

Constraints of Urban and Peri-urban Agriculture in achieving Sustainable household Dietary Diversification

Case of settled pastoralists in Turkana Central Sub-County, Turkana County, Kenya.

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Lists of Acronym

<u>Abbreviation</u>	<u>MEANING</u>
FAO	FOOD AND AGRICULTURE ORGANISATION
UNICEF	UNITED NATION CHILDREN FUND
WFP	WORLD FOOD PROGRAM
IFPRI	INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
CIDP	COUNTY INTEGRATED DEVELOPMENT PLAN
ASAL	ARID AND SEMI-ARID LANDS
SSA	SUB SAHARAN AFRICA
CFSVA	FOOD SECURITY AND VULNERABILITY ASSESSMENT
KDHS	KENYA DEMOGRAPHIC AND HEALTH SURVEY
SMART	STANDARDISED MONITORING AND ASSESSMENT OF RELIEF AND TRANSITIONS
WHO	WORLD HEALTH ORGANISATION
HDDS	HOUSEHOLD DIETARY DIVERSITY SCORE
FGD	FOCUS GROUP DISCUSSION
MS	MICROSOFT
UPA	URBAN AND PERI-URBAN AGRICULTURE
MOAPEF	MINISTRY OF AGRICULTURE PASTORAL ECONOMY AND FISHERIES
KII	KEY INFORMANT INTERVIEW
SSI	SEMI STRUCTURE INTERVIEW
SSIR	SEMI-STRUCTURE INTERVIEW RESPONDENT

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ABSTRACT

Low household dietary diversity is a persistent problem experienced by settled pastoralists households living in Turkana (CFSVA,2016) which is highly contributed by the persistent rate of food insecurity. A problem arises from households' inability to access diverse food and nutritious diets due to insufficient food baskets (KDHS 2014) , resulting from poor physical and economic access to diverse food to meet the nutrition needs of the poor and food-insecure households. The UPA practices in urban and peri-urban centres have played a significant role in improving household food security. The practice focused on improved access to fruit and vegetable for the poor and food-insecure households. However, UPA has hardly contributed to sustainable household dietary diversity. The research aims to map out factors that impacts settled pastoralists involved in urban and peri-urban agriculture practice in sustaining household dietary diversification in Turkana County. The factor that the research sought to explore. The research design incorporated a combination of primary data collection methods of Household Dietary Diversity score from 29 respondents of the 30 involved in Semi-Structure Interview, 16 Focus Group Discussion, 4 Key Informant Interview, and Observation of household food and status of UPA sites. The finding showed HDD of households practicing UPA is averagely high compared to households inactive in the Practice. The households access food through different sources such as safety net programs, purchase from income earned from formal and informal employment, selling livestock, UPA products or Cash transfer. UPA has contributed to the supplementation of household food baskets, income purchases other nutritious food. A household's physical or economic access from UPA practice supplementing the food basket allows the households to choose diverse food commodities that meet household members' nutrition needs. UPA is hindered or enhanced by factors related to natural factors such as Prolonged drought ,Insufficient water combined and salinity, Migratory pest and diseases. The socio-economic factors such as Limited access to Inputs, Limited Agronomic knowledge on crop production, Expensive Climate SMART Technology, Low Return of Investments, Integration between Livestock keeping and Crop production in UPA and Perception towards certain food crops that impacts on sustaining of dietary diversification among settled pastoralist in Turkana. The research recommends that the Ministry of health should scale up Nutrition awareness on the nutrition value of UPA products, The Ministry of Agriculture, Pastoral Economy and Fisheries need to provide, capacity build climate adaptation technology and agronomic knowledge on crop production spearhead insurance of UPA practice and incorporation into the Agriculture Policy, Incorporate gender mainstreaming on UPA and through partnership provide high-quality seeds and collective support UPA vulnerable household with inputs.

Keywords: FOOD SECURITY, FOOD ACCESSIBILITY, DIETARY DIVERSIFICATION,

URBAN AND PERI-URBAN AGRICULTURE

OTHER KEY TERMINOLOGY: SETTLED PASTORALISTS, HOUSEHOLD AND FOOD BASKETS

1 . GENERAL INTRODUCTION

This chapter describes the background, the research context and the problem to be studied.

1.1 Background and Context

This study focuses on constraints that settled pastoralist households practicing urban and peri-urban agriculture (UPA) in Turkana County face in achieving dietary diversification. There is limited knowledge on what factors impact urban and peri-urban agricultural practices towards physical and economic access of food in achieving household dietary diversification is the driver of the aforementioned research. Therefore, the current research maps out factors that enhance or hinder the settled pastoralist households from fully exploiting the benefits of Urban and Peri-Urban Agriculture practices in achieving and sustaining dietary diversification.

1.2 Research Context

According to the WFP Kenya Comprehensive Food Security and Vulnerability Analysis (CFSVA) (2016) Turkana is considered one of the most food-insecure regions of Kenya's arid and semi-arid lands. Turkana is a remote area, and most of the inhabitants are pastoralists. The geographical region is characterised by poor infrastructure, low access to essential services, and chronic poverty (KDHS 2018 & SID 2013). The combination of a harsh climate and terrain stimulates a whole or a few pastoralists to continuously move with the animals in constant search for water and pasture, a trend associated with the nomadic lifestyle.

Pastoralism as a mode of livelihood in Turkana comes with a share of challenges ranging from frequent human-driven to natural disasters, including drought, food insecurity, and conflicts from neighbouring Uganda, Ethiopia, South Sudan, and the Pokot's (Mbugue D. et al. 2012). The recurrent cycles of the said challenges have weakened the possibility of relying on livestock keeping as the main livelihood activity, driving some to seek other alternative ways to survive. Thereby forcing some pastoralists to migrate to the urban areas, settling near peri-urban centres or on roads near urban areas (Carr, C.J., 2017). The shift in the mode lifestyle perceived as progressive towards accessing primary basic amenities such as education and health FOLT(2018-2020) . However, despite the progressive interpretation, settling within the urban and peri-urban areas made the food insecurity issues more visible in relation to others affecting the vulnerable poor and food-insecure households. The situation resulting from high-rate low household dietary diversity, becoming an area of concern to the Turkana county government (SMART Nutrition Survey 2019). Therefore, forcing the Turkana county government to take action to avoid extreme impacts due to extreme cases of low dietary diversity.

The Turkana county government initiated a multisectoral platform that will promote partnership and collaboration of key food security sectors, namely the Ministry of Health and the Ministry of Agriculture and partners operating within Turkana County led by WFP, FAO Save the children and non-governmental organisation (SMART Nutrition Survey 2019). The crucial goal of the partnership and collaboration was to alleviate the high rate of food insecurity in Turkana within the urban and peri-urban areas.

The central area of intervention to be looked at was to improve food accessibility for the poor and food-insecure households among the settled pastoralists, a move that identified improving agricultural productivity as a priority (CIDP 2014-2017). The purpose of the identified area of intervention aimed at supporting the

vulnerable group to engage in own food production and reduce dependency on food assistance (Dadu, S.K., 2019) to support household food basket.

In the last four years, the Turkana county government and food security partners introduced urban and peri-urban agriculture (UPA) within the urban and peri-urban areas to improve the food security situation. The UPA practices in urban and peri-urban centres have played a significant role in improving household food security (Khumalo, N.Z. and Sibanda, M., 2019). The practice focused on promoting home gardening and community gardening for the poor and food-insecure households. However, the choice of each relied on the available resources such as water availability and land.

Achieving SDG 2: Zero Hunger was the driving force behind UPA promotion. The intervention employed three Agri-nutrition pathways of improving agricultural production, income generation, and women empowerment (Kenya Agri-nutrition Manual 2013). The pathways described as a blueprint support household access to diverse foods (Chihambakwe, M. et al., 2019), playing a significant role in addressing household consumption needs and supplementing household income or reducing food expenditure (Gallaher, C.M 2013). However, UPA has hardly contributed to sustainable household dietary diversity (Pedzisai, E. et al. 2014) in Turkana. Therefore, it has raised a question on its viability since it is unknown what hinder the benefits associated with UPA from contributing to food security and how it addresses household dietary diversity.

The Ministry of Agriculture, Pastoral Economy, and Fisheries' mandate is to enhance food and nutrition security in Turkana county through spearheading Agri-nutrition interventions. However, UPA aimed at supporting settled pastoralists in improving dietary diversity has had minimal influence on food production increase, income generation and food security (Turkana CIDP (2014-2017,2018-2022, SMART Nutrition Survey 2016,2018,2019). Therefore, MOAPEF wants to what factors that enhance and inhibit the poor and food-insecure households in fully exploiting the benefits of UPA within urban and peri-urban settings to sustain household dietary diversity in the next 5 (Five)years.

1.3 PROBLEM STATEMENT

Low household dietary diversity is a persistent problem experienced by settled pastoralists households living in Turkana (CFSVA,2016) highly contributed by the persistent rate of food insecurity. A problem that arises from households' inability to access diverse nutritious diet due to insufficient food baskets (KDHS 2014) , resulting from poor physical and economic access to diverse food to meet nutritious needs among the poor and food insecure households. Therefore, the continuous trend playing a role in reported cases of malnutrition (SMART Nutrition Survey 2019) despite the benefits associated with Urban and Peri-urban Agriculture in sustaining household dietary diversity in urban and peri-urban areas of Turkana.

The Ministry of Agriculture pastoral economy and Fisheries whose mandate involves improving food and Nutrition Security in Turkana, plans to upscale urban and peri-urban agriculture sustainably improve the dietary diversity of the poor and food insecure among the settled pastoralists. Although, the ministry lack knowledge on what factors hinder the Households already practicing Urban and Peri-Urban agriculture from sustaining their dietary diversity. The problem that drove this research.

The knowledge gained in mapping out factors that impacts urban and peri-urban agriculture practiced within Turkana will be useful in providing input for the Turkana County Integrated Development Plan 2023-2027,

supporting the Agricultural sector in coming up with Agri-nutrition implementation strategic plans. Additionally, supporting the integration of plans among Agri-nutrition partners and stakeholders involved in food and nutrition security.

RESEARCH OBJECTIVE

The research aims to map out factors that impacts settled pastoralists involved in urban and peri-urban agriculture practice in sustaining household dietary diversification in Turkana County. The focus was to understand the current dietary diversity based on the mode of food accessibility based on the household food basket and unravel challenges and opportunities surrounding the contribution of UPA towards food accessibility in sustaining dietary diversification.

RESEARCH QUESTION

What factors impact settled pastoralists practicing urban and peri-urban agriculture in sustaining household dietary diversification in Turkana?

Sub-questions

1. What is the current household dietary diversification among Turkana people living in urban and peri-urban settlements?
2. How do settle pastoralists households living in urban and peri-urban areas physically and Economic access food to meet the dietary needs?
3. How has urban and peri-urban agriculture contributed to the shift in household food baskets on dietary diversity within the practicing households?
4. What are the opportunities and challenges that pastoralists involved in urban and peri-urban agriculture practice undergo in the process of improving food accessibility within their households?

2.0 LITERATURE REVIEW

Introduction

The research used key concepts that are important in the operationalisation of indicators while identifying the constraints and mapping out challenges of UPA in achieving dietary diversification to dig deep into the area of study; it is, therefore, significant to understand some key concepts. The research's concepts include food security, food accessibility, dietary diversification, and Urban and Peri-urban agriculture. Additionally, Other terminologies used in the research include settled pastoralists, household and food baskets, which are also crucial, as discussed in this chapter.

2.1 Definition of Terminologies

Food Security

Food security exists when all people have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO 1996). In this thesis, food

availability is paramount to access. In the case of Turkana, the main inhabitants are pastoralist described to practice a pastoral community lifestyle and mode of life.

Pastoralist communities, A pastoralist community is described as a group or a population that keep livestock as a form of livelihood and practice a nomadic form of lifestyle involves movement from one location to the other in search of pasture and water (Nicolas S., Rainer L. 2020).” Pastoralism as the principle livelihood for the Turkana people has existed for over 9000 years’ Ekitela J.M (2010) page 3

As used in this paper, **Settled Pastoralists** refer to the Turkana pastoralists living a sedentary lifestyle within a populated area either in near urban areas or centres within which the nomadic lifestyle is not taken as a priority. The form of sedentary lifestyle practiced either by the entire household being fully settled, or partially in that a portion of the household still practice nomadic lifestyle. A Household being the unit of analysis, it is important also to understand what a household characteristic is.

Household is defined as a small group of persons who share the same living accommodation pool and some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. [FAO 2021]. The household is a social group that resides in the same place, shares the same meals, and makes joint or coordinated decisions over resource allocations and income pooling (Ellis, 2000). In Turkana, a household includes all individuals feeding on one pot daily. It may include nuclear family (Wife and/or Husband and Children) or extended family members (Other relatives), a factor that determines the household size, which varies considerably according to wealth.

Food accessibility is ensured when all households and all individuals within households have sufficient resources to obtain appropriate foods (through production, purchase or donation) for a nutritious diet Gross R. (2000) . Food accessibility, according to Gross R. (2000) determined through three dimensions; affordability (the ability of a household to purchase food), allocation and preference (acceptability of food in place). In the research the use of Food accessibility focuses on the physical and Economic Access on how the poor and food-insecure households supplement their household food needs.

Dietary diversification is derived from the word diversity which means variety; dietary diversity is therefore described as *‘The number of unique foods consumed over a given period of time, provides information on household food security’* (Hoddinott, J. and Yohannes, Y., 2002.pg 2) or habitual decision individuals or groups of people regarding what foods they eat (Preedy V.R., Watson R.R.2010). The latter also describes that proper dietary choices require the consumption of vitamins, minerals, carbohydrates, proteins, and fats that play a significant role in human health, which is attained by consumption of a variety of food types or, as the literature describes food groups (UNICEF 2018)

2.2 Conceptualisation of Concepts and Operationalisation

Dietary diversity among settled Pastoralists living in urban and Peri-urban areas of Turkana

Understanding the dietary diversity practice among the settled pastoralist is important in unravelling the changes and shift undergone and influencing factors. Across the globe, geographical, socio-economic, and cultural factors (Lima,J.P., et al. 2021) largely determine the dietary diversification of any given group. A habit that cuts across from the national, household, and individual levels. A more recent review of eight studies done by Carletto et al. (2015) examined the relationship between agricultural production (crops and livestock) and dietary diversity within any given household. Linking the form of livelihood as a determinant to dietary diversity among any given group of households is key (FAO 2015), for example in the case of those involved directly with

agricultural production, the dietary diversity changes all around the year, driven by the seasonality (Lillian A. O, 2018).

A study on Maasai pastoralists living in Southwest Kenya showed that dietary diversity changes both during the onset of the rain season and dry season (Lora I, 2014). The addition of milk to their daily diet is high during the rainy season compared to the dry season. In other pastoralist regions such as the Karamoja in Uganda, a community with the same bordering region as Turkana, milk consumption differs over time (Isa. F, Chery. S, 2009). During the dry season, such additional food types are consumed in different forms but to serve the same purpose. In both Turkana and Karamoja, particular priorities during the lean season are given to children below the age of 5 years (Lilian A.O 2018).

The other important factor to note is that dietary diversity as an intended outcome is determined by the portfolio of activities that a group or a household within a community is actively involved in. Daniel O., (2017) study of Turkana pastoralists identified the various livelihood practices and coping strategies the household participates in to support access to a diverse diet. Another noticeable is the social description of pastoralists who consume crop products such as vegetables is feeding on animal feeds (Peter M. C et al., 2015). Therefore low dietary diversity is caused by various factors but is primarily influenced by the household or family income (WFP 2020). The status of COVID 19 pandemic have not made it easier for the poor and food insecure households either.

Food Accessibility among settled pastoralists in urban and Peri-Urban Areas

Access to sufficient and nutritious food is crucial for reducing food insecurity outcomes within poor and food insecure households. Efforts to ensure dietary diversity are related to socio-economic factors and the level of information available (Van D. T. et al. 2020). Though some particular sociodemographic factors also play a role in consuming foods such as fruits, vegetables, and proteins (Singh, J.K et al 2019). Consumption of which is related to the prevention of adverse food insecurity outcomes.

Physical access

In pastoral areas, it is important to note that the predominant primary mode of livelihood mainly revolves around livestock keeping (Carr C.J 2017). Therefore, food is mainly sourced directly from livestock (Peter M. C et al., 2015), either from family-owned livestock or in-kind from neighbours. Though the settled pastoralists have minimal or no contact with livestock, pushing them to rely on other forms of livelihood such as crop production access of food commodities such as cereals and grains previously mentioned in the literature (Carr, C.J., 2017).

The environmental support towards agriculture production among the settled pastoralist living in Arid and Semi-arid lands, areas susceptible to drought and continuous food insecurity pushed for measures such as Food assistance in form of relief food or in-kind (Czuba, K., O'Neill, T.J. and Ayala, A.P., 2017). The provision through government or other agencies to curb the devastating effects of Hunger. The measures that provide avenue for the households living in the areas to rely on relief food an important source of food (Augustine T.L, 2021) Other household to avoid starvation, households also share food with other households of the same family members or close relation. A social tie that still exist within Turkana but slowly diminishing because of Urbanization Ekitela R.J (2010).

