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Socio-economic vulnerability assessment approach and households' resilience among USAID Nutrition Projects, Isiolo County, Kenya

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Abstract

This study aimed to understand the correlation between socio-economic vulnerability assessment approaches employed by USAID funded development projects and household resilience, using the USAID Nawiri project the largest multi-dimensional development initiative in Isiolo County as a case study. Despite the significant positive impacts of USAID projects in regions like Isiolo, the cessation or withdrawal of USAID funding often results in beneficiaries reverting to their prior vulnerable state, increasing dependency on aid and reducing household resilience. The research was guided by four main objectives: to assess the influence of household income on household resilience among USAID Nutrition projects in Isiolo; to evaluate the influence of household assets on household resilience; to examine the influence of social services on household resilience; and to analyze the influence of food security on household resilience among USAID Nutrition projects in Isiolo. The study targeted 385 respondents from the USAID Nawiri project, achieving a response rate of 83.9%. A descriptive survey design was used, and two structured questionnaires were administered: one for project staff, PREG partners, and the County Steering Group, and another for community project participants. Data analysis revealed a regression value of 0.742, indicating a strong positive correlation between the independent variables and household resilience. The coefficients of determination showed that all four independent variables household income, household assets, social services, and food security were statistically significant predictors of household resilience, with p-values below 0.05. The findings highlighted food security as the most significant factor influencing household resilience in Isiolo. Households with reliable access to adequate and nutritious food were found to be better equipped to withstand shocks and stresses, emphasizing that food security is essential for overall household resilience. A significant portion of household income and assets is typically directed toward food purchases, underscoring the centrality of food security. Additionally, access to and effective use of social services including healthcare, education, agricultural extension services, and financial services were closely linked to food security. The study recommends that the USAID Nawiri Project and other development initiatives prioritize strengthening food security, particularly in ASAL (Arid and Semi-Arid Lands) counties, as this will establish a critical foundation for other interventions aimed at enhancing household resilience.

Keywords: Socio-Economic; Vulnerability; Assessment; Approach; Households' Resilience

1. Introduction

The study investigates how the Socio-Economic Vulnerability Assessment Approach (SEVAA) influences household resilience, particularly within the context of USAID nutrition projects in Isiolo County, Kenya. SEVAA has evolved from static perceptions of poverty to a dynamic understanding of vulnerability as shaped by shifting socio-economic conditions. It helps identify community-specific shocks and stressors, enabling development programs to tailor interventions that reduce risks and build resilience. This approach has become central in modern development practice,

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as it empowers communities to understand their vulnerabilities and promotes sustainable, context-sensitive solutions to poverty and malnutrition. Household resilience is defined as a household's ability to anticipate, absorb, and recover from shocks such as economic downturns or natural disasters. Key to building this resilience is aligning support with a household's specific needs, often categorized by their current economic stability. The PEPFAR Economic Strengthening Pathway classifies households into those in destitution, those struggling, and those prepared to grow—each requiring distinct interventions. A resilient household can maintain well-being despite adversity, and identifying the right mix of coping strategies, adaptation capacities, and support systems is critical in reducing vulnerability. Isiolo County faces significant challenges due to its marginalization, including frequent droughts, conflict, and limited infrastructure, leading to high levels of malnutrition. USAID has implemented several nutrition projects here using SEVAA to identify vulnerabilities and design interventions such as income diversification, healthcare access, and education initiatives. While some progress has been observed, such as improved household economic stability and health outcomes, two of the existing projects are closing without fully achieving their goals. Their transition into the long-term USAID Nawiri Nutrition project presents an opportunity to refine SEVAA for greater impact and reach. This study thus seeks to examine potential gaps in SEVAA to improve the effectiveness of future resilience-building initiatives.

1.1. Statement of the problem

For several years, households in Isiolo have consistently received emergency relief in the form of food aid and cash transfers to address the challenges of poverty and especially malnutrition and food insecurity. However, this support appears to contribute to increased dependency and deepening poverty within the communities over time. Despite the combined efforts of national and county governments, as well as development partners, to mitigate acute malnutrition and poverty, the long-term impact has not been as effective as desired (Food and Agriculture Organization of the United Nations, 2018). According to the Kenya Population and Housing Census conducted in 2019, Isiolo had 31,326 household (Kenya National Bureau of Statistics, 2019). By 2023, out of the total households in Isiolo, 20,600 households (an equivalent of 65%) were receiving cash transfers and relief food. These households were deemed to be highly vulnerable and on the verge of starvation if not assisted (TEAM, 2024). The resilience of households at this point was extremely low and up to date most of these households are yet to recover. In a similar vein, CIDP 2023-2027 indicated that the cross-section poverty rate in Isiolo County was 53. 9% in the year 2021 against the liner poverty rate tag of 38. 6% in the same year. Furthermore, the mean prevalence of food poverty was 34.7% in 2021 with a multidimensional poverty of 53% meaning that Isiolo County is deprived in more than half of the weighted indicators that contribute to the multidimensional poverty such as health, caring and feeding, safe water, and sanitation, education, health and nutrition knowledge, shelter and housing, standard living and information. This is equivalent to over half of the households in Isiolo being highly vulnerable, and which cannot on its own manage shocks/stressors (Shibia, 2020).

The low resilience among households in Isiolo is influenced by a combination of factors, including the historical marginalization of communities, recurring disasters intensified by climate change, ongoing political and economic instabilities, the impacts of the COVID-19 pandemic, and the devastation from the desert locust invasion. These challenges have compounded, severely affecting the most vulnerable populations, with malnutrition being the predominant outcome, particularly among children and mothers (USAID, 2022). As a predominantly pastoralist community, many households have lost their livestock, which serve as their primary source of income, food security, and assets. As a result, many households now rely on relief aid and cash transfers for survival.

To address some of these challenges, USAID has invested over $400 million in development and humanitarian assistance in the Arid and Sem-Arid Lands (ASALs) in Kenya where Isiolo is a member county. Such support towards the GOK, NDMA and the community has contributed strongly to achievement of positive progress in enhancing institutions, systems and households' capacities in managing shocks. This support provided by USAID, rescued many lives who would have otherwise been killed in the disasters; safeguarded precious lives, properties, and other resources; and also enhanced the preparedness and mitigation of disasters. Such investment notwithstanding, vulnerable populations in Kenya's ASALs still present humanitarian need due to the frequent and worsening disasters experienced in the country as well as various existing failings of local disaster response systems (USAID, 2022).

The focus for development partners such as USAID is now on implementing strategies that facilitate households' transition out of malnutrition and poverty and enhance their resilience to cope with shocks and stresses, rather than offering temporary relief as before (Macharia et al., 2020). This involves leveraging household strengths and addressing weaknesses to enable effective resumption of normal life (Verger et al., 2021). Consequently, USAID has developed Nutrition projects that introduce a range of integrated socio-economic interventions. Households affected by malnutrition in Isiolo are the primary participants in these projects. Among the strategies used by USAID is the socio-economic vulnerability assessment approach, which identifies and addresses the specific needs of each household in real time. For example, if a household lacks food, they are linked to diversified sources of livelihood to generate income,

enabling them to afford food and meet other basic needs (BRAC, 2021). Collaboration with the Isiolo County Ministry of Health ensures that health and nutrition services are accessible to every community member, even in the most remote areas, addressing healthcare access issues alongside other interventions based on pre-assessed participants' needs (Angeon and Bates, 2019).

The goal of the USAID Nutrition projects, through the use of the socio-economic vulnerability assessment approach, is to build more resilient households in Isiolo. These households are generally better off and are able to use a variety of private and public risk management tools in case of when savings have been exhausted or when disturbances are major (Djalante et al., 2020). Namely, with enough adaptive capacity, a resilient household is in a position to make changes that minimize both risk exposure and sensitivity to shocks (Tora et al., 2021). The accumulation of more and diverse types of assets, productive, financial and human capital related ones increases adaptive capacity. In the foreseeable future, it is anticipated that households in Isiolo will experience enhanced empowerment through increased access to information, expanded opportunities, improved income, greater asset ownership, enhanced food security, and upgraded social services. This progress is expected to be facilitated by leveraging local resources, strengthening capacities, and receiving support from the county government. The socio-economic vulnerability assessment approach has been instrumental in evaluating the varying degrees of vulnerability and resilience within households in Isiolo, utilizing specific indicators such as household income, assets, social services and food security. These indicators help shape the understanding of household resilience within this context and influence how USAID Nutrition projects are designed and implemented. Hence this study was investigating the influence of the socio-economic assessment approach on household resilience among USAID Nutrition projects in Isiolo.

1.2. Purpose of the study

This research examined the socio-economic vulnerability assessment as a tool and its applicability to household resilience regarding development projects; Focus to USAID Nutrition Projects in Isiolo County Kenya.

1.3. Research Objectives

The research objectives of the study were.

- To assess the influence of income on household resilience among USAID nutrition projects in Isiolo, Kenya.
- To evaluate the influence of assets to household resilience among USAID nutrition projects in Isiolo, Kenya.
- To examine the influence of social services to household resilience among USAID nutrition projects in Isiolo, Kenya.
- To analyze the influence of food security to household resilience among USAID nutrition projects in Isiolo, Kenya.

1.4. Research Questions

The study sought to answer to the following questions.

