Rule of Aid: The effectiveness of aid in achieving food security

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Abstract

This thesis examines the effectiveness of international aid in alleviating severe food insecurity, with a focus on how institutional quality and economic capacity influence this relationship. Drawing on panel data from 90–92 countries and employing multiple regression models, the study examines whether agricultural aid per capita is associated with reductions in the Severe Food Insecurity Share (SFIS). The results show a marginally significant effect for more recent aid flows, but stronger and more consistent effects for Rule of Law and GDP per capita. These findings suggest that aid's impact is heavily conditional on the domestic context in which it is delivered. To further investigate these dynamics, the study employs a comparative case analysis of Botswana and Haiti, countries situated at opposite ends of the Rule of Law spectrum. Despite receiving substantial aid, Haiti continues to experience high food insecurity, in contrast to Botswana, which has translated aid into improved outcomes through stronger governance and coordinated systems. This supports the thesis's central argument that aid can only be effective when absorbed into accountable, resilient institutions. By combining statistical analysis with case-based inquiry, the thesis employs a mixed-methods approach to capture the multidimensional nature of food security. It argues that aid must be seen not as a standalone solution but as one part of a broader strategy rooted in domestic capacity and institutional development. The study concludes with a call for more integrated and locally informed aid practices to ensure meaningful progress toward global food security.

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Section 1: Introduction

Food security is not just about the presence of food, it is also about access, equity and dignity of individuals. Based on the 1996 World Food Summit, the global definition of food security is defined as 'all people, at all times, having the physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy lifestyle' (Food and Agriculture Organisation, 1996). This definition includes four essential dimensions: availability, access, utilisation and stability. For a nation to achieve food security, all four dimensions must be simultaneously fulfilled and sustained over time. Each one is just as essential as the next, and the absence of just one can lead communities to experience vulnerabilities in hunger and malnutrition. These four pillars are tightly linked to broader socio-political and economic systems. Food security is not just a humanitarian issue but a structural one, influenced by colonial legacies, international trade systems and global governance.

Despite global initiatives, the challenge of food insecurity remains persistent and widespread, with an estimated 2.33 billion people experiencing moderate to severe food insecurity last year (World Health Organisation, 2024). This isn't a failure of food production, the world grows enough food, but rather a failure of distribution, power, and policy. Food insecurity is also divided into four pillars by the FAO: unavailability, inaccessibility, poor utilisation and instability. These definitions are ultimately comprised of a lack of sufficient food, inability to properly use food due to various factors, economic and physical barriers that prevent individuals from acquiring food and chronic vulnerability to losing food access.

In response to such alarming statistics, global development institutions such as the World Food Programme (WFP), Food and Agriculture Organisation (FAO), World Bank, and OECD's Development Assistance Committee (DAC) have implemented food aid and financial support mechanisms. Central to these interventions is the Official Development Assistance

(ODA), [1]which is intended to support food systems and agricultural resilience in low- and middle-income countries. However, the effectiveness of these aid efforts is highly debated. Critics argue that food aid may create long-term dependency, displace local food markets, or serve donor interests more than recipients' needs (Harvey & Lind, 2005). On the other hand, food aid is often seen as an essential safety net, especially in crisis contexts, there to alleviate the devastating effects. Aid, when aligned with local systems and community agencies, has the power to potentially improve nutritional outcomes and strengthen food systems (Foo, 2017). This is why the core research question of this thesis will be to investigate the following:

The effectiveness of aid in addressing food insecurity?

This research takes a mixed-methods approach, combining cross-national regression analysis with comparative case studies. The quantitative component uses data from approximately 90 countries to investigate the relationship between agricultural aid per capita (main independent variable) and the share of the population experiencing severe food insecurity in 2022 (dependent variable). The models include key control variables such as GDP per capita (PPP-adjusted), average years of schooling, conflict presence, and institutional quality (measured through the Rule of Law index).

The analysis draws on a critical political economy framework, which guides the selection and interpretation of control variables as structural conditions that may mediate the effectiveness of aid. Furthermore, it is important to note that this research does not assume that aid is inherently good or bad. Instead, it asks more complex questions: Who benefits from food assistance, and who is left out? How do political relationships shape technical interventions? While the regression analysis in this thesis cannot directly answer these questions, it contributes

[1] Government aid that promotes and specifically targets the economic development and welfare of developing countries. ODA has been the main source of financing for development aid since it was adopted by the OECD's Development Assistance Committee (DAC) as the "gold standard" of foreign aid in 1969 (OECD, 2021)

to the discussion. It examines whether aid has a measurable impact on food insecurity and explores how structural factors, such as governance quality and economic conditions, affect this relationship. The findings may offer an insight into which conditions aid is more likely to be effective or limited in addressing food insecurity. These questions matter, especially in a world where food security is increasingly threatened by climate shocks, conflict and global economic instability.

This research makes a unique contribution to the ongoing debate on the effectiveness of aid in achieving food security. It employed newer, more comprehensive data from 2013, 2017 and 2022 across 90 countries. While existing studies often focus on specific regions or short-term impacts, this research takes a broader, cross-national perspective with an introduced time-lagged regression to evaluate the effectiveness of aid in addressing food insecurity. Often, correlations or simple regressions are conducted to evaluate relationships. This thesis applies multivariable regression analysis while controlling for key structural factors such as GDP per capita, education, conflict and institutional strength. By doing so, it moves beyond a descriptive attempt to identify broader patterns that can inform policy design. Given that this topic has not received attention on a global scale, this study helps in filling the gap in the literature by uncovering how aid interacts with contextual variables in shaping food insecurity outcomes.

In the next section, a conceptual framework will be discussed, outlining definitions of food security and theories of aid effectiveness. Section 3 describes the methodology, including the selection of variables and the design of the regression models. Section 4 presents the statistical results, followed by a critical discussion in Section 5, which interprets the findings, compares two contrasting country cases and reflects on border limitations. The thesis concludes by summarising key insights and identifying avenues of future research.

Section 2: Literature Review

2.1 Understanding Food Security and Its Dimensions

Food security is a multidimensional concept, originally defined by the World Food Summit in 1996, which was outlined previously. It was later amended by the FAO in 2001 to include nutritional and cultural dimensions[2], recognising the multi-dimensional characteristics of food security (FAO, 2001). This definition has continued to inform global researchers as well as policymakers over the decades. It breaks down into four foundational pillars as follows:

Availability is the first pillar, which relates to the physical presence of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid). Secondly, *access* to adequate resources (whether that is financial, physical or social) to obtain appropriate food for a nutritious diet. Thirdly, *utilisation*, referring to the ability to metabolise and make use of food, which is influenced by diet quality, clean water, sanitation and healthcare. This dimension also includes nutritional knowledge and food safety. Lastly, the fourth pillar, *stability*, refers to the consistent access to adequate food at all times, without the risk of losing access due to sudden shocks (these include economic crises, conflict or climate disaster).

These pillars are not just a theoretical concept, they are operational categories used to inform aid design, monitor interventions and evaluate their outcomes. However, as Manikas et al. (2023) demonstrate in their systematic literature review, food security is a difficult concept to measure consistently. It is a 'latent construct', which is not directly observable, thus requires a range of indirect indicators that capture not only the material outcomes but also the experiences of individuals and households of insecurity. Their review of over 200 articles led

[2] The FAO recognises that food security is not only about having enough calories, but also about accessing diverse and nutrient-rich food that supports long-term health. The cultural dimension emphasises that food must be appropriate to local customs, traditions, and dietary preferences, highlighting the role of dignity, identity, and acceptability in achieving true food security (Food and Agriculture Organisation 1996)

to the conclusion that most food security assessments heavily rely on availability and access, leaving utilisation and stability underrepresented. Tools such as the Food Consumption Score (FCS), Household Dietary Diversity Score (HDDS), and Reduced Coping Strategies Index (rCSI) offer holistic measures for *acute food insecurity,* but are not applied consistently across the globe and programs leading to data unavailability.

