

The **KENYA INSTITUTE** for **PUBLIC**
POLICY RESEARCH and **ANALYSIS**

The Impact of Unconditional Cash Transfers on Households' Food Security in Arid and Semi-Arid Lands in Kenya

Joseph Nyaramba and Caroline Ngari

DP/310/2023

**THE KENYA INSTITUTE FOR PUBLIC POLICY
RESEARCH AND ANALYSIS (KIPPRA)**

**YOUNG PROFESSIONALS (YPS) TRAINING
PROGRAMME**

The Impact of Unconditional Cash Transfers on Households' Food Security in Arid and Semi-Arid Lands in Kenya

Joseph Nyaramba and Caroline Ngari

*Kenya Institute for Public Policy
Research and Analysis*

*KIPPRA Discussion Paper No. 310
2023*

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Published 2023

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ISBN 978 9914 738 35 3

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Abstract

This study investigated the impact of regular Unconditional Cash Transfers (UCT) on household's food security in arid and semi-arid lands (ASALs) in Kenya. Using Propensity Score Matching (PSM), the study assessed the Average Treatment Effect on the Treated (ATET) for two key food security outcomes. To demonstrate robustness of the study findings, the study employed three matching methods on the 2022 Kenya Demographic and Health Survey (KDHS) data to estimate the impact of the Inua Jamii programme on the beneficiaries. The study focused on 3,444 households from the arid region and 6,182 households from the semi-arid region. The study specifically analyzed data from households that either received the UCT (treatment group) or did not receive the UCT (control group). The results show that cash transfers had a positive impact on food consumption in ASALs. In the arid lands, beneficiaries on average experienced an increase in their food consumption score by 3.4 per cent. In the semi-arid lands, beneficiaries on average increased food consumption score by 1.4 per cent, though not statistically significant. However, cash transfers did not significantly improve households' coping strategies during food shortages in the arid region, where the coping strategy index score on average increased by 2.9 per cent. In the semi-arid region, the coping strategy index score decreased on average by 6.8 per cent, indicating progress towards the use of less destructive coping strategies during food shortages. Expanding unconditional cash transfer programmes in arid regions to cover more households is imperative. However, it requires other complementary interventions and continuous monitoring. Collaboration between the government and donors is crucial in formulating effective crisis management strategies in arid and semi-arid areas. In semi-arid regions, where cash transfers did not significantly influence food consumption, there is need to adjust the transfer value and programme efficiency.

Abbreviations and Acronyms

ASALs	Arid and Semi-Arid Lands
ATET	Average Treatment Effect on the Treated
CSI	Coping Strategy Index
CT-HSNP	Cash Transfers for Hunger Safety Net Program
CT-OVC	Cash Transfers for Orphans and Vulnerable Children
CT-PWSD	Cash Transfers for Persons with Severe Disability
CT-UFS	Cash Transfers for Urban Food Subsidy
FCS	Food Consumption Score
GDP	Gross Domestic Product
KDHS	Kenya Demographic and Health Survey
NHIF	National Health Insurance Fund
NDMA	National Drought Management Authority
NSPP	National Social Protection Policy
NSPS	National Social Protection Secretariat
OPCT	Older Persons Cash Transfers
PSM	Propensity Score Matching
SDGs	Sustainable Development Goals
UCT	Unconditional Cash Transfers

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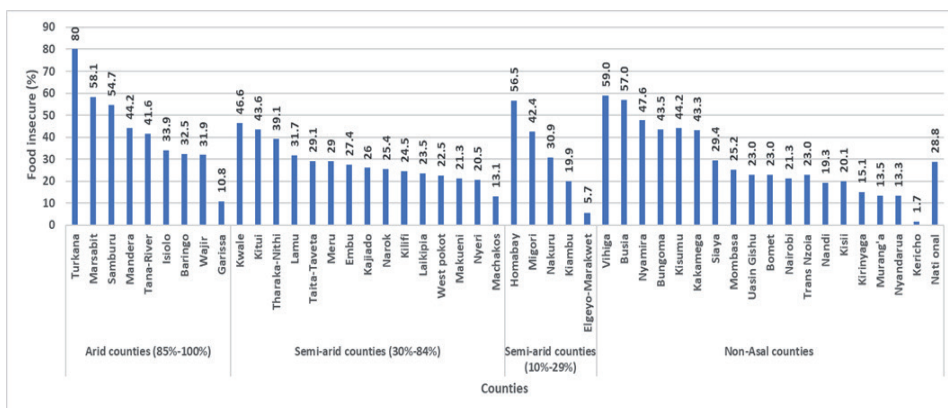
1. Introduction

Food security is defined as the state in which all individuals consistently have access to an adequate supply of safe and nutritious food, enabling them to maintain a healthy and active life. To achieve this condition, it is imperative to ensure that the four essential dimensions of food security, including availability, accessibility, utilization, and stability, are met (FAO, 2008). Food availability entails the physical existence of enough quality food on a consistent basis whereas food access is about having enough resources to obtain a nutritious diet. The third dimension is the utilization of food which implies the ability of individuals and households to consume food in a way that meets their dietary needs and preferences. Stability dimension refers to the ability of individuals and households to maintain access to food over time, even in the face of shocks and crises.

Sustainable Development Goal 2 (SDG2) aims to eradicate hunger, achieve food security, improve nutrition, and promote sustainable agriculture. It recognizes the interconnections between sustainable agriculture, empowering small farmers, gender equality, rural poverty reduction, healthy lifestyles, climate change, and other goals within the 17 Sustainable Development Goals (Sampedro, 2021). Food insecurity has been increasing in sub-Saharan Africa (SSA). Between 2021-2022, approximately 28 million people in the region faced acute food insecurity due to rising food prices and income reductions, especially among the most vulnerable. The conflict in Ukraine worsened global cereal shortages and fuel price hikes, driving up food import costs. Effects of COVID-19, high unemployment, and disrupted supply chains, continue to impact food security. These issues compound existing pressures from rapid population growth and climate change, causing worrisome levels of food insecurity in SSA (Mitra et al., 2022).

The 2022 Kenya Health Demographic Survey (KDHS) highlights that approximately 30 per cent of Kenyan households' experience food insecurity, indicating limited access to sufficient food or funds for purchasing essential food items. This figure aligns closely with the findings from the 2015/2016 Kenya Household Budget Survey (KDHS), which indicated that roughly 32 per cent of Kenyans fall below the food poverty line of Ksh 2,331 per month for rural households and Ksh 2,905 per month for urban households. The food poverty rate is most pronounced in the ASALs, with arid counties exceeding the national food poverty rate of 31 per cent. Turkana, Mandera, Samburu, Marsabit, and Tana River all report food poverty rates above 40 per cent, with Turkana facing the most significant challenges (Figure 1.1). According to the KNBS (2021) Kenya poverty report, these five counties also have the highest severity of food poverty, with Turkana registering a severity rate of 20 per cent.

