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Famines, Poverty and Intergenerational Mobility in Developing Countries

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Abstract

The famine has not ended yet. Though much has been done, famine is still visiting some parts of the globe, ravaging economies, taking lives, and compelling people to experience acute hunger, starvation, and associated diseases. Deadly famines have impacted parts of Asia and the Pacific at different times. China has experienced the most lethal famine in history in terms of severity and fatalities. Africa is still facing famine. There are many countries worldwide, across continents, whose population is still facing hunger and starvation on an alarming scale. Thus, famine is still relevant today.

The effects of famine have been the subject of much research, including long-term health, nutritional deficits and diseases, effects on adults who faced famine as children, and impacts on ensuing generations. However, little research has engaged the long-term economic impacts of past famines i.e., the extended impact of famine on intergenerational poverty and educational mobility. The present study bridges the gap and focuses on how past famines may fuel intergenerational poverty through intergenerational educational mobility.

The present research maintains two objectives at the center. The first objective is to explore the deeper connections between famine and degree poverty whether or not the past famines are still influencing the depth of poverty in the countries that experienced famine. The second objective is to explore whether famine events impact poverty outcomes and fuel intergenerational poverty. Using datasets from the University of Oxford, Tufts University, the World Bank, the World Economic Forum, the UNDP, and other reliable sources. This study argues that past famine events have significant influence in creating deeper poverty and reduce intergenerational mobility.

Available data suggest that Asian countries experienced nearly similar number of famines to African countries since 1801, though famine mortality and other consequences vary greatly. Among the three Asian continents that experienced famine, southeastern Asia can be considered as Asian famine hotspot. A total of 17 famines occurred in southeastern Asia. Eastern Asian countries have experienced nine famines since the 1860s. European countries experienced fewer famines, and the countries in the Americas experienced the least number of famines during the same period. No country in Asia is currently experiencing famine, like some countries in sub- Saharan Africa, but poverty and hunger are still notable.

This study generated correlation coefficients and regression analyses with famine, poverty, and intergenerational mobility variables. The correlation coefficients demonstrate that past famine variables are correlated with the present-day deepening poverty variables. The regression analysis demonstrates that the past famines have significant effects on the intergenerational mobility among many people in countries that experience famine.

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Acronyms and Abbreviations

ADB	Asian Development Bank
BMI	Body mass index
DRC	Democratic Republic of Congo
FAO	Food and Agriculture Organization of the United Nations
FBS	Food Balance Sheets
GDP	Gross Domestic Products
GNP	Gross National Products
GNI	Gross National Income
HCR	Poverty Headcount Ratio
HDI	Human Development Index
HDR	Human Development Report
HFA	Height for age
IMR	Infant Mortality Rate
IPC	Integrated Food Security Phase Classification
IPCC	Intergovernmental Panel on Climate Change
LAC	Latin American and the Caribbean
LDC	Least Developed Countries
OU	University of Oxford
MDGs	Millennium Development Goals
MPI	Multidimensional Poverty Index
SDGs	Sustainable Development Goals
WB	The World Bank
WDI	World Development Indicator
WDR	World Development Report
WEF	World Economic Forum
WFA	Weight for age
WFH	Weight for height
WFP	World Food Program
UNDP	United Nations Development Program

Chapter 1: Introduction

Has famine ended? In Sudan, the 2003–2005 famine took 200,000 lives. A devastating famine in Uganda killed 100,000 million people between 2003–2006. The 2011 famine in Somalia caused 255,000 deaths. A large number of families in Ethiopia, Madagascar, South Sudan, and Yemen experienced famine in 2021. Indeed, famine is knocking at the door of 41 million people worldwide (WFP, 2021). These recent events clearly indicate that famine continues to be an urgent issue in need of contemporary discussion. In particular, developing countries have a long way to go to end this terrible socioeconomic ill.

In recent years, climate change has been a powerful driver of famine (UNFCCC, 2021), responsible for widespread drought and hunger in many parts of the world. As many international organizations report, several developing countries are experiencing widespread hunger and famine due to climate change for the first time in their history. The present research explores these forces and develops a comprehensive understanding of meaningful solutions.

Using datasets on significant famines in Asia and Africa, this study explores the deeper connection between famine and poverty, examining how famines contributed to a protracted crisis that created extended poverty cycles.

Objectives

This research was conducted with a broader objective to explore the policy explanations that contributed to the success of some countries in addressing famine and the failures of other countries to do the same. It explores major famines and how they contributed to protracted poverty in the immediate and long-term aftermath. Special focus is given to the policies taken by

the countries that experienced famine and how those policies produced positive results. For example, some countries successfully managed the aftermath and assured development, while others continued suffering from problems associated with underdevelopment. The specific objectives are:

1. To explore whether past famines influenced the depth of poverty for countries that experienced famine in their past.
2. To explore whether famine events fueled intergenerational poverty in the form of intergenerational educational mobility in countries that experienced famine in their past.

Research Questions

A set of research questions guided the literature review and data collection. In line with broader and specific research objectives, the following five questions guided the research:

a. What are the connections between famine and poverty? How does the influence of famine persist or not?
b. What are country-specific consequences of famine events?
c. What are causes or major contributing factors of poverty and famine in countries that experienced famine?
d. Do past famine events affect present-day depth of poverty?
e. Do past famine events influence intergenerational educational mobility in famine-affected countries?

Study Rationale

This study elucidates key policy decisions implemented by both nations that successfully addressed famine situations and those that remained plagued by chronic food insecurity and other challenges. Such understanding may reduce the severity of future famines and reduce poverty. This study, therefore, may offer long-term benefits and broader human wellbeing.

Scope of the Study

Research scope traces the boundaries of research. It indicates the parameters under which a study is operated (Simon & Goes, 2013). The present research uses a large-scale dataset covering countries that have experienced famine. The central focus is on countries that experienced famine and had policies and interventions to deal with the famine problem. I cover both countries that dealt with famine successfully and have reduced their vulnerability over time, as well as countries that failed to do so and continue to experience chronic poverty and hunger.

Research Ethics

Research based on secondary data liberates the researcher from applying for ethical consideration through the Institutional Review Board process, as no human subjects are directly interviewed in this process. Yet, the research involves general ethical considerations in terms of primary research design, public good implications (ensuring the research will do not harm), transparency, replicability, and publicness (Data Big and Small, 2016). More importantly, it needs to check which rules and regulations are applied for the issues of ethical considerations for secondary data.

This research was conducted using existing data and secondary data, published in academic journals, newspaper reports, magazine features, and periodicals (mainly journal articles and books). To obtain historical data on famines, I was dependent on a range of published literature, government records, and official records. As this process did not include human interaction, most ethical considerations did not apply.

Conclusion

Famine still exists in many countries worldwide. Thus, there must be deep-seated reasons why famine and poverty are not disappearing from the contemporary world. The present research sought to understand the impact of famine on the depth of poverty with a broader expectation of

finding meaningful solutions. Consequently, I offer strategies for developing countries to reduce or end the possibility of famines. Meaningful solutions may provide better living standards for millions of people suffering from the dreadful aftermath of famines over the years.

Chapter 2: An Interdisciplinary Approach to Poverty and Famine

Introduction: Poverty as a Concept

Poverty is not only an ongoing concern for most countries in the world, but it is also as old as human history. It is not only a concern for poor and developing countries but also a concern for advanced and developed countries. Poverty is a concern not only for the poor themselves but for the more affluent part of society. Let us consider the following ideas:

> People must not be allowed to become so poor that they offend or are hurtful to society. It is not so much the misery and plight of the poor but the discomfort and cost to the community which is crucial to this view of poverty. We have a problem of poverty to the extent that low income creates problems for those who are not poor (Rein, 1981).

It is a central apprehension or poverty discussion about who should be at the center of poverty analysis. Is poverty should be in the center because of the interest of (a) the poor, (b) the non-poor, or (c) both the poor and non-poor? It is always better to take a broader view to addressing a problem that is quite widespread –like poverty. Ticking a partial view like the fast two option depicts cannot address poverty at a broader scale. Addressing poverty to find minimization and solution, is obviously excellent for the whole society –including poor and non-poor.

A considerable part of poverty literature pays attention to the particular group of people who should be the focus of our concern. To tell it differently, *who* should be our concern's focus while discussing poverty and related problems? The indicating factors and criteria might differ in different societies, but the poor ultimately received much attention in poverty discussions. Now the question is, who are poor? Is it a particular group of people whose income is ‘below the

standard acceptable level of income' or the income poverty –or is it a group whose consumption pattern falls below the standard and minimum 'acceptable consumption standard' or the consumption poverty?

Conceptualizing Famine: Related Concepts and Their Measurements

According to Merriam Webster Dictionary, famine is 'an extreme scarcity of food' (Merriam-Webster Dictionary). Britannica defines famine as a 'severe and prolonged hunger in a substantial proportion of the population of a region or country, resulting in widespread and acute malnutrition and death by starvation and disease' (Encyclopedia Britannica). Cambridge dictionary defines famine as 'a situation in which there is not enough food for a great number of people, causing illness and death, or a particular period when this happens: another crop failure could result in widespread famine'(Cambridge Dictionary).

This study defines famine as a situation with extreme and prolonged hunger in a locality, where there is an acute scarcity of food experienced by the majority of the population, and when mass people lefts with no choice other than starving, resulting in a large number of deaths due to widespread starvation and acute malnutrition induced diseases.

This study also defines the concepts that are associated with this study. By hunger this study means the *feeling emaciated, weak, and sick due to a lack of food with a strong desire to eat*. Starvation is *extreme deficiency in calorie intake, below the level required to maintain the life of a human*. By malnutrition this research mean *a specific imbalanced condition that develops when the body deprive of vitamins, minerals and various other nutrients required to maintain healthy tissue and organ functions*.

Modern day hunger is measured using a specific famine scale. Famine scales are the ways where the degrees of food security in terms of population are measured. The Food and Agriculture Organization of the United Nations (FAO) calculates hunger by combining aggregate

Food Balance Sheets (FBS) for a country with specifically selected household survey estimates of the inter-household variance in calorie availability (World Bank, 2022). Malnutrition measurements indicate the anthropometric measures like as weight for age (WFA), height for age (HFA), weight for height (WFH), and body mass index (BMI).

Conceptualizing Poverty

Service Substantial attention has been paid to conceptualizing the idea of poverty. Poverty, as the lack of basic needs, is as old as human history. Poverty has many notions and manifestations. The causes and consequences vary significantly across time and space. Remarkable improvements have been observed in the last couple of decades in the discussion of poverty, although there is considerable disagreement regarding the definition of poverty. Individual descriptions tend to focus the term differently with specific dimensions. The idea of poverty ranges from a smaller form of the one-dimensional measurements -which focuses on individual income or the income of a household unit. In contrast, the multidimensional concept of poverty concentrates on a comprehensive idea that includes subjective and objective analysis. The following section focuses on how the poverty and famine have been conceptualized over time and the treatments that are set up according to those conceptualizations and measurements.

The poverty and famine literature can broadly be discussed into two different sections - based on the causes and the consequences of famine. The first part of this review will concentrate on the causes, and the latter focuses on the immediate and long-term consequences of famine across countries.

Poverty as Absolute and Relative Base

In the early phase of the 20th century, poverty was considered a lack of basic physical resources like food, clothing, and shelter (Booth 1886, 1903; Rowntree, 1902). In the latter period, poverty has been discussed unidimensionally, focusing on income. Rowntree developed

the idea of poverty line based on individual or household income –which Is considered the first effort to develop a poverty line that distinguishes the poor and non-poor of a given area or country. Thus the first formal poverty line –the threshold that separates poor and non-poor clearly –was developed using only income-based methods of households (Rowntree, 1902). This monetary approach, developed by Rowntree, was used widely and dominated development discussions until the 1960s.

Absolute poverty indicates a condition when the household income goes below the level that is required for ordinary living. When the income is below that level, the household cannot meet its basic needs like food, safe drinking water, shelter, education, and health care.

The Basic Needs Approach

Following World War II, economic growth has become the single most important factor for achieving development and poverty alleviation for all the countries (Niemietz, 2011; Misturelli and Heffeman, 2008). Poverty alleviation has become a major goal for countries to ensure development. It has been observed that poor households have been facing various problems due to a lack of basic needs. The international labor organization developed the basic needs approach in the 1970s. The concept ‘subsistence’ received considerable attention throughout the basic needs approach (Streeten et al., 1984). In addition to the minimum requirements for human physical survival, the basic needs approach included essential services provided by and for the community as a whole including The provision of education, health care, safe drinking water, sanitation, public transport, and cultural facilities (Hoque et al., 2018; Streeten et al., 1984).

