Currently, production of OFSP in the project areas is low and it's for household consumption and there is insignificant yield in incomes so far. The livelihood indicators are poor across the sub counties as evidenced by the hunger score, dietary diversity and coping strategy index outcomes.

Adoption of OFSP: The baseline shows that the project is appropriate and properly targeted working with local organizations with community touch. The community has positively embraced the OFSP project and are ready to be part of it. Appropriate structures, including farmers groups have been formed and capacity built, and they have embraced the project. In addition, the stakeholders are available, ready and willing to give support. The ground is ready though some delays have been observed in terms of the laying of the water infrastructure. Twin key concerns of the key stakeholders are security (arising from unpredictable raids) and rainfall unreliability.

Improved economic opportunities for women and youth in OFSP value chain: From the survey, the value chain presents numerous economic opportunities as the product has ready market in the ECD centres being supported by the county governments. The improved access to markets in the project areas will improve their livelihoods.

Increased community and stakeholder awareness on nutrition and economic value of OFSP: From the survey, the level of awareness on the nutritional value of OFSP is still low and this requires deliberate campaign and working with the health workers in the sub counties**.**

5.2 Recommendations

1. **Prioritize awareness creation on OFSP**: Only 15(12.6%) of the HHs were aware of the number of sweet potatoes they produced from their farms while 22(or 18.5%) were not sure. This means that the majority in the community are not aware of the benefits of OFSP.
2. **Knowledge of Deficiency of vitamin A**: From survey, there level of knowledge of deficiency of Vitamin A is very low in the three project areas. Therefore, there is need for a multi-faceted approach to community advocacy and campaign working with the heath personnel and community health workers in the sub counties.
3. **The need to understand the community life and household characteristics**: In order for the project to achieve optimally, the project implementers need to understand the farmers' household characteristics, production circumstances with emphasis on understanding the farmers' decision-making process in adopting the

nutritionally improved OFSP in the project areas. There is need to make efforts to follow the schedule to fully be with the community, whose local experience indicates there are valid fears if the schedule is not followed

4. **Develop partnerships with local initiatives and the county government departments**: From the survey, there is a lot of willingness by various partners more so the county government departments to work with the local organizations in the areas of extension services, demonstration plots and trainings of communities.
5. **Provide early maturing varieties and vines**: The major constraints for OFSP production in both Samburu and Turkana is the low and irregular rainfall during the growing season, resulting in high risk of crop failure. There is need for short-duration (early-maturing) varieties under rain fed potato growing.
6. **Support adoption of OFSP**: The uptake of OFSP is still very low in the project areas. In order to spur adoption of OFSP, there is need to allocate more resources on awareness creation, water provision and market opportunities for produced sweet potatoes. In addition, there is need to capacity build of the various farmer groups through field demonstrations, exchange forums and trainings.
7. **Train farmer groups on OFSP**: Training on production and consumption of OFSP has been conducted on all the three sub counties where the project will be implemented. However, more training should be done in Loima and Turkana central where only 2(2.0%) and 14 (11.8%) of the respondents respectively indicated having been trained.

APPENDICES

Appendix 1: Survey tools


Orange Flesh Sweet Potato final H


KII Guide GOK, county, NGOs and p


FGD Guide.docx


KII Guide women Group Leadership.d


Observation Checklist.docx

Appendix II. Data Sets


Orange_Flesh_Sweet_Potato-Baseline_-


NOFSP_DTBS (3).sav

28-03-2021[5538].sav

Appendix III: List of Key Informants

No.	Name	Position	Organization
1.	Joy Otieno	Livelihood coordinator	SAPCONE
2.	Losike McDonald	Field Officer	SAPCONE
3.	Samwel Eregai	Director of ECDE	Turkana Central Subcounty
4.	Paul Njuguna	Assistant Director of Agriculture,	Turkana central Subcounty
5.	Patrick Lokwayen	Field Officer	FRONTIERS
6.	Simon Eyanae	Group Leader	Naotin farmers group
7.	Mike Ekaran	Group Leader	Nang'olekuruk farmers Group
8.	Ekidar Yoana	Group Leader	Kang'alita Irrigation Scheme
9.	Salena Lenaimalda	County feeding program coordinator	Samburu County
10.	Jemen Lentoijoni	Director- education and vocational training (ECDE section)	Samburu county
11.	Josphat Ebukut	Project coordinator	SCP
12.	Fred Lelemoyog	Project officer	SCP
13.	Benard Kitur	County Agribusiness officer	Samburu County
14.	Paul Lengusuranga	PSO- Elbarta Child and Family Programme	SCP
15.	Sammy Lothuro	Area Chief	Lotegei
16.	Lawrence Lorunyei	Teacher in charge	Nalingangor ECDE school
17.	Jackson Lotome	chairman	Ebur Farmers Self Help Group - Logetei
18.	Cathrine Loruman	Secretary	Nalingangor sweet potato farmers group
19.	William Lochuch	Chairman	Naling'ang'or OFSP Self Help Group
20.	George Lokurono	Area Chief	Nalingangor