Figure 1.1: Percentage of food insecure households per county



Source of data: KDHS (2022)

The 2023 drought early warning and monitoring system report by the National Drought Management Authority (NDMA) highlights the impacts of the prolonged drought in the Horn of Africa, particularly in Kenya. The drought led to the loss of over 3 million livestock, the depletion of critical water sources, and significant drops in crop yields. The report further emphasizes that approximately 4.4 million individuals were facing acute food insecurity, with almost 1 million children aged 6-59 months and 142,000 pregnant or breastfeeding women and girls in need of treatment for acute malnutrition. Additionally, the soaring food prices placed substantial strains on vulnerable households, especially in Kenya’s arid and semi-arid lands (ASALs), which harbor a significant concentration of food-insecure households. These difficulties are compounded by the unique vulnerabilities of ASALs communities such as droughts, floods and conflicts, which often challenge their ability to effectively cope with and recover from such shocks (Shibia 2023; Maione 2020; Devereux & Tibbo 2011).

Social protection programs are widely acknowledged as essential for reducing poverty and vulnerability in arid and semi-arid lands (ASALs). In Kenya, diverse entities administer social protection through mechanisms such as social assistance, social health insurance, and social security. The government plays a central role in delivering social protection, encompassing food distribution, social health insurance, price subsidies, school-based feeding programs, and cash transfers. Unconditional cash transfers have emerged as a preferred method of supporting vulnerable populations. From 2005 to 2011, the government established several cash transfer initiatives, including Cash Transfers for Persons with Severe Disability (CT-PWSD), Older Persons Cash Transfers (OPCT), Cash Transfers for Urban Food Subsidy (CT-UFS), Cash Transfers for Hunger Safety Net Program (CT-HSNP), and Cash Transfers for Orphans and Vulnerable Children (CT-OVC) (Ministry of Labour and East African Affairs, 2016). Notably, in Kenya, approximately 17 per cent of households received cash transfers or social assistance to address their immediate needs (KNBS, 2023).

Cash transfers play a significant role in reducing vulnerability and poverty. Cash transfers enhance household consumption, improve individual's health status, promotes school attendance and nutritional outcomes of children (Das & Sethi, 2023; Maione, 2020; Haushofer & Shapiro, 2013). These outcomes have been noted as essential elements for promoting human capital development and livelihoods in the community. Cash transfers in Kenya are among the most preferred mode of offering support to vulnerable groups and populations to respond to shocks and smoothen their consumption without the distress of selling their assets (Ministry of Labour and East African Affairs, 2016).

Unconditional cash transfers (UCTs) are financial assistance programs that provide eligible individuals or households with regular cash payments without imposing specific conditions or criteria. Unlike conditional programs, which require recipients to meet certain requirements such as health, education, or nutrition criteria, UCTs offer flexibility. Recipients can use the funds as they see fit, whether for food, shelter, healthcare, education, or other essential needs. These programs serve as a social safety net, aimed at alleviating poverty and enhancing the well-being of vulnerable populations (Baird et al., 2011; Fernald et al., 2008).

In 2020/21, the government cash transfers reached 763,670 older persons, 294,345 orphans and vulnerable children, and 34,536 persons with severe disabilities. CT-HSNP aims to reduce hunger and vulnerability in specific geographic areas. The program is dominant in northern Kenya. In 2015, CT-HSNP reached 84,340 beneficiaries who received Ksh. 2,550 per month (Ministry of Labour and East African Affairs, 2016). A study done by (World Bank, 2018) found that in overall, on average, cash transfers accounted for close to 1.5 per cent of household expenditure across the country, but it accounted for 3.8 per cent of household expenditure among the poorest households.

The value of the unconditional cash transfers and the criteria used for selecting beneficiaries heavily rely on data obtained from the Kenya Household Budget Survey (KIBHS) 2015/2016. The number of beneficiaries reached out of the targeted number also depends on the country's financial resource base as social protection budget allocation is 0.4 per cent of the GDP. According to KNBS (2021), food poverty lines are set at Ksh 2,331 for rural areas and Kshs 2,905 for urban areas. However, it is important to note that the KIHBS survey provides a snapshot of household circumstances at a specific point in time, which may not adequately capture economic shocks such as a high cost of living, sudden unemployment, or loss of assets due to catastrophic events like droughts, floods, and global pandemics over the years (Devereux & Tibbo, 2011). Additionally, the last KIHBS survey was conducted eight years ago highlighting the limitations in using this data to determine current food poverty lines.

Sustainable Development Goals (SDGs) envisage the need to end hunger, achieve good health, alleviate poverty, and reduce inequality by 2030. Kenya's vision 2030 aims to attain high quality of life for all its citizens by the year 2030. The 2019 Kenya National Social Protection Policy aims to ensure that all Kenyans live in dignity and exploit their human capabilities to further their own social and economic development. The government committed 0.4 per cent of the

Gross Domestic Product (GDP) to social protection services. The average annual government spending for social protection is estimated to be over Ksh 26 billion, benefiting over 1.3 million people.

Although the Kenya's social protection programs have made progress in reaching great proportion of the poor population, 32 per cent of Kenyans did not meet the food poverty line threshold. Despite of this, large proportion of eligible households remain uncovered by any form of social protection with the population in the Arid and Semi-Arid Lands (ASALs) affected the most (Mutea et al., 2022). In 2015/16, six counties registered food poverty rates of more than half their population, these were Turkana (66.1%), Mandera (61.9%), Samburu (60.1%), Busia (59.5%) and West Pokot (57.3%). In 2018, HSNP reached 97,661 persons in Wajir, Turkana and Mandera at a cost of over Ksh 3.3 billion. Despite of HSNP success, increase in food prices and effects of climate change pushed both the beneficiaries and other households to vulnerable situations. The number of households who require social assistance has been increasing over the years (Ministry of Labour and East African Affairs, 2016). Determining effective strategies to enhance food security to populations in ASALs remains crucial in providing and protecting vulnerable groups against livelihood risks. Innovative social protection policies will enable vulnerable populations to escape from poverty traps and develop the required resilience to respond to future shocks.

The primary goal of this study is to assess the impact of unconditional cash transfers on household's food security in arid and semi-arid lands (ASALs) in Kenya. Specifically, the study analyzes the effects of unconditional cash transfers on household's food consumption and examines the impact of unconditional cash transfers on household's coping strategies in the face of inadequate access to food.

The rest of the paper is organized as follows: Section 2 provides the review of policies, laws and regulations on social protection programs in Kenya; section 3 provides a review of the literature and section 4 presents the methodology that was used. Section 5 presents the results, and the discussion of the study and section 6 provides the conclusions and recommendations of the study.