Economic access

In urban and peri-urban centres, formal or informal employment have played a role in supporting the households unable to rely on environment for livelihood strategy to earn income: (Cordero-Ahiman, O.V. 2021). Availability of structured and non-structured markets infrastructure providing avenue to purchase various food commodities (Carri, C.J., 2017) . The latter also described gathering wild foods like fish, wild fruits, and tubers as a means to access food commodities among the pastoral group in these areas. In Communion set-up for example in the case of the Maasai (Peter M. C et al., 2015) .).

The adjustment to change of livelihood mode in combination with factors relating to environmental, socio-economic effects, a shift to food commodities like maize and sugar by pastoralist merits attention especially in the current trend that it non-missing food commodity in Pastoralist food basket (Isa. F, Chery. S,2009). Drivers such as seasonality in relation to the trend of hard economic times, devising coping strategies to shield against long-term effects of hunger.

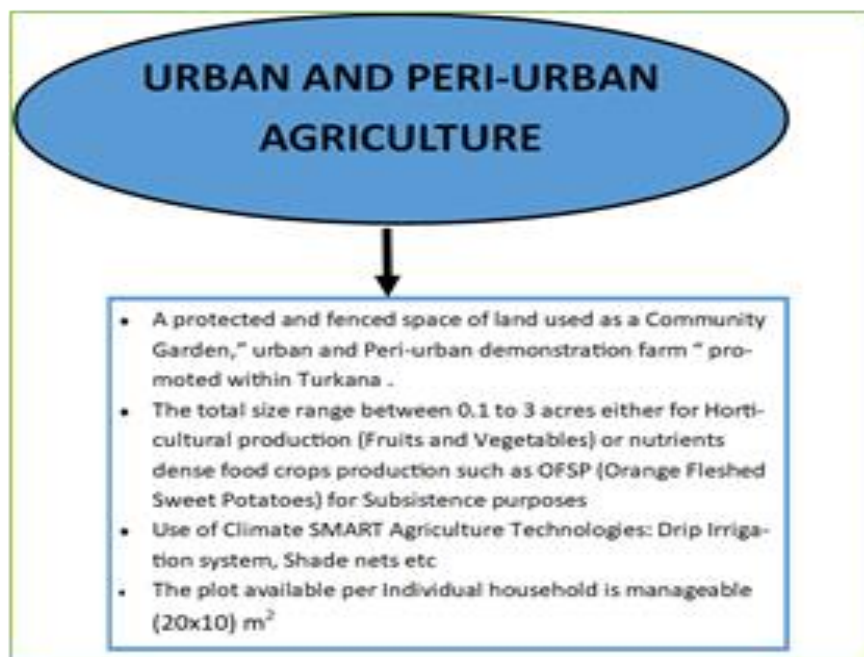
The value given to quantity of a certain food commodities over diversity a reason why maize components have become a regular diet among the pastoralist (Lima,J.P., et al. 2021). Protein-rich foods and those considered healthy are more expensive than foods high in carbohydrates as Lilian (2018) confirmed as a trend among pastoralists living in Turkana. In a nutshell , the dietary diversity potential of a household relies on the ability and capability to access diverse food through economic or physical means. However, demographic factors such as age, sex, education level and family size should not be ignored.

The various way that household access diverse food highly determines what household consume within the **food baskets**, which is a customized basket of local agricultural products for daily individual consumption (multitude 2008). The accessibility to supplement the food baskets gaps based on the poor dietary diversification requires an alternative activity to fully supplement the household food basket which Urban and Peri-urban Agriculture sought to achieve.

Urban and Peri-urban Agriculture is defined as the cultivation of crops and rearing of animals for food, including fisheries and forestry and other uses within and surrounding the boundaries of cities (FAO COAG 1997).

"Urban and Peri-urban" agriculture in this research refers to farm units close to or within settlement centres that operate as a semi-commercial farm to grow vegetables and other horticultural crops. The practice mainly referred into two terms such as Community Garden or Home garden. In Turkana county context urban and Peri-urban Agriculture is in a form of community garden characterised by individual household informally owning sizeable patch of land but share inputs and infrastructure such as fence, water source and piping. Noting land in Turkana is communion unless it is formally owned by an individual(CIDP 2018-22)

FIGURE 1. 1 URBAN AND PERI-URBAN AGRICULTURE DESCRIPTION.



Source: Author (2021)

Urban and peri-urban agriculture contribution to household food baskets and dietary diversity

Urban and peri-urban agriculture used a farming system (Lee-Smith, D., et al. 2019) that varies across the continents surrounding environment. The effectiveness' is although highly influenced and driven by environmental, sociodemographic factors (Chihambakwe, M. et al. 2019) and the interlink existing with natural resources, especially where land and water are critical. However, increasing exposure to climate risks, ineffective policies, and poor governance render households unable (Khumalo, N.Z. and Sibanda, M., 2019) to utilise the benefits associated with UPA entirely. UPA play two critical roles in promoting household food accessibility that influences the food commodities within a household food basket where accessibility of diverse diet is enhanced (Khumalo, N.Z. and Sibanda, M., 2019, Chihambakwe, M.et al. 2019).

Physical and Economic food accessibility benefits are among the varying benefits associated with UPA in relation to households actively involved in the practice with a secondary goal to achieve Dietary diversification.

According to the FAO guide, several African and Asian cities have widespread use of urban and peri-urban agriculture practices for intensive production of vegetables and specialty crops such as flowers, fodder, meat, milk and eggs. The practice is significant in effectively strengthening the poor and food-insecure households to improve their livelihood strategies and contribute to household consumption demands in the ever-increasing population (Chihambakwe, M. et al. 2019) and scarce resources.

The UPA promoted within a household that externally rely on food donations and relief like in the case of pastoral communities in Turkana Ekitela R.J (2010). If out into action UPA support production food locally. Also add a variety supplementing the food basket hence influencing household diet diversify. The poor and food-insecure households through UPA significantly reducing dependability on unreliable sources of food such as relief and donation, and expenditure on food (Ouma, D.O., 2017).

UPA, described as a form of employment, income earned from selling agricultural products (Padgham, J. et al., 2015) as returns is viable if practiced as an income-generating activity. The prices vegetables and fruits carry a monetary value when the demand is high. In situation where the UPA practitioners' households are the key source or players, the dividends earned through selling of the products' highly supplements Household income (Diana LS, et al, 2019). Therefore, income generated from UPA improves the financial asset within a household and ultimately their purchasing power to other food commodities beyond the production capability of a household (Pedzisai, E. et al. 2014) and within the food basket. Household with diversified sources of income including income earned from the sale of urban and peri-urban agricultural produce can mobilise resources to access adequate and nutritious food (Nolwazi Z.K, Melusi S. 2019)

The supply and extra benefits associated with UPA beyond the household level depend more on the surplus or what household produces in excess beyond the consumption demand (Ouma, D.O., 2017). It is worth noting that critical benefits such as food security improvement, stabilised food consumption, and dietary improvements with an expected impact on reducing undernutrition are highly achievable. However, most households involved in UPA mainly do farming for subsistence purposes as the practice faces enormous challenges that render the practice ineffective or unattainable to achieving household dietary diversity (Nolwazi Z.K, Melusi S. 2019).

Opportunity and Challenges of UPA in Supporting Food Accessibility

UPA practice is also faced by myriad challenges rendering that runs from local, community and to the household level. To fully exploit and achieve the ultimate benefits associated with the practice, it is therefore key in mapping out what opportunities and factors enhance and deter the poor and food insecure households from fully exploiting benefits associated with UPA in sustaining household dietary diversity.

Previous studies done on sustainability of UPA (Nolwazi Z.K, Melusi S. 2019) identified inhibitors cutting across natural determinants with current term described as environmental crisis either work for or against effectiveness of UPA. In the presence of the climate change slogan and the demands for adaptation concerns by the Environmental activists influences the optimal use of the available natural resource to positively support the ecological footprints (Padgham, J. et al., 2015).

Although competition for the already limited resources such as water and land, natural resources that UPA is primarily reliant on, goes parallel with population growth. The more water is needed for domestic use the less availability for UPA practice use (Pedzisai, E. et al. 2014). A combination when land come into play affects the household engagement in UPA (Chihambakwe, M. et al 2019) thereby directly influences the capability of the households to fully obtain and reap the intended benefits.

The dynamicity of UPA provides a various range of challenges ranging from Natural determined to human all across the globe (G.Feola et al, 2020). Unlike urban centres, rural areas with high potential for food production is ultimately in contrast with Turkana where the environmental conditions are unfavourable for crop production (KDHS 2014). The Arid and semi- Arid lands with its potential considered not supportive to agricultural production (KDHS 2014). Efforts to promote climate SMART agriculture technologies is futile though the cost is ultimately unreliable and not resilient to the harsh environmental condition, water stress, and high temperature (Lee-Smith, D. et al. 2019).

Another significant challenge is UPA practices is associated with water scarcity. The competition and scramble of the valuable commodity revolving around domestic use and development (Lee-Smith, D. et al. 2019). Unlike

in Turkana, where conflict for water lies between domestic use, livestock and UPA practices. There are ways to recycle and reuse wastewater in urban town. In the case of Nairobi, due to water scarcity, UPA HH practicing Households device way in using wastewater like sewage water for crop productivity. An alternative water source to support UPA (Pedzisal, E. et al. 2014) signified how the poor household desperately needs to make UPA successful without exhausting the limited water sources necessary for domestic use. Though the effort looked positive as households copes with the limited resources (Lee-Smith, D. et al. 2019), the knowledge gap and trust for the safety of reused wastewater are concerns for UPA success.

Urban and peri-urban agriculture occupies land situated along riverbanks, roadsides and streams, and wetlands [24,27]. Nowadays, UPA is on the increase in sub-Saharan African cities regardless of some of the challenges of access to basic services and land tenure. UPA effectiveness requires space (G.Feola et al, 2020) , within the urban, and peri-urban settings. It fully applies to households provided with small plots (Pedzisal, E. et al. 2014). Though the contention that UPA practices such as conventional agriculture cannot guarantee food access for the rapidly increasing population within households argues that Space of land influences the effectiveness of the practice.

Economic and physical food accessibility highly relied on production capabilities, environmental reliability, and economic situation through which UPA is practiced (Buechler, S. et al., 2013). Social and cultural perceptions and/or attitudes directed on food or within the proximity of the households also significantly influence household diet preferences and choices (Ouma, D.O., 2017). The factors that highly impacts on the poor and food insecure settle pastoralist from fully benefiting from UPA.

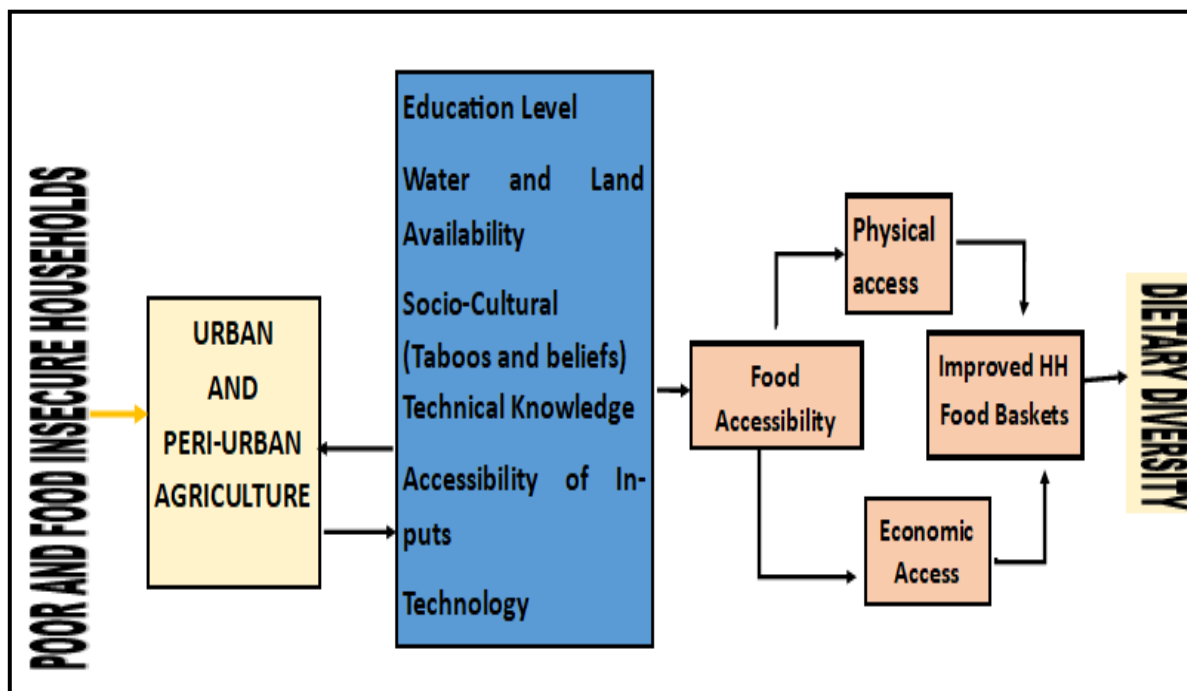
2.3 Conceptual Framework and Operationalisation

The conceptual framework developed for this research is based on Concepts that the research aims to explore. **The Vulnerability context is the Poor and food-insecure households**, where vulnerability is due to food insecurity resulting from low incomes, unemployment, poverty, environmental and socio-economic factors.

Urban and peri-urban agriculture practiced aim is to support the poor and food Insecure household escape poverty and food insecurity. As the pastoralist households engage in UPA activities, they increase their potential to address the household food security status through **Food access**. UPA is likely to ensure **physical** through the supply of fresh food to a household consistently, given that the production resources are available, it Increases the number of agricultural products.

Additionally, apart from producing their food for household consumption, households can also produce for selling and thus generate income. The income earned from the sale of urban and peri-urban agricultural produce can mobilise resources to access diverse foods commodities “**Economic food access** “. Physical and Economic access improves the households’ **food baskets**, enhancing the **household dietary diversity** with improved nutrients intake.

FIGURE 2. 1 CONCEPTUAL FRAMEWORK OPERATIONALISED KEY CONCEPTS



Source: Author(2021)

3. Research Study Area and Methodology

This chapter describes the Area of study and Methodology used in the research: that includes research strategy, research design, data collection methods, data collection tools and sampling criteria, data analysis and ethical consideration.

3.1 Area description

Turkana Central Sub-County, the study area, is situated in Turkana County, one the second largest County within the ASALs in the North-West of Kenya. Temperatures in Turkana can be as high as 40°C during the dry season, with average rainfall ranging between 120-500mm per annum. Turkana Central has a population of 185,305(KNBS 2019), therefore the second highly populated Sub-County in Turkana.

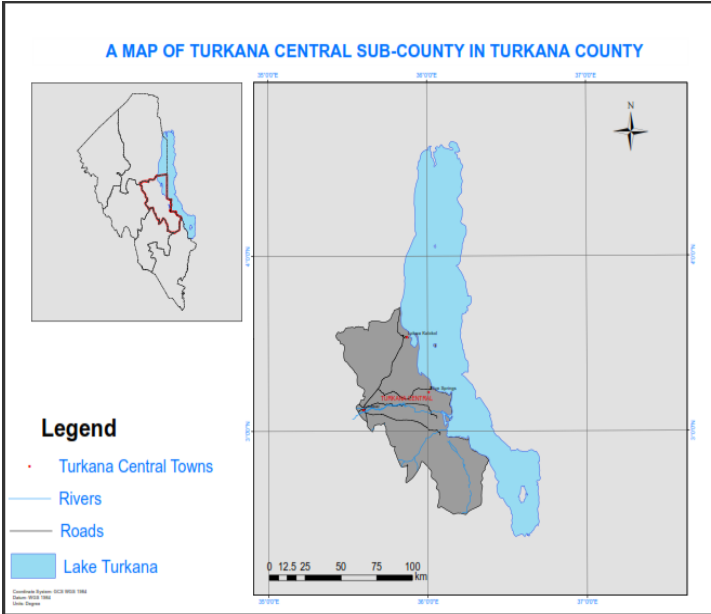
Turkana Central sub-county also hosts the Turkana County headquarter and Capital town, several NGOs, Faith-Based Organisations and INGOs who are the key partners involved in Food and Nutrition Security Interventions on UPA practice. It also Attracted many pastoralists, with the majority having to settled near the Capital town Lodwar or within the roads. The Capital Town also hosts the Ministry of Agriculture, pastoral Economy and Fisheries, Turkana County Government and National Government offices. The choice for Turkana Central was purposive based on the researcher's knowledge and Easiness for the research assistant to access all the areas

where urban and peri-urban agriculture is practiced. Natural water bodies surround the Sub-County, with lake Turkana to the west strip and river Turkwel passing through the capital town and other seasonal rivers.

FIGURE 3. 1: MAP OF TURKANA CENTRAL AREA



Source: Author (2021)



3.2 Methodology

Research Strategy

The research used a case study strategy. A case study supported the researcher in conducting an in-depth exploration of certain phenomena within some specific context, a group or individuals (Rashid, Y et al.,2019). The researcher involved use of a research assistant due to the travel related to the COVID-19 situation to collect data. The research employed qualitative data collection methods .The qualitative data collection tools used include FGD sheet, SSI sheet, observation, Key Informant interview, and HDD score sheet. The research sub-questions informed the design of the of interviews and Discussion.

Research design

A mixed methods research design was used incorporating desk study to explore the problem based on different databases and online search tools, secondary data from Turkana County, Ministry reports and Websites. The formulation of objectives and research questions then followed, and finally data collection in the field. The data analysis was done next that involved analysis of all the data sources through Top-down approach , then discussion of results, conclusion and recommendation.