- How does income influence household resilience in USAID nutrition projects in Isiolo, Kenya?
- How does assets influence household resilience in USAID nutrition projects in Isiolo, Kenya?
- How does social services influence household resilience in USAID nutrition projects in Isiolo, Kenya?
- How does food security influence household resilience in USAID nutrition projects in Isiolo, Kenya?

2. Literature review

2.1. Introduction

This chapter gave an overview of other researcher's works, academicians and scholars towards socio-economic vulnerability assessment approach and the resilience of the households. The chapter examined the idea of households' vulnerability, how income impacts on household vulnerability, how asset impacts on household vulnerability, how social service impacts on household vulnerability and lastly, how food affects household's vulnerability.

2.2. Theoretical Framework

This section looked at theories anchoring the study that support vulnerability and resilience. The theories discussed include the vulnerability theory, and the resilience theory.

2.2.1. Vulnerability Theory

Proposed by a leading legal theoretician Martha Fineman, 'potentially better post-identity approach', called vulnerability theory, claims that people are inherently vulnerable to different sorts of risks and should be defended by the state as equal material beings (Fineman, 2010). It claims that if vulnerability is posited as an inescapable condition, the work is thereafter undertaken to map out how this vulnerability might be managed. Hence, human beings are not stripped of their vulnerability due to certain aspects or periods one may find in the life cycle, but rather, we are vulnerable just with varying degrees of strength (Fineman, 2010).

The problem of different resilience giving rise to vulnerability is key in vulnerability theory as it regards attention to the social aspect and social relations. There is no person who is born as a resilient person. Instead, resilience is created within and through such institutions and relations which render some people privileged and powerful (National Academies of Sciences et al., 2019).

Vulnerability theory acknowledges that life is pervasively vulnerable, and that vulnerability differs depending on the life course and social structure; thereby following patterns of oppression based on race, gender, sexuality, disability, and class. However, the theory directs our consideration to social instead of personal attributes and roles, and the bipolar structures that are intrinsically unequal as employer-employee, creditor-debtor, adult-adolescent, parent-child, shareholder-shareholder, and so on. Vulnerability is thus a tool which helps to decipher the social privilege and inequalities inherent in these relations and shows how to change them for the better to promote equity and reduce adversity as it will be shown in this study.

2.2.2. The Resilience Theory

Resilience theory assumes that resilience is a function of risk and protection factors hence educating the community on possibility of resilience formation in spite of the risks. Resilience theory aims to explain the factors that are within persons and systems which they will have to overcome to be able to handle adversity (Van Breda, 2011). These were established as those that affected the possibility of resilience. This is a strength that makes response to vulnerabilities better resulting in a positive effect, it is called a protective factor. It is important to note that when considering the concept of resilience, it is always in relation to an external factor that can be classified as a threat, disturbance, or stress, which can be further categorized as having damage potential. For instance, a society described as resilient to a hurricane is not inherently resilient to the hurricane itself but builds resilience against the potential latent damages associated with the event. Only recently has the resilience approach to natural hazard management evolved, emphasizing people's capacity to prevent, recover, and innovate, provided there is social capital, participation, and trust (Usamah et al., 2014).

The strength of the theory is that; endogenous factors such as will power resources, assets, knowledge, attitude, learning capacity and capability all point to the fact that individuals and systems can move on even in unfortunate circumstances. However, one may not entirely disagree with the theory's weakness given that Social-Ecological Systems (SES) are dynamic complex systems and do not transform in a steady, progressive, or discreet manner. Using the same context, Pisano (2012) admits that SES can be present in another kind of regime, known as 'alternate states' where the function and structure of SES and its feedback vary. This suggests that it is always a challenge to put a measuring stick to the capacity embedded in the ecological facet of SES. Besides, household resilience also implies support structure, but not all households may be integrated to the level where they share a common approach to problems. Most households that will be studied in this research belong to dynamic socio-ecological systems and hence the assumption that they may not have similar vulnerabilities which puts them in different levels of resilience.

2.3. Empirical studies

This section reviewed previous empirical studies on household resilience, focusing on four key factors assessed in the socio-economic vulnerability assessment approach: household income, assets, social services, and food security. It explored how these factors influence household resilience.

2.3.1. Households' resilience in development projects

In their study, Fang et al. (2016) posited that the households are indeed the bricks and mortar of production and consumption in the communities. A vulnerability assessment assesses threats that households are at risk of facing and some coping or adaption mechanisms in terms of promoting household level resilience. The level of vulnerability for the rural households reduced annually from 1986 to 2015, although fluctuations were recorded strongly. The only three major indicators that existed prior to the year 2000 were knowledge measured by baseline education, the food security, and water security. The next most significant factor is again knowledge based on basic education attained past the early 2000s; cash income; and reliable source of water. The increase in the value assigned to education and income has a

correlation with the change in spatial orientation of rural households from aim-oriented to sustainable goals (Mikolai et al., 2020). The processes and capacity of a household to cope with shocks or stressors define the resilience of the household. Resilience is considered a state rather than an inherent ability or strength, reflecting the capacity to protect against unfavorable well-being outcomes. Cissé and Barrett (2018) expand the concept of resilience into an econometric framework, defining it as the conditional probability of achieving specific measurable thresholds, such as minimum herd size, per-capita expenditure, food consumption scores, or children's mid-upper arm circumference. They demonstrate that these resilience measures, much like standard poverty indicators, can be evaluated at different levels—from individuals and households at the micro level to communities, regions, and nations at the macro level. Resilience research often distinguishes between protective and promotive factors: protective factors "minimize the harm" by moderating adverse effects, while promotive factors are positive resources or assets that enhance resilience.

Resilience within return to equilibrium framework is more concerned with evaluating the impact of shocks on well-being outcomes ex-post and attribute resilience to ability of the households to rebound from a shock (Knippenberg et al. 2019).

It may be useful to establish a minimum level of development resilience, above which the households can be deemed vulnerable. However, linking households with relevant economic strengthening interventions entails enhanced knowledge on the needs and coping mechanisms of the target households. This approach posits that households living in poverty are not actively involved in economic activities and depend on social assistance to make ends meet; therefore, economic development activities focused on asset enhancement are not suitable for this classification. Fang et al., 2016 Poor therefore are those who can barely feed their families or meet their basic needs are poor and unstable and thus need to have their assets safeguarded against loss by shocks and stresses. These households may still be poor but they are growing and their consumption level is fixed. Interventions that focus on the increase of the assets are most suitable for this group. Due to the difficulties of constructing and assessing valid categories of vulnerability, it is expected that the best strategy to link the right level of intervention to the households would hinge on qualitative approaches in assessing strengths, preferences but more critically clients' perception of coping capability.

According to USAID PREG (Partnership for Resilience and Economic Growth) end line report in 2022, building household's resilience requires an integrated approach and a long-term commitment to improving three critical capacities: More often than not when Wikipedia participants described components of adaptive capacity, the following concepts can be distinguished: capacities for absorptive and transformative adjustment. Analyzed as index constructed from relevant indicators following Galton's Law, each of them is an index and some of the indicators are themselves indices. At its simplest, absorptive capacity is the extent to which there has been a lack of sensitivity to shocks and stressors and capability to avoid, by the use of preventive measures, to control and by the use of appropriate coping mechanisms to limit, such significant negative changes that are irreversible or to minimize their impact. Adaptive capacity thus engulfs the possibility of making anticipative and rational decisions on other sources of income in the face of altered circumstances. Imaginative capability pertains to governance systems, policies and/or regulations, physical and human resources, community networks and/or structures, and formality and informality of protection systems within which the transformative capacity is enacted. The report was able to analyze various resilience indicators under the three capacities at the household level in the ASAL Counties and current resilience building projects are building on those indicators (Verger et al., 2021).

A 2023 publication titled "The Failure of 'Resilience' Projects in Northern Kenya" highlights that when traveling across northern Kenya, one is likely to encounter banners along roadsides promoting various resilience-building initiatives aimed at supporting pastoralists. Examples of these projects include the 'Regional Pastoral Livelihoods Resilience Project', the 'Drought Resilience and Sustainable Livelihoods' program, and the 'Resilience Consortium'. These projects often feature mission statements that emphasize building a "prosperous and resilient community," "eliminating drought emergencies through resilience," obtaining a "resilience premium," and merging "resilience with a fast-growing economy." The article criticizes the coercive, donor-driven approach, which is not a new phenomenon, but what was particularly disheartening during discussions was the realization that these 'resilience' projects often undermine resilience on the ground. They tend to foster dependency, stifle flexibility, and inhibit adaptability among the communities they are meant to support (PASTRES, 2023). According to a study by Karani and Kariuki (2017), to the resident communities, household resilience in Isiolo is said to be a long-term development outcome like sustainable livelihood because it enhances improved livestock production that results to improved income, health, natural resource/pastoral land, food security/biophysical well-being, and education. "The assessment of household resilience is fraught with complexity: both the definition of resilience and the methodologies used to measure it are heavily contested" (Jones and Tanner, 2017). Significant controversy and confusion arise around its classification, particularly when trying to determine whether resilience is best understood as a state, a capacity, or a condition

However, literature on resilience in the context of households is limited and often presents a fragmented view. While the foundational concepts and theories of resilience can be applied to the household as well as to the individual, a body of knowledge specifically aimed at understanding how resilience can be fostered in households – and how this might help to improve the well-being of households who are currently vulnerable – is currently lacking. Measures of household resilience are also an underdeveloped research area. While a diverse range of both qualitative and quantitative methods have been employed to understand how shocks and stressors affect households, there is as yet no widely agreed-upon method for assessing levels of resilience and vulnerability according to how well households are able to avoid, mitigate or cope with adverse events (or bounce back from such events). This suggests a clear need for more focused research aimed at the understanding and measurement of household resilience (Barrett et al.2021). For this study, household resilience was measured against income level, asset ownership, access to social services and food security.