2. Review of Policies, Laws, and Regulations

A review of policies, laws, and regulations on social protection programs in Kenya provides insights into the framework and legal provisions governing social protection initiatives in the country. These policies and regulations aim to address various social risks and vulnerabilities, improve the well-being of vulnerable populations, and promote inclusive development.

The Government of Kenya has integrated its commitment to social protection within the country's legislative framework. The Constitution recognizes social security as a fundamental right for all citizens, ensuring access to social protection, the Constitution of Kenya entail a comprehensive Bill of Rights that binds the State to provide appropriate social security to persons who are unable to support themselves and their dependents. In line with this, Vision 2030 sets a goal to improve the quality of life for all Kenyan citizens by the year 2030.

Kenya has also adopted the Social Protection Floors Recommendation (ILO Recommendation No. 202), which establishes globally recognized standards for social protection in the country. This recommendation provides a comprehensive framework for ensuring adequate social protection coverage.

The Social Assistance Act provides the legal basis for social assistance programs, specifying eligibility criteria and entitlements. The legislation provides the legal basis for the implementation of social assistance programs in Kenya. It establishes the criteria, eligibility, and entitlements for various cash transfer programs, such as the Older Persons Cash Transfer Program, the Persons with Severe Disabilities Cash Transfer Program, and the Orphans and Vulnerable Children Cash Transfer Program.

To further strengthen the social protection sector, Kenya has implemented specific laws and acts. For instance, the National Social Protection Policy (NSPP) in Kenya serves as a comprehensive framework for addressing poverty, vulnerability, and inequality through social protection interventions. It outlines the government's commitment to these goals and provides guidance on implementing various programs under social protection. The policy specifically defines the criteria for targeting beneficiaries and identifies the partners involved in implementing these programs.

The National Social Protection Secretariat (NSNP) coordinates various social protection programs in Kenya, including the cash transfer programs mentioned above. It aims to improve coordination, harmonization, and targeting of social protection interventions to maximize their impact and reach.

In terms of disaster management, the Disaster Risk Management Act focuses on preparedness, response, and recovery, including social protection measures to support affected populations.

Additionally, the Child Welfare and Protection Act focuses on the welfare and protection of children in Kenya. It outlines measures for safeguarding children's rights, including provisions for child support, foster care, and adoption. Therefore, the act complements social protection efforts by addressing the specific needs and vulnerabilities of children.

The legislative measures contribute to a comprehensive legal framework for social protection in Kenya, ensuring that vulnerable populations have access to social security, healthcare, disaster management, and child welfare. Reviewing these policies, laws, and regulations helps stakeholders understand the legal framework, principles, and strategies underpinning social protection programs in Kenya. It enables policymakers, implementing agencies, and civil society organizations to assess the effectiveness, coherence, and inclusivity of existing initiatives and identify areas for improvement and further development.

3. Literature Review

3.1 Theoretical literature

Entitlement theory

The entitlement approach to food security, championed by Sen (1981), seeks to address the question of why famines persist despite an adequate food supply. Sen argues that famines result from issues related to access to food, drawing from his early experiences in India. To tackle famine caused by food access problems, Sen introduces the concept of entitlement. This approach distinguishes between two fundamental components of entitlement: endowments and entitlements. Endowments encompass the control of assets and resources, including labor power, while entitlements refer to “the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities they face.” Sen further identifies four types of entitlements or legal means of acquiring food: trade-based entitlement, production-based entitlement, labor-based entitlement, and inheritance and transfer-based entitlement (Elahi, 2006; Gasper, 1993; Sen, 1981).

The core idea behind the entitlement approach is that famines occur not solely due to food scarcity but rather due to entitlement failures. Even when food is available, famine can strike when people lack access to food production, face natural disasters that disrupt production, encounter difficulties in buying or selling goods for food, or suffer from market forces that divert food to more profitable markets. Additionally, famines can result from a decline in wage rates, causing starvation, and a lack of access to provide food to those experiencing famine. In essence, the entitlement approach shifts the focus from food availability to people’s access to food as a key determinant of food security and the prevention of famines. When considering the implementation of Unconditional Cash Transfers (UCT), this approach emphasizes that ensuring access to food and resources for vulnerable populations is essential for improving food security and reducing the risk of famine. UCT programs can directly contribute to addressing entitlement failures by providing individuals and households with the financial means to access food and meet their basic needs, especially in times of crisis or hardship.

The theory of change

A theory of change is a systematic methodology that outlines how a particular intervention, or a series of interventions is expected to bring about specific developmental changes. It relies on causal analysis and available evidence to chart a clear path from actions to outcomes. To construct an effective theory of change for a program, it necessitates thorough analyses, engagement with stakeholders, and drawing insights from real-world experiences. This approach serves several crucial

purposes: identifying effective solutions to address underlying issues, guiding decision-making on approaches, considering practicality, effectiveness, and uncertainties, and highlighting fundamental assumptions and risks for ongoing scrutiny. In essence, a theory of change provides a structured framework for understanding how interventions contribute to desired outcomes, grounding planning and decision-making in evidence and adaptability (Connell & Kubisch, 1998).

Unconditional cash transfers (UCTs) serve as pivotal initiatives within social protection policies and strategies, and constructing a comprehensive theory of change is essential to elucidate how these interventions align with broader objectives. The primary aim of these policies is to shield individuals and households from the adverse impacts of consumption shocks, preventing them from falling into poverty or experiencing deeper levels of deprivation. By employing UCTs, a well-structured theory of change articulates a clear and evidence-based pathway: during food shortages, UCTs are provided directly to beneficiaries, leading to an improvement in their food consumption scores and a reduced reliance on negative coping strategies.

3.2 Empirical literature

Habimana et al., (2021) determined the impact of cash transfers on food consumption and poverty reduction in Rwanda. The study estimated propensity scores using logit models to explain the treatment effect using Integrated Household Living Conditions Survey of 2013/2014. The study found that cash transfers increased households' food consumption levels and reduced the proportion of households who were poor by two to five per cent. The findings were similar with those revealed by (Aker, (2013), which examined that unconditional cash transfers in the Republic of Congo improved outcomes of the populations who were extremely vulnerable.

Martins & Monteiro, (2016) in their quasi-experiment study on the impact of the Bolsa Familia program on food availability of low-income Brazilian families found that beneficiary households had a 6 per cent higher food expenditure compared to non-beneficiaries. Additionally, Hidrobo et al., (2018) meta-analysis found that social protection programs improved both the quantity and quality of food consumed by beneficiaries. The magnitudes of these effect sizes were found to be meaningful as the average social protection program increased the value of food consumed/expenditure by 13 per cent and caloric acquisition by eight per cent.