Sample size:

The sample size for the two(2) Focus group Discussions provided a total of 16 respondents 4 male and 12 females. However, the research targeted 10 males but few men were available for the Focus group discussion.

The Semi-Structure Interview was conducted to 30 respondents constituting 10 males and 20 females, few men participated since considering women dominate those directly involved in UPA practice. Culturally too in Turkana household food to be consumed is determined by women. The Household Dietary Score targeted the 30 SSI respondents but only 29 participated, 1 (one) was not comfortable answering the questionnaire on food.

The key informants Interview was conducted to 4: one(1) from MOAPEF (2)two from Ministry of Health, and one(1) partner from WFP.

Data Collection

The research used Data collection employed both Secondary data and primary data collection methods.

Primary data

Primary data on Household dietary diversity, UPA, and food accessibility was collected through the support of research assistants interaction with respondents through Key informant Interviews, Focus Group Discussion semi-structured interviews, Household Dietary Diversity Score and observation. The primary data use provided an avenue for the researcher to get first-hand empirical data and information, which also supported validating the credibility of secondary data sources. The primary data collection employed the Top-Bottom Approach.

Key informant interview

Key Informants Interviews were first used to collect information on the general overview on impact of UPA towards dietary diversity and challenges that key partners perceive and experience in supporting the practice. They were selected from specific offices to represent different key ministry in Turkana county and major partners within Turkana County.

Focus Group Discussion

Through the researcher assistants, the researcher conducted two FGDs. One focus group Discussion was done at the beginning of the research and the second was done at the end to validate the study's findings. The second Focus Group Discussion was to validate the data Collected . The FGD target a minimum of 6 and with a maximum of 8 participants each.

FIGURE 3. 2 FGD RESPONDENTS IN NAZARENE UPA SITE



Source: Author(2021)

Semi-Structure interview

The semi-structured interview was used to collect information from those households practicing UPA targeted respondents within Turkana Central Sub-county. The method gathered information on food accessibility, household food basket composition, and the influence of UPA on dietary diversity as well as challenges of UPA practice among the settled pastoralist in Turkana. The semi-structure interview guide was developed by the researcher and familiarised by the research assistant in collecting data in the field.

FIGURE 3. 3: SEMI-STRUCTURE INTERVIEW CONDUCTED TO A MALE RESPONDENT UNDERGOING



Source: Author(2021)

Dietary diversity score

The Dietary Diversity Score Sheet was applied to the semi-structure Interview respondent. It looked into unravelling the trend at which a household practice dietary diversification with a given period, it also looked into the percentage of households or individuals consuming individual food groups as another essential analytical strategy. As stated by FAO Dietary diversity scores and percent of households consuming each food group can be used as a one-time measure or ongoing monitoring (FAO 2013). Therefore it aimed at monitoring the Household dietary trends of the UPA HH practicing Households. Information from the interaction on food was used to generate the number of food groups consumed in the household in the last 24 hours during data collection. A structured questionnaire was used to record the type of meals and composition by the households.

The Score sheet was designed using the 12(FANTA) main food groups (Anne S. Paula B Sept 2006). The food groups checked against included: A. Cereals B. Root and tubers C. Vegetables D. Fruits E. Meat, poultry F. Eggs G. Fish and seafood H. Pulses/legumes/nut I. Milk and milk products J. Oil/fats K. Sugar/honey L. Miscellaneous and the scores were Zero (0) for the non-consumed and one (1) for the Consumed food groups. The results Score was entered in a grid score of 0-12
The research employed HDD to 29 out of 30 respondents, 20 actively undertaking UPA practice and 9 who inactive in UPA practice

Video/picture Recording for Observation

The observation of videos and pictures recording was utilised to support the researcher's data by building on sub-questions themes. The observation of pictures and video recorded during data collection, provided the status of household food baskets and Cultivated crops in the field. The pictures and video also provided a view of the status of UPA sites, checked on various food crops cultivated in the UPA sites to build on the sub-questions 2, number of foods within a household to build on SQ3, and the status of UPA in term of observable opportunities and challenges(SQ4)

Secondary data

The secondary data were mainly collected from books, journals, government reports, WHO, WFP FAO, U.N., reports, and documents to understand and explain key concepts related that the study aimed to explore. The Secondary data helped in reviewing theories related to the research, views of different researcher as well as documents and reports within the ministry of Agriculture. On various subject matters and key concepts covered under the study it was also used as a source for defining and operationalisation of the key concepts that the research explored.

Limitation

The travel regulations and experienced effects of social distancing limited the researcher to conduct key informant Interview virtually therefore offered limited time to probe on extra information over the study. The

use of research assistance working with the Ministry of Agriculture made time limited to engage in Data collection since as a result of extra duties at workplace.

Covid-19 regulations against gathering in groups especially among untested people from different household posed a challenge during participation of some respondent when he/she is not audible enough to be heard by everyone.

The video and photos were taken during the research (SSI &FGD) audio were inaudible and pictures unclear, leading to distortion of essential information that can not be recalled during data analysis.

The semi-structured interview guide for the focus group discussion was designed in English. Use of jargon was not a problem since it was replaced with “*Ng’aturkana*” Vernacular related words that relate and connect with the research study. The participants’ responses showed they relate to the wording used for example Use of the word UPA lacks a vernacular specific word but use of “Gardening” as a proxy was agreed by the researcher and research assistants.

Testing of the semi-structured interview tool during the first session with the research assistant looked easy and took a short period though with the respondents, the time scheduled for one interview was way above what the researcher predicted. Therefore some of the questions were not probed further in respect of the time limit needed for interaction but in instance where it deemed necessary the researcher asked for additional time with the respondents.

Selection and sampling of the respondents

The research used purposeful sampling in choosing the study area and the same used in selecting the Focus Group participants who are practicing UPA in Turkana Central. The selection of UPA site was through snow-ball non-random sampling where the researcher relied on the extension officer to identify the UPA site.

The sampling of Semi-structured interview respondents was done by purposively by taking into account the members of the households directly involved in food preparation for their family and decide on what the household eats. The criteria of the participants' selection involved only the household actively practicing UPA and the household that withdrew and inactive in UPA practice.

The Key informants were selected through Snow-balling, considering their involvement of the informant on food and Nutrition Security intervention and the expertise knowledge He/She has in that area of UPA promotion. The key informants were selected from the Ministry of Agriculture inter Agri-Nutrition Office within the Turkana County Government, the two Community Health Workers from the Ministry of health who work and monitor the nutrition situation at the community level.

Data Analysis methods

The data Analysis of research was done using the top-bottom approach.

The data from the HDDs sheet was coded and entered in a grid for interpretation. The data used to calculate the average. The aim of the HDD was to answer the sub-question on :

The HDDs data was use during constant comparative (with independent coding) with Data from SSI confirm the informaton collected from focus froup discussion. It help assess the contribution of UPA and its contribution to household food basket and challenges surrounding its unsustainability.

To determine the average HDDS (0-12) for the sample Household, the following formula was used.:

$$\text{Average} = \text{SUM HDDs} / \text{N(HH)}$$

Where HDDS is the score and N the total number of Respondents participated in HDDs

The data collected was analysed by the qualitative data analysis method. The FGD, SSI and KI were first transcribed ,translated from “Ngaturkana and kiswahi” to English by research assistants and thoroughly reviewed, followed by identifying themes categorised based on the research sub-questions. The results from different data sources were compared and cross-checked with the collected documents and the research assistants field notes.

During the focus group discussions, audio and recordings and notes of key points taken, respectively. The transcription was done and translated to English , scripts were produced and used to produce grids for analysis for report writing to answer the following sub-questions.

Concepts from different FGDs and interviews were then pooled together and integrated into common themes.

TABLE 2 1. DATA COLLECTION METHODS, ANALYSIS AND TOOLS USED.

No	Research Questions (primary and secondary)	Data Source / Collection Method	Respondents	Data Analysis Method	How findings was used
Research Question: What factors impact settled pastoralists practicing urban and peri-urban agriculture in sustaining household dietary diversification in Turkana?					
1	What is the current household dietary diversification among Turkana people living in urban and peri-urban settlements?	HDDs	29 on HDD directly decide on HH food consumption	Use of Ms Excel	To provide the HDD score and Average food groups consumed in Both Inactive and Active UPA practicing households
		SSI	30 Respondents	Thematic Analysis Presented in Graphs and Tables	
2	How do settle pastoralists households living in urban and peri-urban areas physically and Economic access food to meet the dietary needs?	SSI	30 Respondents (18 Active and 12 inactive in UPA)	Thematic analysis presented in Graphs and Tables	Used to Identify Economic and Physical means HH food Access theme.
		FGD	16 Respondents		
		KI	30 Respondents (18 Active and 12 inactive in UPA)		

		Observation			
3	How has urban and peri-urban agriculture contributed to dietary diversity and household food baskets within practicing households?	SSI	30 Respondents (18 Active and 12 inactive in UPA)	Thematic analysis	Used to identify benefits of UPA on Household Food basket and HH dietary diversity theme
		FGD	16 Respondents		
		Observation			
4	What are the opportunities and challenges pastoralists involved in urban and peri-urban agriculture practice undergo in the process of improving the household food accessibility within their households?	KII	3 Respondents	Thematic Analysis	Used to identify and map out Opportunities and Challenges on UPA practicing HH towards HH food Accessibility.
		SSI	30 Respondents (18 Active and 12 inactive in UPA)		
		FGD	16 Respondents		
		Observation			

Source: Author(2021)

3.8 Ethical Considerations

Ethics refers to prescribed code of conduct. Ethics establish the standards and norms that guide certain behaviour. In research, ethics guide the researcher in the investigation of the study.

According to Shamoo and Rensik (2009), the researcher needs to observe and obey ethical norms in conducting their research due reasons such as ; Importance of Norms to promote the aims of the research, ethical standards to promote the values that are essential in cooperation, ensure the accountability of the researchers to the public, help to build public support for research, promote a variety of other important moral and soci-cultural values.

The researcher in this study observed the voluntariness of the respondents and did not force them to obtain information, respect of privacy, respect of anonymity and confidentiality, not deceiving respondents. These details were only collected for academic purposes, and this study mainly focused on qualitative data.

The issues identified by the study were upheld with strict confidence. This entailed the confidential keeping of all the relevant information sought by the study. The information sought from respondents was kept confidential in order to avoid victimisation of respondents.

Authority was sought from the Ministry of Agriculture, Pastoral Economy and Fisheries(MoAPEF through the office of County Executive Committee(CEC) and County Chief Officer (CCO) and Turkana Central Sub-County Agriculture Office before engaging respondents in the study. Thirdly, the researcher sought permission from the National Commission for Science, Technology and Innovation (NACOSTI) before going to the field to collect data. Fundamental cultural norms were observed during the study.

CHAPTER 4 RESULTS AND FINDINGS

Introduction

This chapter provides the respondents demographic characteristic summarised in graphs, charts and tables. The results is also present according to themes

4.1 RESPONDENTS PROFILE

The selection of respondent profile was to identify variables considered to be the reason settled pastoralists to practice any form of UPA activities by a household relies on literature studies. The variables are

Sex of the respondents

The sampling method used during the selection of respondents gave equal opportunity to both males and females. The disintegration in sex involved approximately ratio of 2:1, 65% of the selected respondents being female and 35% male. The number as per Semi-Structured interview conducted were 20 and 10 female and male respectively. At the same time, the Focus Group Discussion respondents involved a total 16 respondents that comprised of 12 females while 4 males as shown in the table).

TABLE 4. 1 DISINTEGRATION OF RESPONDENTS IN TERM OF SEX

Data Collection Method	Sex		Comment
	Males	Females	
Semi-Structured Interview	10	20	HDDs respondents
FGD	4	12	
TOTAL	14	30	
Percentage	35%	65%	

Source: Author (2021)

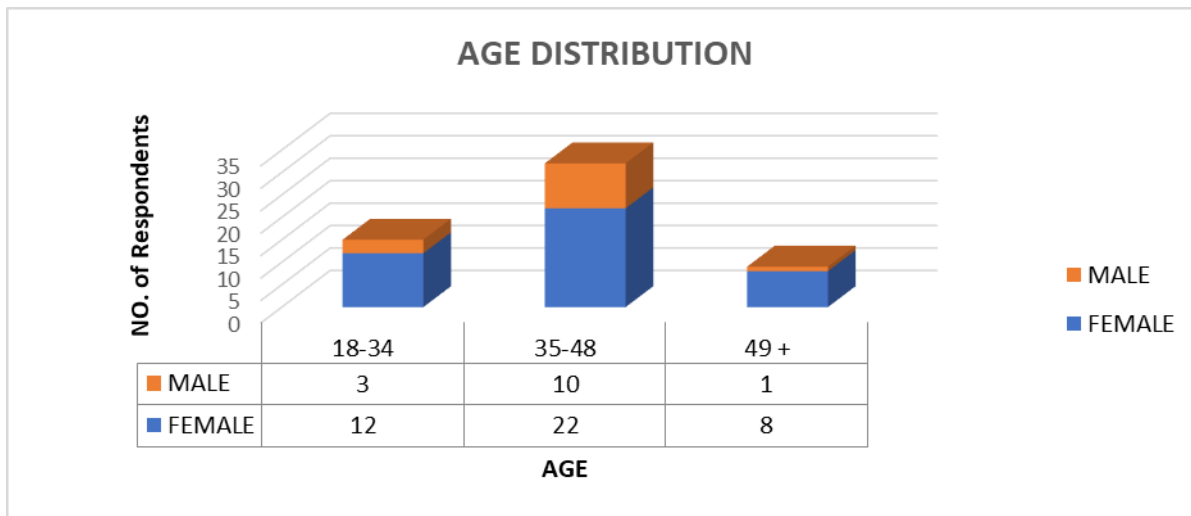
The result in Table 2 shows that women respondents were more than male respondents. The data shown showed more females participated in the research as compared to men.

Age of Respondents

Age bracket is a key determinant when productivity is of concern. In Kenya, the level of productivity in relation to age was categorised into youth (18 and 34 years) , middle-aged (35-48 years) and elderly(49 years and above based in Kenya (Article 260 of Kenya Constitution 2010) . The level of productivity reduced with age. The age of the respondents

The Focus Group Discussion and SSI had a total of 46 respondents of which 16 (34.8%) were of 18-34 years, 22 (66.6%) being 36 - 48 years old, while 8 (6.6%) aged belonged to 49 and above. Figure 10 below illustrates the age range of respondents.

Figure 4. 1: Ages of respondents



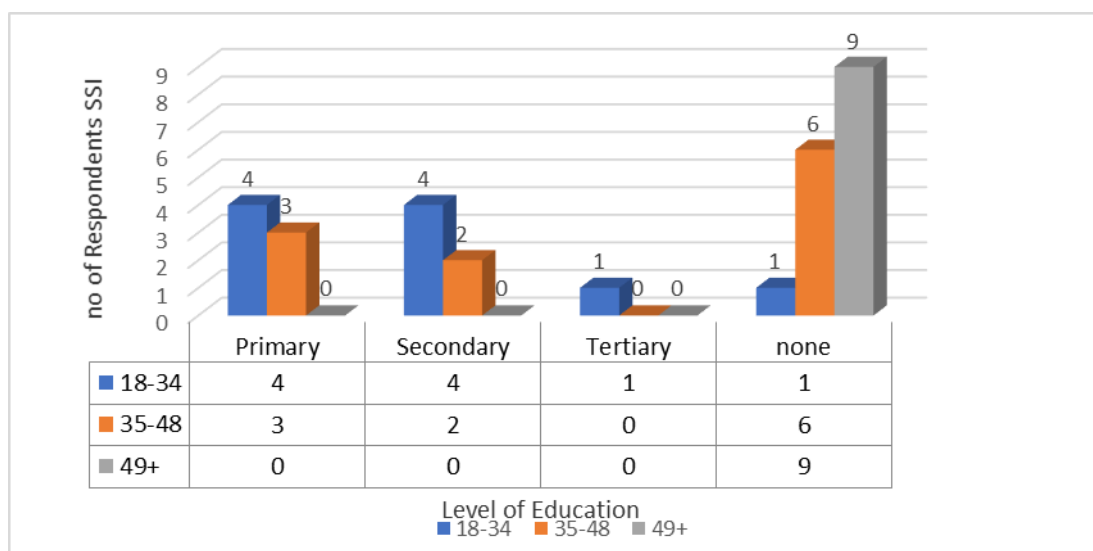
Source : Author (2021)

Figure 4.1 above indicates that the age distribution among UPA practicing households ' participants in the three categories of age range that showed the middle-aged between 35-48 years were the most involved in UPA.

Respondents' level of education

The semi-structured interviews showed 11 (36.6%) respondents had some primary, secondary and tertiary educations, while the 19(73.4%) did not have any form of education.

FIGURE 4. 2 DISPLAYS THE CATEGORICAL LEVEL OF RESPONDENTS' EDUCATION.