2.3.2. Income and household resilience.

Households are the building blocks of the economy and are usually the averaging units in the assessment of vulnerability. At household level, the endogenous economic characteristics are defined as the pillars which influence the building of the vulnerability of households to risks or shocks (Ur Rahman et al., 2021). It can therefore be useful in the analysis of vulnerability at household level to carry out the analysis at the practical level regarding the forms of impact and coping strategies of external shocks and risks in relation to impacts (Fang et al., 2016). Household characteristics, in particular the economic dimensions, were depicted in detail by Ur Rahman et al. (2021) – such subgroups of households are considered more vulnerable and exposed to re-purification than households with higher SES. One measure that is used to describe the level of wealth is the one provided by the average or household income. It has also been a driver that has informed whether households are willing to undergo adaptive measures or not (Butter et al., 2016). Using the concept of income decile, higher income households well thought-out are more likely to have more resources to manage in terms of expenditure, disasters, or macro-economic shocks. They may have money in savings or insurance policies, or credit that can lead to the absorption of shocks. From the studies that Belay et al (2017), pointed out, the probability of adopting a costly and probably more effective adaptation measure in response to the effects of the vulnerabilities depended on the income level of the affected household (Dasmani et al., 2020).

The diversification of income sources could help reduce the impact would have on the households (Le et al., 2022). Similarly, to the aforementioned studies, Huynh and Bui (2024) posits that the more links a household has, whether income ones or not, the better it could compensate or respond to unfavorable conditions that affect one's welfare or income. As for the incomes, most of the households were reported to depend on one or at most two-income sources mainly from the informal and small-scale businesses which could plunge the households into serious financial vulnerability upon the hazard. According to Dang et al. (2019), 'livelihood diversification' means that a household that builds up a variety of livelihood activities and/or assets as a way to sustain or enhance income and standard of living. This is because livelihood diversification is a concept that focuses on income accumulation diversification. A livelihood consists of the income, skills, assets (such as stores, resources, claims, and access), and activities needed to secure a means of living. A resilient livelihood is characterized by its ability to absorb shocks and stresses, recover capabilities and assets, and sustain itself for future generations. Additionally, it provides positive impacts and benefits for livelihoods at both local and global scales, contributing to sustainability in the short and long term (Ittmann and Helms, 2021).

Diversification of livelihoods generates important stocks with which to cope with the heavy endemics of extreme events. It was established that the higher the heterogeneity of income, the higher the livelihoods' shock-absorbing capacity from sources (Belay et al., 2017). That is because livelihood diversification is a risk diversification technique commonly employed by farmers of Samoa to mitigate impacts of annual cyclone (Colding, Elmqvist, and Olsson, 2018). Brouwer et al. , (2017) stated that multiple income earning sources reduce flood vulnerability in rural Bangladesh and climate change impact vulnerability in rural Vietnam's Coastal Northern Provinces. Nonetheless, it is argued that the poor engage in diversification to survive while the relatively well-off engage in diversification with an aim of enriching their income. In a blog post challenging livelihood diversification in the building of resilience in pastoralist households, Something as recent as the PASTRES 2024 resilience agenda shows that more often than not, resilience programs tend to internalize the disparaging discourses surrounding pastoralism to essentially advocate that the best thing that can happen to pastoralists is to have them look for employment opportunities and thus desist from investing in enhancing the pastoralists' abilities to cope with shocks and stresses. Thus, resilience should not be viewed as reverting to a previous position but always as evolving and developing, being such that when new conditions come about, they are addressed. This must be done on networks, and relations to the social structure that sustains pastoralism. This is why our focus is on what we have termed relational resilience does not blame the pastoralist community; does not reduce them to being victims; does not simply shell out money and leave them to sort it out it looks at what they have and seeks to build on that. (Karani and Kariuki, 2017) In the arid and semi-arid areas (ASALs) of northeastern Kenya pastoralism

is the predominant livelihood activity. Shocks are very detrimental to pastoralist livelihoods because they lead to huge loss of livestock, hence expose the pastoralist to poverty. The most vulnerable are the poor households particularly those with limited and small livestock- holding and those with limited social capital in terms of familial support etc (Ouma, Obando And Koech, 2012). Techniques such as selling-off assets for sustaining a livelihood and pulling out children from schools, are unbeneficial copings that vulnerability makes the households embrace with lasting effects on those same households (Hansen et al. 2004; Jensen, Barrett, and Mude, 2017).

Social protection interventions have gained recognition as an effective adaptive strategy over time. Among these, cash transfers are designed to stabilize incomes and consumption patterns, ultimately reducing the risk of poverty. An increasing amount of research indicates that cash transfers contribute to enhancing the resilience of households and communities against unexpected challenges. They serve as a vital source of income for highly vulnerable households in the ASALs (Karani and Kariuki, 2017).

Since devolution which has encouraged decentralization there are so many, so many groups, so many committees as it brings what can be termed as the 'labour' of doing resilience that is very demanding to many particularly women. The rewards can include some accommodation for meetings and the like, but the projects that receive money are soon shut down as a rule. Similarly, the effective cash transfers which are designed for enhancing people's living standards may be delivered or allocated contrarily to the original intentions of the project and damage or distort the local 'moral economy' (PASTRES, 2023).

Unemployment is also an important factor in understanding household resilience. It does not just affect those who are directly not working; through a reduction in income, it affects the whole household. It has been identified as a major influence on perceived vulnerability (Huynh and Bui, 2024). Its impact is very dependent on the context. A sudden increase in unemployment in an area produces a shock to the local economy that affects not only those who have lost their jobs but also the people who have jobs and the non-working population (Fang et al., 2016). In comparison to a case of a slum clearance project in India, the residents could not make plans to secure alternative housing by taking a loan because they knew that their employment was not secure (Singh et al.2021).

2.3.3. Assets and household resilience

These include the land, livestock and financial assets which are important in increasing capacity of the households. These assets can be used to generate income, create savings, and used to buffer against economic risks among the households (Woldemichael et al., 2023). Assets are subdivided into fixed and current assets. It relays that productive assets are essential for generating consumable or tradable output; examples are land, livestock, and durable commodities. Portable productive assets that are relevant to certain contexts are assessed in terms of their capacity to produce household income. Tangible non- income producing assets like house, cars, refrigerator, television set, etc., reflects the status of living standard and wealth of a household. Ownership of productive assets like agricultural land or equipment can increase household productivity and food security. This leads to improved resilience against food shortages, price volatility, and agricultural risks such as droughts or pests.

As an adaptive capacity, Ansah et al. (2022) research show that owning assets such as land, livestock, or businesses can provide additional income streams for households. This diversification reduces reliance on a single source of income, making the household more resilient to income shocks, such as job loss or market fluctuations. Asset ownership can serve as collateral for accessing credit and financial resources. In times of need or emergencies, households with assets can leverage these resources to manage crises, invest in resilience-building measures, or cover unexpected expenses. Assets can act as a buffer against economic shocks by providing a form of savings or investment. For example, savings in the form of livestock or agricultural produce can be sold during lean periods to maintain household income and consumption levels. Certain assets, such as housing or vehicles, can enhance social status and networks, which may provide access to social support systems, information, and opportunities. These social connections can be valuable in times of crisis or need (Kansiime, et al., 2022).

Following a framework proposed by USAID known as Sustainable Livelihoods approach (SLA), asset capitals serve the purpose of risk insurance whereby a given household is able to prepare itself to take a certain form of risk which could be devastating and at the same time help the same household to recover from the shock once it occurs. Consequently, assets come in as performance indicators or precursors of vulnerability with more assets meaning less vulnerability and where assets have been decimated, the higher the vulnerability of people.

Slater, R. and Ulrichs, M. (2017) define the accumulation of assets not sufficient for enhancing the ability to cope or transition out of poverty without relevant synergistic interventions that support stable livelihood at the systems level.

An example of this is Kenya's ending draught emergencies framework which details a plan of how to create resilient food systems in the ASALs. These actions are centered on enhancing livelihoods and building up existing resilience strategies (diminishing/increasing herd numbers, ranging, borrowing animals) with better market access and value addition, and easy access to veterinary services. Moreover, enhanced water, crops, and rangeland resource management is expected to help promote environmentally sound natural resource and water utilization. In the absence of these complementary programs, social protection's effectiveness in enhancing long term adaptation will be muted resilience policy and programming in Kenya's ASALs need to acknowledge multiple livelihood stressors (Slater, and Ulrichs, 2017).