Webb et al., (2006) using an ethnographic comparative study also confirmed that insufficient food quantity, inadequate food quality, uncertainty and worry about food were a significant part of the food insecurity experience. In addition, their study also found that culture had a significant influence on food security in terms of food consumption. On the other hand, Bhalla et al., (2018) in their impact study shows that the social protection program had statistically significant impacts on food security and diet diversity scores in Zimbabwe. However, the impact on food consumption was minimal. Cash transfers gave beneficiaries greater choice in their food basket thereby improving diet diversity.

Nafula & Onsomu, (2013) microsimulation study that sought to evaluate the effects of unconditional cash transfers on poverty reduction highlighted the crucial role of effective targeting in achieving households' welfare. Their microsimulation highlighted that unconditional cash transfers had potential to reduce multidimensional poverty through increased disposable income. Similarly, Haushofer and Shapiro (2013) found that monthly unconditional cash transfers positively impacted households' food consumption.

A recent study by Mncube et al., (2023) on the role of cash transfers in addressing food insecurities in KwaZulu-Natal, South Africa found that access to cash transfers improved households' food security. The study identified several other influential factors in the model, including the gender of the household head, availability of financial resources, participation in farm-based organizations, access to cooperatives, and engagement in agricultural training, all of which were found to hold statistical significance.

In terms of food security stability, studies found that poor households are the least resilient to food insecurities. Other household characteristics such as family size, education level, age and gender of the household head also explain this relationship. For instance, in a study by Assefa & Abide, (2023), it was found that rural Ethiopian households, especially those headed by women or poor, displayed lower resilience to food insecurity. The study identified six key factors contributing to this resilience: family size, income diversity, livestock ownership, use of improved seeds with fertilizer, access to credit, and received social assistance. Additionally, drought significantly influenced household resilience, with wet midland areas showing higher mean resilience indices compared to drier midland regions. The authors finding reflected Shibia (2023) who found significant influences of drought and floods on Kenyan households' resilience. According to the author, educated, wealthier and smaller households had higher resilience levels which was also dependent on the residence aridity intensity. The study also revealed that households in the ASAL regions coped with climatic shocks by reducing food consumption and selling livestock.

Similarly, a study conducted by Mungai (2014) revealed determinants of food security among the households surveyed included household head age, household head education level, household size, land size per capita and household income. Large households were found to be food insecure compared with households with fewer household members. Land size per capita, household income and household head education level were found to have significant positive effects on household food security.

Maione, (2020) impact assessment of the Hunger Net Safety Program proved that the intervention improved food security, reduced extreme poverty and hunger. Cash transfers were found to increase food access, meal size, and calorie intake, while also protecting vulnerable households facing resource loss due to weather and economic changes. The author also highlighted that the program had benefited 31 per cent of the poorest regions' population since inception, hence the need for scaling it up for greater impact.

The appeal of unconditional cash transfer programs is that they represent a potentially straightforward mechanism for alleviating poverty. They are easier to manage than in-kind transfers and leave households with the most possible flexibility in how to adjust their spending. Not only are the transaction costs low, but there is no subsequent need to monitor how the resources are used. Nevertheless, UCTs have some disadvantages, they might be spent on “non-essential” goods, and thereby compromise welfare in the long-term; they could lower labor supply due to their income effect and their allocation could lead to conflict within the household or community (Bobonis et al., 2015).

Empirical studies reveal diverse findings regarding the impacts of social protection programs on food security. Some studies show positive effects on food availability and quality (Bhalla et al., 2018; Martins & Monteiro, 2016; Webb et al., 2006), while others indicate limited effects on food accessibility (Bhalla et al., 2018) and suggest that cash transfers may have a minimal impact on food stability (Mungai, 2014; Beyene et al., 2023). This study explores the effects of unconditional cash transfers on household food security, with a particular focus on vulnerable households in Kenya’s arid and semi-arid lands. Additionally, it investigates how household-specific attributes influence the likelihood of becoming a cash transfers beneficiary.

4. Methodology

4.1 Estimation of Treatment Effects

The study aimed to estimate the impact of unconditional cash transfers on the household's food security. Household's food security was measured by household's food consumption and the household's coping mechanisms when they didn't have food or money to buy food. The study utilized the cross-sectional data from the 2022 Kenya Demographic and Health Survey (KDHS) thus employing a quasi-experimental design approach. Since this study was based on observational data rather than randomized data, it adopted an impact evaluation approach rooted in Neyman-Rubin's counterfactual framework. The study assessed the outcomes of individuals who received Unconditional Cash Transfers (UCT) (treatment) in comparison to those who did not receive such UCTs (control) but exhibit similar observable characteristics to the recipients.

The Propensity Score Matching (PSM) approach developed by (Rosenbaum & Rubin, 1983) to address any selection bias and promote estimations that focus more on establishing causal relationships was used. Various methods for evaluating treatment effects are based on the principle of matching households that receive unconditional cash transfers (UCTs) with non-recipient households that demonstrate similar observable characteristics (Abadie et al., 2004).

We first estimated a probit regression that modelled households' probability of receiving unconditional cash transfer. The estimated probabilities of receiving the UCT (treatment) provided the propensity scores. Then those households who received the cash transfers were matched with those who did not (control), but who have similar propensity scores. We used the matches to estimate the impact of UCTs on households' food security. To increase the confidence in our findings and ensure their robustness, we utilized two other alternative matching methods to estimate treatment effects. It is expected that these methods will produce consistent results.

The study assessed food security outcomes, denoted as Y_i , for both treated and control groups, with T_i representing treatment status (1 for treated and 0 for control). The average treatment effect on the treated (ATET), expressed as expected impact is defined as:

$$ATET = E [(Y_i^T - Y_i^C) | T_i = 1] \dots\dots\dots (1)$$

In equation 1, $Y_i^T | T_i=1$ is directly observed, but the counterfactual $E (Y_i^C) | T_i=1$ needs to be estimated. This estimation is accomplished by leveraging the propensity score to identify non-treated cases whose propensity scores closely resemble those of treated households.

The validity of the PSM matching results relies on the successful fulfillment of two critical conditions, namely, the assumptions of conditional independence and common support. Conditional independence requires that there be a set of covariates, observable to the researcher, such that after controlling for these covariates, the potential outcomes are independent of the treatment status (Caliendo & Kopeinig, 2008; Diagne & Demont, 2007).

The assumption of conditional independence is denoted by:

$$(Y_i^T, Y_i^C) \perp T_i \mid X_i \dots\dots\dots (2)$$

Conditional independence ensures that the comparison group, formed via matching, closely mirrors the treatment group, thus achieving a balance that closely mimics what would naturally happen in a randomized selection process.