Most studies and aid monitoring tools tend to prioritise availability and access dimensions, such as crop yields, trade flows and income data, due to their annual procurement by governmental and international agencies. However, the FSL Indicator Handbook, written by the Food Security Cluster, (2020) outlines that true food security must incorporate more than production or purchasing power. This includes both objective indicators (e.g., dietary intake, expenditure patterns) and subjective, experience-based indicators (e.g., perceptions of hunger or coping strategies. Understanding these dimensions is essential for the evaluation of different aid modalities and the ways in which they target various aspects of food insecurity.

2.2 Aid and Food Security

Aid programs aimed at reducing food insecurity come in many forms, most notably humanitarian food assistance and Official Development Assistance (ODA) for agriculture. Within these categories, there are distinct modalities, including:

1. Relief food aid, typically given in emergency settings
2. Project food aid, targeting specific interventions like school feeding or agricultural training
3. Programme food aid, involving macro-level budget or balance payment support, i.e., financial assistance to governments to help stabilise food systems during crises, such as subsidising food imports during price shocks

4. Cash and voucher-based assistance (CVA), often championed for its localising effects by supporting both household choice and local markets (e.g., WFP e-voucher programs in Somalia, Yemen and Afghanistan) (World Food Programme, 2025)

This diversity is necessary because aid operates through a wide range of mechanisms, each with distinct implications for effectiveness and equity. The empirical evidence on aid's impact is mixed. According to '*The Development Effectiveness of Food Aid'* (OECD, 2006), the mode by which aid is delivered significantly affects both the efficiency and equity of outcomes. For instance, direct transfers, triangular exchanges (procured in one country and sent to another), cash transfers or local procurement are often seen to be cost-effective and promote community empowerment. However, in-kind aid, especially when 'tied' to donor country commodities, can result in inefficiencies, incurring an average efficiency loss of over 30%. This tension is further illustrated in case-specific studies such as Tranchant et al. (2019), who, using quasi-experimental methods in Mali, found that multi-factor food assistance improved nutrient intake and reduced harmful coping strategies. Similarly, Hidrobo et al. (2014) conducted randomised control trials across Ecuador, Niger, Uganda and Yemen, which showed that cash and voucher-based programs not only improved dietary diversity but also had positive impacts on household food security outcomes when compared to food aid alone.

However, the actual effectiveness of aid is deeply contingent on context, with empirical studies on food aid's long-term effectiveness giving us varied opinions. For instance, Atmani (2021) finds that in Yemen, after the Arab Spring, aid did in fact offer relief but was seen to be short-lived and did not contribute to long-term food security due to ongoing conflict and institutional collapse. This reflects a common finding in conflict and post-conflict contexts, where aid can address the immediate hunger but often struggles to rebuild agricultural systems, supply chains and even governance structures needed for sustainable recovery. Similarly, 'The Development Effectiveness of Food Aid' (OECD, 2006) finds that aid effectiveness is

significantly hindered by ‘tying’. This specific type of aid, referred to as ‘tied aid’, requires recipients to purchase goods and services from donor countries, which in turn shifts power to the donor country while limiting local responsiveness, as criticised by Clapp (2015) in their research. Quantitatively, Frongillo & Jones (2007) show a strong statistical relationship between external assistance and improved household food access, but only when accompanied by stable governance and investment in agricultural infrastructure. Moreover, Gulati et al., (2012) find that long-term improvements in food security indicators are strongly correlated with multi-year agricultural investment and institutional capacity, rather than with short-term emergency aid

Furthermore, the FAO’s 2024 data shows that although development flows to agriculture reached USD 17.3 billion in 2022 (a 36% increase from the previous year), out of this only 4.4% of total development assistance went to agricultural sectors of nations, although the sector contributes largely to the GDP of most recipient countries (FAO, 2023). Moreover, the African continent, which received nearly half of these flows, continues to face disproportionately high levels of food insecurity. These mismatches between investment and impact suggest that the quantity of aid alone is insufficient; governance and alignment with local food systems also matter greatly.

Ultimately, it is of vital importance to select the right indicators to observe in assessing aid effectiveness. While calorie adequacy and undernourishment rates are widely used, they often miss the nuanced picture of diet quality, coping strategies and lived experience of hunger. Manikas et al. (2023) stress that the government’s overreliance on partial and easily accessible data hinders the ability to fully understand and address the complex food insecurity dynamics.

2.3 Power Dynamics, Colonial Legacies and Historical Considerations

While food aid is often framed in humanitarian terms, it is also an inherent political instrument which is embedded in global systems of power, influence and inequality. Many aid-receiving nations are former colonies whose agricultural systems were designed to export rather than sustain local populations. Aid programs which were introduced in the 1980s-90s, under the IMF and World Bank, further exacerbated this trend by requiring cuts to subsidies, liberalisation of trade and the privatisation of state-run food enterprises (McLean, 2002; McMichael, 2009). These reforms dismantled local safety nets and made countries more vulnerable to global price shocks. Critics such as Escobar (1995) argue that development aid reflects a form of 'institutionalised Western knowledge' that marginalises local epistemologies and reinforces the Minority-Majority hierarchy. Although these scholars are not completely anti-aid, they draw very important attention to aid, particularly when shaped by donor preferences can reproduce dependency rather than foster autonomy of food sovereignty.

Furthermore, scholars such as Clapp (2015), Molenaers et al. (2015), and Meester et al. (2024) have shown that control over food, its distribution, and the benefits of food-related interventions are often shaped by geopolitical interests, elite bargaining and institutional path dependencies that reinforce global inequalities. Molenaers et al. (2015) explain that political conditionality in aid has evolved from punitive measures (e.g. cutting aid in response to human rights violations) to second-generation conditionalities in the 2000s. These are more complex, varied and embedded donor-recipient negotiations. These forms of conditionalities often link budget support or access to development funding with governance benchmarks, which include democratic reforms, anti-corruption policies, or public sector restrictions. Ultimately, rewarding states that align with donor-defined standards of transparency or reform. The concern is not merely with the content of donor conditions, but with the structural power imbalance that allows donors to impose them in the first place. In practice, this means that

crucial food aid and agricultural development funds may be used as a form of leverage to influence domestic political structures, which can be at the expense of local food sovereignty. For instance, when budget support is tied to policy reforms, recipient governments may be compelled to implement donor driven policies such as public sector cuts or market liberalisation. These may not necessarily align with local needs or political contexts which can undermine domestic decision-making processes, displace local accountability structures and further weaken the legitimacy of an already fragile institution. These dynamics raise critical concerns about ownership and dependency, giving power to the donor country (Clapp, 2015). To what extent are food security policies shaped by local needs versus the interests of the donors? How does the selective disbursement of aid, based on criteria such as 'good governance' or 'democratic credentials', reinforce unequal power relations that the Minority world has over the Majority world[3].

Beyond these conditionalities, food systems in food-insecure states are now embedded in elite bargaining networks and the capture of value chains, which refers to the process by which powerful actors control key stages of production, processing and distribution which allowing for the extraction of disproportionate economic benefits over the smaller producers and local communities. Interventions which are designed to improve food security, such as subsidies, credit support or infrastructure investment, are often appropriated by political and economic elites. Aid flows are often not directed to those who may need it more, but rather filtered through power structures that prioritise private gain Meester et al., 2024). 'Food, power and politics' discusses how, in Ethiopia, food aid has historically reinforced state monopolies, with

[3] The terms *Minority World* and *Majority World* are used as alternatives to *Global North* and *Global South* to challenge the power-stricken and often oversimplified binary. *Minority World* refers to the wealthier, industrialised nations that represent a small proportion of the global population but hold disproportionate economic and political power. *Majority World* highlights the fact that the vast majority of people live in regions typically classified as developing or low-income, shifting focus to global population realities rather than economic dominance (Alam, 2008).

value chains captured by politically connected actors. Aid thus often fails to disrupt underlying power asymmetries that perpetuate hunger. Ultimately, technical solutions to food insecurity and hunger, such as increasing yields or food aid, often fail to address the political roots of the issue, such as exclusion, elite capture and lack of institutional accountability.