The monetary and basic needs approaches received widespread criticism due to several weaknesses. Both approaches fail to address the social norms that may create barriers to the full

participation of people in society. So a new approach was needed to fill this gap, for poverty alleviation and attaining development.

The Social Exclusion Approach

Social exclusion is a multidimensional phenomenon and a process where everyone living in society does not get access to the opportunities and services available. This process excludes a particular group of people, usually the poor, prom full participation within society and getting benefits and opportunities that are already available. The Council of the European Union developed the social exclusion approach, defining the term social exclusion as the "process through which individuals or groups are wholly or partially excluded from full participation in the society in which they live" (Deakin et al., 1995).

The social exclusion approach addresses that when a particular group of people is excluded from different types of opportunities and services, the excluded group we'll face different types of problems caused by inequality. It is hard to alleviate poverty without full participation.

The poor, as the social exclusion approach observes, "are Individuals or families whose resources are so small as to exclude them from the minimum acceptable way of life of the member state in which they live" (European Commission, 1981). The social exclusion approach closely connects with Peter Townsend's idea of poverty. Townsend saw poverty as 'relative deprivation', as a particular condition in which the

> Lack of resources can characterize to obtain the type of diet, participate in the activities and have the living conditions and the amenities which are customary, or at least widely encouraged or approved in the society is to which they belong (Townsend, 1979).

In line with this explanation of poverty, with the process of economic growth and development, new obligations and expectations are placed upon individual members so that they can be integrated into the society where they live.

The Capability Approach

In the late 20th century, the development discourse took a new route and focused on the poor's perception of their own poverty, well-being, and the' being and doing' they valued as most important. This trend was greatly hesitated by the capability approach –as coined by Amartya Sen. Capability approach observes poverty and well-being in the context of the abilities of individuals to transform resources into valuable assignments (functioning), like –being nourished, being sheltered, being entertained and their freedom to choose from various functioning combinations (Sen, 1999, 1995). In line with the arguments of Sen, a good number of exertions focused that there are needs to develop a specific list of basic capabilities (Alkire, 2002; Saith 2001; Nussbaum, 2000).

As Nussbaum developed in 2000, the central human capabilities include life, Bodily integrity, health, census, affiliation, emotions, practical reasons, and other species. Sen's capability approach laid the conceptual foundation of the Human Development Report, yearly prepared by the United Nations Development Programme (UNDP). The report usually monitors the progress and development of nations in terms of the human development index (HDI) –a comprehensive measure of three dimensions: life expectancy, educational attainment, and the command over resources that are required for a decent living (UNDP, 2013).

The Biological Approach

Hunger and starvation are clear manifestations of poverty across time and space. Seebohm Rowntree, in his writings in 1901, defined families as experiencing 'primary poverty' if their total income is 'insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency. It is, indeed, important to have a minimum income to maintain families with this option to mount of food required for normal physical functioning.

The biological approach has been severely criticized in later years (Rein and White 1981). There are several witnesses with the biological approach. Firstly, the approach did not address the variations in physical features, climatic conditions, and work habits (Townsend 2014; Rein 1971; Sukhatme 1978). Secondly, there is a significant difference between minimum nutritional and minimum food requirements –the biological approach did not address this issue very clearly. Thirdly, the approach focuses on food items, but the nonfood items did not receive considerable attention.

The Inequality Approach

Is poverty equivalent to inequality? There has been advocacy and effort in viewing poverty as inequality. Miller and Roby conclude:

> Casting the issue of poverty in terms of stratification leads to regarding poverty as an issue of inequality. In this approach, we move away from efforts to measure poverty lines with pseudo- scientific accuracy. Instead, we look at the nature and size of the difference between the bottom 20 or 10 per cent and the rest of the society. Our concern becomes one of narrowing the difference between those at the bottom and the better-off in each stratification dimension (Miller and Roby, 1971).

Poverty is not about an issue of inequality, but they are not unrelated. They have a very close connection; inequality and poverty are very associated with each other. Societies with higher inequality may also help the higher rate of poverty. A redistributional arrangement may solve poverty problems, without expanding the production capabilities of a country. To understand poverty, it is crucial to consider it distinctively. Understanding the distinctive nature of poverty permits us to "treat it as a matter of interest and involvement in itself"(Sen, 1982).

Poverty as Relative Deprivation

Poverty has been used as relative deprivation, and it received notable attention with the publication of this idea by Peter Townsend. Indeed, poverty as relative deprivation has been successfully used in the analysis of poverty (Sen 1982; Ruchiman 1966, Townsend 1971). Poor

people are deprived people in each society, and such a description is not surprising. But the deprivation, in its relative sense, is not so ordinary in nature.

There are clear distinctions between deprivation and relative deprivation. In the discussion of relative deprivation in society, Peter Townsend mentioned the concept of *feeling* deprivation and the *conditions* of deprivation. Relative deprivation can be used objectively to mention the situation where people possess less of their desired positions –in terms of favorable employment, income, or superior status or power than others (Townsend, 2014). The *conditions* of deprivation are not fully separable from the *feeling* of deprivation. The material objects cannot be evaluated without reference to how people evaluate them, and the feeling cannot be explained explicitly as it is deeply rooted and implicit in nature (Townsend, 2014; Sen, 1982).

Townsend also mentioned a 'reference groups' for the sake of comparison –based on how the 'relative' concept works. To understand this concept, we need to understand the groups with which the people in question are comparing themselves and feeling deprived. The sense of deprivation is obviously related to his or her expectations and awareness of opportunities and his sense of fairness and who should enjoy them (Sen, 1982).

The relative deprivation of property indicates the lack of resources required to sustain available food, activities, lifestyle, and other assets that a household is accustomed to or in this society where people belong (Townsend, 1979). The measurement of relative deprivation of poverty permits us to make an objective comparison between the condition a group is experiencing compared to the other groups also residing in the same society, but are not facing a similar situation.

Livelihood and Livelihood Failure

Although the term livelihood has been originated in economics, the idea can be found in the earlier mono-disciplinary discussions proposed by economic thinkers where they engage

themselves in discussions of macro-level economic and political relations of capitalism in the post-colonial regions (Scoones, 2009; Hoque et al., 2018) A major shift in development approaches has been experienced in the 1980s and 1990s, and the most remarkable shift was – from a long run focus on economic growth to overall human well-being and sustainable development. This shift in plan sis the discussion of livelihood issues (Solesbury, 2003; De Haan and Zoomers, 2005).

Another discussion appeared in the Brundtland Commission report (Brundtland, 1987), and later in the earlier publication of the Human Development Report (UNDP, 1990). The latter publication was influenced by the insights of Sen where development was observed as the expansion of human capabilities (Sen, 1983, 1985). The livelihood concept came to the central focus with the publication of 'sustainable rural livelihoods' by Chambers and Conway (Chambers and Conway, 1992), which provides a clear definition of livelihood, which was used recurrently in the later years.

Livelihood and Poverty Connections

There exists a strong connection between poverty conditions and livelihoods taken by different occupational groups in different socioeconomic and political contexts (Martin and Lorenzen 2016; Cramb et al., 2004; Gautam and Andersen, 2016). A study (Smith et al., 2001) was conducted in two different districts in rural Uganda. It was observed that the 'very poor' people who lack the necessary means required to engage any type of economic activity other than engagement as day laborers or beggars were unable to diversify their livelihoods. In contrast, the people with much wealth were engaged in one or more than one income-generating activities connected to agriculture. The people with 'poor' or 'average' income earning categories are usually engaged in a variety of activities such as small-scale services, fish trading, production and

selling of livestock, and working as day laborers in the farms to supplement their subsistence crop production (Hoque et al., 2018).

Another study (Reardon et al., 1992) in Burkina Faso found that the people with a greater amount of livestock holdings have greater opportunities for diversification. The greater stock of animals allows them to get better loan opportunities for further investment and greater profits. The greater profits permit them to invest in various off-farm enterprises to maximize their profits further. However, the poorer households are engaged in subsistence farming, working as laborers, and similar kinds of lower-paid activities. The lack of capital and access to resources do not permit further diversification. The study concluded that the cash in hand plays a central role and permits people to further diversification of their livelihoods and income intensification. Household poverty does not let people go forward for further diversification, forcing the household to engage in stagnant poverty.

Food Availability Decline and Famine

The food availability approach (FAD) goes beyond the classic Malthusian explanation of the inevitable consequences of population growth and food shortage. As the FAD approach explains, famine can occur as a direct consequence of food availability decline. When food is unavailable, people cannot feed themselves, which causes starvation and starvation-related deaths. This conventional approach, which dominated the famine and development discussions for a longer time.

In Malthusian discussion, famine was considered a strong positive check, which will occur naturally, as the unavoidable consequences of exponential population growth and slower food production. With this positive check, Malthus continued, nature will balance the amount of population with the level of food supply available.

The population grows geometrically –as Malthus discussed – whereas food production and supply grow arithmetically, which will result in a gap between population growth and food supply. The gap will continue increasing with time. Disasters and famine might occur, according to the Malthusian notion, when population growth exceeds the availability of food or the existing rate capacity of the land to produce food to feed the growing rate of population. If people do not take preventive checks in advance, as Malthus argued, the inevitable strong positive check will be the ultimate consequence –including widespread disease, war, pestilence, and famine.

The influence of the FAD approach was even evident in 1994 famine discussions. The FAD approach has been influencing famine discussions until the 1990s, although the empirical evidence is that most famines do not support the food shortage as the main reason for famine.

As mentioned earlier, the FAD approach cannot explain most of the famines in history because the unavailability of food is not the reality for most of the famines. The empirical evidence does not support the FAD approach anyway. Food shortages have caused some famines in history, but there are many reasons behind that shortage -and most of those reasons are anthropogenic, not natural.

The FAD approach has many limitations, which make the approach in a weaker position. The problem of food availability he's just one facet of the entire problem. Most of cases, food unavailability is not natural; many factors work together and make food unavailable to most of the population –the FAD approach fails to address those factors in the famine discussion.

The Entitlement Approach and Famine

The FAD approach was challenged by The entitlement approach, developed by Amartya Sen, which tells that famines occur not due to the unavailability of food but rather caused by the failure of entitlements. With strong empirical evidence from the Great Bengal famine, famine in the Sahel region, and famine in Ethiopia, Sen powerfully theorizes that famines are the

consequences of entitlement failure and deprivation (Sen, 1982). Sen argues that there are other factors beyond the decline of food availability. The inability or the lack of opportunity of the agricultural laborers to exchange their primary entitlement (labor) is the base of their hey exposure to hunger and famine.

When the poor people do not have the opportunity to exchange their entitlements (e.g., selling physical labor to purchase food items for the family members), or exchange other items (small land, livestock-like family assets, and items that are available to the poor), they are left no choice other than staying hungry. If they receive no outside support, the family starts suffering from hunger and malnutrition. Drawing empirical examples from the Great Bengal famine, Ethiopian famines, and the famine in the Sahel region, the entitlement approach shows that millions of people died not due to lack of food availability, but those famines deaths were the result of the failure of the entitlement of the poor.

An individual's possessions (in the form of land, labor, and capital) comprise his endowments. Those endowments are used for the productive purpose of enhancing his entitlements. When an endowment decreases anyway, it also leads to the reduction of entitlements at the same time. The decline of entitlements affects the commodity bundle (including food and alternative commodities), forcing people to starve (Drèze and Sen, 1990). A decline in food availability may affect individuals' entitlements by increasing food prices that may go beyond individual purchasing powers. Still, it is just one possible reason for the idea of entitlement failure (Drèze and Sen, 1990).

Sen continued arguing the famine crisis was a deeply connected issue with governance. Sen argues that there is no country in the world where famine occurred under democratic governance. What Sen wanted to argue is that democracy itself is capable of refuting the possibility of famine in advance. Democratic governments can work proactively, as the

government elects them -they are responsible for the peoples' plight too, to stop famine events and symptoms long before it actually occurs.

The entitlement approach is not beyond weakness. However, there is still no such strong empirical evidence that might refute the arguments for the entitlement approach. The entitlement approach so powerfully argues the famine problems from its deeper roots.

Famine and Intergenerational Mobility

Famine may create long-term influence on creating intergenerational mobility. The intergenerational social mobility indicates the relationship between the socioeconomic status attained by the parents and the socioeconomic status their children might achieve in adulthood. Social mobility clearly reflects the extent that the adult individuals clearly move up (upward mobility) or move down (downward mobility) throughout the social ladder compared to their parents.