Source: Author (2021)

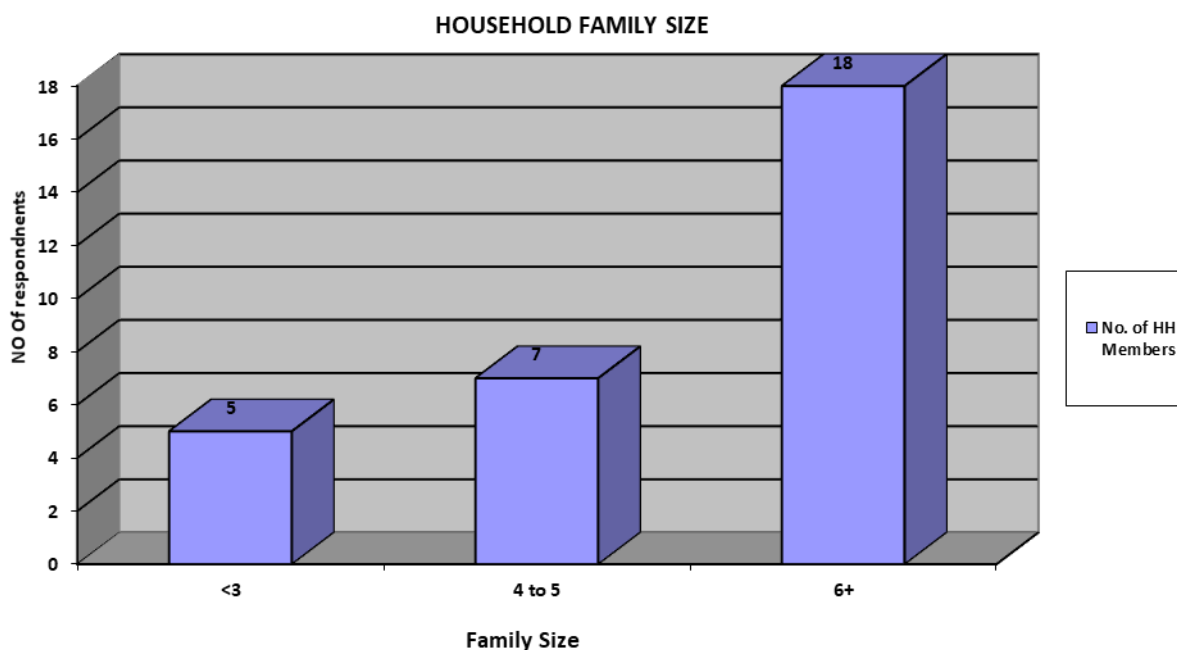
Figure 4. 3 Level of education of respondents

The result in Figure 4.2 above shows that UPA practicing households ' participant (86.6%) had some form of education (86.6%), while only 5 respondents from both categories of respondents did not have any education

Family Size of the Respondents

The results from SSI showed a difference when it comes to household family size. Household size in the Turkana context plays a role in accessing a certain type of food .Therefore as per the data collected during SSI, 18 respondents had a family size of 7 and above, (5)five had between 4-5, and only 5 had a family size of 3.

FIGURE 4. 4: FAMILY SIZE

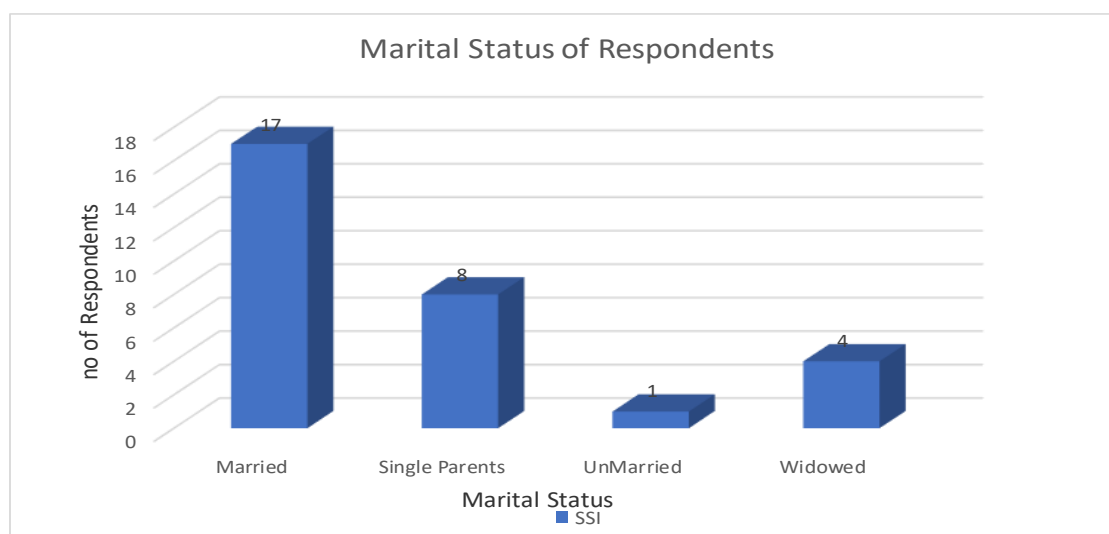


Source :Author (2021)

Marital status of respondents

The marital status of the Semi-Structure interview respondents was asked, and the result showed the distribution into 17(56.1%) married, 8 (26.6%) single parents, 1 (3.3%) unmarried and 4 (10.3%) widowed,

FIGURE 4. 5: MARITAL STATUS OF RESPONDENTS



Source : Author (2021)

Marital Status was asked to the Semi-Structure Interview respondents. The result indicated in Figure 4.1 show indicate that majority of the Respondents involved in UPA majority were married. However, single parenthood raised a question of the burden single parents have towards supporting household with food provision.

TABLE 4. 2 SUMMARY OF THE DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

	Percentage		Percentage
AGE			
18-34	32.6	EDUCATION	
35-49	47..8	None	53.3
49+	19.5	Primary	23.3
		Secondary	20
		Tertiary	3.33
SEX			
Male	35	FAMILY SIZE	
Female	65	< 3	16.7
		4<=>5	23.3
MARITAL STATUS		>6+	60
Married	56.7		
Single Parents	26.7		
Unmarried	3.3		
Widowed	10.3		

Source: Author(2021)

Forms of UPA practiced and sizes

TABLE 4 1 LAND PORTIONS SIZES AMONG THE RESPONDENTS

Land area in meter	No. of respondents
6m by 25m (150m ²)	10 Respondents (46.6%)
10 by 20 m (300m ²)	4 Respondents (26.6%)
6mx8m (48m ²)	4 Respondents (26.6%)
Total:	18

Source: Author (2021)

The data in Table 3 : on land sizes indicated the size categories 10 by 20 m (300m²), and 6mx8m (48m²) showed an average of 4 households while only 10 owned a 15 by 20 m (300m²). The most identical thing noted was that the sizes across every household differed per UPA sites differ.

Sources of income identified

A question on sources of income, the question aimed at understanding the households' economic capabilities towards accessing various food types and commodities. The findings are highlighted in Table 5 .

TABLE 4. 3 SOURCES OF INCOME RESPONDENTS' PERCENTAGE

Activity	No. and % of Respondents
Agriculture UPA product selling	10 (33%)
Small business	4 (14.6%)
Livestock selling Business	1 (6.6%)
Formal and non-formal employment	13 (43.3%)
Safety Net (Cash Transfer)	9 (31.3%)
Charcoal burning	5 (16%)

Source: Author (2021)

The semi-structured interview conducted to 30 respondents, as shown in Table 4.5, indicated varying income sources. The finding noted that the majority 13(43.3%) depended on formal and informal employment (casual labour, hawking, Construction works), in terms of gender showed 9 male and 4 Female. In addition to employment, 6.6% of the participants generate income by selling livestock, 31.3% from safety net UPA program cash transfers, and 33% of respondents selling UPA products.

4.2 KEY FINDINGS

4.2.1 Dietary Diversity among the Turkana

The Household Dietary Diversity Score (HDDS) aimed to measure food groups consumed by household members over a given period(24 hours). The HDDS was important in ascertaining the ability of a household in accessing diverse and sufficient food with the need to meet the dietary needs necessary for a healthy and productive life of individual members. The relevancy of HDDS was to provide a glimpse of the beneficial role UPA played in positively impacting the household's dietary Diversity and changes in a situation where UPA is no longer practiced.

The results were interpreted based on the average HDD score. The scores were interpreted and Categorised in three. where average score recorded as less than or equal to 3(Three) indicated poor or low Dietary Diversity, an HDD score ranging from 4 to 5 as medium (require improvement) while a score above 6 indicates sufficient.

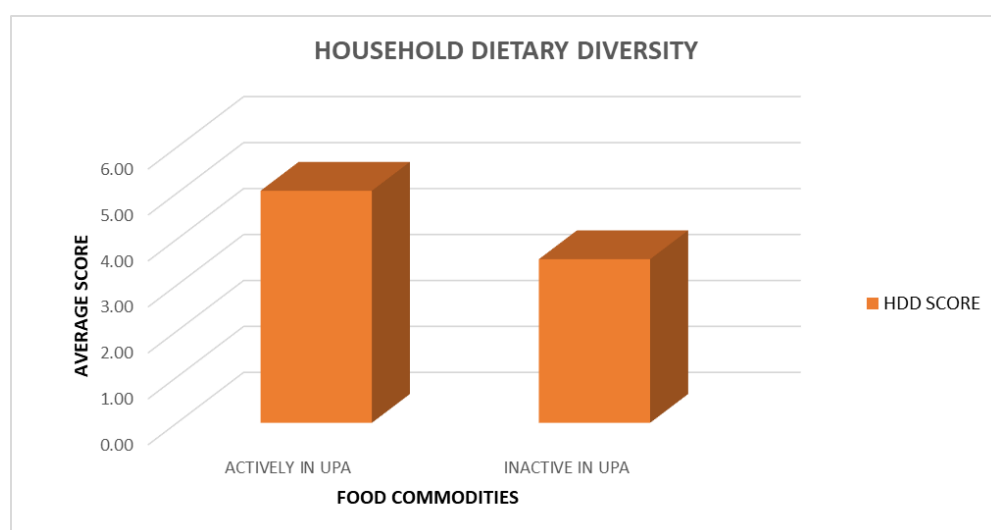
TABLE 4. 4 SUMMARY OF THE HDD SCORES

NO. of Respondents		HDD Scores	Average HDD scores
Actively in UPA	20	101	5.05
Inactive in UPA	9	32	3.56
	29	133	4.31

Source: Author (2021)

From Table 4.4 above, the results from the HDDs conducted to the 29 respondents signified that households actively involved in UPA consume variety of food groups. However, it showed no similarity between different households. The results showed majority, about 70% accessed less than 5 food groups, and only a small portion of about 29 % accessed four food groups and above(Appendix 5). The noted additional food groups did not emanate or produced through the UPA practice rather accessed externally from the household. *Figure 21 below clearly illustrates the dietary diversity scores of the household that took part in HDD those involves in UPA and those that stopped.*

FIGURE 4. 6: DIETARY DIVERSITY SCORES OF RESPONDENTS



Source: Author (2021)

The household actively involved in UPA related the importance of the significant role in accessing other food commodities the Practice plays within the household's proximity, exchanges with neighbours, or more visibly purchasing from the nearby markets.

4.2.2 The Economic and Physical access of Food Sources in Urban and Peri-Urban areas

The respondents engaged during focus group Discussions and Semi-Structured interviews were asked the question Where and how do you access the food you consume within your households? The responses from the respondents highlighted 8 common sources that cuts across the group and agrees with key informants' responses. Table 4.5 below shows how the frequency of foods within reach of the household highly relies on the sources.

FOOD SOURCES WITHIN URBAN AND PERI-URBAN AREAS

During the Focus group discussion and SSI respondents were asked where they access their food to meet their dietary needs. The respondents' responses identified several sources table 22. Which also identified frequency as mentioned by KII2 and KII3.

TABLE 4. 5: VARIOUS SOURCES OF FOOD ACCESSED

Source of food in A household	Percentage	Frequency
Relief food from WFP and County Government	25	6 times a year
IMAM Supplementary Feeding	13	Monthly
Purchase from income Earned formal and informal job	20	Daily
Income from the selling of Livestock	14	During extreme situation
Family UPA practice	21	Often depending on the season
Buy from cash transfers provided (SNP)	3	Three times a year
Festivals	2	Unpredicted

Source: Author (2021)

As per table 4.5: Social safety net programs contribute to a total of 41% of food sources of the semi-structure interview respondents. The SSNP as mentioned by KII2, is provided to the poor and food-insecure households to meet immediate food needs and shield against advanced effects of food inaccessibility during the lean season as in-kind or as relief. The support was identified from the Ministry of health database to be provided by developmental and international partners like WFP, Red Cross Kenya, Save the Children in close coordination with the government at the national and County levels operating in Turkana. As per the information collected(safety net programmes) differ in form, depending on the level of vulnerability and need.

The responses from SSI, KI, and FGD relief food, IMAM, and Cash transfer as the current SNP program(Table 7). The relief aims to meet immediate food needs within the poor and food insecure, while IMAM supplementary feeding provided to the household with Acute Malnutrition cases for children(Over 6 Months). Cash transfer is provided to persons older than 49 years and deemed not too productive.

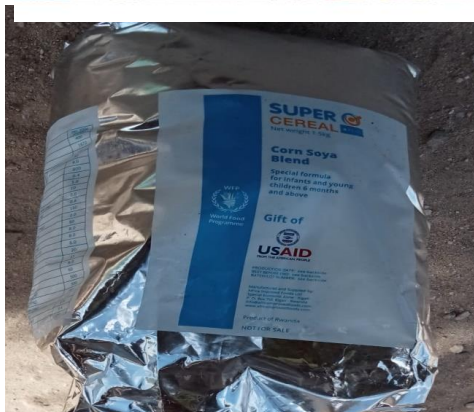
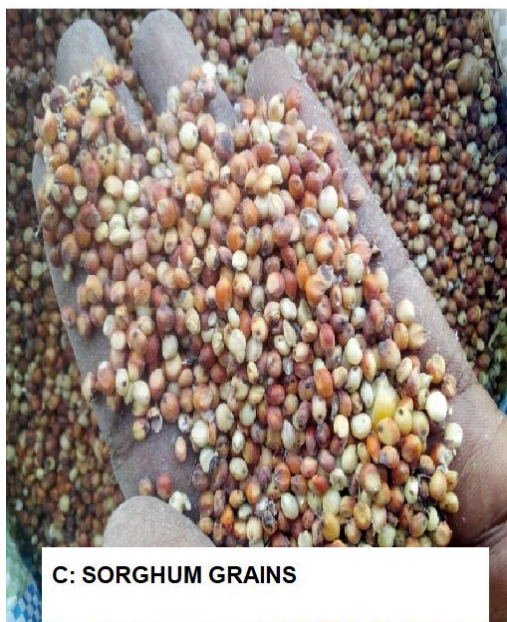
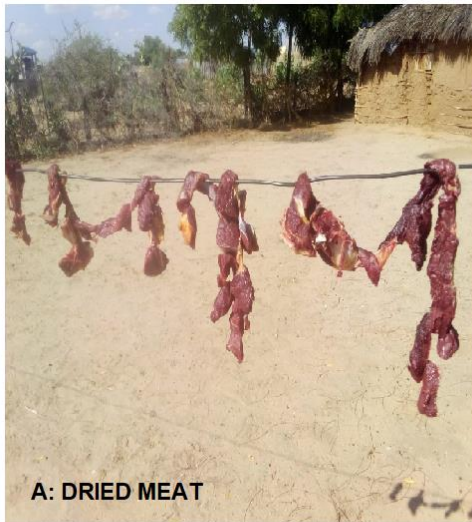
Household's Food Basket

The food basket within a household as used in the research helped determine the household dietary diversity fluctuation daily. A follow-up question on the food accessed by the household from the SSI respondents ascertains that household food baskets had few food commodities. The food commodities were mainly dominated by Cereals and grains and condiments the main food groups mentioned and observed.

As observed both active and inactive in absence of UPA practice showed the common food commodities only contributing to 3 food groups. Illustrated in the pictures(A-E) and Table 4.6.

