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Livestock ownership and food security among displaced and non- displaced households in Afghanistan

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ABSTRACT

This study examines whether the ownership of livestock enhances the food security status of displaced households in Afghanistan. The Sustainable Livelihoods Framework is used to argue that the ownership of livestock is a productive asset that can protect consumption in a conflict-affected area. This research uses a nationally representative survey dataset from the Afghanistan Living Conditions Survey conducted in 2016-2017, which covers 19,838 households in 34 provinces. Food security is measured using three different indicators that are the Household Dietary Diversity Score (HDDS), the Food Consumption Score (FCS), and the log adult-equivalent per capita consumption expenditure.

Survey-weighted econometric analysis is conducted. Survey-weighted Ordinary Least Squares (OLS) regression analysis is conducted for the HDDS and log adult-equivalent consumption, while a survey-weighted Negative Binomial regression analysis is conducted for the Food Consumption Score to correct for overdispersion. An interaction term between livestock ownership and displacement is included to test whether livestock ownership has a buffering effect on displaced households.

The findings show that livestock ownership is positively and significantly related to better food consumption adequacy (FCS), but not related to dietary diversity and per capita food consumption. Displacement is negatively correlated with dietary diversity, but positively correlated with the frequency of food consumption. The interaction terms are statistically insignificant, indicating that the effect of livestock ownership does not systematically differ from the reduction of food insecurity among displaced households.

The findings highlight that asset ownership does not guarantee improved resilience in the absence of institutional and market assistance in a fragile context.

KEYWORDS: Livestock ownership, displacement, food security, livelihood assets, resilience, Negative Binomial regression, fragile states, Afghanistan

1. INTRODUCTION

Afghanistan is one of the world's most food-insecure and conflict-affected countries. Years of protracted conflict, state weakness, economic instability, and climatic stress have undermined rural livelihood systems, in which agriculture and livestock production are key sources of income and food. However, a large number of Afghan families are still moderately to severely food insecure, and millions of people have been displaced internally, making them more vulnerable as a result of lost assets, reduced market access, and degraded social networks. In vulnerable situations such as this, the importance of productive asset management in household survival and resilience cannot be overstated.

Livestock is a critical part of the rural Afghan livelihoods system. Apart from its use in agricultural production, livestock is a multi-purpose asset that can serve as a source of income, a source of animal-source foods, a source of wealth, and a shock-absorbing mechanism during economic instability. With regard to the management of livelihood resources, livestock can be useful in improving consumption smoothing and income stability. Displacement may reduce access to grazing areas, veterinary services, credit, and social support structures. Such limitations may make the usefulness of livestock as a resilience resource doubtful.

Although a considerable body of literature confirms the positive relationship between asset holding and household welfare in low-income agrarian countries, there is a lack of empirical research that investigates the differential impact of livestock holding on food security outcomes for displaced households in fragile and conflict-affected countries. Current research tends to investigate the impact of welfare associated with asset holding or displacement vulnerability separately, without making an explicit attempt to examine the relationship between the two. In the case of Afghanistan, where livestock production is still an important part of rural livelihoods and displacement is widespread, it is important to examine the relationship between the two.

This paper examines the relationship between livestock ownership, displacement, and food security outcomes using nationally representative data from the Afghanistan Living Conditions Survey (2016-17). Regarding the issue of managing livelihood resources, livestock can be used to improve consumption smoothing and income stability. But displacement can reduce access to grazing areas, veterinary care, credit, and social support structures. This can make the usefulness of livestock as a resilience resource questionable. Food security is measured using three different indicators where are the Household Dietary Diversity Score (HDDS), the Food Consumption Score (FCS), and the log adult-equivalent per capita consumption expenditure. Livestock ownership is defined using a binary variable constructed from Tropical Livestock Units. The inclusion of an interaction term between livestock ownership and displacement allows the analysis to test whether livestock assets are used as a buffer against displacement.

The paper makes three different contributions. First, it offers the first econometric evidence on livestock ownership and food security in Afghanistan. Secondly, it applies asset-based resilience theory to displacement analysis. Thirdly, it provides management insights for the design of displacement-sensitive livelihood programs.

The rest of this paper is organized as follows. Section 3 presents the research design and hypotheses. Section 4 describes the data and econometric methods. Section 5 presents the results. Section 6 interprets the results and their implications. Section 7 concludes.

2. LITERATURE REVIEW

2.1 Livelihood assets, welfare, and resilience

Livestock is an important livelihood diversification strategy in the rural regions of developing and conflict-affected countries. In a fragile state like Afghanistan, livestock serves as a productive asset, a source of animal-source foods, a store of value, and an informal insurance instrument. This makes livestock a highly relevant asset in a situation where formal credit markets, secure employment, and public social safety nets are absent.