It is synonymous with upward mobility when individuals achieve better socioeconomic status and lift out of poverty. When the existing socioeconomic status of the individuals declines, compared to their parents, it is referred to as downward social mobility. On the contrary, when individuals fail to achieve better socioeconomic status and stay nearly similar socioeconomic status to their parents indicates the individuals living in poverty over generations –which is also referred to as the 'vicious cycle' of poverty.

This study focuses on mobility in terms of education. Education creates possibilities that help individuals improve their socioeconomic conditions and ultimately help them lift out of poverty. Children becoming more educated, compared to their parents, create more possibilities and enhance their socioeconomic status, thus lifting them out of poverty. This study considers 'educational mobility' when individuals achieve better educational attainments than their parents. This is also referred to as upward educational mobility. Downward educational mobility occurs

when individuals are less educated than their parents. This study uses the World Bank Global Database on Intergenerational Mobility (GDIM). The GDIM estimates inter-generational mobility that covers 153 countries, which covers nearly 97% of the population (World Bank, 2018).

The explanations of famine, are the causes of famine is discussed so far. The following sections review the consequences of famine in countries that experienced famine.

Food Insecurity and Hunger

The most pressing challenge is famine, widespread food shortages, and unusually life-threatening hunger. A geographic area experiences famine when unusually extensively high mortality risk is associated with a severe threat to food consumption for the majority of an area. Such severe food insecurity does not always mean that there is a severe shortage of food availability for which the famine is to occur. Still, life-threatening starvation is in the form of mass starvation (Ravallion, 1997). Famine raises questions about the performance of political and economic institutions and whether those institutions help protect people from mass starvation and deaths.

Famine and Its Health Impacts

One of the major challenges and concerns in the post-famine period is famine's adverse health impacts, which have long-lasting implications. The health effects severely affect individual performances and livelihoods, and the impact on individuals' livelihoods may continue over generations (Taye et al., 2010). The interpretation of such a long-lasting health impact is almost impossible because there are very few baseline data to compare. Only long-term surveillance systems over generations about the impact of climate change-induced famines on health and livelihood -for example, can record the health impacts in the long run. The impact of climate-induced droughts and famines created long-term health complications which undermines their livelihood performances and survival capacities in the long run (Taye et al., 2010). The evidence

from oral stories and written records also indicates the severe public health impacts oh famine in the Horn of Africa. For example, the largest group of poor people in Ethiopia is small-scale farmers. Studies show that his public health impacts are manifold -Including infectious and chronic diseases, nutritional deficiency disorders, instability, environmental degradation, and poverty. All these complexities have short-term and long-term manifestations throughout the first, second, and third generations (Dugassa, 2019).

Famine and Its Demographic Impacts

The demographic impacts of famine are another widely discussed area. Most of the authoritative definitions of famine contain explicit references to the demographic effects of famine. The demographic effects include mortality, fertility, and population movement, which are widely affected by famine events. These impacts are both immediate and long-term, although understanding the relationships between the democratic process and famine is extremely limited (Hugo, 1984).

Famine and Marital Fertility Decline

Studies also explored the impact of famine on marital fertility. The retrospective data on children born from 1990 to estimate trends in annual marital conception probabilities, shows evidence of significant short-term declines in conception probabilities during the years of famine and major political and economic upheaval. The study found that in the longer term, marital fertility in rural and urban areas declined in the 1980s after increasing moderately in the 1970s (Lindstrom & Berhanu, 1999).

Famine Survivors and Physical Growth in Adulthood

The impact of early life famine exposure demonstrated a significant effect on adulthood among the survivors of the 1983-1985 Ethiopian great famine. The nutritional short is in early life brings adaptive changes in body structure and functioning that can remain throughout the

individual's entire life course experienced famine in their early life. The study exposed that the famine created specific impacts, including lowering heights, prenatal and post-natal complications, and body mass index, with a higher risk of being overweight, general obesity, and abdominal obesity in adults (Arage et al., 2021).

Famine and its effects on the cognitive and behavioral development of children

Famine and nutritional deficits also have a long-term impact on children's cognitive and behavioral development directly or indirectly experienced famine. Studies explored that the effects include the adverse impact on brain development from the second trimester of pregnancy until two years of age. The famine-induced malnutrition had a negative impact on cognitive and behavioral functioning throughout childhood and adolescence; following infantile malnutrition, severe attention deficit disorder was observed, which was closely associated with poor performance on the high school level examination.

Research Gap

Much has been done on the study of famine over the tickets and centuries, particularly its impact on long-term health and nutritional deficits, diseases, physical capacity, child nutritional and cognitive development, Complications in adulthood, physical growth, fertility decline, and various prenatal and post-natal complexities. But little has been done on its impact on fueling poverty and adverse impact on intergenerational mobility. This research closes the gap in both areas and bridges the famine manifestations with a long-term depth of poverty and intergenerational mobility. It focuses on the long-term impact of famines on the depth of poverty today, and on intergenerational mobility in countries that experienced famine in the past.

Conclusion

The traditional one-dimensional of poverty, which often indicates income as a base, fails to explore the concept's depth. Poverty is not just having insufficient money or just the lack of

resources required to ensure a decent life. It is more than having money and resources. A range of other factors combinedly influences the full participation of an individual or a household. It also includes the lack of access to education, health care, nutritious food, safe drinking water, and sanitation facilities. Household income or assets cannot ensure all these things for a family for a longer time.

Poverty is a particular situation when a household lacks basic needs and faces substantial deprivation. The journey from absolute to relative poverty mark greater improvements in poverty and famine discussion. In this same way, moving from a unidimensional analysis of poverty to a multidimensional focus portrays substantial progress in understanding poverty that may help protect the livelihoods of the poor.

The poverty discussion literature visited a long route. The theoretical approaches were developed over time. The 'primary poverty' based on nutritional deficit move to absolute and relative one in later years. Persisting inequality creates greater problems for the poor, especially during famine. The concept of poverty and inequality are not similar, but they are very interrelated. Poverty should be treated distinctively to understand it clearly. Poverty as relative deprivation discusses how a particular group of society is being deprived of different opportunities that are available in society, and the main reason is the poverty of that group.

The connection between livelihood and poverty concentrates on essential aspects of poverty where livelihood failure makes a household vulnerable to starvation and even famine. The sudden failure of livelihood may cause great suffering for livelihoods who lack substantial support –like savings or assets –immediately or in the long run. The livelihood failure can be manageable if alternative jobs are available within our nearby areas. Both the FAD and entitlement failure expose the true nature of people's vulnerability during famine-like emergencies, and how people suffer most through starvation and death.

Chapter 3: Research Methods and Data

This chapter concentrates on the overall aims and approaches, the type of design this research is following, the sources of data collection, the data collection method, the type of procedure this resource is following, and the data analysis strategies.

Research Design

Research projects are designed in a particular way to enhance the chances of collecting the right information required to answer specific research questions. Research design provides the glue that holds the research project together (Trochim, et al., 2006). If a research design is sound and clear and follows proper protocol, the accumulated information ends up with fruitful results. Research design indicates the overall strategies applied to carry out research. Research design is a plan that indicates the underlying structure to integrate all the elements of quantitative research to produce authentic results, which would be free from bias and ensure maximum generalization (Dannels, 2018).

A research design decides several things: what variables will be prioritized, the type of data to be collected, how the data will be collected, how they will be manipulated, how the data will be analyzed, the way the extraneous variables be controlled to address the research problem clearly and to produce authentic and reliable results. The evaluation of research loses its value if the research design is unclear and appropriate. In this way, the design decisions both constrain and support the ultimate conclusions (Dannels, 2018; Miles & Huberman, 1994).

This research is designed based on a quantitative approach to demonstrate whether the past day's famines impact the depth of poverty and intergenerational mobility today. Based on the

quantitative dataset, this research demonstrates the statistical connections among variables with a variety of statistical significance levels and techniques.

This research aims to explore the effects of famine on the present-day depth of poverty and intergenerational mobility. In searching for the effect, the past-day famine data and the present-day poverty data will be statistically tested to determine whether any statistically significant cause-and-effect relationship exists.

Sources of Data

In line with the objectives, this study relies on open-source datasets of several sources, including WFP, Oxford University, World Bank, and Asian Development Bank, to explore the impact of famine on present-day poverty and development. The datasets will be analyzed to get specific findings in line with the study objectives. To examine the impact of famine on the mobility of people in searching the intergenerational poverty, this study focuses on the intergenerational mobility data of the world bank. Primarily, this study focuses on the mobility data of the World Economic Forum, but the data explored only a limited number of countries, most of which are developed countries.

The dataset has been prepared using a variety of sources. For the initial phase, the data set was designed based on the world data of the University of Oxford and the famine dataset of Tufts University. Both datasets focus on the major famines in different countries, death statistics, the causes, or the major triggering factors. Those two datasets focus on famine statistics from the 19th century to the present. These two datasets why are considered the base for famine analysis. Based on those datasets, a new dataset has been built and updated with information on ongoing famines. The statistical analysis of this study focuses on famines that occurred after the 19th century. Depending on the availability of reliable data, some statistical figures explore the famine data after the 1860s.

Variables and Data Analysis

Additional Variables

In addition to the variables listed in the Oxford Our World in Data and the famine data of Tufts University, some other variables are added from various sources. Other variables sources include the World Bank -for global mobility data, Transparency International -for corruption index data, Freedom House for democracy score and index data, UNDP -for human development index data, and the poverty ratio data. Additional variables include the poverty gap ratio, poverty line, gross national income (GNI), the present-day economic status, the specific economic groups for a particular country, poverty headcount ratio, social mobility index, population growth rate, economic freedom for a particular country, political rights and civil liberties, etc.

Independent Variables

For the sake of statistical comparison, a few variables were considered independent variables. The independent variables include the severity of famine in terms of the highest death toll, the mortality, the duration, and the number of famines that occurred during the study period. The death statistics significantly varied across different publications. To avoid any exaggeration, this study tried to minimize the extremes and used the midpoints of the death toll that are reported differently in various publications and reports.

Table 3.1 Independent and Dependent Variables

Independent Variable	**Dependent Variable (poverty)**	**Control Variable**	**Dependent Variable (mobility)**
Famine mortality Number of famine Famine duration in months	Poverty gap ratio Poverty HCR Poverty gap index Poverty line	GDP GNI per capita Human Development Index Literacy rate Population growth	Child upward educational mobility (MU050) Child downward educational mobility to Q1 Child upward educational mobility to Q4 Child upward educational mobility to Q3

Dependent Variables

To examine whether there is any impact of the past famine on the present poverty and intergenerational mobility, a good number of variables were treated as dependent variables. The dependent variable includes the excess mortality, present-day human development index, gross national income in most recent years, present-day economic status, the economic group that a country is associated in line with its economic strength, poverty line, poverty headcount ratio, poverty gap index, economic freedom the country is experiencing currently, 18 variables that explored the mobility population, democratic score, the scores of political rights and civil liberty, and a range of mobility variables to determine the present-day intergenerational mobility in the countries that experienced famine in their past.

Analysis of Methods

A full-fledged dataset has been developed to explore the connection between famine and present-day poverty and development. After plotting all the variables required for exploring the relationships between the mentioned variables, is series of correlation tests are conducted. The correlation analysis explores whether the independent and dependent variables have a positive or negative correlation and how strong those correlations are. If there are stronger correlations between the variables, a further regression analysis was conducted to explore the causal connections.

This study uses correlation and multiple regression analysis. First, to find the relationship between variables, pairwise correlation was used. Later the regression analysis was conducted. This research uses the following regression model:

$Y = \alpha + \beta$ Number of famine $+ \beta$ Famine duration $+ \beta$ Mortality $+ \beta$ Literacy rate $+ \beta$ GDP growth rate $+ \beta$ Population growth $+ \varepsilon$

Here, y = Poverty gap
α = Alpha

ε = Error term

Three models have been used in regression analysis.

Additional Calculations and Robustness Test

In terms of the effects of famine on intergenerational mobility, there might be some different theoretical stands. First, does famine affect only the generation[1] that it impacted? Or does famine affect the existing generation and the children born from that generation? In the latter case, the famine impacts only two generations. Or it also impacted the third generation? About 90 years later, can we still say that famine is impacting the third generation like the Great Bengal famine is impacting generations today? So, it is crucial to ask how much time the famine has an impact on the depth of poverty and intergenerational mobility.

In explaining the variable famine, this research has included all the famines from 1801 till today. In the dataset, a total of 57 famines occurred from 1801 to 1950, and 26 famines occurred from 1951 till today. Conceptually, it is a major question that we can say is still affecting intergenerational mobility today. Because we are discussing the impacts six generations later. Can we say that it is impacting intergenerational mobility today? So it is crucial to ask, how many years has the famine impacted intergenerational mobility? If we say, it affects only two generations -the generation that experienced it and the generation that it follows. That means we must limit the famines that took place 60 years ago (or roughly 50 to 60 years ago).