The main Food commodities were listed(Table 4.6) from the respondents households in the absence of UPA products :

FIGURE 4. 7 COMMON FOOD IN HOUSEHOLD FOOD BASKET



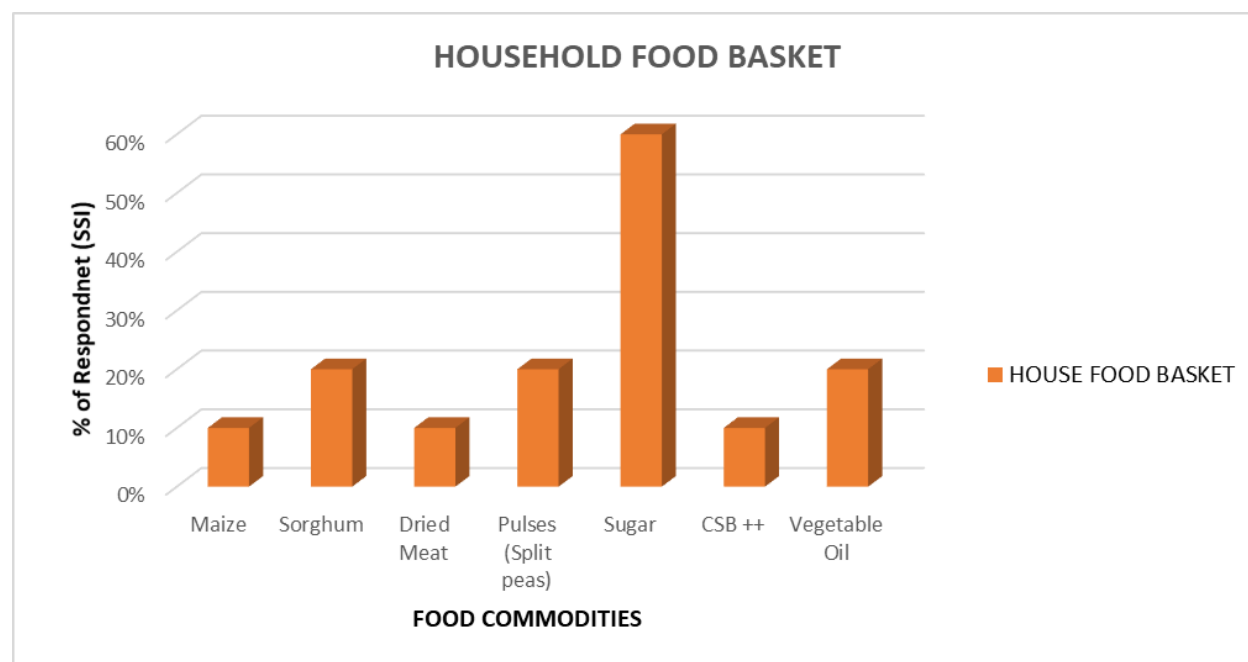
Source: Author(2021)

TABLE 4. 6 FOOD BASKET AT HOME IN THE ABSENCE OF UPA

Food commodity	Food group	% . of HH	Source
Maize	Cereal	10%	Market Purchase
Sorghum	Cereal	20%)	Relief
Dried Meat	Meat	10%	Purchase and family
Pulses (Split peas)	Legumes	20%	Relief & in Kind
Sugar	Condiments	60%	Purchase
CSB++		10%	Supplementary feeding
Vegetable Oil		20%	Purchase and Relief

Source: Author (2021)

FIGURE 4.8:DISTRIBUTION OF FOOD COMMODITIES IN HOUSEHOLD'S FOOD BASKET IN ABSENCE OF UPA



Source: Author(2021)

4.2.3 Influence of UPA on Household food basket and Dietary Diversity

Organisation of UPA

The organisation of UPA as described by SSI , FGD and KIs based on the data collected is multi-sectoral that identified sectors within Turkana County Government, Ministry of Agriculture, Pastoral Economy and Fisheries. The research identified different stakeholder as mentioned during SSI , FGD and observation who play different role.

TABLE 5 1 :DIFFERENT STAKEHOLDER INVOLVED IN UPA

Stakeholders	Characteristic	Role	Key Contribution
MoAPEF	Turkana County Government	Coordination of Partners Provision of Extension Services Link between UPA practicing Household and Partners	The Ministry of Agriculture provide extensions services and are responsible of the households involved in UPA crop production
MOH		Identification of food insecure household at Health facility level.	Link the food insecure with UPA programs and offer Nutrition Education through SBCC model.
INGO	International	Provision of inputs	Draft UPA programs targeting poor and food insecure household, source for funding and participate in planning.
NGOs	Local	Provision of inputs	
FBOAs	Local	Provision of Inputs	

Source : Author(2021)

At the community level the selection of poor and food insecure household to be engage in UPA is done by the community elders and community elites . The UPA site as per Key Informant 1 and 3, a contact person is located in every UPA site community resource person.

FIGURE 4. 8: UPA SITE FUNDED BY FULL GOSPEL CHURCHES OF KENYA(FGCK), A FAITH BASED ORGANISATION IN TURKANA CENTRAL.



Source: Author(2021)

The researcher inquired what benefits the respondents attributed the UPA practice the individual and household levels. The focus group discussion and SSI responses showed that the production of diverse crops significantly contributed to the accessibility of diverse food in their households and improved diet quality.

TABLE 4. 7 CROPS CULTIVATED IN THE UPA FIELDS

Food crops	Category	No.of respondent	Status	Field type
Green grams	Pulses	5	Poor	Under Convectional
Cowpeas	Pulses	4	Average	Drip Irrigation system
Amaranthus	Vegetable	7	Average	Convectional
Tomatoes	Fruit	2	Poor	Shade net and open field
Watermelon	Fruit	7	Average	Drip irrigation in Open Field
Spinach	Vegetables	18	Average	Drip irrigation system and in open field
Kales (Sukuma)	Vegetables	10	Average	Open Field
Papaya	Fruits	5	Average	Fruit trees in Open
Maise	Cereals	3	Poor	Open field , Bucket irrigation
Sorghum	Cereals	3	Average	Open Field flood and bucket irrigation.

Source: Author (2021)



Source: Author (2021)

FIGURE 4. 9 DIFFERENT TYPES OF CROPS GROWN UNDER UPA PRACTICING HOUSEHOLDS .

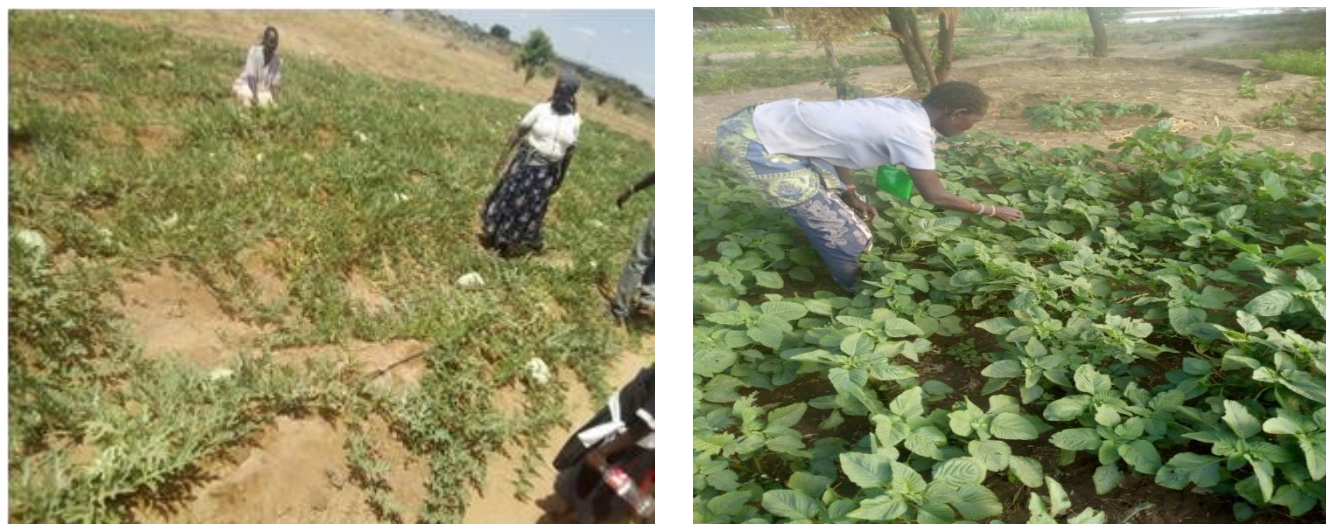


FIGURE 4. 10 PICTURE(RIGHT) WATERMELON GROWN (LEFT)AMARANTHUS (RIGHT)

Alternative source of livelihood

The actively (18 SSI respondents) involved in UPA sated the existence of a variety of food crops within the designated UPA sites , and varied food crops ranging from cereal, Vegetables and Fruits observed during the research **Fig 4.11**. During the discussion and interview, benefits associated with UPA practice with both the actively involved and non-actively involved mentioned that the Practice provided an alternative source of livelihood since most of the respondents were involved predominantly in pastoralism, a response that was put across by KII3 from WFP.

The result further indicated that 10 UPA practicing households constituting to 36% had more 4 types variety of crops in fields, while 5 constituting 17.3% had 3 different types of crops in their fields. While from the focus group discussion the group mentioned the only crop available was watermelon. When asked what influences the crops grown, 20% of respondents associated it with the seeds provided as relief. In contrast, others mentioned the viability of crops and profit that originates from the sales.

The Ministry of Agriculture's KII1 mentioned the budget allocation every year meant to purchase nutrient-dense seeds for the vulnerable UPA practicing households . The information that confirmed the revelation from the respondents that the food crops produced are mainly driven by the technical officers who provide support in form of Inputs.

According to the discussion generated from the focus group discussion, though diversified crops provide adequate and quality food for individual households, the benefits vary with the season. The respondents RSSI2(12.08.21) irrigation farm quoted saying '*.... Before the farm disintegrated the production was enormous, and vegetables became part and parcel of household diet where we grew different crops...*'

FIGURE 4. 11 RESEARCH ASSISTANT CONDUCTING SSI TO RESPONDENT SII15

Respondent AA Testimony on food accessibility status before and after the UPA



Respondent AA. 'I started getting involved in gardening after I received nutrition training from the Community Health Volunteer in one of the meeting we had at the hospital.

The nurse' doctor' mentioned on the importance of eating variety of food within the household. Although she insisted, I should consume vegetables and fruits with other food so as my child can get enough breastmilk and also for the good of my health. I had no money to buy enough for my household of 7. Luckily, I was selected as one of the beneficiaries of the community garden that was opened by the ministry of Agriculture. Ever since that day I have never stayed more than one day without consuming vegetables like Amaranthus, spinach or cowpeas from the portion given to me in the garden. My child used to be sickly and these days I do not even take him to hospital as before. I am hoping to grow more food crops such as oranges and papaya in future to also get additional fruits'

Source: Author (2021)

During the Key informant interview, one of the Key WFP informants involved in promoting resilient programs, including UPA In Turkana, mentioned how UPA practicing households experienced the farm flourishing in the first three months. The positive observation was due to the expectation to experience the benefits associated with UPA, and the same was mentioned several times during the Focus Group Discussions. The confirmation that the benefits are visible when all the necessary support is in place. A response corresponded with the information collected in the ministry food and crop situation reports.

The most common Vegetable crop highly grown by high number of respondents was spinach. Also, according to information gathered during focus group discussions, the integration of Social Behaviour Change and Communication(SBCC) from the Ministry of Health on the importance of Vegetables and fruits in household diets. The Key informants from the Ministry of health and WFP confirmed the crucial part SBCC had played mainly done for nutrition awareness.

The respondent actively involved in UPA during the research period also mentioned that the food crops grown are meant for subsistence purposes at the household level, depending on the selected beneficiaries. Key informants 3 & 4 mentioned that targeted households are selected based on Integrated Management of Acute Malnutrition (IMAM) programme. Integrated Management of Acute Malnutrition is a program in the Ministry of health aimed at supporting nutrition insecure households by providing supplementary feeding.

Income generation (Employment creation)

During the semi-structured interviews, beneficiaries of UPA practicing households were asked if they sell the excesses of what they harvest from the farm. The result showed that 16 (53.3%) of the UPA Practicing households participant agreed that they harvest in some period in excesses, and the sold either directly to the villages or vendors who approach to buy. The income earned used to purchase some maize flour or sugar to sustain a household in a week as stated by SSI respondent 8.

Although the 6(six) of the 16 that experiencing surplus produce, agree on keeping a sales record. The data collected from the respondent compared status and status of Technology being utilised during in relation to the rainy and dry season in Practice and relating to the substantial record obtained in a month.

FIGURE 4. 12 UPA PRACTICED (A) COMBINATION OF SHADE NET AND DRIP IRRIGATION (B) DRIP IRRIGATION.



Source: Author (2021)



FIGURE 4. 13 RESPONDENT SSI12 OF PAWPAW FRUIT PLANT.

Testimony SSI12



Source: Author(2021)

‘In my garden I grow majorly vegetables such as cowpeas, Amaranthus and spinach while in my garden portion I planted papaya tree. The most demands I get are from the papaya from local market and also neighbors who buy from me. They fetch good money at the ...

When it comes to calculating the amount of earnings, I always write down what I have sold in a day. As we can go to the papaya fruit tree, the production is always after a month where I harvest enough for sell but I don’t forget to give my children and family to enjoy also. The same to the vegetables but majority of the income from the vegetable I used it for saving in our group where we contribute Ksh 200 (\$ 2) per day.

The Savings where we ask loan for example paying school fees for our children you are given, and in my case, I paid back yesterday the bunch the loan I took 2 months ago ‘

Extra Benefits from UPA

During the focused group discussion, all the 9 UPA Practicing households shared the benefit UPA on their households' food accessibility and income. They agreed that UPA has integrated and strengthened their social network. They explained that sometimes they share food stock from the UPA with family members, friends, and neighbours, building strong relationships in their communities. The respondents gladly mentioned before the introduction of the UPA practice, they were operating alone. 3 of the Focus group respondents identified themselves to be part a welfare courtesy of UPA. According to them, their involvement in the UPA improved individual income and earnings.

4.2.4 Opportunities and challenges of UPA on food accessibility in relation to Dietary Diversity.

To get insight of the benefits of UPA, both the FGD and SSI respondents were asked the about the challenges facing UPA practice in relation to household food access and sustaining household dietary diversity.

The responded mentioned challenges as in table 4.8 listed in order of ranks:

TABLE 4. 8 CHALLENGES FACING UPA PRACTICE

Challenges	No. of Respondents	% Occurrence
Prolonged drought	40	95
Migratory pest and diseases	46	50
Limited access to inputs	30	75
Limited extension services	31	50-60
Expensive Climate SMART Technology	35	75
Perception of Certain food crops	35	60
Limited water and water salinity	35	65
Limited Agronomic knowledge on crop production	35	75
Low Return of Investments	36	80
Integration of livestock and UPA	30	75

Source: Author (2021)

The key challenges, that was highlighted by 95% of the respondents was prolonged drought.

Prolonged drought

During the separate focused group discussions involving the UPA practicing households 16 respondents from the Focus group discussion identified prolonged drought as a main challenge. The 20 out of the 30 semi-structured interviews respondents highlighted that the drought in Turkana contributed highly to the failure of the food crops in the field. The observation made from the video and picture taken in the field confirmed crops in the UPA sites were weathering as shown in the figure:

FIGURE 4. 14 WEATHERING COWPEAS FOOD CROP FROM PROLONGED DROUGHT



Source: Author(2021)

The Extension officers, the key informant 1 within the Ministry of agriculture, associated the weathering of crops due to high temperatures the crops . The Key Informant II also describes how the crops are grown under stretched conditions combined with water stress, poor soil and limited rainfall. The rainfall season mentioned by Key Informant 1 and 2 is experienced during the month of March and May and from October to December.

Insufficient water combined and salinity:

In one of the UPA sites, the drip irrigation kits had totally been dilapidated, that rendered not useful anymore considering by the respondent. As FGD respondents mentioned, the source of water for the practiced is drilled from the underground. As described by the Key Informants from the Ministry of Agriculture ...*"..the water in some point during the dry season go below the water table ,providing insufficient water for crop production and emitting salty water.."* The During focus group discussion the respondents were asked or what influences your decision on the ones to grow on the farm or backyard?, the respondents related it to water scarcity, crops that are drought and saline tolerant. In the response received, one of the respondents described the land size of the UPA as being determined and distributed depending on the amount of available water and land reclaimed.

Migratory pest and diseases:

50% of the Semi-structured interview and 30 % from the Focus group discussion were either affected by the desert Locust invasion of 2020 or other described pests of the ladybird family. The 18 respondents of the semi-structured interview participants decried the devastating effect the desert locust had on their farm. 40% of the affected mentioned they did not recover, which to them, no immediate recovery packages got provided. The researcher was well familiar with the situation has been part of the locust control Team in Turkana.

Limited access to Inputs

During the conduction of the semi-structured interviews that involved respondents from 4 UPA location sites, 25 (80%) out 30 UPA practicing households who were actively practicing UPA mentioned limited inputs as a challenge. The Inputs mentioned to be used vary from tools, seeds, or starter packs such as drip irrigation kits. 25 the semi-Structured interview talked of the relying on inputs distributed by the partners or the county government. Key informants' 2 mentioned on the inputs provided to farmer once during the inception of UPA as a starter pack and no follow-up is conducted on the status of the inputs. Though during the research period from the data base of the Ministry of Agriculture, inputs such as hoes, jembes and seeds were distributed under the courtesy of desert locust recovery to UPA Practicing households who were mainly affected by desert Locust. The confirmation from the respondents ,the was no surety they are part of the targeted group through the Ministry of Agriculture. The KII1 described the provision of inputs are always in form of subsidy to the vulnerable households involved in UPA though it was also mentioned by KII2 on how the various NGOs support but there was no record to ascertain it.

Limited Agronomic knowledge on crop production

During the semi-structured interviews 25 (73.3%) with 18 active and 7 inactive respondents mentioned on they had limited agronomic knowledge on crops production especially vegetables, while a few acknowledge having little knowledge of growing horticulture crop but not under drip system. A factor highlighted by of the SSI respondents. The confirmation from the KII1 that the beneficiaries of UPA have limited knowledge in crop production, A challenge FGD highlighted , as they related it to limited indigenous knowledge and experience on crop production. Another knowledge gap was on pest control without use of pesticide.

UPA practicing households and Key informants from the Ministry of agriculture highlighted that training is conducted on a need basis. The on-farm training from the response gotten in the two-focus group Discussion conducted is usually offered when a partner provides support with new seeds and a new crop. in which it is provided as one package.

Limited extension delivery services-

During the separate focused group discussions probing about the extension service provided by the Ministry of agriculture, the respondents only recalled having been visited by the extension officers thrice in a month. An issue that cut across the 14 focus group respondents. Though the KII1 from the Ministry of Agriculture highlighted community resource persons are selection from each site to offer follow-up and link for support from the extension officer in charge. Most of the said person are said to have insufficient experience and limited knowledge of UPA practice modalities and agronomy. A respondent mentioned the struggle with pests and disease affecting some of her crops that became a menace, leading to uprooting of the entire crop from the portion of land. The KII1 mentioned budget constraints do not allow continuous extension services and few numbers of extensions officers available.