At the global level, the liberalisation and 'financialisaton' of food trade, the growing influence of agribusiness giants such as ADM, Bunge, Cargill, and Dreyfus have made an incredibly uneven playing field. Collectively known as the ABDC group (based on alphabetical convenience of their initials), these firms control between 75%-90% of the global grain trade (Lawrence, 2011). They play a major role in determining and dictating prices, access and supply routes of the grain. During crises, speculative behaviour by these actors can drive global food prices upwards, leaving food-insecure nations vulnerable, exposed both to market volatility and aid conditionality tied to those very markets (Meester et al., 2024).

This intersection between food, finance and foreign policy highlights the persistent tension in aid discourse: is food assistance driven by genuine solidarity or a tool of strategic influence? For this thesis, recognising that tension is crucial. Assessing the impact of aid requires more than what works, it demands asking who truly benefits, under what circumstances, and at what cost?

2.4 Context Matters

While geopolitics shapes the broader aid landscape, national-level context, particularly institutional strength and economic stability, plays a critical role in determining aid effectiveness on the ground. Institutions are foundational to the structure and functioning of societies and economies as they significantly influence the capacity to achieve development outcomes, such as food security. Institutions, broadly defined, are the formal and informal rules, governance structures and enforcement mechanisms that dictate how a nation manages,

distributes and accesses resources within its own society (Zawojska & Siudek, 2025). In the Minority world, under a democratic government, an institution is said to be functioning well when it provides transparent, accountable governance, ensuring effective policy implementation while protecting property rights, thereby creating an environment that sustains economic and social development. Conversely, weak institutions are characterised by the presence of corruption, inefficiency, and an instability which often results in the misallocation of resources and diminishes the trust of its members/citizens (North et al., 2009). Strong institutional frameworks have consistently been linked with improved socio-economic outcomes within a country, particularly in the context of aid effectiveness and food security. Molenaers et al. (2015) discuss that the effectiveness of external aid intervention significantly depends on the governance environment of recipient countries. An effective government ensures that aid resources are transparently allocated, properly utilised and reach the intended beneficiaries, which in turn benefits and improves the likelihood of long-term development. Whereas countries that have deficiencies in their governance structures frequently experience aid captures by elites, misallocation of resources and ineffective or short-lived development. This ultimately can lead to persistent food insecurity despite the substantial external support (Collier & Hoeffler, 2004).

Additionally, economic development, which is often measured by GDP per capita, plays a crucial role in determining food security levels. GDP per capita is commonly utilised as a measure of a country's overall economic health and an individual's purchasing power, which directly influences people's capacity to access nutritious food (Smith & Haddad, 2015). A nation's wealth determines the level of possession of fiscal resources, robust infrastructure, and more effective public safety nets, thus giving a nation the structure to better withstand food crises. Countries with stable economic environments are also more likely to invest in agricultural infrastructure, education, and healthcare, factors that can collectively enhance food

security and reduce vulnerability to economic shocks (FAO, 2023). Economic instability, however, significantly exacerbates vulnerability to food insecurity. Economic conditions such as high inflation rates often lead to sudden spikes in food prices, reduced purchasing power, and greater nutritional insecurity. Research consistently demonstrates that economically unstable environments, especially when compounded by weak governance, substantially limit households' and individuals' abilities to achieve stable and sufficient access to nutritious food, which further perpetuates cycles of poverty and malnutrition (Headey & Ecker, 2014).

Moreover, institutional instability, which is manifested through political volatility, conflict, or systemic corruption, can significantly amplify the impacts of economic shocks and undermine agricultural productivity and food supply chains. Collier & Hoeffler, in their article 'Greed and Grievance in Civil War' (2004), they highlight that nations experiencing conflict or substantial political instability are particularly susceptible to food insecurity, as conflict disrupts agricultural production, displaces populations, and severely restricts humanitarian access. Similarly, weak governance frameworks exacerbate the effects of economic shocks by limiting effective governmental responses and eroding trust in public institutions, essential for coordinated crisis mitigation.

Despite the clarity of theoretical arguments linking institutional strength and economic stability to food security, empirical quantification of these relationships remains less systematically explored across diverse contexts. This is what this research aims to explore through robust empirical analysis, to gain a critical insight into the conditions necessary for sustainable food security alongside aid.

Section 3: Methodology

3.1 Research Design

This thesis employs a mixed-methods approach to investigate the effectiveness of aid interventions on food security outcomes across selected countries. The study combines a quantitative cross-national regression analysis with a comparative case study approach to provide both a level of generalisability and contextualisation. The research seeks to answer the following question:

The effectiveness of aid in addressing food insecurity?

Furthermore, testing the following hypothesis:

Hypothesis (H1): An increase in aid per capita leads to a significant decrease in the levels of severe food insecurity.

To explore this question, the thesis will focus specifically on agricultural aid, including direct food assistance and concessional development finance provided under Official Development Assistance (ODA), which is monitored by the OECD. The analysis draws on quantitative indicators that measure both aid flows and food security outcomes over time. Additionally, two country case studies will be developed and compared to explore the mechanisms and contextual factors that may influence aid effectiveness. This research will consider not only the presence and quantity of aid delivered but also other control variables which influence the context under which aid is given.

3.2 Data Sources and Variables

Table A1

Original Variable Name	**Name used in thesis**	**Definition**	**Source**	**Years**	**Countries**
Prevalence of severe food insecurity (%)	Severe Food Insecurity Share (SFIS)	% of national population experiencing severe food insecurity based on FAO's Food Insecurity Experience Scale (FIES)	FAO / Our World in Data	2022	90
Total aid for agriculture	Total aid for agriculture = (AAF) Aid Per Capita = (APC)	Total financial flows in constant 2018 USD from all donors to the agriculture sectors. *Originally in USD, transformed into Aid Per Capita (Aid divided by national population) and log-transformed for normalisation*	OECD / Our World in Data	2013 & 2017	90

Note: Overview of the dependent and main independent variables used in the regression models

Table A2

Original Variable Name	**Name used in thesis**	**Definition**	**Source**
Population (historical estimates)	Population	Total population per country per year, measured in absolute numbers. *Used to calculate aid per capita*	UN World Population Prospects, as accessed via *Our World in Data*
GDP per Capita (PPP-adjusted)	GDP per Capita (PPP-adjusted)	Gross Domestic Product per capita adjusted for Purchasing Power Parity (PPP), measured in constant international dollars. *Log-transformed to improve distribution symmetry for regression analysis*	World Development Indicators database, *World Bank*
Rule of Law Estimate	Rule of Law	Estimate of governance quality capturing institutional stability, property rights, judicial independence, and corruption control. Expressed as an index ranging from -2.5 (weak governance) to +2.5 (strong governance).	World Governance Indicators, *World Bank*
Average Years of Schooling	Average Years of Schooling	Average number of completed years of education per adult (age 25+) by country,	UNDP, Human Development

		serving as a proxy for education quantity and human capital levels	Report, as accessed via *Our World in Data*
Deaths in armed conflict (UCDP data)	Conflict Dummy Variable	Absolute number of recorded deaths due to armed conflicts per country per year based on direct and verified reports. *dummy variable: coded as 1 if the country experienced any armed conflict-related deaths within the observed year, and 0 otherwise. This indicates the presence or absence of (significant) conflict.*	Uppsala Conflict Data Program, as accessed via *Our World in Data*

Note: Overview of control variables from the years 2013 and 2017 used in the regression models

i. Dependent Variable

Severe Food Insecurity Share (SFIS) measures the percentage of a country's population that experiences severe food insecurity, as defined by FAO's FIES[4]. This data was taken from the Food and Agriculture Organisation of the United Nations (2024), which was processed by Our World in Data.