Considering this effect issue, this research conducts a robustness test (presented in Appendix B) where all the famines that occurred after the 1950s will be taken into consideration, and the same statistical calculations will be done to observe how much famine affects the immediate generation and the generation next to them.

[1] For clarity, a generation roughly indicates a 30 year time period.

Chapter 4: Poverty, Hunger, and Famines: Major Connections

Introduction

Poverty is a many-headed evil, and it demonstrates itself through various manifestations. The members of poverty-prone families suffer from hunger and malnutrition throughout the year. It makes them ill health and vulnerable to many diseases that healthy bodies can easily prevent. They suffer from the lack of nutritious food and clean water and experience various waterborne diseases. Poor also lack or have limited access to education, health care services, and other essential services. They experience increased morbidity and mortality within a shorter period (shorter life expectancy compared to people in developed countries). They are less connected and lack access and control over resources, including educational benefits, knowledge, sill, capital, and extended social networks that strengthen them. They experience deterred or lack of participation in the decision-making process in the political and socio-cultural sphere within which they exist.

Without these networks and access to the resources, they remain weaker and experience limited access to institutional benefits, market opportunities, employment opportunities, and the welfare of public services. When children of low-income families go through these situations, they become accustomed to it without getting the benefits of education. Thus, intergenerational poverty is transmitted from one generation to the next. Once poverty becomes intergenerational, there remains less chance for the community people and their generations to lift out of the vicious cycle of poverty.

Over one billion people live in poverty in the rural areas and poor urban settlements of Asia and the Pacific, Latin America and the Caribbean, Africa, and the Least Developing Countries. Many live in abject poverty, unhealthy environment, and unacceptable conditions.

They lack basic needs and do not have opportunities to help their children to get a better education. Hunger, malnutrition, and associated diseases are the everyday realities for those families –which compel the children to drop out of schooling and focus on income-generating activities to help families with some income.

Hunger is one of the most intractable problems that can be understood if related problems or diseases happen. Otherwise, we cannot trace its existence with an open eye. Children who have experienced it for longer face different types of problems throughout their lives. It hinders people and children from taking full participation in their lives.

Hunger is the consequence of many factors. Those include poverty, little or no access to major food items, unsustainable and unskilled way of exploiting natural resources, inefficient food production –like using rudimentary tools and technics in agriculture with the hope of producing more to feed the growing populations, inefficient food distribution systems, and environmental pollution. Pollution plays a role in producing less food, unsustainable patterns of consumption, natural and anthropogenic disasters that damage crops and livelihoods of people associated with farming, unplanned population growth without plans to turn them into an asset, armed conflicts in different parts which hiders production and distribution networks.

Famine is a situation when acute hunger turns into mass starvation, and people start dying due to lack of food and starvation, and malnutrition-associated diseases are widespread due to inaccessibility to adequate and nutritious food. Famine death starts when local capacity fails and outside efforts are insufficient to stop mass death. Famine death does not mean the incapacity of the local authorities, there are many famine events in history where authorities did not care about famine death, even ignored the existence of famine at all, still when the acute starvation and death

toll is high. There are also times, famine events in history when outside support, in the form of aid, food allotment, and other support from many foreign friends are ignored and restricted and did not let reach the affected people.

Poverty, Hunger, and Famine: Connections

What causes hunger? There are four major reasons behind the hunger problem around the world. There is debate about managing global poverty, where developed nations can play an effective role. It is often argued that the United States alone can tackle global poverty by expending $30 billion annually–only a small share of the $530 billion the U.S. spends on its military. But it is certainly true that developing countries should try their best to solve their own problems. Strategic and methodological help can help them to empower in the long-run stability, rather than taking food and financial aid each year –which increases dependency and debt.

First, hunger causes due to poverty. Nearly a billion population on the earth live below the poverty line. As poverty rose, the hunger problem also rose to keep pace with the poverty rate. The developing country's poverty rate is higher, and their hunger problems are also more extensive. People who experience poverty suffer from different types of issues. They suffer from livelihood failure, the lack of income does not let them work on their family investment, and they cannot let their children go to schools properly to change their economic status and be lifted out of poverty. The family does not have money to invest in education like game changer opportunities, therefore, the children became dropouts from school sooner and lose the chance to change their families and help them to change their economic vulnerability.

Another major reason is natural disasters. This is true for both developed and developing countries, but developed countries usually manage this problem with efficient policies and programs. As they have sufficient strength to handle this problem and have the strength to manage the losses, they can handle this problem more efficiently than others. But natural disaster

problem creates huge issues for people in developing countries. When such events happen in developing countries, --the agriculture fields are submerged under water, crops are damaged, farmers cannot be benefited from their labor, and they lose everything in terms of their investment and savings for the following year. This creates a hunger for the families directly associated with farming activities, as they usually possess very little or no savings. They are the most victims of natural disasters.

The government of those countries is not financially stable enough to handle such disaster issues. The LDC governments lack sufficient resources to support the farmers and small investors who lost almost everything after the disasters. Keeping the frequent disaster events in the center, the insurance companies dos not work in those areas because such investments seem not profitable for them as frequent disasters are the reality. Crop insurance is largely absent in developing countries (or the price is so high that the farmers cannot think of affording that insurance).

The third reason is the investment in agriculture. If the investment is higher and more efficient, it can produce many benefits. Most of the developing country farms are largely dependent on traditional production tools. In most cases, the producers cannot invest more money to get a better return. Another reason is directly associated with which it influences the investment decision. That is the production techniques and efficiency. If the farming sector uses efficient tools and modern technology –which is the direct output of modern agriculture research and scientific invention –the production could be better. The lack of scientific knowledge and advanced production tools and techniques does not let them confident to invest in agriculture or farming sectors.

The fourth reason is conflict and unstable governance. In many parts of the world, governments are busy solving conflict problems, which keeps them busy for the majority of the time. When these problems are widespread, and the government is engaged with them, they

cannot focus more on the production sector, like growth issues –which might help the country have a stronger economy. Therefore, they cannot invest more in scientific investments and the benefits of scientific research and innovations. The parts of Africa and Sub-Saharan Africa are busy all year dealing with conflicts and wars. Such a situation does not let the people focus more on the agriculture sector. Often, such war and conflict directly affect agriculture and damage crops and crop storage outputs. Such tensions and damages ultimately fuel immediate hunger and poverty situation.

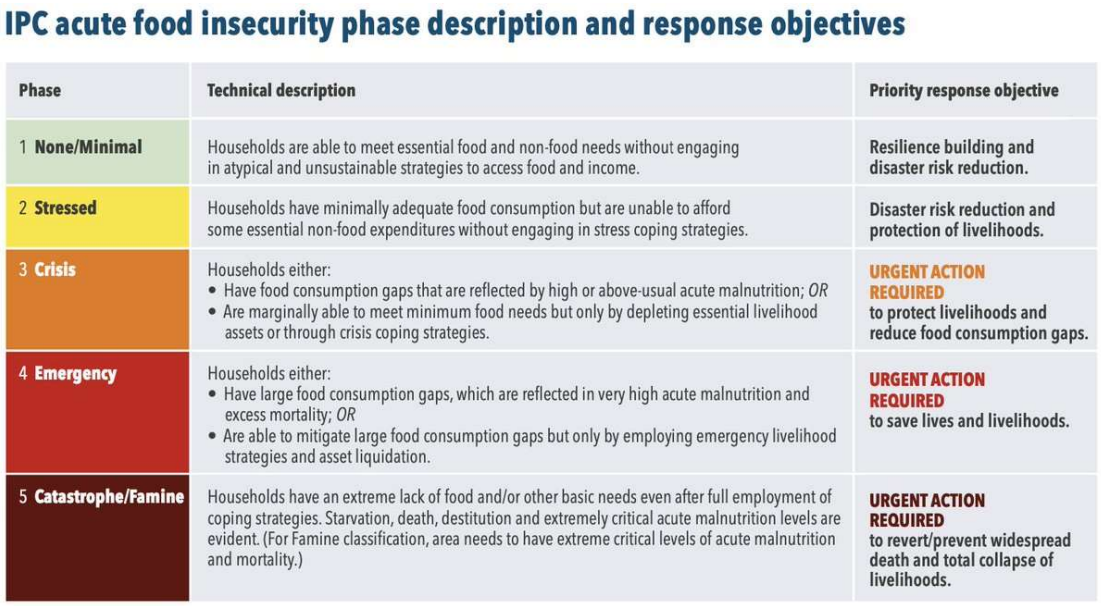
Conflict and war are also associated with civil issues –particularly those not directly associated with war. Their storehouses are looted, agricultural fields are burned during harvesting season, the markets cannot function well because the shops and storehouses are looted, farms and livestock are ravaged, and mismanagements are evident in the food chain and supply management. The business networks cannot work correctly, the extortion, strikes and, road blocking, price hike does not let producers get just price, and the customers do not purchase products from markets. Both availability and access become vast problems during conflict and tensions. In war-torn countries in Africa, the majority of the population is facing acute hunger. While peaceful African countries, in comparison, like Ghana and Rwanda, have successfully managed this problem, and hunger is in decline there.

Most war-torn countries of the world are hungriest than any other countries. The countries that have experienced famine in the past, facing war and conflict situations today, are the biggest sufferers in terms of poverty, hunger, and malnutrition-like pressing problems. The countries like Somalia and the Democratic Republic of Congo are two such countries that have experienced deadly famine in the past and now facing lethal conflicts and war. The possibility of achieving peaceful states and a modern democratic country free from hunger, poverty, and malnutrition is beyond their dream.

Major Contributing Factors of Poverty and Famine

Famine is a specific condition when the people of a region or country face acute inaccessibility to adequate amounts of food due to unavailability of food and or high prices which is beyond the capacity of the people. These result in acute malnutrition and hunger, mass starvation, and massive deaths. Many causes and factors play a crucial role in creating starvation and famine. In most cases, famine does not occur for a single factor, instead, multiple factors work together behind each famine.

A situation is declared famine if the crisis reaches its peak and mass starvation starts causing deaths. A country's situation is declared famine when it meets certain conditions. The United Nations has set a phases scale –the Integrated Food Security Phase Classification (IPC)– which indicates the requirements of food security and whether it is turning into famine.



IPC acute food insecurity phase description and response objectives

Phase	Technical description	Priority response objective
1 **None/Minimal**	Households are able to meet essential food and non-food needs without engaging in atypical and unsustainable strategies to access food and income.	**Resilience building and disaster risk reduction.**
2 **Stressed**	Households have minimally adequate food consumption but are unable to afford some essential non-food expenditures without engaging in stress coping strategies.	**Disaster risk reduction and protection of livelihoods.**
3 **Crisis**	Households either: • Have food consumption gaps that are reflected by high or above-usual acute malnutrition; *OR* • Are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis coping strategies.	**URGENT ACTION REQUIRED** to protect livelihoods and reduce food consumption gaps.
4 **Emergency**	Households either: • Have large food consumption gaps, which are reflected in very high acute malnutrition and excess mortality; *OR* • Are able to mitigate large food consumption gaps but only by employing emergency livelihood strategies and asset liquidation.	**URGENT ACTION REQUIRED** to save lives and livelihoods.
5 **Catastrophe/Famine**	Households have an extreme lack of food and/or other basic needs even after full employment of coping strategies. Starvation, death, destitution and extremely critical acute malnutrition levels are evident. (For Famine classification, area needs to have extreme critical levels of acute malnutrition and mortality.)	**URGENT ACTION REQUIRED** to revert/prevent widespread death and total collapse of livelihoods.

Figure 4.1 Integrated Food Security Phase Classification (IPC) by The United Nations
Source: IPC Famine Factsheet, 2020 (UN-OCHA, 2020).

Livelihood Failure and Job Opportunities

Poverty, as elaborated in chapter 4, is a lack of basic needs. It is a many-headed evil. It can turn into long-term hunger and famine if there is no way to support and feed their families for an extended period. Poverty may become a famine if there is no external support to stop short-run or longer-term starvation or hunger. Such effort might include relief provisions, especially for families whose internal support system has been broken down (the families don't have any support, or no savings to avoid starvation). The long-term support includes the creation of jobs so that the families get some opportunities to earn and feed their families.