The common support assumption requires that for each value of the propensity score there is a nonnegative probability of being both treated and untreated (Crump et al., 2021). The propensity score, denoted by $P(X_i)=Pr(T_i|X_i)$, measures the probability of receiving cash transfer given a set of covariates. The common support assumption is expressed as;

$$0 < Pr (T_i =1 \mid X_i) < 1 \dots\dots\dots (3)$$

Equation 3 implies that the probability of receiving the UCT, conditional on covariates lies between 0 and 1. By the rules of probability, this means that the probability of not receiving the UCTs lies between the same values $Pr(T_i=0|X_i)=1-Pr(T_i=1|X_i)$. For every possible score, it is crucial to have the presence of both individuals who received treatment and those who did not, or there must be a substantial overlap in characteristics (common support) between the two groups. This overlap is necessary to enable adequate matching.

When estimating the propensity score, we employed a probit model and selected covariates that exhibited correlations with treatment status. Importantly, these covariates were not directly influenced by the treatment outcomes (Imbens, 2015).

To enhance the credibility of our findings, we also evaluated the impacts of the cash transfer through two additional methods namely, Nearest Neighbor Matching (NNM) and Inverse Probability Weights (IPW).

The Nearest Neighbor Matching (NNM) approach begins by standardizing the variables and creating a distance metric between all pairs of observations, typically utilizing the widely recognized Mahalanobis distance. Subsequently, each treated case is matched with the closest non-treated case, and their outcomes are compared (Austin, 2010). Inverse probability weighting, on the other hand, relies on constructing a probit regression model to estimate the likelihood of receiving unconditional cash transfers for a given household. The predicted probability from this model is then used as a weight in subsequent analysis.

4.2 Measurement of Variables

The study determined the impact of unconditional cash transfers on households' food security outcomes.

Food Consumption Score

This indicator is a composite score based on households' dietary diversity, food frequency, and relative nutritional importance of different food groups. We used information on the foods consumed by the households in the previous seven days prior to the survey to develop the Food Consumption Score (FCS) guided by WFP approach (World Food Programme, 2008). Each food item was given a score of 0 to 7, depending on the number of days it was consumed. Food items were grouped according to food groups and the frequencies of all the food items surveyed in each food group were summed up. Any summed food group frequency value over 7 was recorded as 7. Each food group was assigned a weight, reflecting its nutrient density. For each household, the household food consumption score was calculated by multiplying each food group frequency by each food group weight, and then we summed these scores into one FCS for each household (Appendix 1). We normalized the developed FCS to range from 0 to 100 using the min-max approach.

Coping Strategy Index

Food consumption behaviors during food shortage were assessed using the Coping Strategy Index (CSI). The CSI is a behavioral approach to food security analysis which indicates the level of household stress resulting from insufficient food or the means to purchase food (Korir et al., 2021). The CSI is an index based on a series of questions about how households manage to cope with a shortfall in food consumption in terms of the occurrence, quantity, sufficiency, and frequency of consumption (Maxwell & Caldwell, 2008). We employed the reduced CSI which uses five standard coping strategies in response to food shortages. The number of days in the past week a household had to rely on the various coping strategies ranging from never (0) to every day (7) provided the frequency. For each household, the household's coping strategy index was calculated by multiplying each coping strategy frequency by each coping strategy weight, and then summing these scores into one coping strategy index score for each household (Appendix 2). The CSI scores ranged between 0 and 56. We normalized the developed CSI score to range from 0 to 100 using the min-max approach.

Treatment variable

We created a binary variable from the information on those who received at least one of the four unconditional cash transfers (CT-PWSD, OPCT, CT-HSNP, and CT-OVC). In this study, we assumed that unconditional cash transfers are

under the management of household heads or caregivers acting on behalf of the individual beneficiaries within the households. Since UCT are unrestricted, they may be used to boost food security within the entire household.

Matching covariates

The choice of the matching covariates was influenced by the Ministry of Labour & Social Protection targeting criteria for the four cash transfers. The four types of cash transfer programs in Kenya have distinct eligibility criteria. The Cash Transfer for Orphans and Vulnerable Children (CT-OVC) targets extremely poor households with one or more Orphans and Vulnerable Children (OVCs) or households with chronically ill caregivers who cannot perform their duties and are not benefiting from other social assistance programs. The Older Persons Cash Transfer (OPCT) is designed for Kenyan citizens aged 70 (previously 65) and above who do not receive a pension, are not enrolled in other cash transfer programs, and have resided in a specific location for over a year. Persons with Severe Disabilities Cash Transfer (PWSD-CT) aims to assist extremely poor households with a Kenyan citizen who has a severe disability, is not enrolled in other cash transfer programs, and has resided in a particular location for more than a year. Lastly, the Hunger Safety Net Programme (HSNP) targets vulnerable and poor households residing in the poorest arid counties of Turkana, Marsabit, Mandera, and Wajir in Northern Kenya. These programs collectively address various aspects of poverty and vulnerability among different segments of the population (Handa et al., 2012).

The choice of covariates plays a crucial role in matching, as it impacts both variance and bias. The age of the household head was measured in years, while the gender is recorded as Male or Female. Education was measured by the number of years of education. Marital status indicates if the household head has a partner or not. The study also considered the presence of a disabled person, an orphan, the elderly (those aged 65 years and above) and the household's social economic status (wealth quintiles) due to their significance influence on the cash transfer targeting criteria.

Sensitivity analysis

We carried out sensitivity analyses after the matching process to validate the results. Since matching relies on the assumption of Unconfoundedness, these sensitivity analyses reveal the robustness of the associations in the presence of potential uncontrolled confounding variables (Van Der Weele & Ding, 2017).

Because PSM relies on the assumption of sufficient overlap in characteristics to enable effective matching, it becomes essential to evaluate the quality of the propensity score model based on the resulting balance in covariates. As a means of assessing this covariate balance, we conducted an examination of variance following the matching process and utilized density plots to visualize any differences in density distributions between the treatment and control groups, both before and after the matching procedure (Ali et al., 2019).

4.3 Data Sources

The data used for this study were drawn from the Kenya Demographic and Health Survey (KDHS) 2022. This was a nationally representative cross-sectional survey where a total of 37,911 households were successfully interviewed. The survey collected information on background characteristics of each person in the household, assets, land ownership, and housing characteristics, health expenditures, household food consumption, and social protection.

The sample was designed to have 42,300 households, with 25 households selected per cluster, resulting in 1,692 clusters spread across the country with 1,026 clusters in rural areas and 666 in urban areas. The 2022 KDHS sample was split into two halves. In one portion, households completed the long household questionnaire, woman's questionnaire, and man's questionnaire. In the other portion, households answered the short Household questionnaire and the short woman's questionnaire.

The study specifically analyzed data from households that either received cash transfers (intervention group) or did not receive cash transfers (control group). We utilized data collected from 19,747 households who completed the long household questionnaire nationally, but we limited our focus on 3,444 households from the arid region and 6,182 households from the semi-arid region. The unit of analysis was individual households.