The Sustainable Livelihoods Approach considers the well-being of households as a function of different capital resources, including human capital, financial capital, social capital, physical capital, and natural capital (Chambers & Conway, 1992; Scoones, 2015). In this approach, livestock is both natural capital, which is embedded in agricultural systems, and financial capital, which is a semi-liquid asset. The asset poverty theory also argues that the welfare of households is influenced by the ownership of productive assets, particularly in a scenario where the credit and insurance markets are incomplete (Sen, 1981). Empirical evidence has shown that livestock can act as a buffer stock, which helps households smooth consumption in times of adverse shocks (Fafchamps, Udry, & Czukas, 1998; Kazianga & Udry, 2006).

Resilience approaches can be seen to extend this line of thinking by highlighting the ability of households to withstand and recover from shocks (Béné et al., 2012). Nevertheless, the ability of assets to improve resilience is contingent on other structural factors, such as market access, institutional support, infrastructure, and security. In fragile and displacement settings, these complementary factors could be compromised, which could impede the welfare gains from productive assets.

2.2 Livestock ownership and food security outcomes

There is a large body of empirical evidence that finds positive relationships between livestock ownership and food security outcomes. Livestock directly improves nutrition through the consumption of protein- and micronutrient-dense animal-source foods (Randolph et al., 2007). There are a number of studies that find positive relationships between livestock ownership and improved dietary diversity and child nutritional status in low-income countries (Headey, Hirvonen, & Hoddinott, 2018; Hoddinott, Headey, & Dereje, 2015).

The indirect effects are mediated by income and asset accumulation. The sales of livestock provide income, while the accumulation of livestock improves the welfare and productivity of households. Review from the Food and Agriculture Organization (2019, 2020) and the High Level Panel of Experts (2016) review emphasizes the structural role of livestock in rural income, employment, and agricultural GDP.

However, welfare impacts are not always uniform in different outcome variables. Some studies show stronger correlations with the rate of food consumption than with total expenditure on consumption or food diversity (Barrett, 2010; Ruel, 2003). This suggests that the welfare role of livestock could be complex and nuanced. The specification of the measure, including the use of Tropical Livestock Units or binary ownership variables, could also affect the strength of the correlations.

2.3 Livestock in fragile and conflict-affected environments

Livestock can be one of the few remaining productive assets that are accessible to households in fragile and conflict-affected environments. The relative mobility and liquidity of livestock can raise its value as a coping strategy in conditions of insecurity (FAO, 2021). On the other hand, conflict also lowers the productivity of livestock due to higher mortality rates, reduced mobility, disrupted grazing corridors, and reduced veterinary care. Market fragmentation and insecurity can limit commercialization, thus undermining the welfare approach based on income. Climate-related shocks such as drought can further reduce the size and productivity of herds, especially in arid and semi-arid areas.

Livestock is a critical livelihood, especially for rural and nomadic populations in Afghanistan. Factors like the absence of veterinary services, animal feed, and value chain limitation may impede the increment of productivity growth. FAO (2019, 2020) and World Food Programme (2022) have emphasized the prevalence of food insecurity and structural problems in agricultural systems. The above-mentioned contextual factors imply that livestock could be an important element in food security, but its potential could be context-specific for households.

2.4 Displacement and household welfare

Forced displacement is normally linked to lower levels of household welfare. Displacement is generally linked to the loss of household capital, decreased access to land and employment, as well as destroyed social capital (Jacobsen, 2002; Ibáñez & Moya, 2010). Some studies have emphasized that displaced persons have lower levels of consumption while higher levels of food insecurity than non-displaced persons (Rahman, 2016; Verwimp & Muñoz-Mora, 2018).

Displacement leads to a lack of productive resources and the breakdown of informal risk-sharing mechanisms. In Afghanistan, internal displacement has been caused by conflict and environmental degradation. Based on the International Organization for Migration (2021) and UNHCR (2022), there is a high degree of vulnerability linked to displacement in Afghanistan, which is linked to lower asset ownership and greater dependence on humanitarian aid. Humanitarian assistance can stabilize food consumption, which may result in inconsistent outcomes for different food security indicators.

2.5 Livestock and displacement: Interaction mechanisms

While the ownership of livestock is considered a positive determinant of food security, and displacement is seen as a factor that increases vulnerability, there are relatively few studies that investigate the moderating role of displacement in the livestock and food security relationship.

From an asset productivity viewpoint, the welfare role of livestock is contingent on other complementary factors like access to land, grazing, health care, and market integration (Sen, 1981). Displacement could act as a factor that reduces the complementary conditions, and hence the marginal welfare rate of return on livestock ownership. Lack of access to grazing, insecurity, and poor opportunities for market integration could limit the resilience role of livestock in displaced households.

On the other hand, humanitarian aid could have an independent effect on food consumption, and hence affect the welfare outcomes in a complex manner. While these theoretical points are valid, there is a lack of quantitative evidence on the interaction effects of livestock ownership and displacement, especially in the context of Afghanistan.