An analysis of a study conducted by FAO (2016), disaggregated livelihood by combining Marsabit and Isiolo counties by nature of their pastoral livelihood and Meru County by mixed farming livelihood. Findings show that households in mixed farming livelihood are more resilient than households in pastoral livelihood. Access to productive and durable household assets is important and common to both livelihoods, and adaptive capacity is also a contributing factor to resilience capacity for both pastoral and mixed farming livelihoods. Therefore, it is pivotal for building resilience to enhance livelihood diversification by supporting households to take up more income-generating activities based on their livelihood productivity. The study indicated that policy should aim at enhancing agricultural productivity, increasing productive assets and improving access to basic services. Furthermore, policy interventions should look at enhancing environmental sustainability through improved natural resources management, which is likely to reduce levels of insecurity related to natural resources conflicts (Food and Agriculture Organization of the United Nations, 2018).

Shibia (2020), Some question arises that the households in Kenya exist through borrowings from social connections and other unmaintainable measures including selling off property/ capital and reducing on expenditure or consumption whereby the subsequent risks of droughts and floods are expected to increase (KNBS, 2018). A better understanding of form and form of use of the various coping strategies and efficiency of the various coping strategies in enhancing the capacity of the households to cope with various forms of risks would provide insights on formulating policies. Of interest is also an understanding of the barriers towards the employment of market based formal coping strategies like insurance and credit as they help allow for risk sharing and mitigation across time and various households.

A study by Moret (2017), on Vulnerability Assessment Methodologies defines development resilience "is the capacity over time of a person, household or other aggregate unit to avoid poverty in the face of various stressors and in the wake of myriad shocks. If and only if that capacity is and remains high over time, then the unit is resilient". Basically, the above stated definition says that a household cannot be defined as resilient until it gets out of certain barriers that hinder the ability of a household to acquire enough assets to cushion itself against shocks which are referred to as poverty trap.

However, due to their low income, the poor have limited asset stock both in quantity and quality, and unfavorable contextual factors such as geographical remoteness and poor-quality infrastructure that hinder the overall positive impact of assets ownership on poverty. It has implications on their future development and poverty eradication (Ouoba and Sawadogo, 2022). These households expect fluctuations in their sources of income, and they are credit constrained from accessing financing and other market services that could aid them in mitigating the effects of such shocks. As a result, these low-income households engage in low-risk income-generating activities that are likely to have low rates of return. Middle-aged and older vulnerable households, unable to diversify their income sources or accumulate additional assets, often fall into an "asset poverty trap." Consequently, they resort to negative coping strategies, such as selling productive assets, withdrawing children from school, or cutting back on food and other essentials. These actions further deplete their assets, deepening their structural and long-term poverty (Phadera et al., 2019).

Asset transfers to vulnerable households in order to build their resilience has been a concept that some development projects have explored measurement of program impact on resilience is especially relevant in estimating the impact of asset transfers: In the Phadera et al. (2019) study, as such programs are usually based on the premise that sufficiently large transfers can change the rate of growth for the targeted poor households and give them a chance to reach a non-poor steady state. The movement from a growth dynamic under low-level equilibrium to one which results in attaining non-poor equilibrium may not be feasible without asset transfers or other related programs to facilitate adequate fixed investment. Although the theory of dual growth processes explains 'big push' interventions, outcome measurement that consider only the first change in outcomes disregards the ability of shocks/stressors that can push the households who have benefited from transfers to the low-level equilibrium. Development resilience, on the other hand, estimates the likelihood that a beneficiary household might fall back to poverty and enables evaluation of impact of an intervention on such likelihood.

As Kumaraswamy, et al (2020) pointed out that poor families can also use other informative equipment like radio, mobile phone, Television, and computer in order to acquire useful information which they can rarely get or afford. Some examples include market prices, farm starter services, financial services, government support, and basic services that include a health facility. When advertising and selling goods or services, distance, time, and lack of adequate information on optimal prices in markets result in suboptimal trades and lower incomes. These barriers are however overcome by assets like the mobile phones since they facilitate access to timely information on market prices and indeed grants the trader access to new markets. They may also accelerate the rate of business transactions, reduce the cost of transactions, and improve the generation of revenues that translate to enhanced resources for the improvement of resilience and the achievement of opportunities.

2.3.4. Social services and household resilience

Access to social services strengthens household resilience by addressing diverse needs, mitigating vulnerabilities, promoting well-being, fostering community support, and providing pathways for economic and social empowerment. One aspect of social services is the safety nets that can help households cope with crises and shocks. For example, social assistance programs, unemployment benefits, and food support can prevent extreme poverty during periods of economic hardship, enhancing the household's ability to bounce back (Bowen et al., 2020). Kenya's Vision 2030 outlines a medium-term economic development strategy that focuses on social protection for vulnerable groups, aiming to alleviate poverty, which stood at 45% in the 2000s. In Malawi, two flagships national programmes provide cash-only assistance ranging from $20 to $27 per household per month: the Hunger Safety Net Programme (HSNP) and the Cash Transfer for Orphans and Vulnerable Children (CT-OVC). The HSNP, linked to food security policy, is implemented by the Ministry of Agriculture and Food Security, while the CT-OVC emerged from HIV/AIDS and Orphans policy discussions. Cash transfers, although not linked to specific shocks, provide beneficiaries with a safety net against various risks and costs, enhancing their saving capacity. Beneficiaries of the CT-OVC often use the funds to rear livestock, while those under the HSNP benefit through savings, credit investments, and strengthening social networks, including livestock investments (TEAM, 2024).

Bowen et al., (2020) state that social services, such as food aid, shelter assistance, case work support, or household items, can be particularly important for households experiencing some kind of shock, such as significant income loss or a climate hazard. Such assistance can also affect resilience. For example, households who receive no assistance, even those with a demonstration of need, may be living in a location where assistance is not easily accessible, which might indicate less resilient households. Because the residence is geographically fixed and may be the result of many other characteristics of the households, this variable is a good approximation of the household's resilience status. The estimate of other program characteristics is unclear. For example, one may expect that longer waiting times before receiving a program may preferentially select more resilient households, whereas lost in transit assistance may be captured by all.

According to a survey by Njagi et al., (2021), it established that, of the Kenyan households, 60 percent of them have gone through at least one negative shock. The most common stock has been the increase in food prices, natural disasters, which include either droughts or floods because of unfavorable weather conditions, loss of livestock, the loss of livestock and the death of a close family member. Such shocks have the potential of leading to loss of either income or wealth, especially in the rural households as compared to the urban ones. Extreme shock is said to have reasonable indirect impact on health and is more felt by the poor and most vulnerable individuals. Self-reports indicate that negative shocks impact health care expenditure for the uninsured and under insured households. Households being faced with choices on how to spend their little income when subjected to some economic shocks their decisions on using healthcare services are far more voluntary and filled with dilemmas. This indicates that adverse changes can only aggravate the threats of not seeking care, when necessary, among both the high-end and low-end income households. In addition, many other households with higher income can also be vulnerable and cannot be fully protected from the adverse shocks, and thus, negative income variation is possible. For example, in Kenya, insurance that helps households to cope with shocks such as health expenses, access to credit which can be a buffer to smooth consumption, and others are mostly unavailable, especially to the poor rural households. Currently, the level of health insurance among the households in Kenya is relatively low with only 20% of the households covered by health insurance (Njagi et al., 2021).

Analyzing the factor of availability for basic needs which are actively used in social services, In the work of Ion (2020) focusing on the discussion of the potential link between the stressor of lack of access to the basic services and people's accessibility to food and the availability of food in the market, and food security as the reinforcement of people's well-being. Concerning Statistical data analyzed it was showed that Access to basic services like water and sanitation is an influential variable contributing to the capacity of the household in terms of resilience.

Basic services such as access to clean drinking water, energy, sanitation facilities, solid waste management, and transportation are fundamental for ensuring a good quality of life and offer protection from environmental and health risks (Pitas and Ehmer, 2020). However, there are still significant global deficits in access to basic services. Despite slight improvements over the last 15 years, today there are still 1.4 billion people without electricity access, 2 billion without access to safely managed water services, and 4.5 billion without safely managed sanitation services. Because people have not been able to access basic services, over two billion people across the world cannot be able to access basic health care services. (Mikolai et al., 2020). Poor sanitation and water norms are among the leading causes of deaths in low-income, fragile, and conflict-affected areas, especially for children under the age of ten. Forcing them to travel long distances to collect water and fulfill their sanitation needs also has a differential effect on women and girls, who are often responsible for these duties. Three billion people do not have access to proper handwashing services in their homes, which has become even more essential during the COVID-19 pandemic (Djalante et al., 2020).

Karani and Kariuki (2017) defined social services by three variables that are: facilities for health spending, access to markets and spending on education. Market accessibility was assessed with regard to the number of minutes that it would take any given household to access the nearest market. To have a comprehensive idea about how basic services were deemed important in enhancing the household's resilience, the following term was used. The factor scores obtained for the education expenditure, access to markets, and health expenditure were positive. Even the availability of basic services could be a problem through sheer geographical location which in turn pushed the cost of accessing these services hence compromising the vulnerability of the households. This is so because poor access to public services dented the ability of the household to cope with risks and respond to calamity.

Hossain (2021) has defined access to social services including access to a household's basic needs and utilization of services such as schools, health facilities, infrastructure and markets. Social services such as education and vocational training programs empower household members with knowledge, skills, and opportunities for economic advancement. Education increases employability, income potential, and adaptability to changing job markets, enhancing overall household resilience.