Geographically, the study had a focus on nine arid counties (Turkana, Marsabit, Samburu, Baringo, Isiolo, Wajir, Mandera, Garissa, and Tana River) and fifteen semi-arid counties (Lamu, Kilifi, Kwale, Taita Taveta, Kitui, Makueni, Kajiado, Machakos, Embu, Tharaka Nithi, Meru, Laikipia, Nyeri, Narok, and West Pokot). 5 counties (Kiambu, Nakuru, Homabay, Migori, and Elgeyo-Marakwet) categorized as pockets of ASALs were excluded from the analysis.

4.4 Descriptive Statistics

The data in table 4.1 provides an overview of households in both arid and semi-arid regions who received unconditional cash transfers, considered as the "treatment" group, on two crucial aspects of household food security. For instance, in terms of food consumption scores, households receiving unconditional cash transfers as part of the treatment were 477 in arid and 380 in semi-arid while the households in the control group were 2,967 in arid and 5,802 in semi-arid. Moreover, the coping strategy index data highlights households included in the treatment group (269 in arid and 143 in semi-arid) and those in the control group (1,206 in arid and 1,510 in semi-arid). The findings show that 13.2 per cent of households in the arid region and 6 per cent in the semi-arid region received unconditional cash transfers. This underscores the limited impact of the unconditional cash transfer program in terms of reducing the national poverty rate.

Table 4.1: Households sample

Households	Arid			Semi-Arid		
	Treated (B)	Control (NB)	All (B+NB)	Treated (B)	Control (NB)	All (B+NB)
Households with food consumption scores	477	2,967	3,444	380	5,802	6,182
Households with coping strategy index score	269	1,206	1,475	143	1,510	1,653
Households (%)	13.18	86.82	100	5.97	94.03	100

Source: Authors' computation

Table 4.2: Descriptive statistics of outcomes for unconditional cash transfer beneficiaries and non-beneficiaries

Variable	Beneficiaries (B)		Non-Beneficiaries (NB)		All (B+NB)		Mean difference (B-NB)	
	Arid	Semi-Arid	Arid	Semi-Arid	Arid	Semi-Arid	Arid	Semi-Arid
Food consumption score	49.310	57.039	51.298	61.206	51.022	60.950	-1.988	-4.166***
Coping strategy index score	23.249	14.504	21.656	17.523	21.947	17.261	1.592*	-3.019**

Source: Authors' Computation

The data presented in Table 4.2 offers valuable insights into the disparities between beneficiary (B) and non-beneficiary (NB) households in both arid and semi-arid regions. Firstly, regarding food consumption score, it's observed that its slightly higher for non-beneficiary households in both the arid and semi-arid regions when compared with the beneficiaries. Specifically, in the arid region, household's food consumption score was 49.31 for beneficiaries and 51.3 for non-beneficiaries while in the semi-arid region, food consumption score was 57.04 for beneficiaries and 61.21 for non-beneficiaries. These differences are statistically significant in the semi-arid region, implying that non-beneficiary households tend to fare slightly better in terms of food consumption.

Secondly, the findings reflect variations in coping strategies. In the arid region, beneficiaries exhibit a higher mean coping strategy index (23.25) compared to non-beneficiaries (21.66). Conversely, in the semi-arid region, non-beneficiaries demonstrate a higher coping strategy index (17.52) than beneficiaries (14.50). These disparities in coping strategies are statistically significant.

Table 4.3: Covariates

Variable	Arid		All (B+NB)	Mean difference (B-NB)
	Beneficiaries (B)	Non-Beneficiaries (NB)		
Household head married	0.660	0.754	0.741	-0.094**
Household head education in years	1.921	4.330	3.996	-2.410***
Household wealth quintile	1.553	2.150	2.067	-0.597***
Presence of an orphan	0.205	0.147	0.155	0.057***
Presence of a member aged above 64 years	0.399	0.150	0.184	0.249***
Presence of a disabled person	0.265	0.139	0.157	0.126***

Note: t-test significance levels: * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

Source: Authors' computation

Table 4.3 shows that unconditional cash transfer recipients exhibit statistically significant differences from non-recipients across the identified covariates. Consequently, a simple comparison of means for the output variables would not accurately reflect a causal effect. As demonstrated in Table 4.3, those who receive unconditional cash transfers are notably more likely to belong to poor households falling within the 1st, 2nd, and 3rd wealth quintiles, which aligns with the requirement for receiving such funds. Households receiving unconditional cash transfers also tend to have fewer years of education and a higher proportion of individuals aged 65 years and above.

In the arid region, 66 per cent of unconditional cash transfer beneficiaries have a married household head, while among non-beneficiaries, 75.4 per cent have a married household head. The mean difference shows a statistically significant lower likelihood of having a married household head among beneficiaries compared to non-beneficiaries. Additionally, households receiving unconditional cash transfers in arid regions have more children who are orphans (20.5%) in comparison to non-recipients (14.7%). Recipients of the unconditional cash transfers also tend to have more individuals who are disabled.

Correlation Matrix

Appendix 3 shows that the correlation coefficients of the independent variables are below 0.5. Given these low correlations, we can conclude that multi-collinearity is not likely to bias the regression results.

5. Results and Discussions

This section presents the probit estimates of the probability that the respondent received cash transfers. It also reports results from impact assessment using propensity score matching, inverse-probability weights, and nearest-neighbor matching. This allows us to determine whether our results are robust across different matching approaches.

5.1 Probability of accessing unconditional cash transfers

Estimates of the probit regression equation are presented in table 5.1. Except for the presence of an orphan in the household, all other variables presented in table 5.1 had a significant influence on access to unconditional cash transfers.

Table 5.1: Probit estimates of the probability of receiving cash transfers (food consumption score outcome model for arid lands)

Variable	Regression Dy/dx(*)
Household head married	-0.035*** (0.013)
Household head education in years	-0.005*** (0.002)
Household wealth quintile	-0.030*** (0.006)
Presence of an orphan	0.022 (0.015)
Presence of a member aged above 64 years	0.120*** (0.013)
Presence of a disabled person	0.030** (0.015)
<i>Standard errors are reported in parentheses. *, **, *** indicate significance at the 90%, 95%, and 99% level, respectively.</i>	