2.6 Research gap

There are several significant gaps in the literature. There is a lack of nationally representative econometric evidence that examines the relationship between livestock ownership and various food security outcomes in Afghanistan. Based on the International Organization for Migration (2021) and UNHCR (2022), there is a high level of vulnerability that is associated with displacement in Afghanistan, which is associated with lower ownership of assets and higher dependence on humanitarian assistance. Humanitarian assistance can stabilize food consumption, which may result in inconsistent outcomes for different food security indicators. Moreover, the status of displacement is rarely used in asset-welfare studies in the case of Afghanistan, although it has highly important implications for productive resource access and markets. Finally, there is a lack of research that formally investigates the displacement status as a moderator of the relationship between livestock ownership and food security outcomes.

To fill these gaps, this research uses multivariable regression analysis based on the Afghanistan Living Conditions Survey (2016-2017) to estimate the relationship between livestock ownership and food security and the moderating effect of displacement status.

3. RESEARCH QUESTIONS AND OBJECTIVES

3.1 Research questions

The research questions for this study based on the theoretical and empirical literature:

1. Is livestock ownership associated with household food security outcomes in Afghanistan?
2. Is displacement status associated with differences in household food security outcomes?
3. Does the association between livestock ownership and food security differ between displaced and non-displaced households?

3.2 Research objectives

In order to answer these questions, the research has three objectives:

1. To investigate the relationship between livestock ownership and various aspects of household food security, namely dietary diversity (HDDS), food consumption adequacy (FCS), and log adult-equivalent per capita consumption expenditure.
2. To determine whether displaced households systematically differ from non-displaced households with regard to food security outcomes.
3. To determine whether displacement moderates the relationship between livestock ownership and food security outcomes using interaction terms.

The research objectives are addressed using multivariable econometric models.

3.3 Hypotheses

The null hypotheses based on the conceptual framework and existing literature are:

1. H0₁: Livestock ownership is not significantly related to household food security outcomes.
2. H0₂: Displacement status is not significantly related to household food security outcomes.
3. H0₃: The interaction between livestock ownership and displacement status is not significantly related to household food security outcomes.

4. METHODOLOGY

4.1 Conceptual Framework

The Sustainable Livelihoods Framework is used as the conceptual framework for this research. It conceptualizes the welfare of households as a function of asset ownership, vulnerability to shocks, and structural constraints. In fragile states like Afghanistan, where this research is conducted, the ownership of livelihood assets is a crucial factor in determining food security outcomes.

Livestock ownership is a productive asset that can affect food security in three main ways:

1. Nutritional pathway: Livestock is a source of animal-based foods such as milk, meat, and eggs, hence improving food diversity.
2. Income pathway: Livestock is an income source through the sale of livestock and livestock products.
3. Risk-buffering pathway: Livestock is a store of value that can be easily transformed to cash during economic or climatic distress.

Forced displacement may impact the above pathways by limiting access to grazing land, markets, social networks, and favorable settlement terms. Displacement is therefore modeled both as a direct predictor of food security and as a moderator that affects the relationship between livestock and food security.

Since asset ownership can be a function of underlying household wealth, the empirical model will estimate associative rather than causal relationships.

4.2 Data Source and Study Design

The analysis is based on nationally representative cross-sectional data from the Afghanistan Living Conditions Survey (ALCS) 2016-2017, administered by the Central Statistics Organization. The survey included all 34 provinces and three main population categories: urban, rural, and Kuchi. It used a stratified multi-stage cluster sampling design. Enumeration areas were chosen in each province through probability proportional to size sampling, stratified by urban and rural residence, and then households were randomly selected in each sampled area. Sampling weights are used in all estimations to adjust for the complex survey design and to represent the country as a whole.

The ALCS offers information on the following topics:

- Household demographics
- Livestock ownership
- Food consumption and dietary diversity
- Expenditure and welfare indicators
- Displacement status

The final sample for the analysis contains 19,838 households.

The adult-equivalent consumption regression has fewer observations ($N = 17,559$) because of missing or non-positive consumption data in the ALCS dataset, which cannot be log-transformed. All analyses are weighted by household sampling weights to make the results nationally representative.

4.3 Measurement of Variables

4.3.1 Outcome Variables

Food security is a complex concept. Three complementary indicators are employed.

(1) Household Dietary Diversity Score (HDDS)

HDDS is usually the number of food groups consumed during the reference period. It is a proxy for dietary quality and micronutrient adequacy.

In the ALCS data, HDDS has an extreme ceiling effect. The observed distribution is as follows:

- Minimum = 7
- Maximum = 8
- 99.63% of households have HDDS = 8
- 0.37% of households have HDDS = 7

This indicates that HDDS has extremely small variation and is effectively a near-binary variable.

Although HDDS is a count index, the lack of variation makes count data models unsuitable. The first evaluation of Poisson and Negative Binomial models showed that the dispersion parameter was estimated to be zero, indicating no overdispersion and no additional information contained in the count specifications.

Logistic regression was also considered after dichotomizing HDDS; however, the highly imbalanced data and the inclusion of fixed effects for province caused separation problems and a large loss of observations.