The livelihood opportunities are vital to avoiding hunger situation. It is essential to ask whether poverty is caused by livelihood failure. Usually, poverty occurs when people have no jobs or employment. When there is no such working opportunity, then the people are left no option to earn and no choices other than starving. Such a situation might be created in case of key livelihood failures due to disasters or any reason. The sudden drought may create such a situation. Such a situation may occur if there is no water, or may be caused by long-term waterlogging. Crop failure for agricultural societies or where the main livelihood of the people is agriculture, crop failure may cause severe hunger and malnutrition problem.

The presence of alternative jobs may solve the hunger problem. The alternative jobs create opportunities for poor people to make a living or manage some income for their families - through which families can buy food from the market and maintain their food demands. For agricultural jobs, families might choose a fishing or other non-farm activities in nearby areas to earn and feed their families.

People may choose seasonal outmigration considering the key livelihood failure in their areas. Families may migrate to other regions permanently or seasonally -depending on the availability of work in their own or nearby areas. Seasonal outmigration is a widespread practice

in some disaster-affected communities in southwestern Bangladesh. Traditionally those families were dependent on agricultural practices. Frequent coastal disasters –including riverbank erosion and tidal surge- grabbed agricultural lands and homesteads. But working opportunities are available in nearby villages during the rainy and harvesting seasons. So, those families live on partially eroded embankments, or on the homesteads of others, and work in other agricultural fields. They seasonally migrate to nearby city areas in search of income and mostly engage in non-farm activities.

If there are no such alternative opportunities available within or nearby areas, and if there is no such alternative opportunity, people have no choice but to work and earn with which they can feed their families. If such a situation stays for longer, people face severe malnutrition problems, and people may face deeper problems, which may turn into famine. People are to starve for longer, and when poverty reaches its ultimate state, it turns into hunger and famine.

Environmental Factors and Food Insecurity

Throughout the history of the famine, natural disasters have been closely associated with the creation of the famine situation. Though disasters do not create famine single-handedly most of the time, but they play pivotal roles. Natural disasters –like widespread drought, flood, cyclones, coastal surges, and riverbank erosion– undermine agricultural production and create regional food insecurity. Usually, the poor live in vulnerable zones –like low-lying coastal areas and vulnerable poor settlements in urban areas– they become affected directly if natural disaster-induced livelihood failure, joblessness, and agricultural production failure.

Inequality

Inequality has many manifestations. It fuels vulnerability to different groups. In terms of power, asset status, and gender, there are differentiations and divisions –where a group enjoys more power and privileged than the other. The privileged groups enjoy benefits in such a way that

others become deprived. The privileged few enjoy the benefit in such a way that it not only deprives others but also creates pain for the rest. Climate change is a manifestation of global inequality, where the rich unsustainably exploit natural resources that produce climate alteration, like pressing global problems. On the other hand, the poor are almost passive players in creating emissions, but they are the most vulnerable active receivers. Thus, global inequality is created by the already privileged people and for their own benefit.

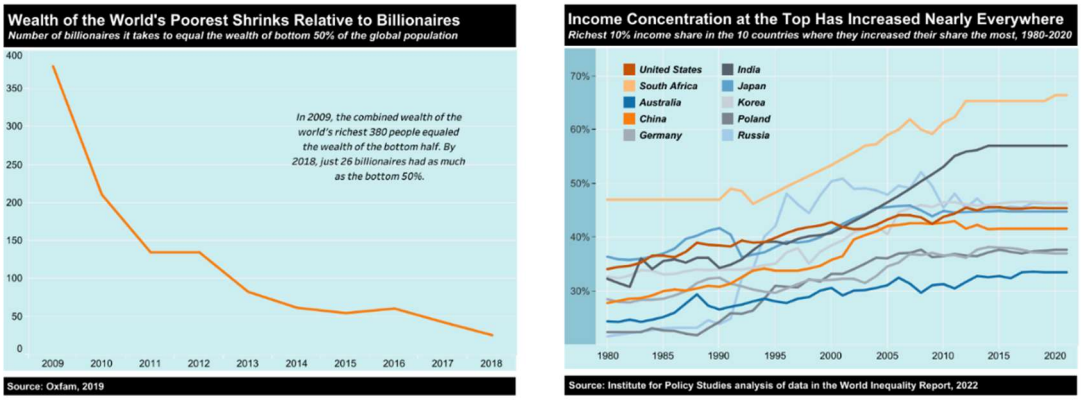


Figure 4.2 Shrinking Global Resources to Richest and Rising Inequalities

Inequality creates hunger, where the privileged group supports themselves with their savings and good storage of foodstuff, and the poorest sections cannot support themselves. Consequently, they starve and die of hunger. Many countries in the world grow more food than they need. If such additional food storage supported and fed the hungry world, there would be less possibility of famine. But this is not happening because of inequality and different issues along with governance.

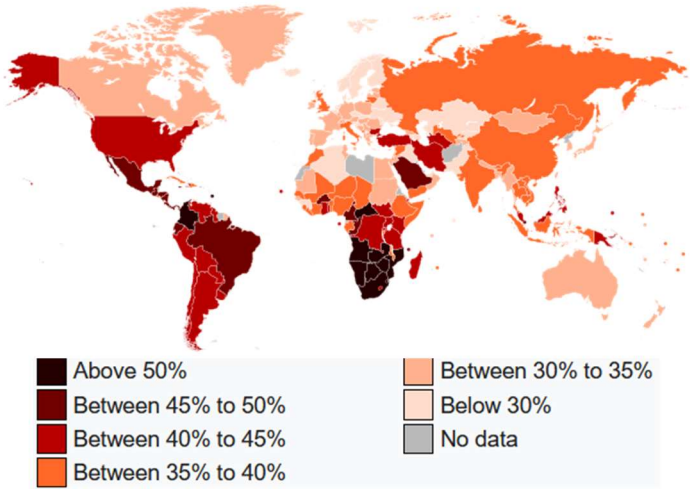


Figure 4.3 World Map of Income Inequality Gini Coefficients by Country. Based on World Bank data Ranging from 1992 to 2020 (World Bank, 2022)

Governance is another problem, which is not often willing to understand the need and plight of the poor. When people had to starve and die, there were many cases where the government was not cordial enough to respond to their humanitarian crisis with care. There is no case or country where the country has stable and effective governance (particularly democracy) and still experiences famine and loss of lives.

This chapter focuses on how poverty, hunger, and famine are interrelated. Poverty and hunger-related problems like malnutrition and malnutrition-related diseases are very interlinked. Where there is poverty, there are hunger and malnutrition-related issues. This is something inevitable. But famine is not. The poverty of a nation, even long-term poverty, does not turn into a famine situation all the time. Though there are obvious connections between poverty and famine, famine is not an inevitable consequence of poverty.

Poverty is a many-headed evil, and so is famine. Famine does not necessarily mean an acute shortage of food; instead, it means the failure of entitlement of the people experiencing such a situation. The poverty extent, time, and space do matter. When poverty is in absolute form and continues over an extended period, that might turn into famine if the scale and volume are large.

If the majority of the population is exposed to absolute poverty over an extended period, that may turn into famine.

Long-term poverty might cause a wider scale of hunger and malnutrition problems for communities. When a community faces such problem, they might face the problem of intergenerational poverty, and poverty with longer-term starvation. Such starvation might turn into famine if there is no such societal support or any kind of support from the government or any outer or international support to stop starvation.

Famine doesn't occur in a day. It takes a longer time to occur, and it signals the government and international communities for an extended period before they occur. If the government and other communities ignore the signals repeatedly, such ignorance to respond to those signals might result in famine. Such a thing happened in the case of the Great Bengal famine. The frequent signals and long-term negligence may lead a community to experience famine.

Another powerful reason is the wrong policy to address famine. Bad policies are dangerous. They might spend resources to stop starvation and famine but in the wrong way. Such policies that are targeted to stop famine but not properly may end without producing fruitful results. British policy failure caused the Great Bengal Famine in 1943-44, though the British colonial government blamed the weather conditions and natural disasters behind the food shortfalls.

Market and Price Hike of Major Food Items

In terms of food security issues, the market has always been important in playing a role either fueling or aggravating hunger issues. The market may play a crucial negative role in creating famine. When the government has little or no control over the market, the market may take the opportunity to set the price and increase it intentionally in its own favor. During the

Great Bengal famine, for example, the price skyrocketed within a shorter period of time, and soon the prices of major food items went far beyond the people's capacity. The hunger started not because the food was unavailable, rather because of inaccessibility due to market monopoly and lack of government control over the market mechanism, illegal hoarding by the stockers, and overpricing.

Government, Democracy, and Policy Failure

In each country's hunger situation, the government has a crucial role in averting any crisis resulting from mass starvation and famine. The government's inability to play a strong role to stop hunger can result in famine. If the government is formed in line with public opinion through a free and fair electoral process, it is responsible for managing any crisis connected to people's plight. But in many famine cases, the government did not play any remarkable role. There are also famine events where the government was not only negligible but also acknowledged the existence of famine. Democratic governments are needed to be accountable and responsible to their people. As Sen discussed, "No famine has ever taken place in the history of the world in a functioning democracy" (Sen, 1999). Government's negligence and wrong policy also caused the Great Bengal famine, which the colonial British Raj blamed the Bengal famine as a result of weather issues. British policy failure caused mass starvation and one of the worst famine in history.

Climate Change

Climate change has been creating additional burdens for developing countries. Climate-induced frequent and severe disasters often devastate the communities' resources, crop fields, and business opportunities, washing away dwellings and agricultural fields in the lowlands and coastal belts. Anthropogenic and climate-induced disasters are evident all over the world. The victims range from the inhabitants of developed to less developed countries, the cities and rural

centers, from rich to poor and landless farmers. Though developing countries have an almost negative role in involving activities responsible for climate change, they are still the most sufferers of the pressing global that this century is experiencing. Climate change is the single most important anthropogenic issue the world deals with today. The rich countries have little to do with this; they are just getting its destructive impacts. They are the passive receivers of the odds of climate change.

Many countries –like Bangladesh –experience coastal disasters almost every year. The countries that share larger coastal parts, like Bangladesh, India, and many African countries, are experiencing climatic events connected to sea-level rises like coastal surges, flooding, riverbank erosion, embankment breaching, cyclonic events, and violent storms frequently. The vulnerable poor communities in many parts of the world choose to live in coastal belts because of low-cost living and fishing-like fragile income and employment opportunities. When coastal disasters hit there, they become paupers in most cases. They lose stored food and livestock and work opportunities for a longer time. They cannot get a loan, because loan providers seek financial assets as a guarantee they do not have. They lack resources and savings to support themselves with their families for the longer term. Developing countries' governments are not financially strong enough to support their poor citizens during the wake of disasters. Climate change and hunger connections will be further elaborated on in the later part of this chapter.

Conflict

Conflict greatly impacts and causes hunger and famine in countries with conflict situations. Conflicts push communities to leave their homes and crop fields and jobs. In such situations, families cannot bring much to feed their members for a longer time. Due to conflict, they cannot stay home and earn money. They cannot work in their agricultural fields, and cannot collect any food from natural sources. They cannot borrow money from their relatives, as the

whole community is facing the same situation. They cannot help each other's financially or with resources. In such situations, families move elsewhere and stay there indefinitely without hoping to manage adequate nutritious food for the family members. Such a situation is currently happening in Darfur, Sudan.

Pandemic, Like the Recent Covid-19

A global pandemic, as with Covid-19, creates sudden vulnerability in many countries. The countries whose economy is not stronger enough is the most sufferer. The developing country and LDC governments do not have the capacity to support the majority of the populations who are poor. Within the first few months, the majority of the developing countries stopped their support of their poor communities due to the financial dearth of the government. In a poor economy, the government cannot support the vulnerable majority for a longer time. Getting no stronger support, the death toll increases when people went outside in search of a living. The death toll in developing and developed countries showed a sharp difference in terms of death statistics after the first few months.

Climate Change, Protracted Crisis, and Ushering Famines

Let us consider a fundamental question about climate change and famine in our contemporary world. Extended literature is still dealing with the skeptical question –does the climate change concept real? Is there any direct impact of so-called climate change on famine today?

First questions first, in answer to the question of whether there is any climate change evidence today or not. We can look at climatic data that is scientific and led by pioneer scientists of the world. The data clearly shows that there are major global temperature changes compared to the last couple of centuries. Those data clearly show that the temperature has been increasing over the centuries, and the rate has been alarmingly high in recent decades. The climatic data

demonstrates that there is a direct connection between increasing temperature and the change in the climate. That results in melting ice caps, sea-level rise, global desertification, deforestation, rainfall variability, increasing devastating drought events, and many other alterations in global temperature.