Source: Authors' computation

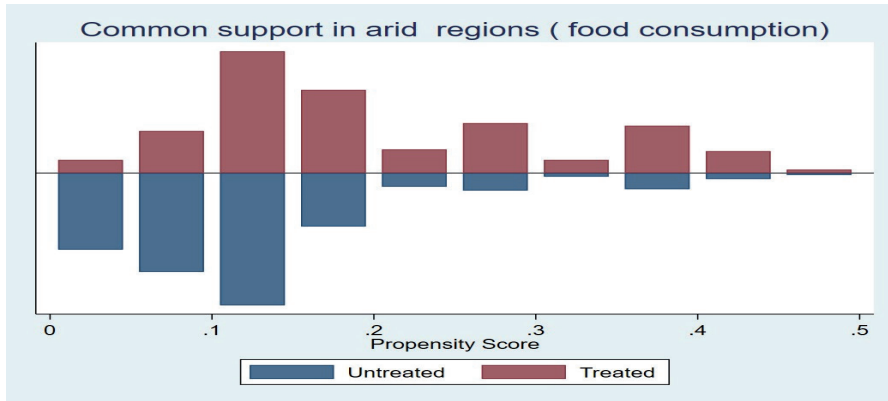
Table 5.1 shows that the selected covariates had statistically relevant influence on the possibility of a household receiving the cash transfers except for presence of an orphan. The findings reveal that married household heads were 3.5 per cent less likely to be recipients of unconditional cash transfers (UCT) compared to unmarried household heads. Furthermore, for each additional year of education attained by the household head, the likelihood of being UCT beneficiary decreased by 0.5 per cent. Curiously, households with orphans were 2.2 per cent more likely to receive UCT, although this effect did not reach statistical significance. On the other hand, households with elderly members aged 65 or older were 12 per cent more likely to receive UCT. Additionally, households with disabled members were 3 per cent more likely to be UCT beneficiary. Significantly, households in other wealth quintiles

other than the poorest were 3 per cent less likely to be UCT receipt, indicating that UCT targeting tends to cover the most vulnerable and poorest households.

5.2 Balancing test

Figure 5.1 shows balancing test for unconditional cash transfer impact on household's food consumption score outcome model in the arid lands.

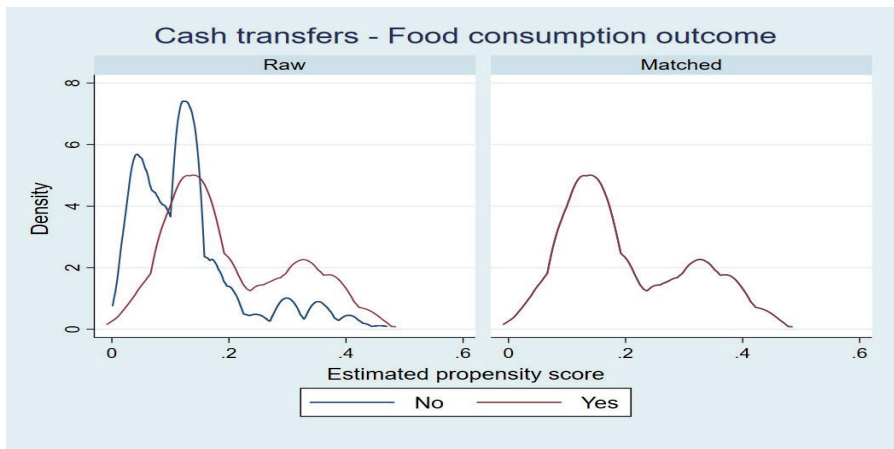
Figure 5.1 :Test for Common Support (Arid)



Source: Authors' computation

The test for balancing indicates that majority of treated and untreated households have low propensity scores between 0 and 0.5. It is therefore easy to find matches between treated and untreated households with the propensity scores. From figure 5.2, treated and the untreated households were largely within the region of common support, indicating that all treated individuals have corresponding untreated individuals.

Figure 5.2: The distribution of the propensity scores



Source: Authors' computation

5.3 Impact of unconditional cash transfers on households' food security in the ASALs

Table 5.2: Impact of cash transfers in arid and semi-arid lands

Matching method	Outcome variables	Arid		Semi-Arid	
		ATET	P-values	ATET	P-values
Nearest Neighbour Matching	Normalized food consumption score	3.161	0.003	1.426	0.188
	Normalized coping strategy index score	2.907	0.092	-6.645	0.003
Propensity-score matching	Normalized food consumption score	3.380	0.001	1.426	0.188
	Normalized coping strategy index score	2.928	0.089	-6.672	0.003
Inverse-probability weights	Normalized food consumption score	2.591	0.000	3.368	0.000
	Normalized coping strategy index score	1.438	0.030	-7.749	0.000

Source: Authors' computation

Table 5.2 presents results of the impact of unconditional cash transfers in arid and semi-arid lands using two outcomes of food security and three different matching methods.

In the arid region, the Average Treatment Effect on the Treated (ATET) for food consumption score was positive indicating that unconditional cash transfers significantly enhanced households' food consumption by 2.6 to 3.4 per cent using the three different matching methods. Notably, a significant number of households in this region were recipients of the Hunger Safety Net Programme (HSNP), which specifically targeted those experiencing hunger and poverty. The HSNP's regular support led to increased food security, ensuring a stable food supply, and allowing households to purchase food that suited their preferences and requirements effectively. The findings concur with Habimana et al., (2021) who revealed that UCT increased household's food consumption in Rwanda.

In the semi-arid region, the results suggest that ATET for food consumption score increased on average by 1.4 to 3.4 per cent indicating a positive impact on food consumption among unconditional cash transfer recipients. However, this ATET is smaller compared to the arid region and it was not statistically significant. This suggests that the observed increase in food consumption score among unconditional cash transfer recipients in the semi-arid region may not be statistically different from the non-recipients. In the semi-arid lands, a significant portion of households were recipients of cash transfers designed for the elderly. This program's targeting criteria primarily focused on beneficiaries' age and vulnerability, ensuring that individuals aged 65 and above who may be more susceptible to food insecurity are supported. However, despite the increased food consumption among beneficiaries, concerns about dietary diversity arises.

In the arid region, the results show that cash transfers increased the coping strategy index score of the beneficiaries by 1.4 to 2.9 per cent. This indicates that unconditional cash transfers did not support households to use better coping strategies when they did not have enough food or money to buy food. This can be attributed to the numerous challenges households encounter during food shortages and drought in the arid region, where the limited cash transfer value may not significantly alleviate the situation. These findings are in line with Devereux, (2007) which suggests that the relatively modest unconditional cash transfers may not be sufficient to adequately support households confronting severe food shortages.

However, in the semi-arid regions, the coping strategy index score reduced by 6.7 to 7.7 per cent. Thus, cash transfers influenced households to employ less harmful coping strategies among the beneficiaries when they didn't have enough food or money to buy food in the semi-arid regions. In the semi-arid regions, most households were recipients of cash transfers designed to assist the elderly. It is plausible that the elderly beneficiaries could have allocated a significant portion of their limited funds to food consumption during periods of food scarcity, which may account for their reported higher levels of resilience in the face of food shortages.