With these empirical features, HDDS is estimated using survey-weighted Ordinary Least Squares (OLS) with robust standard errors. In this scenario, the OLS offers a good linear approximation and helps in understanding marginal effects.

The equation to be estimated is:

$$\text{HDDSi} = \beta_0 + \beta_1 \text{Livestock}_i + \beta_2 \text{Displaced}_i + \beta_3 (\text{Livestock}_i \times \text{Displaced}_i) + \gamma X_i + \delta p + \epsilon_i$$

The coefficients show the average difference in HDDS scores for livestock, displacement, and their interaction.

(2) Food Consumption Score (FCS)

FCS is a composite indicator derived from food frequency and nutritional weights. It reflects the adequacy and diversity of food consumption.

Descriptive analysis shows that FCS is over-dispersed. The likelihood ratio test of Poisson vs. Negative Binomial models confirms the significance of over-dispersion.

FCS is assumed to follow a Negative Binomial distribution:

$$E(\text{FCS}_i | X_i) = \exp(\beta_0 + \beta_1 \text{Livestock}_i + \beta_2 \text{Displaced}_i + \beta_3 (\text{livestock}_i \times \text{Displaced}) + \gamma X_i + \delta p)$$

The variance function is:

$$\text{Var}(\text{FCS}_i | X_i) = \mu_i + \alpha \mu_i^2$$

Marginal effects and predictive margins are explored.

(3) Log Adult-Equivalent Per Capita Consumption (ln_ae_cons)

Household consumption expenditure is adjusted for household composition using an adult-equivalent measure:

$$\text{AE}_i = (1.0 \times \text{AdultMale}_i) + (0.8 \times \text{AdultFemale}_i) + (0.5 \times \text{Child}_i)$$

Per capita adult-equivalent consumption is:

$$\text{PCE}_i = C_i / \text{AE}_i$$

The natural logarithm is taken to enhance normality:

$$\ln_ae_cons_i = \ln(C_i / \text{AE}_i)$$

The model is estimated using survey-weighted OLS and robust standard errors:

$Ln_ae_cons_i = \beta_0 + \beta_1 Livestock_i + \beta_2 Displaced_i + \beta_3 (livestock_i \times Displaced_i) + \gamma X_i + \delta_p + \epsilon_i$
Coefficients are estimates of percentage changes in consumption.

4.3.2 Key Explanatory Variables

Livestock Ownership

Livestock ownership is measured by summing up the Tropical Livestock Unit (TLU) index:

$$TLU_i = (1.0 \times Cameli) + (0.7 \times Cattle_i) + (0.5 \times Donkey_i) + (0.1 \times Sheep_i) + (0.1 \times Goat_i) + (0.01 \times Poultry_i)$$

However, due to the extreme skewness of livestock ownership and the presence of many zero observations, the key regression variable is a binary proxy:

$$\begin{aligned} tlu_proxy_i &= 1 \text{ if } TLU_i > 0 \\ tlu_proxy_i &= 0 \text{ if } TLU_i = 0 \end{aligned}$$

This variable captures the extensive margin of livestock ownership.

Displacement Status

$displaced_i = 1$ if household is displaced

$displaced_i = 0$ otherwise

4.3.3 Control Variables

Control variables are:

- 1. Household size
- 2. Settlement type (urban, rural, Kuchi)
- 3. Province fixed effects

Province fixed effects account for geographical differences in agro-ecological characteristics, market access, infrastructure, and conflict risk.

4.4 Econometric Strategy

4.4.1 Baseline Specification

The overall empirical equation is:

$$Y_i = \beta_0 + \beta_1 Livestock_i + \beta_2 Displaced_i + \beta_3 (livestock_i \times Displaced_i) + \gamma X_i + \delta_p + \epsilon_i$$

Where:

- Y_i is HDDS, FCS, or ln_ae_cons
- β_3 measures the displacement effect on the livestock-food security relationship
- δ_p is province fixed effects

4.4.2 Interpretation of Interaction

Effects For OLS models:

$$\partial Y / \partial Livestock = \beta_1 + \beta_3 Displaced$$

For the Negative Binomial model, marginal effects are used to compare the results because coefficients cannot be added directly.

Predictive margins are used to visually represent interaction effects.

4.4.3 Survey Weights and Inference

All regressions:

- Weight observations by household sampling weights
- Estimate models with robust standard errors
- Control for province fixed effects

This approach enables nationally representative and valid statistical inference.

4.5 Diagnostic and Robustness Checks

- Multicollinearity tested using Variance Inflation Factors (VIF) for OLS models.
- Heteroskedasticity corrected using robust standard errors.
- Overdispersion tested for FCS prior to choosing the Negative Binomial model specification.
- Extreme outliers in consumption were investigated, and no influential observation was deleted.

4.6 Methodological Limitations

First, because the ALCS is cross-sectional, it is not possible to establish causality. Livestock ownership could be endogenous to household welfare.

Second, the displacement experience varies in terms of length and severity, which cannot be captured by the dataset.