Expensive Climate SMART Technology

The observation made during the research period showed some of the UPA site having worn-out and destroyed drip irrigation kits. The KII2 mentioned the starter kits provided to the identified vulnerable groups as Climate SMART technology that require regular maintenance. The starter pack though is provided only to the few selected individual as demonstration purposes with an aim to promote technology that is water saving and reduce the impactful effects of the scorching sun to the food crops grown. During the Focus group discussion, the respondent highlighted their little skills in maintenance and high cost related to fixing of the parts are way beyond their limits. They cannot use the minimal income earned from the sold food crops in place of food access.

FIGURE 4. 15: (A)DILAPIDATED DRIP IRRIGATION KITS



Source: Author(2021)

Low Return of Investments

The result of the field data established that both UPA Practicing households mentioned that time invested in engaging and labour involved is intensive when converted to monetary value. The result of the two Focus Group Discussion, labour-intensive activities varied from land preparation, agronomic practices, and all upto harvesting. At the same time put into the Practice is way more than benefits associated with UPA. Among the semi-structured interview respondents, 10 mentioned labour and time invested in watching over the food crops from theft was too demanding compared to if channelled to other viable livelihood activities like pastoralism. Key informants from WFP mentioned the domination of women involvement in UPA practice in comparison to men as being driven by cost Benefit Analysis. Therefore, during the selection of the beneficiaries

by both non-governmental agencies and extensions, priority is given to women to avoid a high rate of discontinuation.

Integration between Livestock keeping and Crop production in UPA

However, the key informants acknowledged the integration provided by UPA practice with indigenous pastoral lifestyle. The integration that was confirmed by FGD and SSI, who mentioned they own small livestock at the household level. The informants mentioned how some households have converted vegetables to animal feeds at the expense of consumption as the dropping are used as manure in UPA practice site. The respondents who own the small stocks like goat mentioned that they also consider giving unpalatable vegetables because of the provision of milk to the children. A response echoed by KII2 who support poor and food insecure household with milk producing goats breeds.

Perception towards certain food crops

During the two-focus group discussion and from the semi-structures interview, 10 respondents described the kind of food crops mostly produced as livestock feeds, especially indigenous vegetables such as Black-night shed, spider plant and jute mellow "*Murere*".

The respondent mentioned that the vegetables are not palatable and are not used to consuming them, and perception that consumed by people from western Kenya. Although the respondent admitted some grow in due to pressure to impress the partners for more support. During the interview, 3 out of 18 SSI actively involved in UPA and 9 inactive in the Practice agreed to have sold vegetables to other households rather than consume. The key informant from the Ministry of Agriculture also mentioned that the promotion of indigenous vegetables is due to crop tolerance to drought and salinity and equated the key reason the crops being nutrient-dense.

CHAPTER 5 : DISCUSSION

Introduction

This chapter presents the discussion of the results and finding collected during the research. The Discussion starts with the summary of the findings that answer the sub-questions, followed by the analysis. The chapter also discusses the researcher role during the data collection and in the process of data collection.

5.1 Discussion and Findings

The research aimed to map out factors that impact settled pastoralists involved in urban and peri-urban agriculture practice from sustaining household dietary diversification in Turkana County. The research focus was to understand the impact of UPA on food accessibility and its influence on the Household food basket. The need to understand opportunities and challenges surrounding the contribution of UPA towards food accessibility in sustaining dietary diversification among the poor and food-insecure settle pastoralist households.

Generally, across all households, as from the study findings, women were the dominant gender during the study, and most respondents involved in the study were within the active productive age as identified in the result. In terms of education level, few respondents had achieved primary education, and the household family size was averagely more than six. The results also reveal a portion of the respondent household marital status as married and attend schooling. A proportion of households relied on the safety net programme(SNP) as a

source of food and income supported through the National government, county government food and Nutrition Sectors in coordination with Food and Nutrition Security Partners, Non-Governmental Organisation and Faith-Based Organisation.

Dietary Diversity within the people living in Turkana

The research finding indicated that respondents actively involved in UPA tend to consume diverse food commodities compared to respondent households inactively involved in the Practice. As per HDD score findings respondents who practice UPA tend to be averagely high and characterised nutritious and quality diet, while the inactive respondent household involved in UPA, the diet can be characterised to be of poor quality. In that the diet consumed does not meet the household individuals nutrition needs. The findings confirm the study done by Carletto et al. (2015) which stated the benefits agriculture production on improving household dietary diversity as it increases increasing of food commodities. The findings also agree with the various studies (Peter et al., 2015, Isa., Chery., 2009, Lilian, 2018) which identified, the diet among settled pastoralist changes with involvement of household in agricultural production, though other study does not confirm the studies done in Turkana that both settled pastoralists still access livestock products to supplement their diets.

The findings from households engaged in more than one income generated activity indicated consumption of various food commodities, though the study done by Carr (2017) explained that settled pastoralist effects due to losing pastoralism as their livelihood has been household dietary diversification increases with the portfolio used to physically and economically access food, findings agree with Daniel (2017) study done on coping strategies pastoralists used to meet food needs in Turkana.

In Summary the findings of the research agree that settled pastoralists face low dietary diversification, affecting the vulnerable group such as children, women, and the elderly. Though the respondents physically access food through measures such as relief or safety net programs or/and livestock products and economic means like earning from informal employment, sale of livestock and safety net Cash transfer. The provisions that provide limited food diversity within the household food basket rarely meeting individual nutrition needs. Through UPA, households boost improved diverse food commodities supplementing household food baskets hence enhanced dietary diversity. The study's findings discovered benefits of the Practice driven by factors that lie within the households, community and local level. Factors ranging from socio-economic, socio-cultural or natural directly or indirectly impact poor and food-insecure households food access in the process of sustaining dietary diversification (Khumalo, N.Z. and Sibanda, M., 2019, Chihambakwe, et al. 2019).

The Economic and Physical access of Food in Urban and Peri-Urban areas

On the answering the question of settled pastoralists physically access food within the urban settings the study the findings found that a high number of households rely on safety net programs (SNP) as their main source of food, whilst other literature (Augustine T.L 2021, Czuba K. 2021) confirming SNP to be in form of relief aid. The studies literatures mentioned food relief as one of the most reliable means of accessing food during emergencies in ASAL areas of Turkana. In Augustine T.L (2021) research study done on the influence of the food relief in Turkana, confirms the previous study done by Carr, C.J., (2017) who discusses in his paper that settled pastoralists within urban and peri-urban areas acts as a motivator for households to settle down. Czuba, K., O'Neill, T.J. (2017) study on the impact of food assistance in Turkana also identified safety net in form of food assistance guarantees household access of food in the period of hardship.

Though the relief aims to meet the immediate food need, the food package constitutes cereals in maize and Sorghum, yellow pulses, and Vegetable oil which other studies (Czuba, K., O'Neill, T.J. and Ayala A.P., 2017) explained, the support only happens on emergencies situations. Though the strategy supports short-term food needs, it is ultimately insufficient to warrant a quality diet to meet a household's food and nutrition needs.

Other safety net programs aimed at supporting undernourished children result surprisingly identified the poor and food-insecure households relying on supplementary feeding (SMART Nutrition Survey 2019) , as a coping strategy to access to meet household dietary needs. Others use the nutrition status as a bait to attract supplementary feeding programmed to meet the households' food needs, a cycle that remains a hurdle for the Ministry of Health.

The other source, according to the results and finding households use UPA to access food commodities such as fruits, vegetables and other maize too, a case that shows a comparison agreement with rural households predominantly used to crop production in Zimbabwe and Ghana (Khumalo, N.Z. and Sibanda, M., 2019, Chihambakwe, M.et al. 2019).The study conducted in KwaZulu Natal (Khumalo, N.Z. and Sibanda, M., 2019) also agrees on the advantage of the individual accessing food directly from their UPA sites.

The study findings identified that some households accessed food from structured markets, indicating that household purchasing power to food. The income earned is sourced from different livelihood avenues , such as formal and informal employment , money earned from selling livestock, and Selling UPA products (Cordero-Ahiman, O.V. 2021) . As result that share equal characteristics with household living in urban areas in Zimbabwe and South Africa (Chihambakwe, M.et al. 2019, Khumalo, N.Z. and Sibanda, M., 2019).

The different income though to some households supplemented the household income. The respondent households that lacked other livelihood strategies used much of the income on normal staple food such as Maize and prioritise on Sugar. A Finding that I found disagrees with Daniel (2017) literature that stated dietary diversity is guaranteed with improved income. The finding though that I found relevant to Ouma(2017) statement that what a household purchase in Turkana settings is only aimed at improving quantity of household food basket rather than supplement with quality food commodity to meet household nutrition need. The findings from Lilian (2018) that I got explanation to be a result of poor dietary lifestyle and limited nutrition education , that social behavior change and communication(SBCC) are aimed at improving.

Although households physical and economic access strategies in sourcing food differ, generally indicates interrelationship with extra-economic activity in which a household is wholly or partially involved to meets food requirements.

Influence of UPA On Household food basket and Dietary diversity

The household food baskets directly correlate with the types of food crops household access either physically or economically from UPA practice as per findings of the study. It is worth to suggest from the result that the diverse agricultural products grown under UPA practice are directly collected to improved household food basket adding the number of the food crops . As discussion that is well elaborate by Ouma (2017) that household dependability on relief food has significantly been reduced through UPA . The selling of surplus products from the UPA site offer income as dividends which in turn which Diana, et al (2019) confirmed in discussion on how household improve financial assets within the household. The household through income purchase necessary additional nutrition missing in the household food basket. The findings that supports Nolwazi (2019) role of income as dividends of UPA in mobilising Household access to the nutritious food commodities , with the assumption the household are equipped with nutrition education and nutritious food choices.

The result from the findings identified that in the household consume the same food group food commodities if the UPA products are not considered. Both Active and inactive household on UPA practice consume three food groups consisting of Cereals, pulses, and condiments . The food baskets significantly showed to be closely related to pure pastoralist dietary habits' dietary characteristics as Ouma (2019) explained on her study of dietary diversity in Turkana. The available food crops such as Vegetables and Fruits produced meant additional

food groups in the household daily diet, describing the HDD Score of Five(5) among the household actively involved on UPA as benefits that . The believe that a more diverse food basket provides households the liberty to choose diverse food commodities that meet household members' nutrition needs explained and confirmed in other studies (Khumalo, N.Z. and Sibanda, 2019, Chihambakwe et al 2019) done UPA.

Opportunities and challenges of UPA on food accessibility in relation to Dietary Diversity

The study done by Nolwazi and Melusi (2019) described the sustainability of UPA practice highly dependent on the environmental condition. From the findings , the area of study is described to be prone to drought since it lies in the Arid and Semi-arid Lands (ASAL) areas of Kenya. The later has an environmental impactful role on failure of UPA practices and loss of food crops in the fields was identified as majorly an inhibiting factor. The results also confirmed the claims made by Feola et al , (2020) and mention in KDHS(2014) report over harsh and unsupportive environmental conditions in Turkana to Crop production. Though the claim might be true but the indication and the visible crops within the UPA sites and field, gives a contrasting result when improved technology is use. As Lee-Smith, D. et al. (2019) discusses of the futility of using Climate SMART Technology in promotion of crop products in areas that are affected by climate change provides an avenue for households to sustain dividends from UPA in presence of drought.

Natural resource such as water as per the UPA Practicing households and the result from the data collected showed how water scarcity influenced the failure of food crops in the field , though there is no indication to suggest competition of the water as it happens in urban areas as (Lee-Smith, D. et al. 2019). The water UPA water is mainly drilled water from underground, which the scarcity is associated with level of water being below water table that it becomes harder to siphoned out of the ground. As other literature done on UPA explains that water challenges emanate from competition with there is little study done on quality of water within Turkana central to described the effect of salinity.

Most household associated failure of the UPA practice was due to limited access to Inputs as per the findings. As literature and study done in Tongaat in South Africa by Nolwazi (2019) state for the urban and peri-urban households the lack of farming inputs and is likely to impede the practice of UPA activities and thus compromise the food security status of the households through reduced quantity and quality of food produced by UPA practicing households. The findings that's is also mentioned by UPA practicing household inputs in Turkana that lack of inputs is crucial to cultivate viable food crops. Though the tools are provided to the vulnerable farmers every financial year it is never provided twice to same households. In the inception of every project that relates to UPA inputs in form of tools, seeds and other necessary inputs are provided in the perception that it will help transition the settled pastoralist to agro-pastoralist. Though UPA provided opportunity to earn income no income as shown by the results collected is directed towards purchase of inputs.

The findings of the studies also identified that the UPA practicing households have limited agronomic knowledge on crop production. The finding can be equated to the predominant livelihood of the settled pastoralists. The settled pastoralist based on their indigenous knowledge of agriculture, are conversant with livestock keeping therefore introduction to crops such as vegetables and fruits is totally a new field that will require time to adjust. In other studies UPA .The study finding does not confirm the study done in Ghana by Lee-Smith (2019) that urban and Peri-urban population engage in crops production through UPA based on the indigenous knowledge in Agriculture. The same is shared by Manoj (2016) that the success of UPA practice should be built on the indigenous knowledge of a population. Though the different literature do not recognise the challenges that shifting from pastoralism to crop farming entails but in the case of Turkana great burden lies in the back of the UPA promoters.

In the process of adapting to the climate change effects , the research found out that a mixture of climate adaptation measures is employed to strengthen the resilience against climate impacts. The study identified that use of technology in open land or in enclosure that help support maximum utilisation of water and

available land. The studies done UPA practice in Urban areas by Lee-Smith(2019) state that effect of climate change affects the urban and regions within the urban settings and suggests the use of climate adaptive measures to make use of the limited water and spaces , a measure that agrees with the results and finding of the research. The same is echoed by Pedsizal et al (2014) who state that UPA is an importance strategy to climate change adaptation. The literatures ignore the cost of climate adaptation technology in terms of capacity in terms of skills and knowledge , as well as financial costs . As a result the poor and food-insecure household are left to handle the complexity of climate change with limited resource to maintain and improve. The UPA practicing households in Turkana are burdened to maintain due to the cost associated with the technology. They are not financially secure to maintain the expensive climate adaptation technology.

The economic benefits of the UPA are measured on cost-benefit analysis. The finding showed the financial dividends contributed by UPA on the household role in supporting household meet other needs beside food. The results of the finding reflected a small portion of the household to have made profit from UPA with majority being Practicing UPA for subsistence purpose. Various research done on benefits of UPA(Khumalo and Sibanda,2019 Chihambakwe, et al., 2019) associate UPA to financial gain ,though from the finding the benefits to in Turkana urban and peri-urban has little secondary effects. As a result of it, it has attracted more women who are focused on the subsistence contribution of UPA, than men, whose engagement is based on the economic benefits of the Practice. As the findings show, Low Return of Investments is believed to have pulled men away from UPA practice while only women remain actively involved confirming Lee-Smith , et al(2019) findings as women being the majority gender in UPA practice in urban areas. An argument that backs up the reason women dominate UPA Practice in comparison to men.

The integration of livestock and crop production plays an important role in improving dietary diversity at the household level by providing both animal and crop-based to the specific households. The study done by on Carletto et al.(2015) indicated a correlation between dietary diversity and livestock products. The research findings identified that apart from UPA being utilised for food crop production, it is also used to provide feed to the livestock or small stocks ,a practice that found to contravenes the intended purpose of UPA. Based on the predominant cultural value given to livestock and priority given in terms of offering green leafy food crops as feeds , some households are deprived of nutrition benefits associated with the food crops. As the findings showed some UPA products are necessarily grown for animal feed or use of the limited water to grown grass in place of food crops. Displacement of priority within a household means a household predominantly connected to pastoralism utilise the resources invested in UPA for the wellbeing of the livestock. The same case also could be related to the livestock and UPA conflict over the available water.

In relation to the perception of the crops produced in the UPA site, the finding found that not all that is cultivated and produced end up on the household food basket or rather on the plate. From the study's findings, I found out that in Turkana central, the expansion of the Lodwar town attracts people from different communities with predominantly unique dietary practices. As a result of interaction between various communities , the emergence of stereotype perception towards certain food commodities to be associated with different community; as a result; households end up selling, for example, vegetables "*Murere*" Jute mallow to those communities members that value food. The findings confirms study done on the cultural exchange influence on dietary choice by Alakaam, et al (2015) that explains that some food practices are mostly driven by the social interaction with other ethnic group. The study also confirms the findings by Ouma(2017) that In the situation where the palatability of vegetables is described to be consumed based on the level of interaction with food , a factors that the research found out contributed to some household decide to either harvest and throw away or leave to dry in fields. In the fourth run, few crop commodities are either consumed within the households.

5.2.0 Research process and methodology

The research coincided with effects associated with Covid-19 period, characterised my regulations such as

social distancing and ban imposed against gathering which meant interaction was rendered limited. The next major worry that I was unsure of was how the engagement of the UPA practicing households was to be done especially on reception they would offer the research assistant. Fortunately my research and data collection was boosted by the government flexibility to allow gathering for people less than thirty in a closed space limited to counties with no Covid alert cases, Turkana being one of those. Use other Covid19 measures was purely necessary.

The UPA being a continuous activity, it was easy to liaise with Agriculture officers in-charge of Turkana Central to liaise with the community resource person in mobilising FGD participants and assisted on the sites to settle in based on the objective the research was aimed at.