Hence a significant component of socio-economic resilience is to provide communities with responsive, accessible, and affordable forms of savings, credit, and insurance. In cases where borrowing from financial institutions is not possible due to exclusion, the poor and vulnerable consumers such as the landless, women, and daily wage workers may be unable to invest in assets to build long-term resilience, which makes them borrow from high-risk moneylenders, charging exploitative interest rates hence leading to increased indebtedness (Shibia, 2020).

Lack of social infrastructure has also been found to have a significant influence on household vulnerability and a major barrier in accessing social services. Concentrating on the part of the application aspect included in the definition of infrastructure, they can be stated that it is something applied to meet the need of people. It consists of basic goods and products without which life would be barely possible and taken together, amount to goods considered essential for the functioning of society and the economy. These are the traditional public utilities such as health, water, sewage, electricity and other necessities often referred to as the hard infrastructure alongside the communication channels that include transport infrastructure and computer as well as other information and technology infrastructure (BenYishay and Tunstall, 2017). Housing assistance, environmental services (e.g., clean water, waste management), and disaster preparedness initiatives improve living conditions and reduce exposure to environmental risks. Safe and secure housing and environments enhance physical safety and resilience to natural disasters and climate-related events (Ansah et al., 2022).

The services that social services provide help enact community participation, integration, and relationships. Because of social capital there is a form of solidarity and access to other assistances during hardest of times thus enhancing the social capital that is central to economic progress, health sector, education, migration, response to natural disasters and calamities as well as the fight against climate change (Narayan 2019). Social capital can be present or future assets in the form of status or material health for any participant in a group, and therefore, participants in groups can obtain status or material benefits. It involves the institutional/non-institutional tie that is established and maintained by the discreet or continuous exchange of material/symbolic goods. From the above concepts, it is apparent that social capital can be categorized in one way or the other. Similarly, in Singh, et al. (2021), there is a distinction being made between bridging and bonding social capital. Bonding social capital is a form of social capital that is obtained from interpersonal relationships which may be in form of group, family or group of friends, workmates, religious or village folks. Bridging social capital explains how different individuals are connected.

Uncertainty and credit constraints compel the households in developing countries to engage in low risk and low productivity economic activities that increase poverty in the long run Hence (Shibia, 2020). Products and services

themselves are numerous and range from savings, credit and insurance products, investments, pensions and payment products.

2.3.5. Food security and household resilience

The World Food Summit in its 1996 Declaration defined food security as a condition where all people have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences, supporting an active and healthy lifestyle. As the assessment, food security was applied to ascertain poverty or, more often, the necessity of the food aid in specific region, yet, after adopting it from the Sustainable Livelihoods approach, the framework underwent modifications. FAO defines four dimensions of food security, including: food access in terms of affordability and physical accessibility; food consumption; and food retention; with the passed time as a consideration (FAO, 2018). To capture these dimensions of food security as a more fixed state, several rapid tools and indices have been developed.

Deaton and Deaton noted that the occurrence of COVID-19 affected the income of households, leading to high incidence of household food insecurity. The government's capacity to facilitate the flow of capital and other merchandise imports, and the preservation of transportation systems are a critical aspect shaping food supply chain ruggedness, which will support food supply sustainability in the long-run. Consequently, for urban households, it is estimated that about 90 % of households purchase their food, and thus are susceptible to the effects of changes in prices. This is more so for those households where their main source of income is from trading activities. Hence, this result might be justified by the given context and the main activities practiced by the households (Ouoba and Sawadogo, 2022). This is also in tandem with the Kansiime et al. (2020), who note that market-connected households have higher vulnerability to the worsening of their food security. This paper focuses on drought, one of the natural disasters that create significant consequences on food security thereby increasing vulnerability among the population. In 2023 in Kenya, it was estimated that 4. 4 million people in the ASALs, which is a quarter of the population, were experiencing high levels of acute food insecurity as of February 20th, 2023. The intensity of the droughts increased, and the cycle shortened in the communities, which made their situation and resilience worse. As a result of the drought, farmers never produced any substantial crops for five successive seasons and in the other related cases, the pastoralists lost their livestock.

According to the study, over 2.4 million livestock, which are crucial sources of food and income for pastoralist families, have died in Kenya. In Marsabit County alone, affected communities have lost over 121,000 sheep and goats, 35,000 camels, and about 38,000 cattle in recent months (ReliefWeb, 2022). Several ongoing efforts aim to support these communities in recovering from drought and livestock loss and working toward self-reliance (TEAM, 2024). Vulnerable households have resorted to desperate measures to cope with food insecurity, including relying on food donations, purchasing food on credit, engaging in secondary income-generating activities, consuming less preferred foods, eating fewer meals, seeking help from relatives or friends, and sending their children to beg (TEAM, 2024).

A survey carried out by Woldemichael et al. (2023) shows how a rise in the resilience levels of a given household is associated with an increase in the amount of food purchase made by these households, hence food security. The said changes in this map also align with their study in Ethiopia as also Yimer et al. (2020) else that more resilient households have greater food expenditure and better dietary scores in line with this map's changes. Similarly, in another research by Sibhatu and Qaim (2018), it was stated that AA prominence contributed to better food security results in Ethiopia and other Africa countries. Therefore, the final conclusion of the study was that resilient households were ready more to combine with shocks and stresses such as that associated with food insecurity and would therefore be in a better position to maintain their food consumption patterns and dietary adequacy.

Ouoba and Sawadogo (2022) highlighted that during the COVID-19 pandemic in Burkina Faso, the deterioration of household food security was primarily caused by limited market access due to closures and high food prices. This was particularly challenging for urban households, whose food security is market-oriented, compared to rural households, which rely on production. The proportion of food-insecure households in Burkina Faso due to COVID-19 was slightly lower than those reported in Kenya and Uganda by Kansiime et al. (2020). Household Dietary Diversity Score, a qualitative index measuring a household's ability to consume diverse foods, indicated reduced food variety during this period. Households faced challenges accessing diverse foods due to market closures, increased prices, and reduced income as commercial activities slowed down.

In a way, that tends to decrease real income and in turn the purchasing power, which possibly leads to changes of budget allocation within the articles of consumption by households in the LM status or changes in their plans for consumption (Ansah et al., 2022). Households might respond by switching to other costly sources of protein in the event they cannot afford to absorb the shock effects. At such adverse conditions, households may skip a meal session or even a full day's

meals. Such disruptions include forced food demands for example, having to force feed patients with thickened liquids affect food and nutrition security at the household level. Thus, negative shocks impacts may result to fluctuation in the stability of the expenses incurred on food by the households. The capacity of such households towards managing such consumption shocks is an implication of the resilience displayed (Ansah et al., 2022).

The study and findings were based on the impact of COVID -19 in Burkina Faso.

2.4. Conceptual Gap

The study variables were food security, poverty and household resilience The Influence of Food Security on household resilience

2.5. Conceptual Framework

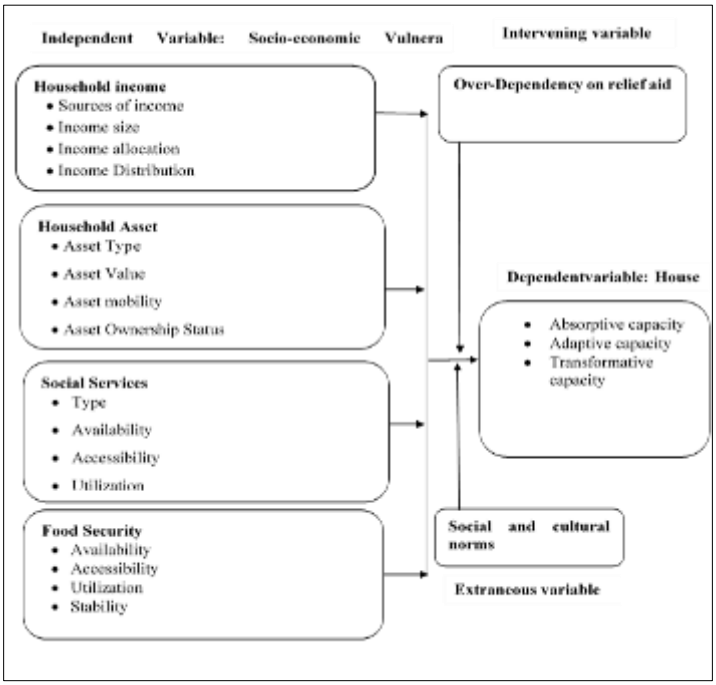

Figure 1 Conceptual framework showing the influence of socio-economic vulnerability assessment approach on household resilience

In this research, the dependent variable was the resilience of the households. The independent variable is manifested by income level, asset holding, social service and food security of the households in the nutrition projects. The relationship between these variables is depicted graphically in Figure 1. The relationship was likely to be influenced by 'dependency of relief aid' as the intervening variable and culture and social norms as the extraneous variables.

This study conducted a comprehensive examination of the independent variables delineated within the conceptual framework, exploring their individual components and collective influence on household resilience, particularly within the context of nutrition projects. The research focused specifically on USAID Nutrition projects in Isiolo, delving into both the interdependent and individual influences of these variables on household resilience.

3. Research methodology

3.1. Introduction

This chapter outlines the strategies that were used in this research process. These include the research framework, the population under study, the number of participants needed for this study, and how the participants were chosen, data collection and analysis procedures and issues to do with the treatment of the participants.