Third, the strong ceiling effect in HDDS means that there is limited variation in the measurement of dietary diversity. The OLS model is therefore detecting marginal relationships in a very concentrated distribution.

Despite these constraints, ALCS 2016-17 remains the best nationally representative dataset available that captures livestock ownership, displacement, and food security outcomes in Afghanistan simultaneously. The results of this study should be interpreted as nationally representative associations, not causal relationships.

5. RESULTS

5.1 Overview

This section presents the empirical evidence on the relationship between livestock ownership, displacement, and food security in Afghanistan. Three outcome variables are analyzed: Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS), and log adult-equivalent consumption expenditure. All models are estimated with survey weights and province fixed effects.

HDDS is estimated with OLS because of its limited variability. FCS is estimated with a negative binomial regression because of overdispersion. Consumption expenditure is estimated with OLS.

5.2 Household Dietary Diversity Score (HDDS)

Preliminary analysis reveals that HDDS has a strong ceiling effect, with over 99% of households reaching the maximum observed HDDS. Because of this, HDDS is estimated with survey-weighted OLS.

Table 1. Determinants of Household Dietary Diversity Score (HDDS)

Variables	Coefficient	Std. Error
Livestock owner	-0.003	(0.002)
Displaced household	-0.003**	(0.001)
Livestock × Displaced	0.004	(0.005)
Household size	-0.0003**	(0.0001)
Rural (ref: Urban)	-0.002	(0.002)
Kuchi (ref: Urban)	-0.005	(0.004)
Constant	7.998***	(0.006)
Observations	19,838	
R²	0.021	
Province fixed effects	Yes	
Survey weights	Yes	

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Livestock ownership is not statistically related to HDDS. Displacement status is negatively related to dietary diversity, although the magnitude is economically insignificant. The interaction between livestock ownership and displacement is not statistically significant. In general, the null hypothesis that there is no significant livestock effect on dietary diversity cannot be rejected.

5.3 Food Consumption Score (FCS)

Because there is evidence of overdispersion, FCS is estimated with a survey-weighted negative binomial regression model. The Incidence Rate Ratios (IRRs) are presented.

Table 2. Determinants of Food Consumption Score (Negative Binomial Estimates)

Variables	IRR	Std. Error
Livestock owner	1.013***	(0.005)
Displaced household	1.013***	(0.004)
Livestock × Displaced	1.017	(0.011)
Household size	0.997***	(0.001)
Rural (ref: Urban)	1.005	(0.006)
Kuchi (ref: Urban)	1.012	(0.014)
Observations	19,838	
Pseudo R²	0.037	
Province fixed effects	Yes	
Survey weights	Yes	

Notes: Incidence Rate Ratios reported. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Livestock ownership is positively and statistically significantly related to FCS. Households that own livestock have, on average, 1.3% higher expected FCS than those that do not own livestock. The interaction term in this study is not statistically significant and it is suggesting that there is no disparity in the livestock effect for displaced households. Although statistically significant, the magnitude of the effect is small.

5.4 Log Adult-Equivalent Consumption Expenditure

The log adult-equivalent consumption expenditure is estimated using survey-weighted OLS with province fixed effects.

Table 3. Determinants of Log Adult-Equivalent Consumption Expenditure

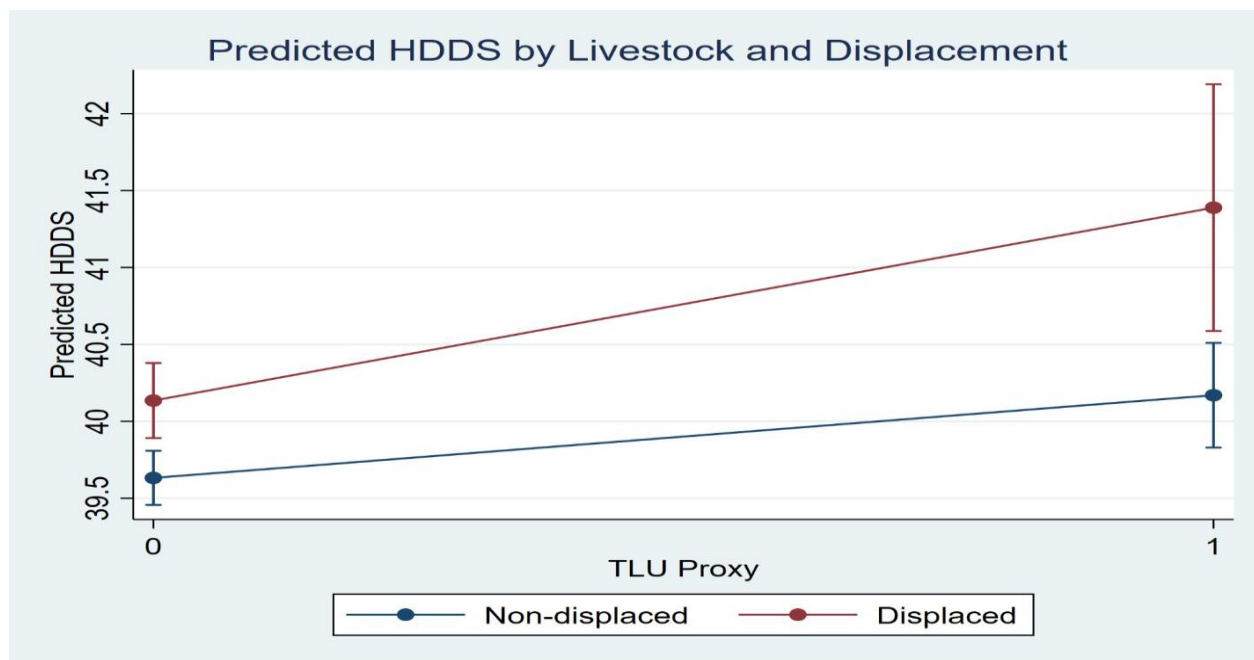
Variables	Coefficient	Std. Error
Livestock owner	0.023	(0.018)
Displaced household	-0.014	(0.014)
Livestock × Displaced	-0.006	(0.037)
Household size	-0.039***	(0.004)
Rural (ref: Urban)	-0.115***	(0.021)
Kuchi (ref: Urban)	-0.189***	(0.042)
Constant	12.714***	(0.061)
Observations	17,559	
R²	0.146	
Province fixed effects	Yes	
Survey weights	Yes	