The research aimed at mapping out factors that impacts settled pastoralists involved in urban and peri-urban agriculture practice in sustaining household dietary diversification in Turkana County.

I conducted my research in Turkana central with areas within and outcast of Lodwar town where the UPA activities are practiced, the closeness of the site made it easy to confirm information and seek for clarification from different respondents. A factor that made respondent feel the value of their contribution to the research. I expected to experience resistance from the various interest group considering it is a political campaigning period in Kenya.

In the context of drought declaration as a national disaster, I was hesitant on engaging UPA practising households who are counting losses or rather enjoying little benefits from the Practice. In the period of a national disaster such as drought, the government in partnership with other partners offer emergency relief food to the household. It was unpredictable finding proper time to meet the practicing households with the fear respondent might prioritise their welfare over the research.

Luckily enough, the selected UPA sites identified practicing households were willing to share the experience and participate in the discussion that will be beneficial in future in improving food accessibility within their households.

5.2.1 The quality of Research findings

During my data collection, the research used key informants interviews, semi-structured interviews with UPA households practicing UPA, Focus Group Discussion, Observation and Household dietary Score for the purposes of triangulation.

As a researcher, my mandate was to virtually coordinate step-by-step processes and progress as per the designed research strategy; the phone being the medium of interaction, it was susceptible to interruption from internet disconnection, posing a major challenge towards distortion of data. To avoid the mishap, having a backup recording medium provided an avenue where I engaged with the respondents passively. I got acquitted with the transcribed collected data and during writing the transcripts for analysis.

The data I transcribed in sheets and transcripts were coded based on the findings based on the research sub-questions and ranked based on consistency in different data collection methods. Therefore I drew the conclusion from all sources to ensured the reliability and validity of the data collected.

In the process of data analysis, I realised my SSI sample size of 30 was very large to analyse in few days; during ranking and prioritising some factors that did not consistently appear in more than half of the sample size were left one though it required consideration in the research. In terms of gender, I worked with the assumption both men and women are actively involved in UPA at the same level, it was a challenge getting a balance therefore women who fitted the criteria participated making women number during the research higher than of men.

Another factor that might play a role in distortion during the collected data and processing is the use of

researcher assistants who have limited knowledge in the field of research and the context at which the research objectives and aim is to study. In some circumstances, in the transcription process, some questions from the research assistant did not reflect the context at which the questions were aiming, which therefore meant much time spent in trying to transcribe unnecessary responses from the participant irrelevant to the research.

In such a situation, if research assistants are necessary, instead of testing a data collection tool on an individual with an no idea of the context on the question. The research assistant required several pre-testing to an actual participant to get acquainted thoroughly on the expectation of each tool content. A simple process that will save the researcher's need to have a close follow-up in pre-checking the correctness of the data collected.

After a thorough screening of the collected data, the research visualised the factors that impact household practicing UPA in sustaining dietary diversification. The factor that can be generalised to reflect on settled pastoralists in urban and peri-urban areas of Turkana.

Though my expectation was UPA acts as a demonstration farm where vegetable are just grown for home consumption. To my ultimate surprise, learning that household have embraced fruit trees in the UPA site and making a living from the limited space and water is something I did not expect. Having to know that a household earns income that caters for their children's education is way above the expectation of many.

In terms of breaking social ties between pastoralists resulting from settling in urban areas, interaction with other communities motivates households involved in UPA to produce food crops and consume, bringing an aspect of socially introduced food choices. For example, the promotion of indigenous vegetables that are pastoralist were predominantly not part of their diet but due to influence from other communities within urban centre push them to try consuming them too.

Despite the much effort done by the household involved in UPA to improve the household dietary diversity, sustaining the Practice requires more continuous capacity building in terms of training and use of technology that are profitable towards Practice of UPA. The various key stakeholders involved in need to develop synergies for the success of UPA.

The findings I believe reflects the realities on the grassroots, essential to be shared with the Ministry of Agriculture Pastoral economy and Fisheries to answer the query the research was aimed to answer. The research has acted as a motivation to further engage to further researcher. Most importantly the study areas have improved my critical thinking skills, coordination skills, time management and importance of planning.

CHAPTER 6 : CONCLUSION AND RECOMMENDATION

6.1 : Conclusion

This research study aimed to map out the factors that impact settled pastoralists practicing UPA in sustaining household dietary diversity in Turkana. The results analysed the key variables that the research each sub-question sought to address.

In understanding the current household dietary diversification among Turkana people living in urban and peri-urban settlements. The research findings identified the difference in dietary diversity of households practicing UPA and those that withdrew from the Practice despite living in the same context. Though the food groups consumed both household are almost from common food groups, there are significant differences among households actively practicing UPA and the household inactively involved in UPA. A change shown that dietary diversity practice among the household actively practicing UPA is boosted by consumption of different food

groups as a result of food accessed from UPA products. Additionally, other than household directly accessing UPA products such like vegetables and fruits, they also better their nutrition needs within the household members by buying. The household withdrawing from the practice are exposed to low dietary diversity. The research also found out that , dietary lifestyle and choices to access diverse diet by a household improves with adoption of UPA especially the poor and food insecure household with limited sources of livelihood outcome.

To meet the nutrition needs, settled pastoralists within urban and peri-urban areas have device and adapted ways to access and shield from advanced effects of food insecurity. The study identified key sources that range from safety net programs to access food physically and in an economic means. Physical accessibility, as the research results highlight, showed that households use relief food to boost their immediate food needs and use it as a catalyst to engage in other socio-economic activities. Household that benefited from cash transfer (safety net program), have the liberty purchase food of choice. The luckiest households with household members involved in income generating activities like selling livestock, earning from UPA sells of products and income from formal and informal employment, have purchase power to purchase food commodities to meet the household members nutrition . Although high purchasing power contributes to dietary diversity since a household can purchase other food. As the research identified , the households end up supplementing the household with poor quality diet that does not meet the nutrition needs of individual household members. A norm that requires change in dietary habits and lifestyle to avoid constantly rendering poor and food insecure household food and nutrition insecure.

The promotion of UPA aimed at supporting the poor and food-insecure household meet the dietary needs as well as improve the food security status of all the household members. The study's findings identified that the primary benefits of UPA to the said household include provision of UPA practice as an alternative source of livelihood. A portfolio that poor and food insecure households have used to improve their household food security through improved access to diverse diets as well as improve household income. The findings identified that different food crops cultivated and utilised within the poor and food-insecure households have improved the physical access to diverse food commodities, playing a role in household dietary diversity. The households access to agricultural food crops that supplement the household food basket with diverse food crops to choose from. Though settled pastoralist boost of additional agricultural crop products from UPA provide diverse food choices. It is critical not to cast and conclude that the latter automatically guarantees an improved household dietary lifestyle and behaviour. The identification of livestock keeping as a predominant livelihood activity of settled households, integration with UPA, strengthens the portfolio in which the poor and food-insecure households supplement food baskets and sustain dietary diversity. The household's ability to improve on the income has significantly played a role in supporting household financial assets which the finding found some of the household pay school fees for their children.

The UPA contribution towards improving Household dietary diversity among settled pastoralist , the study provided an answer to the question, "What are the opportunities and challenges that pastoralist involved in urban and peri-urban agriculture practice undergo in the process of improving food accessibility within their households?" The study findings identified factors within Turkana context that play a role in enhancing and inhibiting settled households practicing UPA towards improvement to food access to sustaining dietary diversity .

One of the environmental challenges the research identified is prolonged drought period, which based on the household practicing UPA have been highly affected . Drought in the context of Turkana, as the findings identified, to influence on water availability and influences the possibility to harvested food crops in the UPA field. A finding that highly contributed to some household withdrawing from the practice.

The research also identified water scarcity as a natural resource in combination with the water salinity to also play a role in the inability of the household to benefit from UPA since they face numerous crop failure or crops

are not supported by the limited water. A finding that literatures identified to be cutting across all the UPA practices

The study's findings identified the use of climate adaptive measures, the technologies are aimed at reducing the effects of climate change that affects the crop failures to water stress and extreme sun. The technology are adapted to help utilise the minimal amount of water as possible, and avoid wastage. Though the findings found adaptation provides a chance for the poor and food-insecure households to engage in the practice continuously, it comes with cost challenges in maintenance and capacity. Therefore, rendering the use of the adaptive climate measure impossible to be utilised in the long term by poor and food-insecure households with limited financial resources.

The invasion of the desert locust could be associated with a new phenomenon in Kenya. The finding from the affected household were forced to abandon the practice considering no emergency prepared measures was in place to support in recovery of UPA practice. The withdrawal as of the findings of the said household that had relied on UPA as a source of livelihood was plunged back into being food insecure, an indication that the practice requires measures that will shield the UPA practicing household against pests and diseases beyond the control of their capabilities.

Among the household involved in UPA, the findings identified the members involved in UPA had limited agronomic knowledge on crop production. A factor that research recognized cuts across both the household actively and inactively practicing UPA. The settled household being predominantly pastoralist has limited experience in crop production and though some may have learned through training and exposure, it requires time to practice and apply. The different Indigenous Technical knowledge makes it challenging for some households to utilise UPA practice when promoting new food crops fully. To build on transitioning from pastoralism to crop production or both requires lots of investment in time and resources. The long-term outcome that UPA need to focus on how capacity of the poor household can be built.

Socio-cultural factors such as perception towards consumption is related to how the household view and treat consumption of a certain food crop. The findings from the study equated the perception to stereotypic attached to UPA food crops. The research found out that due to the increasing population and increased mixture of different cultures and dietary practices, some vegetables are perceived as not everyone for a certain community. A perception prompting households to produce some crops to sell to the said community rather than consume at the household level. A behaviour indicates the household either has limited knowledge of the nutrition benefit or value the said food crops.

The research was not focused on identifying the integration of Livestock keeping and UPA in promoting household food accessibility in sustaining dietary diversification. Although one of identified finding that research found is the role the integration of UPA and Livestock. As part of promoting diversified livelihood, the research noted that the poor and food insecure households also keep small stock animals, benefiting from the dividends of UPA practice. Though based on the information collected on the influence to UPA, it was clear if not well managed, it might lead to the disintegration and failure of the practice in supporting households to achieve dietary diversity. The research though, limited its finding on the interaction of the two (UPA and Livestock) in balancing food crops for the household to meet food and nutrition needs and utilisation of UPA products as livestock feed.

The results finding also identified the perspective of UPA on low return of investment among household members. The less involvement of men in UPA is equated to the poor Cost benefit analysis where the household members invest time, energy and other resources to earn profit. As women are actively involved in UPA to UPA for Subsistence purposes, men involvement is determined by the financial benefit acquired or

income earned from UPA. As other literature mention , the more UPA will be centred on subsistence purpose the more it will attract women and sidelining the men from the practice.

In short the answer to my research question is settled pastoralists face low dietary diversification, affecting the vulnerable group such as children, women, and the elderly as household consume poor quality diet characterised by lack of diversity. As from the findings the poor and food insecure household improves with engagement in UPA which improves the household access to diverse food crops enabling individual household member meet the nutrition needs and requirements.

Though settle pastoralist living in urban and peri-urban areas, physically access food through sources such as relief or safety net programs or/and through economic means like purchase from income earned from formal and informal employment, sale of livestock and safety net Cash transfer. The quality of food the sources provides is insufficient to meet the household members nutrition needs as the food commodities mainly consists of cereals and lack other food groups such as vegetable and fruits.

The incorporation of Urban and peri-urban Agriculture has provided the poor and food insecure households with the option to cultivate food crops that supplement household food basket with diverse quality food commodities enabling households to choose diverse diet and boost household purchase power to access other food commodities boosting household dietary diversity.

Sustaining the food access of UPA practicing households engaged as per the findings is enhanced and hindered by issues and factors of environment like drought prolonged drought, water scarcity and salinity as well as threat of desert locust invasion, socio-economic such as limited agronomic knowledge on crop production and complexity of integration of UPA with livestock keeping, low return to investment of UPA practice and poor perception of food. The issues that require attention when promoting UPA practice.

Hopefully the findings and the conclusion of the research contributed in understanding the constraints of UPA

6.2 RECOMMENDATION

As the findings showed, UPA practice is essential in supporting poor and food-insecure households living urban areas of Turkana in improving access to diverse food to sustain their dietary diversity. To address the constraints of UPA in sustaining dietary diversification as the research sought to study, the researcher proposes the following recommendations for consideration

The Ministry of Health should

- To improve on the dietary diversity of the Poor and food insecure scale-up Nutrition awareness on the nutrition value of UPA products by incorporating them into Social Behaviour Change and Communication(SBCC)

The Ministry of Agriculture, Pastoral Economy and Fisheries need to

- Provide continuous extension services to build the capacity of households practicing UPA on emerging climate adaptation technology and integrate with Indigenous Technical Knowledge as well improved agronomic knowledge on crop production.

- To help shield UPA practicing households against natural disasters such as Desert Locust Development and support recovery, the ministry should spearhead insurance of UPA practice and incorporation into the Agriculture Policy.
- Incorporate gender mainstreaming in coordination with gender, youth and social welfare in designing UPA programs therefore, providing to

JOINT COOPERATION(PARTNERS)

- Ensure access to high-quality seeds and inputs by strengthening the Public, Private, Producers, Partnership Approach(PPPP) to fully transition pastoralists to UPA practice.
- Pull the funding together to meet the inputs demands and requirements of the vulnerability UPA practicing household

Further Research

The researcher would like to suggest that further research be carried out to determine the impacts of the integration livestock and UPA on improving food access and enhancing dietary diversification among UPA practicing households in Urban and Peri-urban areas of Turkana.

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Appendix 1:

Sample Key Informant Interview

	Date (dd/mm/yy)	Interview number

To be completed by the interviewer

1. Introduction

This interview aims will seek identify factors that hinder these households from fully exploiting the benefits of UPA to achieve sustainable dietary diversification. This study focuses on constraints that settled pastoralist households practicing urban and peri-urban agriculture (UPA) in achieving dietary diversification. In the Case study area being Kanamkemer Ward, Turkana Central.

The study is driven by the limited knowledge on the impact of urban and peri-urban agricultural practices towards physical and economic access of food for settled pastoralists living in Turkana, therefore, the current research seeks to map Out the impacts of UPA to the settled pastoralist in sustaining household dietary diversity. The Key Thematic areas that the research will focus: Settled pastoralist, Household, Dietary Diversity, UPA ,food security, Dietary diversity.

READ THE INFORMED CONSENT FORM TO THE RESPONDENT(S) AND ASK THEM TO SIGN IT.

1.1 What is your current position? (WRITE THE RESPONSE BELOW)

1.2 What is your current place of work in Turkana? (WRITE THE RESPONSE BELOW)

1.3 Are you a representative of: (READ THE RESPONSES BELOW AND CHECK ALL THAT APPLY)?

<input type="checkbox"/>	1. The Ministry of Agriculture Pastoral Economy and Fisheries
<input type="checkbox"/>	2. The Ministry of Health
<input type="checkbox"/>	3. World Food Program
<input type="checkbox"/>	4. Other (SPECIFY): <input type="text"/>

2. Settle Pastoralist

2.1 In your opinion, what attracts Turkana pastoralist to settle within urban and Peri-urban areas? (CHECK ALL THAT APPLY)

<input type="checkbox"/>	1.	Food relief
<input type="checkbox"/>	2.	Formal and informal employment

- ☐ 3. Family members influence
- ☐ 4. Loss of livelihood (Pastoralism)
- ☐ 5. Conflicts
- ☐ 6. They have no other choice
- ☐ 7. Other (SPECIFY):

2.2 As per your previous response, what is the most important factor that has attracted the people under review to settle in the areas specified ?