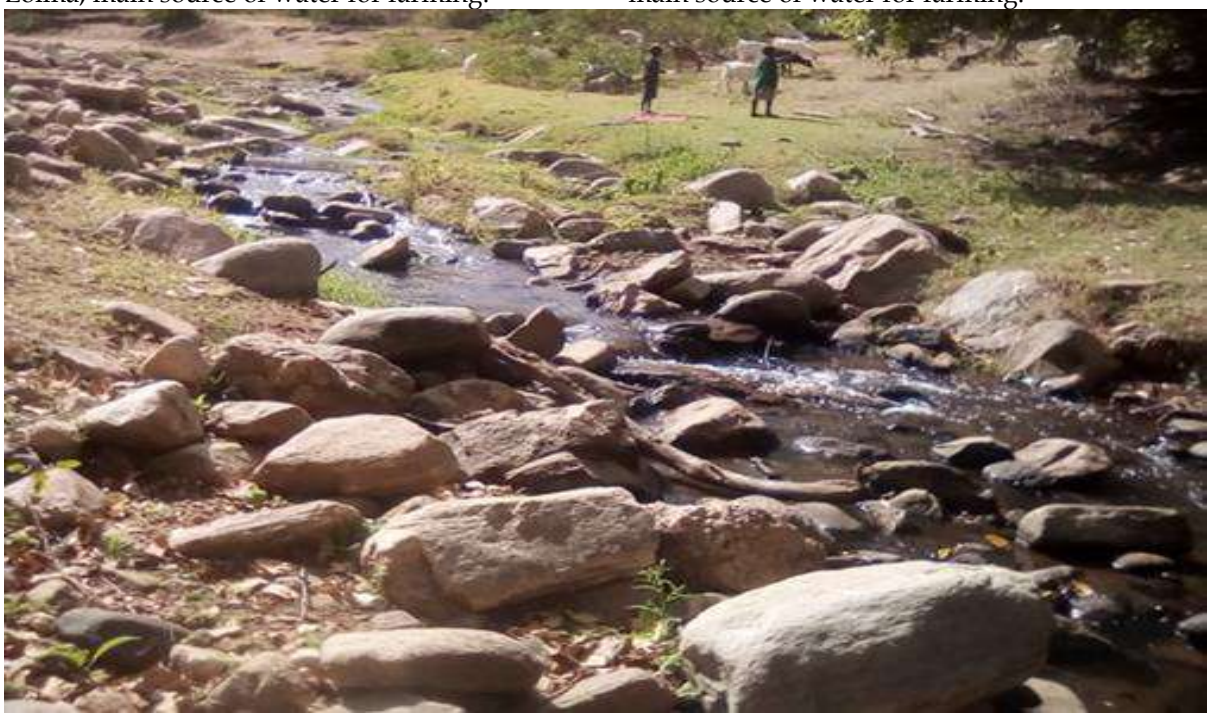
Appendix IV: List of FGD

1. Naotin farmers group
2. Nang'olekuruk farming group
3. Kang'alita farmers group
4. Turkwel famers group
5. Logetei sweet potato farmers group
6. Nalingangor sweet potato farmers group

Appendix V: Project Photos

Above: Section of river Turkwel in Nadapal, Loima, main source of water for farming.

Below: Section of River Lulu in Samburu North, main source of water for farming.



Above: The Lulu community farm for the OFSP being cultivated

Below: Land preparation in Naipa, Turkana Central

Above: Ready farm for plantinng in Naling'ang'or ECDE centre

Below: Cultivated farm with water canal cleared in Nadapal

Above: A sweet potato seed / trial plot in Nalingangor ECD

Below: Other crops in the farm in Kang'alita

Above: Ballast donated by the communiy fro construction of tank base in Naling'ang'or ECDE Centre

Below: 10,000 litre water tank donated by ChildFund already on the Naling'ang'or ECDE ground awaiting installation for the OFSP project

Below: Sand donated by the Community donation for construction of tank base in Naling'angor ECDE Centre

FGD session in Naotin, Turkana central

FGD session in Kang'alita, Loima

Consultants and the staff at SCP