3.2. Research Design

A research design outlines the approach that is to be employed in collecting and analyzing data regarding the study areas. In most cases, a research design includes a detailed account of the study. The researcher can offer detailed responses to the research questions given the evidence that has been collected (Shajahan, 2005). With the aim of characterizing the identified parameters as they are now and statistically representing the data, descriptive surveys are defined as fact-finding inquiries conducted by asking questions, primarily via questionnaires, to a wide range of people (Kothari 2004). According to Pinsonneault and Kraemer (1993), descriptive surveys used to systematically gather and analyze data to describe characteristics, attitudes, behaviors, or opinions of a population. It focuses on providing a comprehensive overview or "description" of a phenomenon without manipulating variables or establishing causal relationships. A descriptive survey design gives responses to individuals' present status questions (Mugenda and Mugenda, 2003).

3.3. Target Population

A population is described as a group of individuals or things that share a single or additional quality, from which data can be gathered and analyzed (Ball et al., 2001). A research population typically consists of a sizable group of people who have been chosen for participation in a study based on the knowledge they can contribute. To make judgments about the target population, the researcher uses data from that group. In relation to a specific study, the target population is made up of a group of people with similar characteristics. The study primarily concentrated on the USAID Nawiri nutrition project due to its significant scope, scale, funding, and timeline, currently making it the largest development project in Isiolo. Therefore, the target population of this study consisted of all relevant stakeholders involved in USAID Nawiri Nutrition Project in Isiolo County and will consist of 1801 Nawiri project participants with malnutrition cases from three sub-counties of Isiolo with a population of 810, Garbatulla, 501 and Merti with a population of 490, 28 project staff, 15 PREG partners and 25 County Steering Group members. These secondary data were sourced from the Nawiri Live Dashboard which is a Monitoring and Evaluation platform that contains all data from the USAID Nawiri Nutrition project.

Table 1 Target Population

Category	**Population**
USAID Nawiri Nutrition Project team	28
PREG Partners	15
Isiolo County Steering Group	25
USAID Nawiri Project malnutrition households in Isiolo.	
Isiolo Central	810
Garbatula	501
Merti	490
Total	1,869

Source: Nawiri Live Dashboard (2024)

3.4. Sample Size and Sampling Procedure

This section provides the methods that was used to identify the sample for the study and how the sample members were selected.

3.4.1. Sample Size

The sample size is determined by factors such as the target population and the research design (Kasomo, 2006). Krejcie and Morgan (1970) developed a formula for calculating the sample size for a given population, providing a convenient approach for addressing sample size concerns in research. In this study, the sample was specifically drawn from the 1,801 participants of the Nawiri Project, while the rest of the target population was considered as a whole group. The Krejcie and Morgan's sample size formula was used in determining the sample size of the households as illustrated here.

$$n = x2N \times p(1-p) \div N \times e2 + x2p(1-p)$$

where,

n = required sample size.

N = population size (1801)

x2 = 3.841

p = estimated proportion of population with attribute of interest (0.5 will be used for maximum variability which gives the largest sample size)

e = margin of error set at 0.05 for a 95% confidence level

$$n = 3.841 \times 1801 \times 0.50\ (1\ -\ 0.50)\ \div\ 1801 \times 0.052\ +\ 0.50\ (1\ -\ 0.50)$$

n = sample size = 316.73

Sample size = 317.

The rest of the population members such as the project team, partners, and steering group was not sampled.

3.4.2. Sampling procedure

Mugenda and Mugenda (2003) define a sampling procedure as a method used to select a study sample from a larger population. In this study, systematic sampling and cluster sampling techniques were employed, with the sample size allocated according to the number of project participants within each cluster in the specific sub-counties.

In order to ensure that every participant of the Nawiri Nutrition project in Isiolo was selected, a systematic random sampling technique was utilized in three clusters consisting of the 3 sub-counties of Isiolo, Merti, and Garbatulla to select the study's household respondents of 317 members. The cluster sample size was allocated by dividing the study population per cluster over the total study population then multiplied by the sample size (n/1801 × 317). The sampling interval within the cluster, was calculated by dividing the total sample size by the cluster sample size. The researchers started with the first unit on the list provided from the project dashboard and choose a sample from every kth unit (810/143, 501/88, 490/86), which was equal to 6. Residents 1, 7, 13, 19, ..., and 143, 88, or 86 depending on the sub-county cluster size were therefore the subjects of the investigation. The researcher focused on the primary caregivers among the 317 selected respondents. The project staff, PREG partners, and the County Steering Group, who were also targeted respondents, were not sampled but rather considered as a census.

Table 2 Sampling Frame

Category	**Population**	**Sample**
USAID Nawiri Nutrition Project team	28	28
PREG Partners	15	15
Isiolo County Steering Committee	25	25
USAID Nawiri Project malnutrition households in Isiolo:		
Isiolo Central	810	143
Garbatula	501	88
Merti	490	86
Total	1,869	385

3.5. Data Collection Instruments

In this study, data was gathered using two sets of questionnaires (Appendices II and III). Kothari (2004) claims that questionnaires are the best data collection instruments. The selection of the questionnaires for this study was based on the simplicity of administration, ability to be fully understood by the respondent prior to answering, and assurance of objectivity on the part of the researcher. Data on the influence of socio-economic vulnerability assessment approach on household resilience in the USAID Nutrition Projects in Isiolo County, Kenya, was collected using structured questionnaires that had both closed – ended and open – ended muti-choice answers to select from. The two questionnaires had similar sections, but different questions based on the respondents. The first questionnaire (Appendix II) was for the USAID Nawiri Nutrition project households and contained six sections. Section A gathered data on the socio-demographic characteristics of the respondents, while Sections B to Be collected information on income, assets, social services, food security, and household resilience. The second questionnaire (Appendix III) was set for Nawiri staff, PREG partners and County steering group members and had six sections – section A to F. Section A collected data on the socio-demographic characteristics of the respondents, while Sections B to F gathered data on the respondents' opinions regarding statements related to household income, assets, social services, food security, and resilience. Two focus group discussions were conducted with a total of 18 respondents to provide deeper insights into the community participants' questionnaire. The data allowed for a more in-depth understanding of how the socio-economic vulnerability assessment approach influences household resilience.

3.5.1. Validity of the Research Instruments

To ascertain the suitability of the questionnaire, its validity was examined. The internal and content validity of research tools were used to attain validity. When developing the research instruments, the researcher constructed the questionnaire based on existing empirical literature, with input from the USAID Nawiri research and Monitoring and Evaluation department. The questionnaire was submitted to the research supervisor for validation before being used in the study. The input from these individuals was used to improve the instrument's validity.

A pilot study was conducted within Isiolo Central Sub-County in a ward known as Ngaremara that is also part of the USAID Nawiri Nutrition Project and comprises of households affected by malnutrition. Given the large scale of the study population, the pilot exercise was challenging but very beneficial. The questionnaires were piloted to determine the instruments' validity before gathering data. The general rule is that 10% of the study sample should participate in the pilot test (Cooper and Schindler, 2010) hence the researchers delivered questionnaires to 31 respondents who were still project participants of the USAID Nawiri nutrition project as part of a pilot. The participants in the pilot were excluded from the final data collection stage. The results of the pilot were used to refine the questionnaires as necessary.

3.5.2. Reliability of Research Instruments

According to Mugenda and Mugenda (2003), reliability is defined as a measure of consistency in the results obtained from research instruments when tests are performed repeatedly, aimed at minimizing errors within the study. To assess the reliability of the research instruments, the split-half method was used. This involved dividing the questionnaire into two halves based on odd and even question numbers and administering them to the pilot sample, which was also split into two groups. The responses from both groups were analyzed using SPSS, and Cronbach's Alpha was calculated as a measure of reliability, yielding a correlation of 0.728. This indicated that the study items were sufficiently consistent, thereby confirming the reliability of the instruments (Cooper and Schindler, 2003).

3.6. Data Collection Procedure

The initial step involved obtaining a research permit from the University of Nairobi, which facilitated a formal request to the USAID Nawiri Project Management team to include Nawiri project participants in the study, as outlined in the Transmittal Letter (Appendix I). The study involved first-hand data collection. The researcher, with the assistance of three trained research assistants, personally administered the questionnaires to the participants. The research assistants were trained on the questionnaire before commencing data collection. To ensure smooth data collection, identified staff, partners, and county members were contacted by phone in advance to confirm the time and date of the exercise. The data collection process lasted for two weeks.

3.7. Data Analysis Methods

The Statistical Package for the Social Sciences (SPSS) version 29 was used for both descriptive and inferential analysis. Descriptive statistics were presented using frequency, proportion, and percentage calculations. To determine the relationships between various variables identified in the literature, a linear regression analysis was conducted. Pearson's correlation coefficient was computed at a significance level of 0.01 to assess the strength of the relationship

between the variables. The following model was used to establish the influence of the independent variables on the dependent variable:

$$Y = \beta\_0 + \beta\_1 X\_1 + \beta\_2 X\_2 + \beta\_3 X\_3 + \varepsilon$$

Where;

- Y= Social economic vulnerability assessment
- X1: Household Income
- X2: = Household Assets
- X3= Social Services
- X3= Food Security
- ε = Error term

3.8. Operational Definition of Variables

The operationalization of variables is presented in Table 3.3.