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Livestock ownership is not statistically related to consumption expenditure. Displacement status is also insignificant. The interaction term is statistically insignificant. Rural and Kuchi households have significantly lower levels of consumption compared to urban households. The null hypothesis of no effect of livestock on monetary consumption is not rejected.

5.5 Predicted Margins

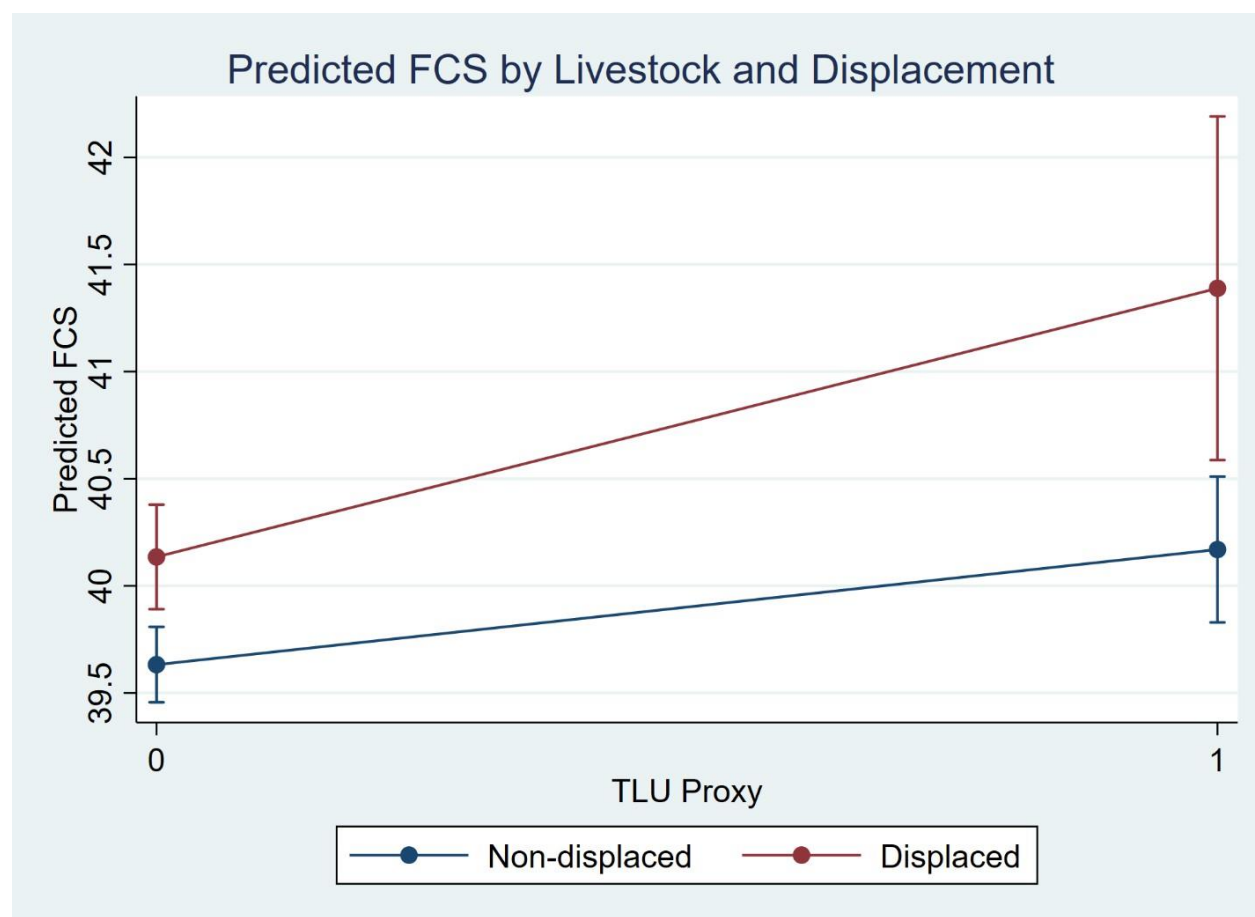
Figure 1. Predicted Household Dietary Diversity Score by Livestock Ownership and Displacement Status



Source: Author's calculations using ALCS 2016–2017.