It is stated that an individual is experiencing severe food insecurity when they have run out of food, gone entire days without eating or experienced hunger due to a lack of money or resources. This variable is a globally standardised, experience-based metric, collected through household surveys and used to assess food access in both moderate and severe forms. However,

[4] The FAO's Food Insecurity Experience Scale (FIES) measures food insecurity at individual or household level using eight questions focused on people's access to food. It captures severity based on self-reported experiences like worrying about food or skipping meals, allowing for cross-country comparisons (Food and Agriculture Organisation, 2022)

this research will use the *severe* form as it reflects the most extreme and unambiguous forms of food deprivation, which are more reliably comparable across countries and time. While moderate food insecurity includes uncertainty or compromises in food quality or quantity, severe food insecurity is more acute, clearer to measure, and more directly linked to humanitarian and policy concerns (FAO, 2024). SFIS captures the access dimensions of food security, one of the FAO's four core pillars. It is based on the FIES metric, which distinguishes between the different levels of food insecurity, enabling a more precise and comparable assessment across countries and time. Although rooted in individual, lived experiences of hunger, the metric is not purely qualitative as it relies on structured household surveys and is statistically scaled using a Rasch model, which transforms qualitative survey responses into quantitative measures. The combination of lived experience and quantitative data makes the FIES a globally validated and replicable indicator.

ii. Main Independent Variable

Agricultural Aid Flow (AAF) refers to the total official development assistance (ODA) and other official flows (OOF) directed toward the agriculture sector in each country, as recorded by the OECD's Creditor Reporting System. ODA and OOF include concessional and non-concessional financing from donor governments and official agencies, and are used to capture the full spectrum of international public financial flows aimed at development (OECD, 2021).

Agricultural aid includes investments in agricultural infrastructure, rural development, food security policy reform, irrigation, crop systems, land use management and more. The variable is expressed in constant 2018 USD, which controls for inflation and allows for year-to-year comparisons. It accurately captures the targeted investment in agriculture, which is essential to food security, while also reflecting on donor priorities. It includes both financial and in-kind transfers (seeds, tools, training, etc) which are then assigned a monetary value by

donors, based on estimated market prices or the costs recorded in project budgets. This data is disaggregated by recipient country, which enables a regression to be conducted at a national level.

Data on population numbers was taken from (Reuveni, 2024)HYDE (2023); Gapminder (2022); UN WPP (2024), with major processing by Our World in Data. It was used to calculate agricultural aid per capita, producing a standardised measure of aid intensity. Aid per capita was then log-transformed to normalise skewness in distribution. The variable was adjusted to standardise for country size and population, which is a fairer cross-country comparison as it controls for population size, rather than economic size, which is separately accounted for in the regression via GDP per capita.

iii. Control Variables

GDP Per Capita

Gross Domestic Product Per Capita, derived from the World Bank, is included due to its strong inverse relationship with food insecurity. In-depth research explores how economic growth intersects with hunger dynamics, utilising reputable sources, including reports from the Food and Agriculture Organisation (FAO) and the World Bank (Reuveni, 2024). Higher GDP per capita often implies better infrastructure, greater economic resilience and improved purchasing power for food (Smith & Haddad, 2015). These findings highlight that GDP per capita is an important factor in reducing hunger, however, other factors must be explored to analyse the influence. Therefore, GDP per capita is expected to have a negative relationship with food insecurity, as higher income levels typically improve infrastructure, purchasing power, and food access. GDP Per Capita (PPP-adjusted) was used as a control variable representing economic wealth and development levels in a country, adjusted for purchasing power parity to ensure comparability across countries and then log transformed.

Education

Average Years of Schooling, taken from UNDP, Human Development Report (2025), with minor processing by Our World in Data, is measured as average completed years of schooling per adult. Education serves as a proxy for human capital, influencing food security through improved knowledge of nutrition, agricultural practices, and economic productivity. An increase in economic productivity can have a positive effect on food security. Muro & Burchi's (2007) study finds that hunger is highly correlated with educational deprivation. Consequently, education is expected to have a negative effect on food insecurity, as increased schooling improves knowledge, productivity, and household resilience. Although this variable does not account for the quality of education received, nor does it fully reflect the educational knowledge of the population, it does have the upside of being widely available and comparable across countries. As it is not the main variable this research is testing, it will be used while acknowledging its limitations.

Institutions

Strong governance institutions enhance aid effectiveness by reducing corruption, improving resource allocation, and facilitating economic stability, directly impacting food security outcomes. Rule of Law (ROL), being a governance indicator from World Governance Indicators, derived from the Databank of the World Bank Group, captures the strength of institutions, property rights security, and governmental accountability, which literature consistently associates with improved food security outcomes (Maslen, 2024). As such, the ROL is expected to be negatively associated with food insecurity, with stronger institutions enhancing aid effectiveness, resource distribution, and policy implementation.

Conflict

The variable was taken from the Uppsala Conflict Data Program (2024) and Natural Earth (2022), which were processed by Our World in Data. Studies show that the presence of conflict disrupts food supply chains, destroys agricultural infrastructure, and diverts resources from development to immediate relief, undermining food security directly (Collier & Hoeffler, 2004). Conflict is therefore expected to have a positive association with food insecurity, as violence and instability disrupt agricultural systems and food access. The original data presented the total number of deaths from conflict by country and year. To simplify this for analysis, a dummy variable was created to indicate the presence or absence of conflict. If any conflict-related death occurred in a given country-year, the variable was coded as 1; if no deaths occurred, it was coded as 0. This variable was vital to consider as conflict significantly disrupts agricultural productivity and market stability, influencing food security directly.

iv. Time-Lag

The outcome year, 2022, was selected as it is the most recent year for which complete data on the SFIS variable is available. The predictor years 2013 and 2017 were chosen to introduce time lags of 9 (longer-term) and 5 years (mid-term), respectively. This selection was made on both theoretical and pragmatic grounds. According to Griep et al. (2021), there is no universal optimal time lag, and they should be chosen based on how long a phenomenon is expected to unfold. This allows for the understanding that changes in food security often manifest gradually due to the systemic, infrastructural and policy-based transformations. Ideally, 2012 would have been used to create a more conventional 10- and 5-year lag, which is more commonly adopted in literature. However, due to data limitations, 2013 was selected as the earliest available year. This aligns with Griep et al.'s (2021) emphasis on balancing theoretical expectations with methodological realities, including data availability. Finally,

using two lagged predictor years enables robustness and sensitivity checks, helping to assess whether the effects of aid and other factors intensify or diminish over time.

3.3 Ethical Considerations

This research uses secondary data, which is publicly available and anonymised. Thus, posing no harm to individuals or groups. However, attention will be given to avoid deficit framing of countries and respecting the dignity and agency of those who are recipients of aid.

Section 4: Results

This section illustrates the statistical findings of an empirical analysis which examines the relationship between agricultural aid and severe food insecurity across approximately 90 countries worldwide. The models are structured to capture both simple and multivariable relationships, employing two time frames for aid (Model 1: 2013 and Model 2: 2017) and a common outcome year, 2022. The use of a time lag addresses potential reverse causality concerns and better reflects delayed policy effects. The regression models were estimated using Ordinary Least Squares (OLS) in RStudio, a widely used open-source software for statistical computing. Furthermore, the following model is applied:

$$SFIS_i = \beta_0 + \beta_1 \log(AID_i) + \theta' X_i + \varepsilon_i$$

In this equation, $SFIS_i$ denotes the dependent variable, measuring the share of the population in country *i* experiencing severe food insecurity in 2022 based on the FAO's FIES. The term $\log(AID_i)$ represents the main independent variable, capturing the log transformed log-transformed agricultural aid per capita received by each country. The vector X_i comprises the control variables, which include average years of schooling (education), the natural logarithm of GDP per capita (PPP-adjusted), a conflict dummy variable coded as 1 if the country experienced conflict-related deaths and 0 otherwise, and an institutional quality indicator measured by the ROL index. The coefficients associated with the control variables are represented by θ, while ε_i denotes the error term capturing unobserved factors

4.1 Descriptive Statistics and Distributions

Table A3

Variable	Number of Observed Data	Min	1st Quartile	Median	Mean	3rd Quartile	Max
SFIS	92	0.500	5.175	8.950	14.245	20.950	63.200
Log Aid Per Capita	92	-3.114	0.651	1.310	1.211	2.121	3.774
Education	92	1.240	4.795	7.255	7.024	9.553	12.560
Log GDP per Capita (PPP)	92	687.4	2816.7	7630.5	8528.0	12920.2	23754.1
Conflict (Dummy)	92	0	0	0	0.239	0	1
Rule of Law	92	-1.809	-0.890	-0.571	-0.506	-0.157	1.255