Table 3 Operational Definition of Variables

Objectives	Variable	Indicators	Type of Analysis	Tools of analysis
To assess the influence of income level on household resilience among USAID nutrition projects in Isiolo, Kenya.	Independent Variable	• Source of Income • Income level • Income Allocation • Income distribution	Descriptive Regression	Frequency distribution tables, Tabulation and percentages
To identify the influence of asset ownership to household resilience among USAID nutrition projects in Isiolo, Kenya.	Independent Variable	• Asset Type • Asset Value • Asset Mobility • Asset Ownership status	Descriptive Regression	Frequency distribution tables, Tabulation and percentages
To examine the influence access to social services to household resilience among USAID nutrition projects in Isiolo, Kenya.	Independent Variables	• Availability of the service • Accessibility of the service • Utilization of the service • Relevance of the service	Descriptive Regression	Frequency distribution tables, Tabulation and percentages
To analyze the influence of food security to the resilience of households among USAID nutrition projects in Isiolo, Kenya.	Independent variable	• Availability • Accessibility • Utilization • Stability	Descriptive Regression	Frequency distribution tables, Tabulation and percentages

3.8.1. Ethical Considerations

The researcher strictly adhered to the principle of "do no harm," which emphasizes the importance of safeguarding the well-being and privacy of all participants. To ensure the confidentiality of the respondents, their identities were protected through several measures. Specifically, personal identifiers such as names were not collected or disclosed, thereby maintaining respondent anonymity. Additionally, participation in the study was entirely voluntary, with some of the respondents choosing to complete the questionnaire at their own discretion. This approach ensured that participants could provide honest and accurate responses without concerns about their privacy or personal safety. The researcher emphasized that the research was conducted solely for academic purposes and not for commercial gain, to manage respondents' expectations and prevent any assumption of potential benefits from participating in the study.

Additionally, a transmittal letter from the University of Nairobi and the project management was obtained and presented to the respondents to clearly communicate the intent of the study

4. Results and discussion

4.1. Introduction

This chapter presents the data analysis, presentation, and interpretation based on the collected data in line with the study objectives. It includes an analysis of the response rate, demographic characteristics of the respondents, and an examination of the independent variables under investigation.

4.2. Response Rate

The response rate refers to the proportion of questionnaires returned compared to those distributed during the data collection process. Out of the 385 questionnaires administered, 323 were fully completed and returned, yielding a response rate of 83.9%. This rate is considered sufficient for making inferences for the study, as it exceeds the generally accepted threshold of 50%, as shown in Table 4.1.

Table 4 Response Rate

Response Category	Frequency	Percentage (%)
Questionnaires Returned	323	83.9
Unreturned Questionnaires	62	16.1
Total	385	100

4.3. Inferential Analysis

To further analyze the relationships between the independent variables (household income, household assets, social services, and food security) and the dependent variable (household resilience), a multiple regression analysis was conducted.

Using the model

$$Y = \beta\_0 + \beta\_1 X\_1 + \beta\_2 X\_2 + \beta\_3 X\_3 + \varepsilon$$

Where;

- Y= Social economic vulnerability assessment
- X1: Household Income
- X2: = Household Assets
- X3= Social Services
- X3= Food Security
- ε = Error term

The findings are as presented in Table 4.31

Table 5 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.742	0.551	0.543	0.474

The model summary in Table 4.31 shows an R value of 0.742, indicating a strong positive correlation between the independent variables and household resilience. The R Square value of 0.551 suggests that about 55.1% of the variance in household resilience is explained by the combined effects of household income, assets, social services, and food security.

Table 6 Analysis of Variance ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	75.345	4	18.836	83.856	0.000
Residual	61.355	318	0.193		
Total	136.700	322			

The ANOVA results in Table 4.32 show a significant F-value of 83.856 with a p-value of 0.000, which is below the significance level of 0.05. This indicates that the regression model significantly predicts the dependent variable, household resilience. Therefore, the null hypothesis stating that there is no relationship between household income, assets, social services, food security, and household resilience is rejected.

The coefficients Table 4.33 shows that all four independent variables (household income, household assets, social services, and food security) are statistically significant predictors of household resilience, as their p-values are all below 0.05.

Table 7 Coefficients of Determination

Coefficients	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	1.225	0.196		0.000
Household Income	0.278	0.049	0.316	0.000
Household Assets	0.230	0.054	0.258	0.000
Social Services	0.360	0.065	0.389	0.009
Food Security	0.420	0.059	0.453	0.001

Household Income has a standardized coefficient (Beta) of 0.316, indicating that for every unit increase in household income, household resilience is expected to increase by 31.6%, holding all other variables constant. Household Assets has a Beta of 0.258, meaning a unit increase in household assets would result in a 25.8% increase in household resilience. Social Services has a Beta of 0.389, suggesting that a unit increase in social services leads to a 38.9% increase in household resilience. Food Security has the highest Beta of 0.453, implying that a unit increase in food security would result in a 45.3% increase in household resilience, making it the most influential factor among the four.

The regression analysis reveals that all four factors household income, household assets, social services, and food security positively and significantly contribute to household resilience among USAID nutrition projects in Isiolo County, Kenya. The high Beta values for each variable indicate strong contributions to resilience, with food security emerging as the most significant factor.

5. Summary of the Study Findings

The study investigated the socio-economic vulnerability assessment approach and household resilience among USAID nutrition projects in Isiolo County, Kenya. The findings provide information on how various factors, including income, assets, social services, and food security, influence household resilience. The key findings are summarized as follows:

The demographic analysis revealed that 57.9% of respondents were female, and 42.1% were male. The majority of respondents (35.0%) were in the age bracket of 30-35 years, with most having completed primary education (61.9%). The study further indicated that 65.6% of respondents had participated in the USAID Nawiri Project for 0-2 years, with 57% having experience in other nutrition projects, demonstrating a relatively diverse demographic composition.

The findings on the influence of household income indicated a significant positive relationship between household income and resilience. The regression analysis revealed that household income contributes to a 31.6% increase in

household resilience. This suggests that increased income enables households to better manage risks and adapt to shocks, aligning with theories that emphasize economic stability as crucial to resilience-building. Findings from the open-ended questions also highlighted the importance of income diversification, which provides households with a more robust financial portfolio, particularly in times of shocks or stresses. Diversifying income sources was emphasized as a key strategy for enhancing household resilience and financial stability.

Regarding household assets, the study found that asset ownership significantly contributes to household resilience, with a 25.8% increase associated with higher levels of asset ownership. The possession of assets such as land, livestock, and savings provide households with a buffer against shocks and enhances their capacity to recover from adverse situations.

The study further examined the influence of social services on household resilience, demonstrating that access to social services accounts for a 38.9% increase in household resilience. The availability of healthcare, education, and social support networks was found to play a critical role in enhancing the households' ability to cope with shocks and stresses. There was also a strong call to improve the availability and utilization of agricultural extension services, a vital social service that plays a key role in enhancing food security.

Finally, the findings indicated that food security is the most significant factor influencing household resilience, with a 45.3% increase. The study shows that households with reliable access to adequate and nutritious food are better positioned to withstand shocks and stresses, supporting the notion that food security is foundational to overall household resilience.

6. Discussion of the Findings

This section discusses the findings on the independent variables in relation to the dependent variable.

6.1. Influence of Income on Household Resilience

The study revealed that household income significantly influences resilience among households involved in USAID nutrition projects in Isiolo County. The regression analysis demonstrated that household income contributes to a 31.6% increase in household resilience, underscoring the critical role of economic resources in managing risks and adapting to adverse conditions. This finding aligns with the theoretical underpinnings of the Vulnerability Theory, which posits that individuals and communities with higher economic resources are better positioned to cope with vulnerabilities and risks (Fineman, 2010). Higher income levels provide households with the ability to diversify their income sources, invest in productive assets, and save for future uncertainties, all of which are essential for enhancing resilience.

Empirically, the results concur with studies by Belay et al. (2017) and Ur Rahman et al. (2021), who argue that households with higher income levels have more options for managing expenditure, disasters, and macroeconomic shocks. These studies suggest that income diversification and economic stability are critical for reducing vulnerability. Similarly, Huynh and Bui (2024) found that income diversification contributes to reducing household vulnerability, particularly in developing regions. The findings of this study add to the growing body of evidence that suggests that household income is a key determinant of resilience, particularly in rural and semi-arid areas like Isiolo County as evidenced by the findings from the focus group discussions.

In the focus group discussions (FGDs) conducted with community members, participants highlighted the importance of income-generating activities such as small-scale businesses and casual labor in improving household resilience. They noted that households with multiple income streams were better able to cope with economic shocks and sustain their livelihoods during periods of drought or other crises. This qualitative insight supports the quantitative findings, emphasizing the role of diversified income sources in building resilience.

In addition, the study's findings suggest that households with a stable income are more likely to access credit facilities, which can further enhance their resilience by providing a financial buffer during economic shocks. The significance of this finding is supported by the work of Fang et al. (2016), which demonstrated that households with access to credit are more likely to recover quickly from shocks and maintain their standard of living. Thus, household income not only directly contributes to resilience by enabling day-to-day survival but also indirectly supports resilience by improving access to financial services and credit.