Notes: Predicted values from survey-weighted OLS model with province fixed effects. Error bars show 95% confidence intervals.

Figure 2. Predicted Food Consumption Score by Livestock Ownership and Displacement Status



Source: Author's calculations using ALCS 2016–2017.

Notes: Predicted values from survey-weighted negative binomial model. Error bars indicate 95% confidence intervals.

The graphical evidence shows very little variation in HDDS by groups and small improvements in FCS among livestock-owning households. Interaction effects are still statistically insignificant.

6. DISCUSSION

This research assessed whether livestock ownership is linked to food security and welfare outcomes for households in Afghanistan and whether displacement affects this relationship. Based on the Sustainable Livelihoods Framework (Chambers & Conway, 1992) and resilience thinking (Béné et al., 2012; Scoones, 2015), livestock was framed as a productive and protective asset that impacts food security and welfare through three channels: direct food access, income, and shock protection.

The empirical evidence shows a complex pattern. Livestock ownership emerges as a significant and positive predictor of adequacy of food consumption, as reflected by the Food Consumption Score (FCS), but it fails to establish a significant relationship with dietary diversity (HDDS) and consumption-based welfare. Displacement status, on the other hand, is found to have a negative relationship with dietary diversity but a positive relationship with FCS. Moreover, the interaction terms for livestock ownership and displacement are statistically insignificant for all specifications. This implies that there is no moderating effect of livestock ownership on the relationship between displacement and the mentioned welfare outcomes. These findings offer partial support for theoretical propositions while pointing to contextual limitations in fragile and displacement-affected environments.

The strongest evidence is for the positive relationship between livestock ownership and FCS. This finding is in line with the literature that highlights the role of livestock as a provider of animal-source foods and as a source of income (Randolph et al., 2007; Njuki & Sanginga, 2013). In the case of Afghanistan, livestock can be used to improve the rate of consumption by providing milk, meat, and income, which can improve purchasing power. In addition, livestock can be used as a source of informal insurance that helps households smooth consumption in the event of a shock (Fafchamps et al., 1998; Kazianga & Udry, 2006). However, the size of the effect is small, which suggests that the ownership of livestock improves the rate of adequacy of food consumption but does not have a large effect on welfare.

Conversely, livestock ownership is not found to be significantly related to dietary diversity. This is at odds with evidence from some low-income countries, which found that livestock ownership enhances nutrition outcomes (Azzarri & Zezza, 2011; Hoddinott et al., 2015). There are some contextual explanations that can be offered. Market fragmentation, price instability, and inaccessibility in conflict-affected areas might lower the accessibility of diverse food. Even if the ownership of livestock raises the availability of resources in a household, some structural barriers in the food system might prevent the improvement of dietary diversity. Households may choose to sell the products of livestock rather than consume them, especially in situations of poverty. Additionally, a lack of variation in HDDS may limit the ability to detect differences. The results indicate that while the ownership of livestock may improve the adequacy of food consumption, it does not necessarily improve the quality of diets in situations of fragility.

Livestock ownership is also not significantly associated with log adult-equivalent consumption expenditure. This could be because livestock are used as a precautionary savings tool rather than a source of income. In fragile environments, households may choose to hold onto their livestock as a source of wealth and sell them during times of shock, thus reducing the cross-sectional relationship between livestock ownership and average consumption. Measurement error could also reduce the strength of the relationship. The binary variable for livestock ownership does not account for herd size, species, productivity, or market participation. This lack of information could lead to an underestimate of the welfare value of livestock ownership.

Displacement is negatively related to dietary diversity, which is consistent with theory on the effects of forced migration on livelihoods and access to diverse food sources. Using the Sustainable Livelihoods Framework, displacement is identified as a significant shock that reduces financial, physical, and social capital. The findings show that displaced households face persistent disadvantages in terms of diet quality.

At the same time, displacement is positively related to FCS. Although this result is counterintuitive, it can be explained by humanitarian interventions that increase the frequency of food consumption. Because FCS is food frequency and not food composition, displaced households can satisfy the minimum calorie need while keeping low dietary diversity. This implies that humanitarian interventions can help in the stabilization of food frequency but not necessarily in the improvement of dietary diversity and overall well-being.