Note: Descriptive statistics for key variables used in the 2013 regression model

Table A4

Variable	Number of Observed Data	Min	1st Quartile	Median	Mean	3rd Quartile	Max
SFIS	90	0.500	4.925	8.700	13.638	20.750	61.800
Log Aid Per Capita	90	-2.247	0.538	1.377	1.365	2.247	4.253
Education	90	1.310	5.280	7.680	7.393	9.742	12.870

GDP per Capita (PPP)	90	761.3	3341.4	8750.6	9796.6	14231.3	30674.6
Conflict Dummy	90	0	0	0	0.333	1	1
Rule of Law	90	-1.758	-0.815	-0.470	-0.437	-0.139	0.981

Note: Descriptive statistics for key variables used in the 2017 regression model

Prior to conducting the regression models, it is crucial to understand the underlying distribution of the independent variables. The log-transformed aid per capita (*log_APC*) variables for 2013 and 2017, which serve as the main explanatory variables, are approximately normally distributed, as shown in *Figures 1 and 2*. The 2013 data show a minor right skew, while the 2017 distribution appears more symmetric and tighter around the mean. Descriptive statistics for the regression variables are provided above in *Tables 3 and 4*. The descriptive statistics show considerable variation across countries, especially for GDP and SFIS values, indicating large cross-national differences in food insecurity and GDP as predicted. Aid per capita values also differ dramatically as visualised in the histograms of l*og_APC_2013* and *log_APC_2017 (Figures 1 and 2)*. Which is why log transformation was applied to reduce skewness and improve model fit.

4.2 Regressions: Initial Relationships

To establish a baseline, two simple linear regressions were run using *log_APC_2013* and *log_APC_2017* as the sole predictors of SFIS_2022 *(Table 6, found in the Appendix).* The model using 2013 aid data yields a positive but statistically insignificant coefficient ($\beta = 0.38$, $p = 0.705$), while the 2017 model reports a slightly negative but equally insignificant coefficient ($\beta = -0.49$, $p = 0.596$). Both models lacked statistical significance and had very low R^2 values (<0.003), suggesting that aid alone, without the help of context, does not account for variation

in food insecurity outcomes. These results indicate that relying on single-variable interpretations underscores the importance of controlling for confounding structural factors, including development levels, education, governance quality, and conflict.

Figure A5

Multivariable Regression: Predictors of Severe Food Insecurity (2022)

	Dependent variable:	
	Severe Food Insecurity (2022)	
	2013 Predictors	2017 Predictors
	(1)	(2)
Log Aid per Capita	-0.404	-1.626*
	(1.051)	(0.882)
Education	-0.238	0.081
	(0.642)	(0.600)
GDP per Capita	-5.542**	-7.014***
	(2.170)	(1.992)
Conflict (Dummy)	0.422	-3.316
	(3.032)	(2.593)
Rule of Law	-4.824**	-4.677**
	(2.305)	(2.272)
Constant	62.010***	76.236***
	(17.258)	(15.908)
Observations	92	90
R^2	0.335	0.377
Adjusted R^2	0.296	0.340
Note:	*p<0.1; **p<0.05; ***p<0.01	

Note: Multivariable regression results examining the effect of agricultural aid and control variables on severe food insecurity in 2022. Models use predictor values from 2013 (Model 1) and 2017 (Model 2).

Model 1

The first multivariable model (Figure 5) above uses 2013 as the base year for predictors. The independent variables include Log Aid per Capita, Education, Log GDP per Capita, Conflict (Dummy) and ROL.

From this, we can observe some key findings, such as that the model accounts for approximately 29.6% of the variance in SFIS in the 2013 predictor model, as indicated by an adjusted R^2 of 0.296. Among the predictors, ROL emerges as statistically significant at the 5% level ($\beta = -4.824$, $p < 0.05$). This implies that a one-unit increase in the ROL index in 2013 is associated with a 4.824 percentage point decrease in severe food insecurity in 2022, *ceteris paribus.* Suggesting that countries with more robust legal and institutional frameworks in 2013 were more likely to experience lower levels of food insecurity nearly a decade later in 2022. This suggests that stronger legal and institutional frameworks directly improve long-term food security, potentially by enhancing governance, policy implementation, and access to essential services. Similarly, GDP per Capita (log-transformed) is significantly and negatively associated with food insecurity ($\beta = -5.542$, $p < 0.05$). This finding suggests that a one-unit increase in the log of GDP per capita is associated with a 5.542 percentage point decrease in SFIS, holding other variables constant. Further reinforcing the idea that higher income levels serve as a buffer against food crises, likely due to better infrastructure and more resilient safety nets. In contrast, other predictors such as log Aid per Capita ($\beta = -0.404$), education ($\beta = -0.238$), and the conflict dummy ($\beta = 0.422$) trend in theoretically expected directions, giving negative values for development indicators and positive values for conflict. However, they do not reach statistical significance. While this may reflect issues such as multicollinearity, measurement error, or unobserved mediating variables, it is also possible that these factors

simply do not exert a strong or consistent influence on SFIS at the national level over this timeframe.

While the 2013 model provides insight into the long-term structural factors influencing food insecurity, the 2017 model allows for a more mid-term perspective. Comparing the two helps to assess whether the impact of aid and contextual variables becomes more pronounced over time or remains consistent.

Model 2

The second model repeats the same specification but uses 2017 values for all predictors. This model slightly outperforms the 2013 version, with an adjusted R^2 of 0.340. This indicates that 34% of the variance in SFIS_2022 is explained by the predictors included in this specification. Log Aid per Capita now shows a marginally significant negative effect ($\beta = -1.626$, $p < 0.1$), suggesting that more recent aid disbursements may play a role in reducing food insecurity, albeit with a delayed effect. Once again, GDP per capita emerges as a significant predictor ($\beta = -7.014$, $p < 0.01$), further reinforcing the role of national wealth levels in mitigating food insecurity. The ROL continues the pattern in playing an important role, with a significant negative relationship ($\beta = -4.677$, $p < 0.05$), confirming its consistency and theoretical importance across both models. Model 2 for 2017 shows us that education ($\beta = 0.081$) now exhibits a positive sign but remains statistically insignificant. However, the conflict dummy switches sign ($\beta = -3.316$), now suggesting that countries experiencing conflict in 2017 were associated with lower food insecurity.

Taken together, both models highlight the consistent and significant role of institutional quality and national wealth in reducing food insecurity. The slight increase in the effect size and significance of agricultural aid in the 2017 model suggests that aid may exert more visible impacts in the mid-term. However, the continued insignificance of education and conflict

highlights the need for further investigation into their contextual or indirect pathways. These results provide only limited support for the hypothesis (H1). While aid per capita was not significant in the 2013 model, the 2017 model showed a marginally significant negative association ($\beta = -1.626$, $p < 0.1$), suggesting a possible short- to mid-term effect.

4.3 Econometric Checks and Robustness

To effectively reduce the influence of outliers in the distribution, log-transformation of the aid per capita and GDP variables were performed. Additionally, scatterplots (*Figures 3 and 4*) confirm a reduction in variance spread after transformation. Extreme values in SFIS were retained, as they are likely to reflect real-world cases of acute crisis (e.g., conflict or famine) rather than measurement error. Moreover, reverse causality was addressed by introducing a time frame lag: agricultural aid and all control variables are taken from either 2013 or 2017, while the outcome variable, severe food insecurity, was measured in 2022. This design strengthens the plausibility of causal direction, and the plausibility of aid affecting food insecurity, rather than the other way around. The analysis acknowledges that aid allocation may itself be a response to food insecurity. Future studies could help dismiss causality more definitively.

Furthermore, the model includes a theoretically justified set of confounding controls: income, education, governance, and conflict, each widely cited in the food security literature. While the inclusion of these reduces the likelihood of omitted variable bias, some variables, such as agricultural productivity, food prices, or climate shocks, were not included due to data limitations. This limitation is noted, and future research is encouraged to address these gaps. While formal heteroskedasticity tests were not performed, scatter plots did not reveal any clear patterns or funnel shapes indicative of heteroskedasticity. As such, there is no strong evidence

that the homoskedasticity assumption was violated through the frameworks of Breusch & Pagan (1979).