Table 5.3: Summary of covariate balance before and after weighting (Food consumption score outcome model)

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Household head married	-0.207	-0.000	1.211	1.000
Household head education in years	-0.513	0.075	0.551	1.122
Household wealth quintile	-0.493	0.101	0.499	1.134
Presence of an orphan	0.151	0.001	1.298	1.001
Presence of a member aged above 64 years	0.580	0.002	1.885	1.001
Presence of a disabled person	0.317	0.001	1.629	1.002

Source: Authors' computation

Table 5.3 presents the absolute standardized mean differences (ASMD) of the covariate balancing between unconditional cash transfer recipients and non-recipients using the propensity score matching method, focusing on the food consumption score outcome. The results indicate a remarkable achievement in balancing the covariates, ensuring that the two groups are more comparable. This is evident in the standardized differences, which have been substantially reduced from their raw values to levels well below the recommended threshold of 0.1 (less than 10%). The values in the matched data range from -0.000 to 0.101, demonstrating excellent covariate balance. Additionally, the variance ratios, which measure the balance in variances between groups, are consistently close to

1.0 (ranging from 1.000 to 1.134), further confirming the success of the matching process. This robust covariate balancing enhances the validity of the analysis and strengthens the ability to attribute any differences in food consumption score to the unconditional cash transfer program, as it minimizes the influence of confounding factors.

Table 5.4: Rosenbaum sensitivity bounds

Gamma	Range of significance levels	
1	1	1
1.5	0.998	1
2	0.700	1
2.5	0.067	1
3	0.001	1
3.5	0.000	1
4	0.000	1

Source: Authors' computation

Table 5.4 shows the calculated bounds on the significance level for the treatment effect calculated using nearest neighbour matching, based on a signed rank statistic. The sensitivity test proves the absence of hidden bias and confirms the validity of the impact results that unconditional cash transfers on food security.

6. Conclusion and Recommendations

6.1 Conclusion

The impact of unconditional cash transfers on food security within the ASAL region exhibited variability. While UCT's primary goal is to enhance food security, it substantially increased food consumption in ASALs, particularly in the arid region. Nevertheless, the effect on coping strategies was adverse, as households receiving cash transfers experienced an increase in their coping strategy index, signaling an inability to establish the necessary resilience against detrimental coping methods, such as adults reducing their food intake to feed children. This outcome may be attributed to the heightened food insecurity vulnerability resulting from recurrent droughts and potentially insufficient UCT value. This study underscores the importance of approaching cash transfers with caution as an exclusive remedy for food insecurity in arid regions, given the persistence of significant structural challenges in the arid region.

What is particularly noteworthy is the decrease in the coping strategy index score in the semi-arid region. This indicates that households benefiting from cash transfers in the semi-arid region were more resilient by employing improved coping mechanisms when faced with food shortages or financial constraints. These better coping strategies likely enabled them to navigate challenges related to food security more effectively. It is important to highlight that unconditional cash transfers tailored for the elderly had a notable impact on their access to food. This is especially relevant because many elderly individuals lack the physical capability to engage in regular income-generating activities, making cash transfers a valuable resource for enhancing their food security.

6.2 Policy Recommendations

Given the improvement in food consumption in the arid regions, it is prudent to continue providing unconditional cash transfers in the arid regions and scale up the program to cover more eligible households. However, there is need for close monitoring of the program's effectiveness and consider supplementary interventions to enhance coping mechanisms. These supplementary measures may include promoting irrigation, enhancing food distribution systems, and encouraging the cultivation of drought-resistant crops. Simultaneously, there is need for collaborative efforts between the government and donors to formulate crisis management strategies that ensure a stable food supply during times of hardship for ASALs households. This comprehensive strategy will play a pivotal role in enhancing food security in the region and addressing the challenges posed by recurrent crises.

Despite the non-significant food consumption score impact, there is a case for continuing cash transfers in the semi-arid region, given the role of enhanced better coping strategies among the households and a positive influence on food

consumption. Certainly, the adjustment of the transfer value to enhance food consumption is a critical consideration. Specifically, there's a need for the State Department for Social Protection to proactively update the regular Unconditional Cash Transfer (UCT) value to ensure that its real value is maintained. This includes periodic assessments and adjustments to account for inflation and changing food prices.

Furthermore, it is essential to address operational aspects of the Inua Jamii program to make it more efficient. One key issue to tackle is the recurring delays in disbursing the monthly transfers to households. Timely and reliable disbursement is vital to ensure that beneficiaries receive the financial support when they need it most.

In addition, the transfer value could consider the size and composition of households. Different households have varying needs, and a one-size-fits-all approach may not be optimal. Therefore, tailoring the transfer value based on household size and the number of dependents can help ensure that the cash transfers are better aligned with the specific needs of each household.

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Appendices

Appendix 1: Standard food groups and the used standard weights

	FOOD ITEMS (examples)	Food groups (definitive)	Weight (definitive) (A)	Days eaten - Last seven days (B)	Score (A X B)
1.	Maize, maize porridge, rice, sorghum, millet pasta, bread, and other cereals	Main staples	2		
2.	Cassava, potatoes and sweet potatoes, other tubers, plantain				
3.	Beans, Peas, groundnuts, and cashew nuts	Pulses	3		
4.	Vegetables, leaves	Vegetables	1		
5.	Fruits	Fruits	1		
6.	Beef, goat, poultry, pork, eggs, and fish	Meat and fish	4		
7.	Milk yogurt and other diary	Milk	4		
8.	Sugar and sugar products, honey	Sugar	0.5		
9.	Oils, fats, and butter		0.5		
10.	spices, tea, coffee, salt, fish power, small amounts of milk for tea.	Condiments	0		
	Total household food consumption score				

Source: WFP, (2008)

Appendix 2: Reduced Household CSI score

In the past 7 days, if there have been times when you did not have enough food or money to buy food, how often has your household had to:	No of days (0-7) (A)	Universal Severity Weight (B)	Weighted Score (A X B)
a) Rely on less preferred and less expensive foods?		1	
b) Borrow food, or rely on help from a friend or relative?		2	
c) Limit portion size at mealtimes?		1	
d) Restrict consumption by adults in order for small children to eat?		3	
e) Reduce number of meals eaten in a day?		1	
Total household score - reduced CSI			

Source: Maxwell & Caldwell, (2008).

Appendix 3: Correlation matrix

Variables	Household head married	Household head education in years	Household wealth quintile	Presence of an orphan	Presence of a member aged above 64 years
Household head married	1.000				
Household head education in years	0.031	1.000			
Household wealth quintile	-0.045	0.616	1.000		
Presence of an orphan	-0.241	-0.118	-0.080	1.000	
Presence of a member aged above 64 years	-0.102	-0.212	-0.109	0.021	1.000
Presence of a disabled person	-0.050	-0.142	-0.093	0.084	0.352

ISBN 978 9914 738 35 3

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