Due to the unexpected climatic alteration, the inhabitants face challenges as they share the same planet. But this is not true for all regions; rather, there is huge inequality here (as the next page figure portrays). All the continents are not experiencing the consequences of climate change in the same way. Some continents are experiencing devastation higher degree than others. Usually, developing countries, which did less to harm the environment, are the worst victims. The developing countries do not have the capacity to adapt or other things to do what they need to do to get relief from the consequences of climate change.

Climate Change and Hunger

Climate change poses a major threat to the food security of the regions and countries that have been already experiencing food production and hunger-related problems. It is due to the inaccessibility of the food bundle that has been produced and managed by another country. It is, therefore, the food insecurity problem for countries that fail to produce sufficient amounts of food for various reasons. Though global food production has been increasing unprecedently, distributional inequality keeps many parts of the world hungry. Climate variability has been increasing those threats at a remarkable scale. The world will continue producing food, and the rate will be increasing notably in 2050 to feed the projected nine billion people, but –if there no major changes take place –inequality will also rise, climate-induced disaster events will also increase, and the developing world cannot produce much food following their exponential growth of population.

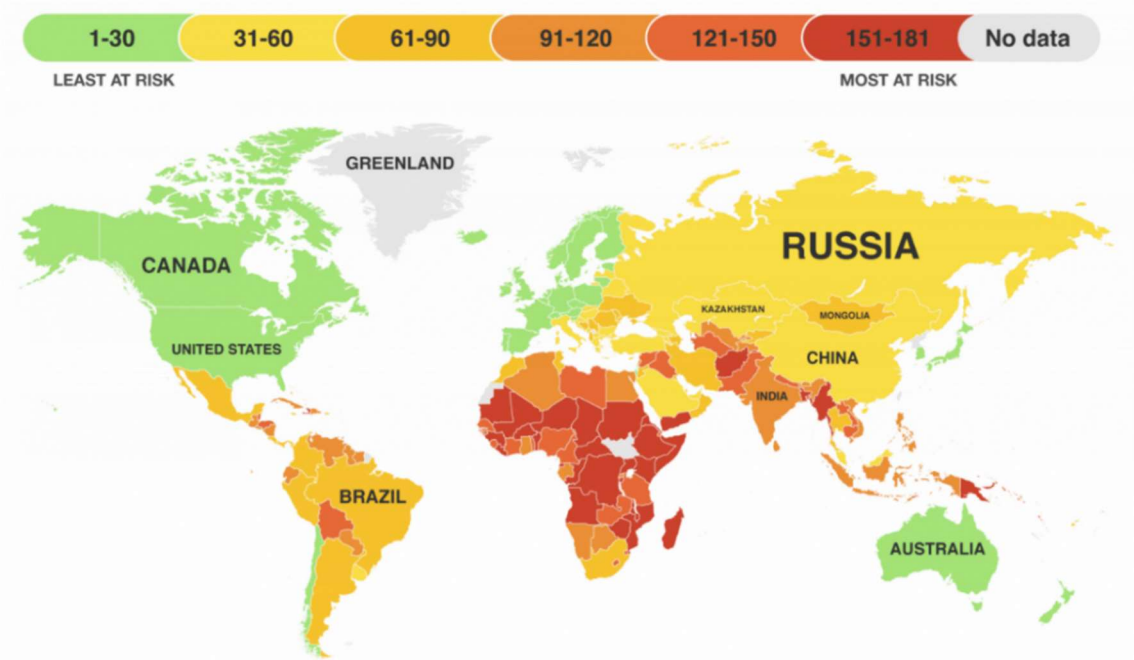


Figure 4.4 Countries at Risk Due to Climate Change-Induced Global Temperature Rising (University of Notre Dame, 2022**)**

Among all seven continents, six continents are being used for human habitation. Among those six continents, three have experienced famine in the past and are experiencing it in the contemporary world. The following section explores/ discusses how some parts of the world, that have experienced many lethal famines in their history are still experiencing hunger issues and are being threatened by further famines in the near future.

Climate Change and Ushering Famines in Africa

Africa as a region is massive –in terms of geographic areas, it is equal to the combination of the United States, China, India, and Australia. The area is enriched with environmental resources, including forests, land, ocean, natural, and mineral resources. At the same time, the continent is at the top regarding the fastest resource depletion. The continent is losing its valuable resources at the fastest rate than any continent or any individual country. If the present rate of resource depletion cannot be reduced or stopped, the continent will continue to be the poorest region in the world. The population rate is also growing, and it will be the home of 2 billion

people by 2050. The poorest people will experience the worst situations globally during that time. Most countries are experiencing and engaged in lethal conflicts, which are also a major concern for the region.

The impact of climate change is evident in African Countries. Violent storms and massive floods are destroying agricultural fields and peoples assets in Western Africa, terrible droughts are intensifying and staying a long time in Eastern Africa, rainforests are decreasing at an alarming rate in equatorial Africa, ocean acidity has also been intensifying alarmingly around the Southern Coast of Africa. Rainfall variability, seasonal variability, and temperature alteration affect agricultural production, which undermines the poor's capacity to maintain their livelihoods. Livelihood insecurity, energy depletion, food insecurity, and the growing vulnerability of people have been diminishing Africa's possibility of reaching its economic growth and development goals. Climate change-induced severe disasters increase force migration, and communities are to struggle for food and water, like basic social needs. The increasing food insecurity, livelihood failure, and diminishing opportunities of the poor force households to face hunger situation in many faces. If such a situation continues, prolonged hunger may turn into mass starvation and famine.

Among the continents discussed, Africa and Asia are in the most vulnerable position. Climate-induced desertification is evident there. Seasonal droughts are affecting the economy and creating famine in Somalia and Sudan. Rainfall variability is affecting agricultural production in many countries in Africa. Rainfall variability is affecting the livelihoods of the traditional pastoralists in Africa. The agricultural output there is also diminishing at a greater scale. If the present trend continues, agricultural production will be severely affected, and the aggravated production could not feed the fastest growth populous countries. Seasonal hunger may turn into mass starvation in many countries in Africa.

Climate change-induced increasing temperature over the last century caused drastic changes in the African ecosystem. It has negatively impacted agricultural production, resulting in decreased agricultural production. Rising temperature is responsible for melting glaciers. Mount Kenya's dying glacier is a greater threat to the entire African territory. The glacier has been reducing since the 1930s and has already shrunk by 90 percent. If the current rate continues, Mount Kenya will lose all its glaciers by 2030. A 3°C temperature increase may result in catastrophic disruptions in African food production systems within the next 30-year period. With this level of increase in temperature, maize and banana production will be reduced by 30 percent, and beans production will be reduced by nearly 60 percent by 2050.

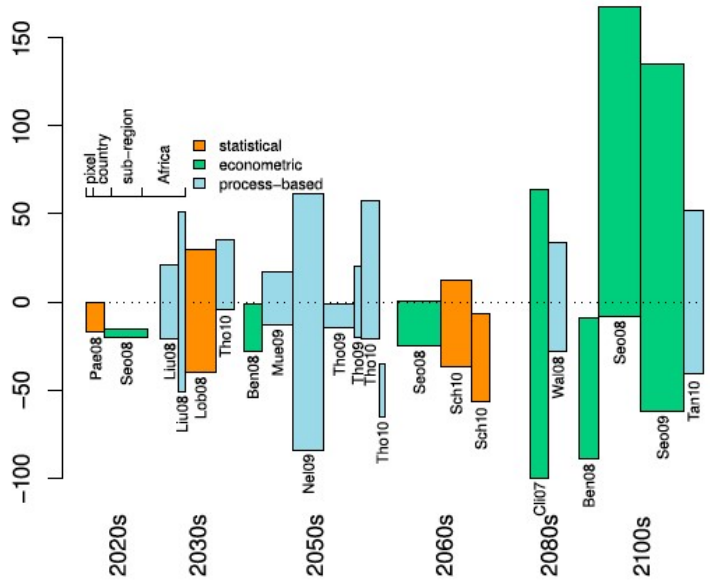


Figure 4.5 Projected Ranges of Climate Change Impacts on African Agriculture, Expressed as Change in Percent Relative to Present Conditions

Note: Bar widths indicate the spatial extent of the projection, and shading depicts the methodology. Sources: Pae08 (10), Seo08 (9), Liu08 (7), Lob08 (11), Ben08 (12), Mue09 (13), Nel09 (8), Tho09 (14), Tho10 (15), Sch10 (16), Cli07 (5), Wal08 (17), Seo09 (18), and Tan10 (19). Source: Müller et al., 2011

Africa has been considered the global epicenter of the climate crisis, though the continent contributes less than four percent in global greenhouse gas emissions. Considering the current rate of climate alteration, it is estimated that extreme weather events will be more frequent and

severe in African countries than in other regions of the world. Those recurring events may result in the livelihood failure of millions of African poor engaged in agricultural practices and pastoral economy, increased poverty and food insecurity, fewer job opportunities, and lower adaptation capacity, making them more vulnerable to climate-induced disasters. The situation will worsen with the high population growth in the continent, which is projected to be doubled by 2050 and further by 2100. As the climate impact is evident by now, agricultural production is reducing, and population growth is higher. The food population gap has been increasing over time, resulting in endemic poverty, acute malnutrition, and mass starvation.

As recent projections estimated that if the current rising rate of temperature increase in the Latin America and Caribbean region continues, it will reach from 1.6°C to 4.0°C at the end of this century, while the change in precipitation is also alarming in the region (Lachaud et al., 2022). Climate induces crisis fueling other parameters like rising inequality, natural resource depletion, and conflict. The ongoing food security in Africa demands serious attention; if ignored, the result may peak and turn into famine.

Environmental Degradation and Hunger in Asia

Asia is the home of the world's second-largest share of poor people. The area is also full of resources, including land, mineral, forest, land, and ocean. Therefore, the continent is more likely to do better in terms of poverty alleviation, economic growth, and achieving development goals. Asia is improving better in terms of the indicators of the Millennium Development Goals.

It would be a great success if the region could feed its fastest-growing population. But the continent is home to a major share of the poorest people –who do not have direct connections to climate change. Still, they are most vulnerable, as the country's economy cannot support them much once the poor continue to be affected by frequent natural disasters. Thus the country's economy cannot get a firm base to develop further. Asia is also known as the most disaster-prone

region in the world. These disasters are natural in the open eye, and seemly natural events, but many of them are anthropogenic that cause conger, malnutrition, and deaths in many countries that have been experiencing extreme weather conditions and frequent disaster impacts.

Asian agriculture is alone responsible for two-thirds of the total agricultural GDP globally. Asia is blessed with rich soil, nice weather conditions, cheap agricultural labor, and many other useful conditions necessary to produce sufficient corps. The region with self-sufficient in crop production that is required for its population. At the same time, the region is known for disasters like cyclones, flooding, and prolonged droughts that cause hunger, malnutrition, and deaths among poor and marginalized groups.

Asia is the most populous region in the world, estimating 63% of the global population. With praiseworthy Green Revolution efforts, Asian farmers contributed over 67% of global agricultural productivity. The region is self-sufficient in terms of overall food demand for the total growing population in the region. There is certainly distributional inequality, for which the region is experiencing hunger and malnutrition problems. Still, here the main question is –being one of the major hotspots of climate change-associated problems, a fundamental question is - whether the continent will continue contributing to food production in the future.

South Asia has one-fifth of the world's population and is known as the most disaster-prone region in Asian territory and in the world. The region is also characterized by the highest population growth rate, with the highest natural resource depletion, a high rate of poverty, and a food-insecure region with one of the most vulnerable geographic hotspots for climate change (Sivakumar and Stefanski, 2010).

In recent decades, the notable climate change in Asia includes –intensification of temperature, changes in air quality, and increased frequency and severity of extreme disaster events over a couple of decades. The extreme weather events, as the projections depict, that include increased precipitation, heat wave, and seasonal variation would become a reality in Asia.

Projections also tell the alarming rate of warming, compared to what has been overserved throughout the last century. Projections also indicate significant warming impacts in the Himalayan Highlands, including the Tibetan Plateau and some arid regions of Asia (Sivakumar and Stefanski, 2010).