6.2. Influence of Assets on Household Resilience

The study found that household assets significantly influence resilience, contributing to a 25.8% increase in household resilience. This highlights the crucial role of asset ownership in buffering against shocks and enhancing a household's

capacity to recover from adversity. The findings align with Resilience Theory, which asserts that assets like land, livestock, and savings strengthen a household's ability to withstand and bounce back from shocks (Van Breda, 2011). Assets act as a form of insurance, helping households manage crises more effectively and maintain their well-being during challenging times.

Empirical evidence supports this finding, as studies by Ansah et al. (2022) and Kumaraswamy et al. (2020) have shown that asset ownership provides a critical buffer against economic shocks. Households with diverse assets, including land, livestock, and savings, are better equipped to manage unexpected expenses and recover from crises. This finding is further corroborated by the FAO (2016) analysis, which found that access to productive assets is crucial for building resilience among households in vulnerable regions. The study highlights that households with greater asset ownership are less vulnerable to shocks and stresses and have a higher capacity for recovery and adaptation.

During the FGDs, participants emphasized the importance of livestock and land ownership in enhancing household resilience. They noted that households with livestock could sell animals in times of need to generate income, while those with land could engage in subsistence farming to ensure food security. These insights from the community align with the quantitative findings, highlighting the critical role of assets in building resilience.

The study also found that households with access to physical assets, such as livestock and land, have a better ability to diversify their income sources and reduce their vulnerability to economic shocks. This finding aligns with the Sustainable Livelihoods Approach (SLA), which posits that asset capitals serve as performance indicators or precursors of vulnerability, where more assets mean less vulnerability (Slater and Ulrichs, 2017). The study's findings suggest that policies aimed at increasing asset ownership and protection, such as land rights and livestock support programs, could significantly enhance household resilience in Isiolo County.

6.3. Influence of Social Services on Household Resilience

The study findings show that access to social services is a significant factor in enhancing household resilience, accounting for a 38.9% increase. The availability of healthcare, education, and social support networks was found to play a critical role in enabling households to cope with shocks and stresses. This finding is consistent with the perspectives offered by Bowen et al. (2020) and Njagi et al. (2021), who argue that social protection programs such as cash transfers, health services, and education improve household resilience to economic shocks. Social services provide a safety net that helps households manage risks, access essential services, and reduce their vulnerability to external shocks.

These findings are further supported by the Vulnerability Theory, which emphasizes that resilience is created through social institutions and relationships that provide support during crises (Fineman, 2010). The study highlights the importance of social services in enhancing household resilience by improving access to healthcare, education, and social support networks. This is particularly relevant in rural areas like Isiolo County, where households may face multiple challenges, including limited access to social services, inadequate infrastructure, and high levels of poverty.

The FGDs with community members revealed that access to healthcare services, particularly maternal and child health services, is crucial in building household resilience. Participants noted that improved access to healthcare reduces the financial burden of medical expenses and enables households to focus on other aspects of resilience, such as income generation and asset accumulation. These qualitative insights support the quantitative findings, highlighting the critical role of social services in enhancing household resilience.

Moreover, the study's findings suggest that strengthening social safety nets and community support networks can significantly enhance households' resilience to shocks and stresses. This aligns with the findings of Karani and Kariuki (2017), who emphasize the importance of social capital and access to essential services in building community resilience. The study suggests that targeted interventions to improve access to social services, such as healthcare, education, and social protection programs, are essential for enhancing household resilience in Isiolo County.

6.4. Influence of Food Security on Household Resilience

Food security emerged as the most significant factor influencing household resilience, contributing to a 45.3% increase. The study shows that households with reliable access to adequate and nutritious food are better positioned to withstand shocks and stresses, supporting the notion that food security is foundational to overall household resilience. This finding aligns with the Resilience Theory, which posits that adequate access to food is crucial for managing risks and enhancing resilience (Usamah et al., 2014). The importance of food security in resilience-building is further supported by empirical

evidence from Woldemichael et al. (2023) and Kansiime et al. (2020), who highlight the critical role of food security in supporting household resilience, particularly in areas prone to drought and other environmental shocks.

The study findings suggest that supporting sustainable food production and conservation practices at the household level is essential for promoting long-term food security. This finding is consistent with the work of Ouoba and Sawadogo (2022), who argued that sustainable agricultural practices, such as diversified cropping systems and improved water management, contribute significantly to food security and, consequently, to household resilience. Moreover, integrating nutrition education and community-based food programs, as highlighted by the study, is essential for enhancing households' ability to manage food resources effectively and maintain adequate nutritional standards.

During the FGDs, participants emphasized that access to affordable and nutritious food is critical for household resilience. Many noted that market fluctuations and unpredictable weather patterns often make it challenging to secure food, especially for households that rely solely on agricultural and animal produce. Participants also highlighted the role of local community food banks and nutrition education programs in promoting food security and resilience. These qualitative insights reinforce the quantitative findings, demonstrating the centrality of food security to household resilience.

The study also indicates that community-based food initiatives, such as local markets and food banks, can play a crucial role in enhancing access to diverse and affordable food options, thereby supporting household resilience. This aligns with findings from Kansiime et al. (2020), who observed that access to diverse food sources through community-supported programs enhances food security, particularly in vulnerable regions. Consequently, policies promoting sustainable food production, improved market access, and community-based nutrition programs are vital for building household resilience in Isiolo County.

7. Conclusion

Based on the study's findings, the following conclusions are drawn

Household income significantly enhances resilience, with increased income enabling better management of risks and adaptation to shocks. Households with diversified income sources and stable earnings are better positioned to withstand economic shocks and maintain their standard of living.

Ownership of assets, such as land, livestock, and savings, plays a critical role in building household resilience. Households with substantial assets are better positioned to recover from shocks and sustain their well-being, emphasizing the importance of policies that promote asset accumulation and protection. Access to social services, including healthcare, education, and social support networks, is essential for enhancing household resilience. Strengthening social safety nets and community support systems can greatly improve households' ability to cope with shocks and stresses.

Food security is the most significant factor influencing household resilience. Ensuring reliable access to adequate and nutritious food is foundational to building resilience, and efforts should focus on sustainable food production, market access, and community-based food programs.

The socio-economic vulnerability assessment approach used by USAID nutrition projects is effective in identifying strategies for building household resilience. However, a collaborative effort among households, the project team, partners, and the government is essential to ensure that food security is addressed collectively. Once food security is strengthened, other socio-economic vulnerability factors should be strategically integrated to create a comprehensive approach to resilience building.

Recommendations

This study makes the following recommendations based on the conclusions

- First, the study recommends that there is need to develop and implement policies that promote income diversification and support small-scale businesses to enhance household resilience. Policies should also focus on improving access to credit and financial services, particularly for low-income households.
- Secondly, it is recommended that social safety nets should be strengthened as well as improving access to healthcare, education, and social support services in rural areas. Invest in infrastructure that facilitates market access and enhances food security, particularly in regions prone to environmental shocks.

- The third recommendation is that community-based initiatives should be supported as they promote sustainable food production and nutrition education. Collaborate with local stakeholders to establish food banks and community markets that enhance access to diverse and affordable food options.
- Fourthly, USAID Nutrition projects should establish mechanisms to continuously assess household vulnerability on an ongoing basis. Regular monitoring enables timely adjustments to interventions, ensuring that resilience-building efforts remain responsive to emerging challenges.
- Finally, there should be active involvements of households and local communities in the design and implementation of resilience-building strategies. Leveraging local knowledge ensures that interventions are culturally relevant and more likely to succeed in addressing the unique needs of different communities.

Suggestions for Further Study

- Arising from the findings from this study, it is evident that future research could examine the specific types of assets (e.g., livestock vs. land) that most effectively contribute to household resilience in different contexts.
- Secondly, a study could be conducted to investigate the impact of social capital and community networks on enhancing household resilience in various socio-economic settings.
- Finally, further research is recommended as resilience building remains a dynamic and evolving field, with limited empirical data available locally. Expanding research in this area is crucial for enhancing our understanding of resilience, which is key to the long-term sustainability of development projects. Comprehensive studies could provide valuable insights into effective strategies and interventions, ensuring that projects can better address the complex challenges faced by vulnerable communities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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Author's short biography

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Ms. Angeline Kioko is a dedicated gender and program management specialist with a strong academic foundation and over seven years of progressive experience in development programming across Kenya. She holds a Master of Arts in Project Planning and Management from the University of Nairobi and a Bachelor's Degree in Gender and Development Studies from Kenyatta University. She is also a certified Project Management for Development Professionals (PMD Pro) practitioner.

Angeline has built a strong track record in designing, implementing, and evaluating donor-funded programs with a focus on gender equality, women's economic empowerment, youth development, social behavior change, and livelihoods. Her professional journey has seen her lead and contribute to multi-sectoral initiatives under complex resilience-building projects, particularly within the USAID programs.

She has a lot of expertise in gender transformative programming, evidence-based targeting, and strategic stakeholder engagement, and has successfully supported the development of gender-responsive tools, capacity building manuals, and implementation frameworks. Angeline is passionate about creating inclusive systems and has consistently championed community-driven approaches that shift power dynamics and promote equity, particularly among women, girls, and marginalized groups. Angeline has also worked to integrate gender lens investing across portfolios and drives measurable impact in the private sector by supporting businesses to reduce gender gaps in leadership, employment, and entrepreneurship. She also contributes to knowledge generation and thought leadership in the fields of gender-smart investing, inclusive economic growth, and social impact measurement.