Lastly, the correlation matrices were examined, and no correlations exceeded the ±0.7 threshold, which is commonly used as a benchmark for multicollinearity concerns (*Tables A6, A7*). The ROL and GDP remained stable across models, suggesting robustness. Aid becomes more relevant in 2017, and the ROL remains significant in both models. Replacing raw conflict data with a dummy variable improved interpretability without altering key conclusions and had minimal impact on results. The improvement in explanatory power from 2013 to 2017 models also suggests stability over time, with aid becoming slightly more predictive as the outcome year (2022) nears.

4.4 Comparative Interpretation

The regression results are summarised in *Figure 5*. Across years, ROL emerges as the most stable and significant predictor, reinforcing the literature, which indicates that institutional strength is crucial for food security. The slight increase in significance for aid from 2013 to 2017 suggests that the impact of financial assistance is more immediate when aid is more recent. Whereas, GDP's consistent significance confirms economic development as a protective factor. Scatterplots (*Figures 3 and 4*) visually reinforce these interpretations: the 2013 aid-SFIS relationship is flat, while the 2017 version shows a mild downward slope. In contrast, education and conflict are statistically weak predictors despite their theoretical importance.

Section 5: Discussion

5.1 Analysis of Quantitative Findings

The empirical results from this analysis highlight the complexities of addressing food insecurity through international aid alone. While agricultural aid shows a marginally significant negative effect in the 2017 model ($\beta = -1.626$, $p < 0.1$), suggesting that more recent disbursements may help reduce food insecurity, its impacts are marginal. In contrast, structural variables such as institutional strength (measured through ROL) and economic development (log GDP per capita) consistently emerge as statistically significant predictors across both models. This suggests that while aid may play a role in addressing food insecurity, its effectiveness is heavily contingent upon the domestic conditions into which it is delivered.

This finding aligns with broader literature, which questions the standalone impact of aid on long-term development outcomes. As North et al., (2009) and Molenaers et al. (2015) argue, institutions are not neutral mechanisms; they are shaped by history, politics and power, all of which influence how aid is implemented. The consistent significance of ROL in both models ($\beta = -4.824$ in 2013; $\beta = -4.677$ in 2017) supports this view and aligns closely with theoretical arguments of Collier & Hoeffler, (2004). 'Good governance' is central to sustainable development outcomes, with stronger legal and governance institutions being essential enablers of food security, facilitating more accountable policy implementation, equitable resource distribution, and resilience in the face of shocks.

The strength and significance of GDP per capita across models further reinforce the economic dimension as a fundamental pillar of food security. Wealthier nations possess more extensive resources, better infrastructure, and resilient safety nets that significantly mitigate the risk of severe food insecurity. These findings resonate with the arguments posed by Smith & Haddad, (2015), suggesting economic stability directly influences a nation's capacity to

effectively respond to and mitigate food security crises. Interestingly, the weak and statistically insignificant results observed for direct aid variables, especially in isolation (*Figure 6),* align with critical literature emphasising that aid alone often falls short in achieving sustainable food security. This insufficiency arises primarily because aid often targets short-term crises without fundamentally addressing underlying structural vulnerabilities, including institutional instability and economic volatility (Clapp, 2015). The findings demonstrate that without accounting for broader institutional contexts, the potential of aid interventions remains inherently limited.

By contrast, the lack of statistical significance for education and conflict across both models could be due to the way these variables are measured. For instance, 'average years of schooling' may not adequately capture the quality or relevance of education to food security outcomes. Moreover, the complex non-linear influence of conflict might not be easily captured with the use of a simple dummy variable. Interestingly, the 2017 model shows an unexpected negative relationship between conflict and food insecurity. A possible inference from this may be that countries receiving higher volumes of targeted humanitarian aid in response to conflict may temporarily reduce food insecurity despite broader instability. Ethiopia provides a clear example of this pattern. Despite experiencing political unrest and ethnic violence in 2017, the country received extensive humanitarian support. By 2022, its SFIS were not among the highest in the dataset, suggesting that large-scale, targeted aid can help mitigate the immediate food-related consequences of conflict. Ukraine presents a related but different case. Despite being involved in an active and escalating conflict since 2014 and registering as a conflict-affected country in 2017, it reported a relatively low SFIS by 2022. This may be due to a combination of significant humanitarian assistance and Ukraine's pre-existing structural strengths, such as its role as a major agricultural exporter and moderately strong governance institutions (Feingold, 2022).

Moreover, these results offer partial support for the hypothesis (H1) that an increase in aid per capita leads to a significant decrease in levels of severe food insecurity. While the 2017 model shows a marginally significant negative relationship, the effect is not robust across both time points. This suggests that aid may contribute to improved food security under certain conditions, but its impact is not consistently strong or standalone without supportive institutional and economic contexts.

5.2 Conditionality and Dependency

The empirical finding that institutional quality is more consistently associated with food security than aid quantity raises a complex dilemma for development policy: Should aid be conditional on governance standards?

Donor countries often require recipients to meet governance benchmarks such as transparency, anti-corruption efforts, or ROL before aid is released. While this may seem logical in terms of ensuring accountability, it also raises serious ethical and political concerns. As Escobar (1995) and Molenaers et al. (2015) argue, these conditions often reflect donor priorities more than local needs, inadvertently perpetuating historical colonial power dynamics. Such criteria risk undermining national sovereignty and local autonomy. When governments are pressured to adopt external models of governance in order to receive aid, they risk weakening local governance systems and replacing them with donor preferences. Instead of building self-sufficient institutions, such conditionality may foster dependency and reduce legitimacy.

Most of all, this power imbalance undermines the idea that aid is a form of global solidarity. When food security depends not on actual need but on meeting external benchmarks, the result is often more exclusion than inclusion. The literature on political conditionality in aid is clear: while some conditions may improve transparency or fiscal discipline, they often

fail to strengthen local accountability or long-term institutional development (Clapp, 2015; Meester et al., 2024). Moreover, the case of "tied aid", where recipients are required to purchase goods or services from donor countries, ultimately exacerbates this imbalance, prioritising donor interests over recipient agency.

5.3 Institutions vs Interventions

As discussed throughout this thesis, while agricultural aid can provide short-term support or crisis relief, it is rarely transformative on its own. Long-term improvements in food security are fundamentally shaped by the strength and structure of domestic institutions. Gulati et al. (2012) similarly argue that sustained investment and institutional stability, not one-off interventions, are key to achieving durable development outcomes. However, institutions are not as passive as previously stated. They are embedded in political systems, shaped by power dynamics, and often influenced by elite interests. In countries with high institutional quality, reflected in strong ROL scores, aid can be aligned with national development plans, used to enhance agricultural systems, and reach food-insecure populations more effectively. But in weaker institutional settings, aid frequently bypasses the state or operates through external actors like NGOs, with limited integration into national systems. While this may appear efficient, it can fragment food governance, disincentivise state accountability, and weaken the long-term development of domestic capacity.

More concerning is the risk that aid may be co-opted by domestic elites. In fragile or conflict-affected states, where oversight is weak, food assistance can be channelled through patronage networks, diverted to politically loyal regions, or captured by private actors for personal gain (Meester et al., 2024). This undermines the equity and impact of aid, deepens inequality, and erodes trust in both local institutions and international partners. These issues may help explain why aid failed to show significant effects in the 2013 model; it is not

necessarily a lack of aid, but where it goes, who controls it, and whether it reaches the people who need it most.

That said, these institutional and political limitations do not mean that countries should be denied aid. The answer is not to reduce support, but to rethink how it is delivered and monitored. More attention must be paid to ensuring that aid reaches the most food-insecure communities, particularly in fragile contexts where the risk of diversion is high. This calls for stronger internal monitoring systems, community-level participation, and locally grounded accountability mechanisms that prioritise inclusion and transparency. At the same time, external donors must avoid imposing rigid governance models that ignore context or override local systems. Development should not become a form of surveillance or conditionality. Instead, aid should be used to strengthen, not substitute, domestic institutions, by supporting inclusive policy processes, investing in long-term capacity, and giving countries the space to chart their paths toward food sovereignty.