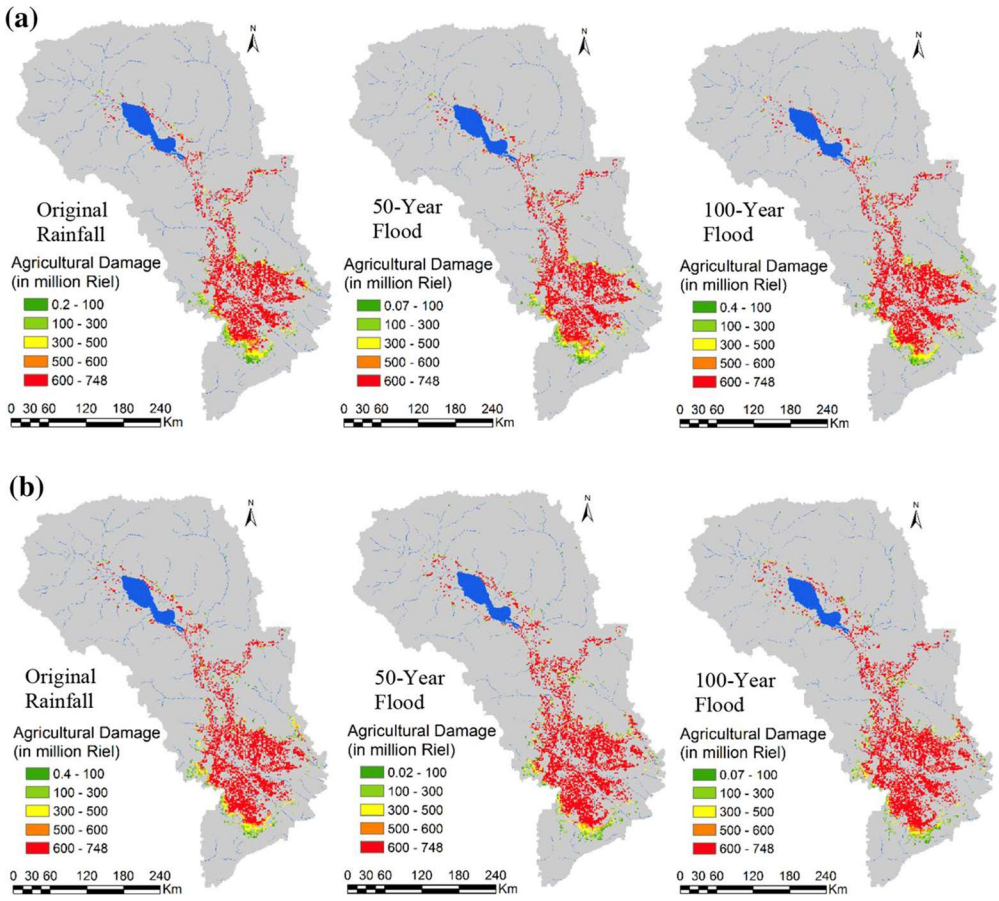


Figure 4.6 Rainfall Variability and Agricultural Damage in Southeast Asia

Note: Comparison of estimated agricultural damage under (a) present climate, and (b) future climate conditions in PRB in the cases of the original rainfall flood, a 50-year flood, and a 100-year flood. Source: Shrestha et al., 2019

Asia is not the innocent victim of climate change. It has been playing as one of the pivotal players in creating global emissions. Asia is responsible for nearly 35 percent of global energy-related carbon dioxide emissions, which was only 17 percent in 1990 (EDGAR, 2022). China alone is responsible for nearly 70 percent of the emission in Asia (ADB - World Energy

Outlook, 2022). If Asia is not heading towards widespread use of renewable energy and improved energy efficiency, its role in creating worldwide energy-related emissions could reach up to nearly 45 percent (World Energy Outlook, 2012).

The effects are quite intimidating. The effects are almost universal –irrespective of who the contributors are. On average, 7 out of 10 nations globally at greatest risk of climate change-induced extreme natural disaster events are in Asia. The rest three countries are small island states in the Pacific (World Risk Report, 2012). As per projections, if there is a 1-meter rise in sea level in 2050, about 20 million Bangladeshis will be displaced (Pender, 2010). Climate change influences the start and duration of growing seasons (Lemma et al., 2016, Zhao et al., 2015). If the temperature exceeds the optimal level, that directly harms the crops' physiological process. A recent study explores that despite adaptation efforts, wheat production in India reduced by 5.2 percent from 1981 to 2009 due to increased global warming (Gupta et al., 2017).

More than 60 percent of the entire population in Asia is directly engaged in occupations like agricultural farming, fishing, and forestry (Stern Review on Economics of Climate Change, 2022). They are at a high risk of losing their occupation due to climate change. Livelihood failures are the key that results in starvation and hunger. Most of the population is at high risk of climate change-induced extreme events. Climate variability may significantly reduce crop production and the income of the farmers (Matiu et al., 2017; Ray et al. 2015; Wheeler 2013).

Income of the little educated and uneducated agricultural laborers, who are not only associated with farming but also almost solely dependent on agricultural production. Most of those laborers are landless and do not have the means to diversify their livelihood opportunities and make different avenues of income.

Climate change has impacted land and water resources, which are declining. Land and water are fundamental to agricultural production, and due to climate changes, water consumption has been increasing (UN-Water, 2013). As part of adaptation to climate change, for instance, the

majority of Indian farmers depend on groundwater resources to avoid climate change-induced drought, resulting in a rapid reduction in the groundwater table. It might increase future vulnerability to climate change. Due to heat stress, nearly half of the Indo-Gangetic Plains (IGP), popularly known as the major food basket of South Asia, may lose its production capacity for wheat production by 2050 (Ortiz et al., 2008).

In terms of increased global warming, if modes projects are considered, a 1.5-2 degree sign C increase will severely impact water resources due to monsoon variability and glacial meltwater, threatening future agricultural production and food security (Vinke et al., 2017). With these climate-induced alterations, massive changes will occur in agricultural production and food supply. The price hike will cause food beyond the capacity of the poor, and poverty and hunger will be there in South Asia, which adversely affect the livelihoods of the millions of poor in the region (Aryal et al., 2020; Wang et al., 2017; Shankar et al., 2015).

Rice is the staple food for the people in Asia. If climate or other factors create a barrier to crop production, the majority of the Asian population starts facing hunger. Rice fields in Asia are the region's key source of rice production. Among Asian countries, some countries are considered climate change hotspots. The mega deltas like Bangladesh, Myanmar, and Vietnam are considered the backbone of the rice economy, and these countries are extremely vulnerable to extreme events and sea-level rise. With climate-induced severe and frequent disasters in the vulnerable parts of these countries, people have been facing hunger problems for the long run. Poor and fragile economies cannot support the victims of those extreme events for longer, leaving people no option other than starving.

Studies project that due to climate change, the rain-fed maize would reduce by 3.3-6.4 percent on average in 2030. It will further reduce by 5.2 to 12.2 percent in 2050. Irrigated yield will reduce by 3-8 percent in 2030 and 5-14 in 2050 (Tesfaye et al., 2017). Due to the absence of proper adaptation measures, South Asia will lose 1.8 percent of its annual gross domestic product

by 2050 (Ahmed and Suphachalasai, 2014). The negative impacts of climate change-induced diesters are not limited to coastal belts and rural settings in Asia; urban settings are also at high risk. About 300-410 million urban dwellers are at high risk of flooding, coastal surge, and riverbank erosion. Food pricing has been undergoing a notable change. As projections depict, prices of major food crops –including rice, maize, wheat, and soybean –will increase 2.5 times by 2.5 times. Again the price of major livestock items –including poultry, beef, pork, and lamb –will increase by 1.5 times by 2050. (Nelson et al., 2009).

Climate Issues and Hunger in Latin America and the Caribbean

The region is the second largest continent, full of natural resources, including land, ocean, mineral resources, and forests. The poverty is comparatively less here. Most of the population depends on agriculture.

The population of the Latin American and the Caribbean (LAC) regions was 588 million in 2013, which is projected to reach 660 million by 2025 (World Bank, 2014). The area is mostly urbanized, and nearly 78.8 percent live in urban centers (ECLAC, 2014). Nearly 25.3 percent of the population is poor, and 12.3 percent live in extreme poverty (World Bank, 2014). Rural poverty is almost twice as urban poverty (IFAD, 2013), and nearly 60 percent of the people in extreme poverty live in rural areas.

Poor people are particularly vulnerable to climate change. As a large majority of the LAC's poor are related to and heavily dependent on agriculture, climate-induced disasters threaten them. A major share of them live in areas known as hurricane zone and also in the low-elevation coastal zones and become vulnerable to sea-level rise, coastal surge, and flooding (Nielsen, 2010; McGranahan et al., 2007). The 64,000 km coastline of the LAC is the most densely populated in the world (Sale et al., 2008), and a larger share of the urban population lives in areas just five meters above sea level (CIESIN, 2012). In addition, the urban slums are situated

on steep slopes with poor drainage systems settlements (Douglas et al., 2008), and a number of groups including female-headed households and children are particularly exposed to climate change risks (Reyer et al., 2017; Kumar and Quisumbing, 2013). These groups are most vulnerable to sea-level rise and natural disasters.

As the Food and Aquacultural Organization (FAO) of the United Nations depicts, climate change is affecting and will continue creating impacts on crop production, food security, and the local economy in Northwestern Brazil, the major part of the Andean region and Central America. As a recent study explored, climate change is impacting and creating significant reductions (9.03-12.7%) in productivity over the 2015-2050 period, and in terms of output, the total losses estimated from 14.7 to 31.4 billion US dollars in the Latin America and Caribbean region (Lachaud et al., 2022). Climate change poses a severe threat to Latin America and the Caribbean region because the vast majority of the population is dependent on agriculture; they have less adaptative capacity and are therefore vulnerable to climate-induced diesters. Agriculture-dependent Latin America and the Caribbean are particularly vulnerable to climate change in terms of livelihood and poverty in general and food security and hunger in particular.

Conclusions

Famine is the deeper consequence of acute hunger and mass starvation. Thousands of families have left nothing but to starve when it hit an area. The families starve and skip meals to store food for longer. Mothers starve themselves and feed a meager amount of food to their children. The hungry people start begging, forge here and there in search of food. They eat many things like mud, leaves, and bark of trees, which they never consider food during their lifetime in usual times. These kinds of alternatives make them sick, which increases their vulnerability.

Between starvation and death, as World Health Organization depicts, there is always disease. These diseases are always associated with hunger, malnutrition, and bad food-related

problems –which their already weak bodies cannot tackle and digest. Therefore they fall sick. The common diseases the famine-affected people experience are cholera, respiratory sickness, diarrhea and dysentery, pneumonia, smallpox, indigestion, and different types of infections. It is estimated that fever and infections cause about half of the deaths during the famine.

Chapter 5: Country-Specific Consequences of Famine

Like poverty, the causes of famine vary significantly across countries and regions. The effects of famine, like the causes, also differ greatly depending on context and environmental factors. The consequences of famine include starvation, disease, malnutrition, and a high death toll. Though the severity of consequences varies according to time and space, they are nearly similar in nature. Based on the available information and historical data, this chapter focuses on the extent of starvation, disease, malnutrition, and the death toll in countries that experience famine.

This chapter focuses on the major famines of the nineteenth, twentieth, and twenty-first centuries. I focus on the causes and consequences of famine; how authorities treated those famines; how accountable governments were; and how state power dealt with such fatal issues.

Major Famines of 19th Century: Key Reasons and Consequences

Irish Famine of 1846–1852

The Great Irish famine also known as the "potato famine" and "Great Hunger," in 1945, a destructive plant disease (caused by *Phytophthora infestans*) spread throughout Ireland's croplands. In the Irish language, it is known as *An Gorta Mor*, or "the Great Hunger." The disease reduced the potato crop by nearly fifty percent in that year, and nearly three-quarters of the crop by the next consecutive seven years. Such a drastic reduction in production caused widespread starvation and hunger throughout the country, as the Irish people relied heavily on the potato as their main source of food at that time.

By 1852, the famine caused nearly one million deaths due to widespread starvation, malnutrition, and hunger-related diseases. Nearly one million Irish people emigrated to escape hunger and starvation.

Ireland was a colony of the British Empire from 1801 until it gained independence in 1921. Thus, the British colonial government did not take the sufficient initiative to stop famine.[2] It is not a fact that crop failure happened widely. Even in the great famine years, agricultural products, including peas, beans, fish, and honey were exported during 1847 when famine ravaged the country. Historians also suggested that Ireland continued to export food items, livestock, and butter, particularly to Great Britain during the famine years.

The Penal Law was repealed in 1829 but still impacted Irish society and governance even during the onset of famine. Initially, the law restricted Catholics from taking leases in lands from landlords. Due to the Penal Law, English and Anglo-Irish families owned most of the land, and the poor Irish-Catholic majority was devoid of landownership, working on lands as tenant farmers. The famine affected the poor and landless people the most.