2.3 In your opinion, has the settling of pastoralists in urban and peri-urban areas improved household food security situation? (CHECK ONE ANSWER)

- ☐ 1. Yes
- ☐ 2. No
- ☐ 3. I don't know

2.3.1 Why? Explain your answer.

2.4 In your opinion, how should food security situation be improved among the settled pastoralists household in the urban and peri-urban areas? (CHECK ALL THAT APPLY)

- ☐ 1. By provision of relief food
- ☐ 2. By promoting agricultural production
- ☐ 3. By provision of livestock to HHs
- ☐ 4. Through employment provision
- ☐ 5. Through an application food voucher
- ☐ 6. Through the promotion of Businesses
- ☐ 7. Through training and food awareness
- ☐ 8. Supporting SCHOOL feeding programme
- ☐ 9. I don't know
- ☐ 10. Other (SPECIFY):

3. Dietary diversification

3.1 What is your own opinion what do you think about the level of households' dietary diversity situation of the settled pastoralist within the Kanamkemer ward? (CHECK ONE BOX FOR EACH ITEM)

Category of HDD	level of HDDs			
	Very Low 0	Low 1	Average 2	High 3

Category of HDD	level of HDDs			
	Very Low 0	Low 1	Average 2	High 3
1. HDDs < 3				
2. HDDs : 3-5				
3. HDDS: 5>				

- 3.2 Based your previous opinion, how would you rate the quality of households HDDs of the households under assessment? Would you rate it as poor, adequate or good? (CHECK ONE BOX FOR EACH ITEM)

Quality of the HDDs	Quality of HDDs			
	I don't know 0	Poor 1	Adequate 2	Good 3
1. HDDs < 3				
2. HDDs: 3-5				
3. HDDS: 5>				

- 3.3 In your opinion, what steps should you in your position take to ensure sufficient dietary diversity of the group under assessment? There is a need for.....: (CHECK ALL THAT APPLY)

<input type="checkbox"/>	1. More awareness	
<input type="checkbox"/>	2. Safety net program support(Cash Transfer)	
<input type="checkbox"/>	3. Agricultural support	
<input type="checkbox"/>	4. Relief food	
<input type="checkbox"/>	5. Other (SPECIFY):	

- 3.4 Does your organisation, implements activities that supports dietary diversity among settle pastoralist or Turkana population living in urban and peri-urban areas? (CHECK ONE ANSWER)

<input type="checkbox"/>	* 1. Yes
<input type="checkbox"/>	2. No
<input type="checkbox"/>	3. I don't know

- 3.5 What programs are available within your organisation to support dietary diversification among settled pastoralist in the urban and peri-urban areas? (CHECK ALL THAT APPLY)

<input type="checkbox"/>	1. Access to farming equipment and inputs	
<input type="checkbox"/>	2. Access to food relief (In-kind or Conditional)	
<input type="checkbox"/>	3. Urban and Peri-urban agriculture support	
<input type="checkbox"/>	4. Food production support	
<input type="checkbox"/>	5. Awareness (Nutrition awareness)	
<input type="checkbox"/>	6. Cash transfer	
<input type="checkbox"/>	7. Food Vouchers	
<input type="checkbox"/>	8. I don't know	
<input type="checkbox"/>	9. Other (SPECIFY):	

- 3.6 In your opinion, is there a need to improve the implemented programs in support of dietary diversification among the settled pastoralists in the targeted areas? (CHECK ONE ANSWER)

- | | |
|---|-----------------|
| * | 1. Yes |
| | 2. No |
| | 3. I don't know |

3.6.1 If yes, what steps could be taken to improve the key programs?

4. Urban and Peri-Urban Agriculture

4.1 Based on your observation, approximately what proportion of the selected households fully commit to UPA without follow-up? (CHECK ONE ANSWER)

- | | | |
|---|----|--|
| | 1. | Less than 25% |
| | 2. | 25% to 49% |
| * | 3. | 50% to 74% |
| | 4. | 75% to 100% |
| | 5. | I don't know |
| | 6. | My organisation does not have need to record |

What are the main factors that contributes to the proportion above?

4.2 In general, do you think the necessary support factors for the Urban and Peri-urban Agriculture such has such as Socio-economic, demographic, technical skills, environment, and cultural —are sufficient for its support on Dietary Diversification? (CHECK ONE ANSWER)

- | | |
|--|-----------------|
| | 1. Yes |
| | 2. No |
| | 3. I don't know |

4.1.1 Please explain your answer.

4.3 What are the key factors that you think needs improvement? (IF NEEDED, PROBE: READ OUT THE ITEMS THAT WERE RATED AS "POOR CONDITION" ABOVE, AND ASK THE QUESTION: "In what way do these items need to be improved?")

5. Household

5.1 How would you rate how the following factors at the household level influence on UPA? (CHECK ONE BOX FOR EACH item)

Materials and equipment	Supply/Quantity			
	Don't know 0	Not at all 1	Average 2	Highly 3
1. Education level		*		
2. Technical (Agricultural) Skills				
3. Sex				
4. Cultural Background				
5. Household size				

5.2 In your opinion, does it require any improvement or changes? (CHECK ONE ANSWER)

- ☐ * 1. Yes
☐ 2. No
☐ 3. I don't know

5.2.1 If yes, how can this be done? (IF NEEDED, PROBE: READ THE ITEMS THAT WERE RATED AS "AVERAGE" OR "HIGHLY" ABOVE, AND ASK THE QUESTION: "How can these items be improved?")

6. UPA Food Accessibility and Availability

6.1 In your opinion, how will you rate the impact of UPA in supporting the following.....: (CHECK ONE ANSWER FOR EACH PHRASE)

Area	Level of competence			
	Don't know 0	Poorly prepared 1	Prepared 2	Well prepared 3
1. Provision of Diverse food within the HH			*	
2. Improved income within the HH		*		
3. Improved the overall HH food basket			*	

6.2 Does the UPA offer opportunity for the HH to improve their food security situation? (CHECK ONE ANSWER)

- ☐ * 1. Yes
☐ 2. No

☐ 3. I don't know

6.2.1 If yes, what are the main goal of UPA promotion? (CHECK ALL THAT APPLY)

<input checked="" type="checkbox"/>	1. Improve access to vegetables and Fruits
<input type="checkbox"/>	2. Income generating Activity for HH
<input checked="" type="checkbox"/>	3. Supply Vegetables and Fruits to Market
<input type="checkbox"/>	4. Improve Practical knowledge of HH
<input type="checkbox"/>	5. Enhance women empowerment
<input checked="" type="checkbox"/>	6. Improve food baskets among urban and peri urban households
<input type="checkbox"/>	7. I don't know
<input type="checkbox"/>	8. Other (SPECIFY): <input type="text"/>

6.3 In your opinion, how frequently do the HH practicing UPA use information, such as weather forecast Rainy Season or dry season (CHECK ONE ANSWER)

<input type="checkbox"/>	1. Always
<input type="checkbox"/>	2. Sometimes
<input type="checkbox"/>	3. Never
<input type="checkbox"/>	4. I don't know

6.4 In your opinion, is there a need to increase the availability and access of the weather forecast? (CHECK ONE ANSWER)

<input type="checkbox"/>	1. Yes
<input type="checkbox"/>	2. No
<input type="checkbox"/>	3. I don't know

6.4.1 If yes, how can the use of the information from weather forecast be used?

6.5 Based on your opinion how will you quantify the various food crops promoted in the UPA in support of household dietary diversity improvement? (CHECK ONE BOX FOR EACH ITEM)

UPA in practice	Quantity?			
	I don't know 0	Not enough 1	Enough 2	Too many or too much 3
1. Improve accessibility of food within the HH				
2. Support Consumption of Vegetables and fruits				
3. Support income generation to purchase other food groups not within reach.				
4. Increased food diversification within the household.				
5. Support food commodity exchange				
6. Other (SPECIFY):				

7. UPA challenges to Food Accessibility

7.1 What measures are applied in your organisation to ensure UPA within the areas promoted is highly beneficial? (CHECK ALL THAT APPLY)

<input type="checkbox"/>	1.	Purchase of high value seeds (Drought Resistant)
<input type="checkbox"/>	2.	Periodic visit to the households practicing UPA
<input type="checkbox"/>	3.	Having a standard plan for training
<input type="checkbox"/>	4.	Ensure the Households are motivated in UPA
<input type="checkbox"/>	5.	Monitor the progress of the households with checklist
<input type="checkbox"/>	6.	No quality assurance system exists
<input type="checkbox"/>	7.	I don't know
<input type="checkbox"/>	8.	Other

(SPECIFY):

7.2 Has your organisation or department in any way get involved in selection households or those involved in UPA? (CHECK ONE ANSWER)

<input type="checkbox"/>	1. Yes
<input type="checkbox"/>	2. No
<input type="checkbox"/>	3. I don't know

7.3.1 If yes, how was your organisation involved?

7.3 In your opinion, is there a need to upscale the UPA in Turkana if dietary diversification needs to be achieved? (CHECK ONE ANSWER)

<input type="checkbox"/>	1. Yes
<input type="checkbox"/>	2. No
<input type="checkbox"/>	3. I don't know

8.5.1 If yes, what key improvement is required to make sure UPA fully support dietary diversification in Turkana?

<input type="checkbox"/>	1. I don't know
--------------------------	-----------------

9.2.1 If yes, what types of support is offered to the households practicing UPA? (CHECK ALL THAT APPLY)

<input type="checkbox"/>	1. Training
<input type="checkbox"/>	2. Research
<input type="checkbox"/>	3. Service delivery
<input type="checkbox"/>	4. I don't know
<input type="checkbox"/>	5. Other (SPECIFY):

7.4 Do any of the partner play a role in spearheading UPA for in close partnership with your organisation as an income generating Activity? (CHECK ONE ANSWER)

- | | |
|--------------------------|-----------------|
| <input type="checkbox"/> | 1. Yes |
| <input type="checkbox"/> | 2. No |
| <input type="checkbox"/> | 3. I don't know |

9.3.1 If yes, what support is offered to the settled households practicing UPA ?(CHECK ALL THAT APPLY)

- | | |
|--------------------------|--|
| <input type="checkbox"/> | 1. Exchange visits |
| <input type="checkbox"/> | 2. Benchmarking |
| <input type="checkbox"/> | 3. Training |
| <input type="checkbox"/> | 4. Tools |
| <input type="checkbox"/> | 5. Seeds |
| <input type="checkbox"/> | 6. I don't know |
| <input type="checkbox"/> | 7. Other (SPECIFY): <input type="text"/> |

7.5 In your opinion, is there a need to improve partnerships within the different partners involved in supporting UPA among the settled pastoralists? (CHECK ONE ANSWER)

- | | |
|--------------------------|-----------------|
| <input type="checkbox"/> | * 1. Yes |
| <input type="checkbox"/> | 2. No |
| <input type="checkbox"/> | 3. I don't know |

9.4.1 If yes, what steps could be taken to improve the partnerships?

7.6 We have reached the end of our interview. Do you have any additional suggestions on the best way to support the settled pastoralist from fully exploiting the benefits of UPA in achieving sustainable household dietary diversity?

Thank you!

Appendix 2 :Focus Group Interviews

Opening question

Beginning the Focus Group Discussion

The recommended pattern for introducing the group discussion includes:

(1) Welcome, (2) Overview of the topic (3) Ground rules and (4) First question. Here is an example of a typical introduction:

Good evening and welcome to our session. Thanks for accepting the invitation to participate in this academic research on the UPA practices of both home(kitchen) gardening and community gardening (Demo farms) in Turkana Central, here in Turkana. My name is....., and the Colleagues with me are and We are conducting a research on behalf of a student studying in Van Hall Larenstein in the Netherlands, but we are from the ministry of Agriculture in Turkana. The aim of the research is to map out factors that hinder settled pastoralists full exploitation of urban and peri-urban agriculture practice in sustaining household dietary diversification in Turkana County.

You were invited because you participate in Home gardening and Community gardening (UPA)so you're familiar the benefits and challenges that the UPA encounters, and well enough you all live in this section of Kanamkemer ward.

Whatever answer you are going to give us is totally helpful be negative or positive. Keep in mind it can have a differing opinion with others and don't feel ashamed on mentioning what have already been mentioned, if you feel it is very important to note.

You've probably noticed the phone being laid in the middle while Mr. Abolem is also following the discussion. We are recording the session because it is very important not to miss any of your contributions and comments in today session. As all of us know we cannot write down everything you say and remember them that's why it is of help to record to be able to go through later. So today in introducing ourselves we will use only one name and put in mind that we assure you none of your names will be used in the report, but it is purposely for knowing each other. The reports will be sent to the student who is abroad to be able to use it for the benefits of his school and for the county in future planning during the upscaling of the UPA.

FGD guide

Generic Questions

Settle Pastoralist, Dietary Diversification and Food accessibility

1. Most of you were not born in Lodwar, or in case you were born here your parents might have come from different places, what prompted them to you to start living in Kanamkemer ward?
2. How well do you understand or know about the term dietary diversity? And how do you apply within your household?

Daily what kind food do you say is part of your diet? Let's list these on the flip chart. If you had to choose the food listed which one would prefer taking on daily basis and why? You can pick something that you mentioned or something that was said by others.

3. Where and how do you access the food you consume within your households?

UPA and Dietary Diversity

1. How has your experience since you got engaged with UPA (Home gardening or Community Gardening)?
2. Based on your engagement with UPA how would you say of the positive benefits of the practice in terms of household diet diversification?
3. In your gardens/Farms, what crops do OR did you grow? and Who or what influences your decision on the ones to grow on the farm or backyard?
4. I know not all of you could say they have benefited from UPA/gardening, what disappointments have you experienced while practicing UPA in trying to improve your household(s) dietary diversity?
5. When you started getting involved in UPA/Gardening, what are some of your expectations that have not been achieved so far? Why has it not been possible to achieve?
6. If given a chance to be provided with necessary support so must fully exploit the benefits associated with UPA, mention the kind of support you would say is sufficient to sustainably enable you achieve household dietary diversity?
7. To the final question now in case there is need to upscale to other community members what are some of the improvements you think would really be important for them to fully benefit from UPA or gardening and support their household dietary diversification?
8. Of all the things we've talked about, what is most important thing that is worth noting when promoting Gardening (UPA)?

Appendix 3: Semi-Structure Interview Guide

Questionnaires used during data collection

Master's in management of Development Food Security and Nutrition Security Semi-structured interview Questionnaire to use in Research Data Collection Kanamkemwar, Turkana County, Kenya.

Greetings, my name is Alphonse Auren Abolem a student pursuing a master's in management of development with a specialisation in Food Security and Nutrition Security at Van Hall Larenstein University of Applied Sciences in the Netherlands. To complete my master studies, it is a prerequisite to conduct a research based on the specialisation I study, and I am in conversation with you for that reason. My area of research is to map out factors that hinder the Households involved in UPA through home gardening or community gardening among the settled pastoralists living in Turkana from sustaining household dietary diversity. The reason you are one of the participants is due to your involvement in UPA.

I would therefore appreciate getting an hour of your time so that we can discuss I would like to discuss with you the following: UPA (Home or Community Gardening), dietary diversification, food basket within your household and challenges affecting UPA effectiveness. I will also ask you about your HDD based on what you remember for the last 48 hours. I, therefore, would like to seek your permission to proceed not unless you got questions. Please, if you feel not to continue amid the interview, you are free to quit. Feel free to ask any question at the end of the interview.

PART A: Respondent

Details

1. Name _____ sex _____ Age _____
2. Marital status: (Single), (Married), (Divorced), (Widowed)
3. Level of Educational: (Primary), (Secondary), University), (None), others specify _____
4. Household family size _____
5. Number of children _____
6. Number of children in School _____

PART B: HG and effects on Food

Availability and Income

1. Are you currently involved in UPA that is either within your home or as a community garden? Yes/No, if not, have you practiced in the past?
2. How long if you are to tell me have you been actively involved in UP/Gardening?
3. What size of that is your UPA occupying or rather the size of your garden?
4. Based on the garden you have, what crops do you grow?
5. How much of it do you eat at home at home, and in case you have a surplus, what do you do with it?
6. How would you describe the food you are able to produce in relation to what you eat?
7. Are you satisfied with the production of food crops in your garden? If not why?
8. Based on your experience can you share with me if there are changes in terms of household food crops consumption before and after the involvement in UPA?
9. In the period you taken part in UPA, have you earned any income from it?

If yes, do you have a record?

10. Will it be okay to confirm how to access other food commodities for your family?

11. How would you be able to say whether your household dietary diversification meets the needs of all the family members?

(Application of HDD Score sheet)

12. Are there any challenges facing the practice during UPA? Yes/ No, if yes what are those challenges?

13. In your own words, how would you say of the benefits of UPA in supporting household Dietary Diversification?

14. Is there a way those involved in promoting UPA could need to improve to enable the poor household from fully getting the benefits of UPA to achieve dietary diversification for a more extended period?

Appendix 4: HOUSEHOLD DIETARY DIVERSITY SCORE SHEET

Dietary Diversity Score

I want to ask if you can remember what kind of food you ate yesterday from breakfast in the morning to dinner/Supper.

QUESTIONS and FILTERS	CODING CATEGORIES
A. Did any member of your households in the past 24 hours eat bread, rice noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?	A. _____[]
B. Did any member of your households in the past 24 hours eat potatoes, yams, eddoes, manioc, cassava or any other foods made from roots or tubers?	B. _____[]
C. Did any member of your households in the past 24 hours eat vegetables?	C. _____[]
D. Did any member of your households in the past 24 hours eat fruits?	D. _____[]
E. Did any member of your households in the past 24 hours eat beef, pork, lamb, goat, rabbit wild game, chicken, duck, or other birds, liver, kidney, heart, or other organ meat?	E. _____[]
F. Did any member of your households in the past 24 hours eat eggs?	F. _____[]
G. Did any member of your households in the past 24 hours eat Did any member of your households in the past 24 hours eat fresh or dried fish or shellfish?	G. _____[]
H. Did any member of your households in the past 24 hours eat foods made from beans, peas, lentils, or nuts?	H. _____[]
I. Did any member of your households in the past 24 hours eat cheese, yogurt, milk or other milk products?	I. _____ ()
J. Did any member of your households in the past 24 hours eat foods made with oil, fat, or butter?	J. _____[]
K. Did any member of your households in the past 24 hours eat sugar or honey?	K. _____[]
L. Any other foods, such as condiments, coffee, tea?	L. _____[]

Appendix 5: Raw HDD Score Sheet

Food Groups	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	0	1	0	1	1	1	1	0	0	1	1	1	0	0	1	0	0	0	0	1	1	1	1	0	0	1	1	1	1	0
3	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1	1
4	0	0	1	1	1	0	0	1	1	1	1	1	1	0	1	0	1	1	0	1	1	0	0	0	1	1	1	1	0	1
5	1	0	0	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7	0	0	1	0	1	0	1	1	1	0	1	0	0	1	0	1	0	1	1	0	1	0	1	0	0	0	0	0	0	1
8	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1
9	0	1	1	1	0	0	1	1	1	0	1	1	0	0	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	1
10	1	0	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	0	0	1	1	0	0	0	1	1	0	1	1
12	1	1	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0