Displacement is not a significant predictor of the cost of consumption, after controlling for covariates, perhaps because of in-kind transfers, remittances, or labor market adjustments. However, consumption variables do not capture non-monetary welfare losses such as housing insecurity, depletion of social capital, and psychological distress.

One of the major contributions of this research was to examine whether livestock ownership moderates the relationship between displacement and food security outcomes.

The fact that there are no statistically significant interaction terms indicates that livestock does not provide any additional safeguarding effects for displaced households. This finding is contrary to the assumption that the ownership of assets will automatically result in resilience in a displaced environment. Displacement can be associated with the loss of assets, distress sales, grazing area restrictions, and inaccessibility to veterinary care, which can impede the protective role of livestock. Moreover, the binary variable of livestock ownership could mask the variability of livestock size and quality, and displaced households may possess smaller or lower-quality livestock compared to non-displaced households. The major strength of this research is the use of nationally representative survey data and the simultaneous analysis of multiple food security outcomes.

Finally, the negative relationship between household size and welfare outcomes confirms resource dilution. Rural households have lower consumption expenditure compared to their urban counterparts, although food consumption scores are not significantly different across models. Kuchi households display different patterns as expected for pastoralist households. The relevance of province fixed effects points towards the existence of significant geographic inequality in terms of infrastructure, conflict, agricultural land, and market accessibility.

7. CONCLUSION AND POLICY IMPLICATIONS

This paper analyzed the relationship between livestock ownership, displacement, and food security in Afghan households using a nationally representative survey and multivariable regression analysis. Based on the Sustainable Livelihoods Framework and resilience theory, livestock was treated as a productive and protective asset with nutritional, income, and shock-coping functions.

Results are mixed. Livestock ownership is positively associated with the adequacy of food consumption, as measured by the Food Consumption Score (FCS). Livestock ownership is not significantly associated with dietary diversity (HDDS) or consumption-based welfare. These outcomes suggest that livestock ownership is related to food consumption frequency but not necessarily to diet quality or overall welfare in the conflict-affected setting of Afghanistan. Displacement is negatively correlated with dietary diversity, which is what is expected. However, the food consumption score of displaced households is higher, which could be due to humanitarian assistance and differences in the composition of consumption. It really worth noting that the interaction term for livestock ownership and displacement is also not statistically significant for all outcomes. This implies that livestock ownership does not have a systematic mitigating effect for displaced households against food security challenges.

The results confirm that food security is a multidimensional concept. Although livestock is important for supporting food consumption, asset ownership alone is not sufficient to guarantee resilience in the context of displacement, insecurity, and market fragmentation. The beneficial role of livestock in improving welfare is highly contingent on structural, institutional, and market factors. This study makes a contribution to the existing literature as it presents the first nationally representative econometric analysis of the interaction of livestock ownership and displacement in Afghanistan.

These results have several policy implications. First, livestock policy should focus on productivity rather than just ownership. Although ownership is associated with an increased frequency of food consumption, it is not significantly associated with food diversity or economic well-being. Policies should therefore focus on better veterinary care, vaccination rates, feed, drought, and extension services. Enhancing the economic returns to livestock assets is critical in fragile environments where structural constraints limit income generation.

Second, livestock projects should include nutrition-sensitive activities. The fact that there is no significant relationship between livestock ownership and dietary diversity means

that the household may appreciate commercialization more than the consumption of animal-source foods. Adding nutrition education, behavior change communication, and dietary objectives to livestock projects may improve the relationship between assets and improved dietary quality.

Third, interventions must be displacement-sensitive. The lack of strong interaction effects suggests that livestock cannot be considered resilience capital for displaced households by default. Displacement intervention programs should include mobile veterinary services, small and agile breeds of livestock, limited space feed, and conflict-sensitive resource management to reduce host- displaced community tensions.

Fourth, improving the integration of the livestock market is critical. The lack of a strong association between livestock ownership and expenditure on consumption suggests that structural commercialization barriers exist. Value chain development, producer organization, market development, and financial service access may improve the role of livestock in improving household welfare beyond the adequacy of food consumption.

Fifth, geographic and demographic targeting needs to be further disaggregated. Large provincial differences and differences by settlement type highlight the importance of spatial inequality in food security outcomes. Households with more people have always been found to have lower per capita welfare, and hence the need for interventions. Interventions in policies must be context- specific and must include mobility-sensitive services for pastoralists and specific programming for provinces that have high vulnerability.

Finally, there is a need for improved data infrastructure to inform the formulation of policies. In this analysis, binary variables were used to indicate ownership of livestock and displacement. Future surveys must include data on the size of the herd, type of the herd, productivity, sales of livestock, and consumption of animal-source foods. Displacement must also be measured based on duration, living conditions, and access to support. In sum, livestock is still a relevant sector for food security programming in Afghanistan. Nevertheless, its effectiveness is contingent on complementary investments in productivity, nutrition, markets, and displacement-sensitive programming. Asset-based programming must be placed within a larger framework of structural and institutional changes to ensure that improvements in welfare are sustained. Structural and institutional changes for sustained improvements in welfare.

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