5.4 Comparative Country Analysis

To complement the quantitative analysis and further explore how institutional quality shapes aid effectiveness, this section compares two countries at opposite ends of the ROL[5] spectrum: Botswana (75th percentile) and Haiti (25th percentile[6]). Their contrasting experiences with food insecurity provide qualitative depth to the regression findings.

Botswana has consistently ranked high on governance indicators such as ROL (World Bank, 2025). Despite facing droughts and climate risks, it has invested in early warning

[5] ROL measured using the World Bank's Worldwide Governance Indicators (WGI), which assess perceptions of the extent to which agents have confidence in and abide by the rules of society. This includes the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Scores range from approximately –2.5 (weak governance) to +2.5 (strong governance), based on aggregate data from expert assessments and surveys of households and firms (World Bank, 2025).

[6] The 75th and 25th percentiles were selected to represent countries with significantly high and low levels of institutional quality, respectively. This approach allows for a meaningful contrast in governance environments while avoiding statistical outliers.

systems, social protection, and agricultural diversification. These efforts, combined with well-coordinated donor partnerships, have helped maintain a relatively low level of SFIS in 2022. Aid in Botswana is aligned with national strategies and targeted towards structurally vulnerable groups, enhancing its long-term effectiveness (World Bank, 2013). Haiti, by contrast, has faced persistent governance crises, widespread corruption, and weak institutional capacity. The nation continues to suffer from high levels of SFIS, despite decades of international aid. The absence of a functioning state has forced aid delivery through a fragmented NGO network, limiting oversight and impact, structural challenges such as environmental degradation, reliance on food imports and fragile infrastructure has further weakened the potential for sustainable improvement (World Bank, 2022). This comparison reinforced key findings from the quantitative models. Institutional quality is not just a statistical variable but a real-world determinant of whether aid translates into food security. In Botswana, stronger institutions facilitate targeted and coordinated interventions. In Haiti, weak governance undermines aid effectiveness and entrenches dependency, even when aid volumes are high.

While the quantitative analysis focused on the "accessibility" dimension of food security, the comparative case study implicitly draws on the other three FAO pillars, availability, utilisation, and stability, to give a fuller understanding of food security outcomes. Botswana's investment in agricultural production (availability), public health and safety nets (utilisation), and early warning mechanisms (stability) contrast sharply with Haiti's persistent deficits in these areas. These contextual differences show that institutional strength shapes not just food access, but a country's ability to produce, distribute, and sustain food security over time. This qualitative analysis, although brief, gives strength to the rationale for using SFIS as a primary indicator, while also validating a mixed-methods approach that captures the multidimensional nature of food security.

Moreover, this comparative case analysis deepens the study's response to the research question by illustrating how the effectiveness of aid in addressing food insecurity depends not on the volume of aid alone, but on the political and institutional environment in which it is delivered. The contrasting outcomes in Botswana and Haiti reinforce the thesis's central finding: aid can support food security, but only when delivered through accountable, capable, and coordinated domestic systems.

5.5 Limitations

There are several possible limitations that may play a role in the conduction of this research. First, while SFIS focuses primarily on the access dimension of food security, it does not fully capture the multidimensional FAO framework, which includes availability, utilisation and stability. Nevertheless, the SFIS was chosen for its global standardisation, consistency and relevance. An attempt was made to address this limitation by incorporating qualitative case studies to explore the broader dimensions of food security more holistically.

A second limitation related to the casual interpretation of the regression results. While time-lags were introduced to reduce the risk of reserve causality, the research cannot fully rule out the omitted variable bias, where an unmeasured factor influences both aid and food insecurity. For example, variables such as climate vulnerability or political instability could impact both the amount of aid received and food insecurity outcomes. Similarly, reverse causality may occur if countries with worsening food insecurity attract more humanitarian aid, complicating the direction of observed relationships.

Data availability also posed a constraint. The final sample includes only 90-92 countries due to gaps in key indicators, particularly in countries experiencing conflict or institutional fragility. This may bias the analysis, as the most severely food-insecure nations often have the least reliable data. Furthermore, the generalisability of cross-country regressions is limited.

While the models identify global trends, they necessarily simplify local socio-political contexts. To manage complexity, this research prioritised consistently available and validated indicators but acknowledges that more detailed country-level research would offer richer insights. Finally, the use of standardised quantitative metrics may risk overlooking local realities or reinforcing dominant development frameworks. This study recognises the epistemological limitations of global development analysis and has sought to counterbalance them through a mixed-methods design, combining statistical breadth with contextual depth in the case studies.

Despite these limitations, the study contributes to understanding how aid, governance, and economic conditions interact to shape food insecurity. It also highlights the need for future research to incorporate additional factors such as climate shocks, agricultural productivity, and local governance capacity to deepen our understanding of food security dynamics.

Section 6: Conclusion

This thesis set out to examine the effectiveness of international aid in reducing severe food insecurity, with a particular focus on the role of institutional quality. Through a combination of regression analysis and a comparative case study, it found that while aid may have some impact, its effectiveness is not consistent across contexts. Instead, structural factors such as Rule of Law and economic capacity emerged as more reliable predictors of food security outcomes. The findings suggest that aid alone is insufficient to address food insecurity. It must be embedded within accountable, capable, and well-coordinated domestic systems to have a meaningful and lasting impact. The comparative analysis of Botswana and Haiti reinforced this point, illustrating how the same international intervention can yield vastly different results depending on institutional strength.

These insights contribute to ongoing debates about the limitations of aid and the importance of building domestic capacity. While this study faced limitations, such as data gaps and measurement constraints, it underscores the need for context-sensitive and system-aware approaches to aid delivery.

Future research should explore how specific forms of aid, such as agricultural or nutritional support, interact with local governance structures. Ultimately, food insecurity is not just a simple logistic issue but rather an outcome of centuries of economic and political exclusion. Thus, structural legacies, colonialism, neoliberal policy reform and global trade imbalances are a factor in the attempt to assess aid effectiveness and offers valuable guidance for policymakers aiming to foster long-term developmental resilience. Achieving food security requires more than aid flows; it demands structural transformation, inclusive institutions, and a genuine commitment to empowering those most affected by hunger.

Appendix

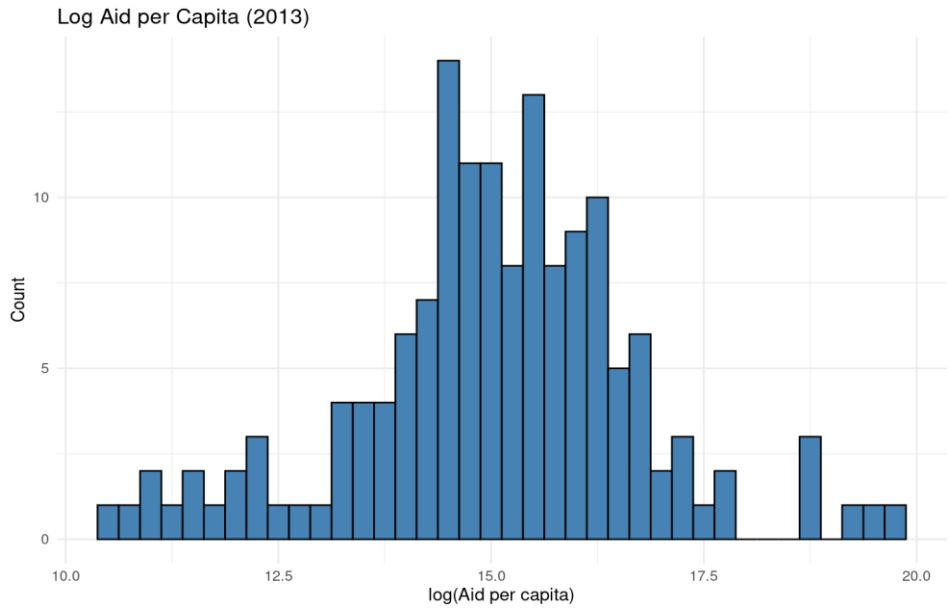
Appendix A

List of Countries Included in Regression Analysis

The following countries were included in the dataset used for the regression analysis, which explored the relationship between the dependent and independent variables:

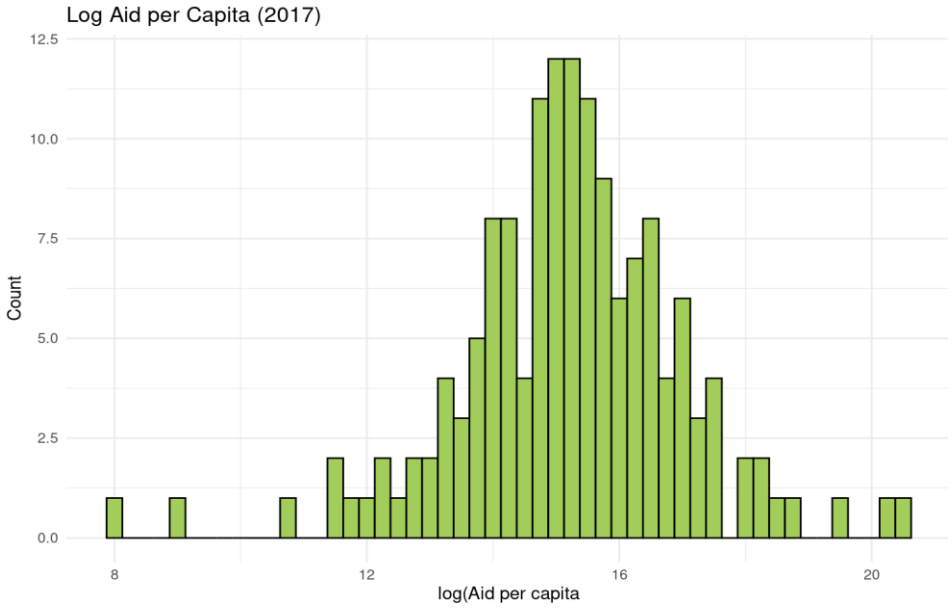
Afghanistan, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bangladesh, Belize, Benin, Bosnia and Herzegovina, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Chile, Colombia, Comoros, Costa Rica, Côte d'Ivoire, Djibouti, Dominica, Dominican Republic, Ecuador, El Salvador, Eswatini, Ethiopia, Fiji, Georgia, Ghana, Grenada, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Indonesia, Jamaica, Kazakhstan, Kenya, Kiribati, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Myanmar, Namibia, Nepal, Niger, Nigeria, North Macedonia, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Samoa, São Tomé and Príncipe, Senegal, Serbia, Seychelles, Sierra Leone, South Africa, South Sudan, Sri Lanka, Suriname, Tajikistan, Tanzania, Thailand, Togo, Tonga, Tunisia, Uganda, Ukraine, Uruguay, Vanuatu, Zimbabwe.

Figure A1



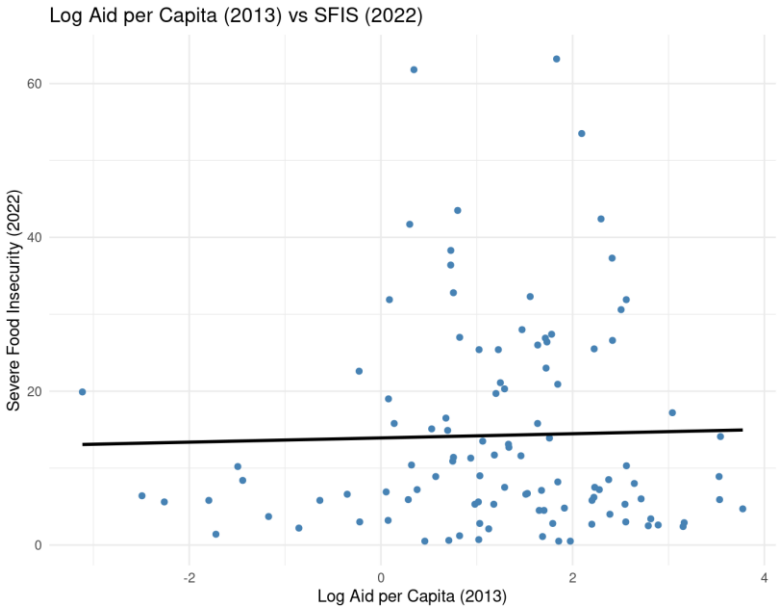
Note: Histogram showing the distribution of log-transformed aid per capita in 2013 across 92 countries.

Figure A2



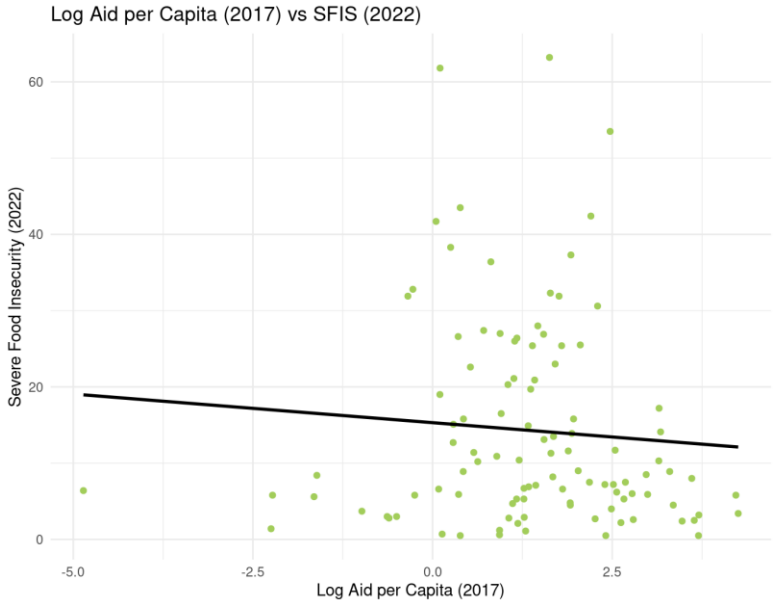
Note: Histogram showing the distribution of log-transformed aid per capita in 2017 across 90 countries.

Figure A3



Note: Scatterplot depicting the relationship between Log Aid per Capita (2013) and Severe Food Insecurity Share (2022).

Figure A4



Note: Scatterplot showing the relationship between Log Aid per Capita (2017) and Severe Food Insecurity Share (2022).

Table A5

Model	Intercept	Aid Coefficient	Std. Error	t value	p-value	R-squared	Adjusted R-squared
2013 Model	13.9207	0.2736	0.9905	0.276	0.783	0.000726	-0.008791
2017 Model	15.3088	-0.7509	0.9161	-0.820	0.414	0.00648	-0.003165

Note: Simple linear regression results examining the effect of agricultural aid on severe food insecurity in 2022. Models use predictor values from 2013 and 2017.

Table A6

	Aid per Capita	Education	GDP per Capita	Conflict	Rule of Law
Aid per Capita	1.0	-0.026	-0.297	-0.344	0.022
Education	-0.026	1.0	0.75	-0.227	0.517
GDP per Capita	-0.297	0.75	1.0	-0.121	0.516
Conflict	-0.344	-0.227	-0.121	1.0	-0.255
Rule of Law	0.022	0.517	0.516	-0.255	1.0

Note: Correlation Matrix of all control variables of the year 2013

Table A7

	Aid per Capita	Education	GDP per Capita	Conflict	Rule of Law
Aid per Capita	1.0	-0.03	-0.2	-0.296	0.085
Education	-0.03	1.0	0.777	-0.307	0.545
GDP per Capita	-0.2	0.777	1.0	-0.24	0.529
Conflict	-0.296	-0.307	-0.24	1.0	-0.319
Rule of Law	0.085	0.545	0.529	-0.319	1.0

Note: Correlation Matrix of all control variables of the year 2017

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