Cape Verde Famine of 1863–1867

Before the Cape Verde famine in 1863, the African country had experienced disasters for almost thirty years. Between 1845–1846, the country experienced famine in the Fogo, Boa Vista, and Sal areas. The government appealed to Lisbon for aid and issued additional taxes to some other regions to support the areas most affected by famine. The country received money from Lisbon to purchase food, but the metropole sent only a meager amount of food due to political unrest. Cape Verde also received money from personal contributions from wealthy local people of Lisbon and cargoes of corn and rice from the Gambia. The aid saved many lives.

[2] In 1977, British Prime minister issued a formal apology to Ireland about UK government's role during Iris famine.

Table 5.1 Major Famines of 19th Century

Year	Country	Major Cause/s	Number of Deaths			Other Major Consequence/s
			Excess Mortality (Midpoint)	**Excess Mortality** (Lower)	**Excess Mortality** (Upper)	
1846–52	Ireland	Potato blight	1,000,000	1,000,000	1,000,000	Huge outmigration, diseases caused by malnutrition
1860–1	India	War, inflation, crop failure, poor policies	2,000,000	2,000,000	2,000,000	Widespread diseases due to malnutrition, and starvation
1863–67	Cape Verde	Drought	30,000	30,000	30,000	Epidemic diseases, starvation
1866–7	India	Drought	961,043	961,043	961,043	Starvation, malnutrition, diseases
1868	Finland	Poor harvest, crime	100,000	100,000	100,000	Widespread hunger
1868–70	India	Drought, colonialism	1,500,000	1,500,000	1,500,000	Malnutrition and disease
1870–1871	Persia (now Iran)	Economic crisis, drought	1,000,000	500,000	1,500,000	Hunger and malnutrition related diseases
1876–79	Brazil	Drought, economic crisis	750,000	500,000	1,000,000	Huge outmigration, diseases caused by malnutrition
1876–79	India		7,176,346	6,135,000	8,217,692	Hunger and malnutrition related diseases
1877–79	China	Drought, lack of state capacity due to rebellion & colonialism	11,000,000	9,000,000	13,000,000	Widespread starvation caused by drought and crop failure
1878–1880	USA (St. Lawrence Island Alaska)		1,000	1,000	1,000	Starvation and epidemic
1885–99	Congo	Colonialism, forced labor	3,000,000	3,000,000	3,000,000	Hunger crisis
1888–92	Sudan	Drought, war	2,000,000	2,000,000	2,000,000	Hunger, people were wounded, and traumatized
1888–9	India	Drought, colonialism	150,000	150,000	150,000	Hunger, migration
1888–1892	Ethiopia	Drought, war, rinderpest	1,000,000	1,000,000	1,000,000	Widespread hunger,

						malnutrition, and disease
1891–1892	Russia	Bad weather, Drought, economic crisis	275,000	275,000	275,000	Hunger and huge economic crises in later years
1896–7	India	Drought, crop failure, colonialism	3,887,287	2,624,574	5,150,000	Hunger, malnutrition, and disease
1896–1900	Brazil	Drought, economic crisis	1,000,000	1,000,000	1,000,000	Widespread hunger and malnutrition-related problems
1897–1901	China	Drought, economic crisis, colonial warfare, internal rebellion	1,000,000	1,000,000	1,000,000	Widespread hunger, and related diseases
1899–1901	India	Drought, epidemic, colonialism	2,699,790	1,000,000	4,399,579	Widespread hunger and starvation
1899–1902	S Africa	Boer War, camp conditions	42,000	42,000	42,000	Hunger, a large number of deaths due to camp conditions

The 1854 droughts further affected all the islands of Cape Verde. Hunger became widespread by 1855, with hungry people eating abnormal food items like banana stalks and donkeys. During the periods of 1850–1851 and 1854–1855 hunger, the country received aid and relief from Lisbon, Brazil, and Guinea (Senna Barcellos, 1988).

As the continuation of the starvation history and the problem with hunger, Cape Verde faced further famine in 1963. The lack of rain in 1863 was the beginning of the country's three-year acute starvation and suffering. The government declared a famine. By April 1864, thousands of people started fleeing toward the capital city for a source of food. Praia Could not handle the huge influx of refugees. Government support from Lisbon was too meager to feed them. Mass disorder and crime spread, as no force could send them back to their rural homes. The governor tried to send people back to their villages and islands by giving them some relief and

opportunities for public works but failed to do so. Support was meager in comparison to the severity of the drought. Inadequate relief efforts led to mass starvation and widespread hunger. People of all islands suffered heavily, but the conditions of Santiago, Fogo, and Maio were the worst. There are no clear records of human casualties, but 1862 and 1867 statistics estimate about 30,000 people died during the 1863–1866 Cape Verde famine (Senna Barcellos, 1988).

Indian Famine of 1876–1879

The great famine of 1876 to 1879 occurred in India under the colonial rule of the British Raj. The famine started with a widespread crop failure in 1876 due to drought and lack of rainfall in that year. It was considered a part of environmental change especially El Nino as observed in India, China, South America, and some parts of Africa.

Both south and southwestern India were heavily affected by widespread drought, particularly Madras and Bombay. The severity of the famine stayed for nearly two years. About 670,000 square kilometers were heavily affected by famine that caused approximately 58,500,000 human deaths (Imperial Gazetteer of India, 1907). The death toll statistics range from as low as 5.6 million to as high as 9.6 million human fatalities. A careful modern estimation shows 8.2 million human deaths during this famine.

The colonial government was not effective in stopping or controlling the famine situation. The government continued the regular export of grains during those years. An export record shows that 320,000 tons of wheat were exported to England, which could have been used to feed the dying people. The commodification of grain and the cultivation of alternative cash crops also played a significant role in creating famine situation (Davis, 2002). Famine occurred when the British colonial government paused to reduce its expenditure on welfare issues. Governors focused on the grain trade (Hall-Matthews, 1996), and had less concentration on famine relief (Imperial Gazetteer of India, 1907).

Chinese Famine of 1877–1879

The Chinese famine or the Northern Chinese famine of 1876–1879 occurred due to drought-induced crop failure in 1875. This famine caused the deaths of between 9.5 million and 13 million people (Edgerton-Tarpley, 2012).

The most affected provinces were Shanxi, Zhili, Henan, and Shandong, with Shanxi being the most seriously affected. Nearly 5.5 million people died in Shanxi; 2.5 million in Zhili; 1 million in Henan; and 0.5 million in Shandong province (Forrest, 1879). Like the Indian famine, it is believed that the drought occurred due to El Nino Southern Oscillation (Gráda, 2009).

The famine started after the 1875 crop failure, and mass starvation reached its peak in 1878. According to British missionary Timothy Richard's *Famine Diary* from 1878:

> people pull down their houses, sell their wives and daughters, eat roots and carrion, clay and leaves, is news which nobody wonders at …The sight of men and women lying helpless on the roadside, or if dead, torn by hungry dogs and magpies [and] of children being boiled and eaten up is so fearful of making one shudder (Cited in Thompson, 2009).

The government effort was too small. The Qing Government, businessmen, and Chinese philanthropists tried to respond by raising funds. More than 31 Protestant and 40 Roman Catholic missionaries raised funds to support famine victims. But there was a silent conflict between missionary efforts and Chinese relief endeavors. Many Chinese people believed that the missionaries would use the famine situation and help Chinese families adopt orphaned children to convert them to Christianity. When the famine was over, heavy rainfall started in the famine area in June 1879. By that time, many rural parts were heavily depopulated by mass starvation and famine deaths, diseases, acute malnutrition-induced problems, and migration to urban centers to escape famine.

The 1885–1899 Famine in the Democratic Republic of Congo

The 1885–1899 crisis in Congo was mainly caused by colonialism and forced labor. A range of atrocities occurred from 1885 to 1899 associated with labor policies targeting collecting natural rubber for export purposes. The atrocities and disruptions resulted in widespread epidemics, disease, famine, and a sharp decline in the birth rate. The population drastically declined due to those atrocities. A modern calculation estimates that the death toll ranged from 1.5 to 13 million.

Considering the exponential demand for rubber, which was abundant in the territory, the private companies and the government-owned rubber-producing areas were keen to extract rubber using cheap labor to minimize production costs. This resulted in forced labor and violent coercion to make huge profits. The Free State used its military force and enforced labor policies that employed forced labor. The poor laborers who refused to participate in such exploitation programs were killed, and entire villages were threatened with being ravaged.[3] Soldiers were killing young men and raping their mothers and sisters (Hochschild, 2019). Atrocities and violent events broke out everywhere.

Although atrocities were one of the significant reasons, the main factors for population decline were diseases, including smallpox, African sleeping sickness, swine influenza, and amoebic dysentery. Nearly 500,000 people died in 1901 from sleeping sickness. These diseases greatly affected indigenous communities and the population declined sharply. The violence and diseases together increased death rates, and birth rates reduced drastically, resulting in a sudden population decline.

[3] The soldiers are instructed to cut the hands of those laborers who do not want to maintain instructions and collect rubber. Mutilation and brutality were common. The military air required to provide the hand of their victims as the proof when they have killed a protester.

The 1888–1892 Famine in Sudan

The 1888 famine in Sudan was caused primarily by extended drought. The country has been ravaged by a number of famines over the decades. In most cases, widespread drought was followed by famine and disease outbreaks. The 1888–1892 famine resulted from widespread drought and desertification and the absence of effective food and agricultural policy. The inadequate public response further fueled the crisis.

The vast area of Sudan and the neighboring Ethiopia were affected by the 1888–1892 famine. Three natural causes caused the great Ethiopian famine: a deadly epidemic of the rinderpest, a widespread drought, and outbreaks of low costs and caterpillars (Pankhurst & Johnson, 2019). However, drought and locust swarms during the 1889–1890 cultivation year were the main reason behind the 1888 famine in Sudan (Serels, 2012).

The Sudanese semi-pastoralists produce less than half of the grains they consume, thus they depend on trading pastoral products and importing grains from India via Red Sea Ports. The 1888–1892 famine was not caused by grain import reduction, because that time, the Sudanese grain market was well stocked, and the price of *Durra*[4] also stable (Serels, 2012). But the people did not have access to food. People neither have the capital to purchase food items from the market nor products to trade for their subsistence, as rinderpest epizootic depleted their cattle stocks (Serels, 2012).

The Ethiopian Famine in 1888–1892

Like many other developing economies, the traditional Ethiopian agricultural practices depended heavily on soil fertility and a good amount of rainwater during the rainy season. The country was well known for good crop production and harvesting, as documented by Portuguese

[4] Durra is cooked maize and millet eaten with various vegetables. Durra is considered as the staple food for Sudanese.

priest Francisco Alvarez. Alvarez documented the region as a "so populous country" and "so abundant in crops." (Alvarez, 1881). Despite sparse agricultural production potential, the traditional Ethiopian communities or unable to overcome if there is any shortage of crop failures in a year due to ravages of locusts or the sudden destruction by war. The state was not stronger enough to support any famine-stricken remote areas.

Ethiopia faced many famines throughout its history. The 1888-1892 Ethiopian famine is considered one of the greatest famines in the territory. Though the country was underdeveloped, this famine was well documented in various contemporary writings.

The epidemic infected the area seriously after the rains of 1888. Hamas was the first affected province, and "within three days," all the cattle were paralyzed, almost unable to graze, and died (Pankhurst, 1966). Soon the disease spread to Tigre, Shoa, Gondar, and other provinces. Massive livestock mortality influenced the famine situation immensely. Nearly 90 percent of cattle, as Italian eyewitness Capucci estimated, in Ethiopia perished (Pankhurst, 1966; Scarfoglio, 1936). The year 1888–1889 was so dry and bad for agriculture that a more significant proportion of crops perished. There was no possibility of rain, no cattle to plow the lands, and no hope of agriculture. The resulting death toll was one of the most fatal famines in Ethiopian history.

Major Famines of the 20th Century: Key Reasons and Consequences

The USSR Famine of 1921–1922

The Soviet Union, officially the Union of Soviet Socialist Republics (USSR), experienced several lethal famines throughout its history. The 1921–1922 USSR famine was also known as the *Povolzhye* famine.[5] This famine is one of the deadliest famines in the history of the region. The suffering began earlier in the spring of 1921 and continued through 1922. The main

[5] The term *Povolzhye* means the Volga region. The famine was named after Vola because, Volga and Ural River are the two mostly affected areas of 1921-22 USSR famine.

reasons for these unexpected famine events were the economic crisis caused by Russian Revolution and the Russian civil war. Another major reason was the defective War communism policy of the government. The rail system also exasperated the crisis, which did not let food distribution systems properly to the famine-affected areas. Define mean primarily affected Volga and Ural river regions, and the famine killed nearly five million people. Based on earlier evidence, modern resource estimates that the famine killed almost 9 million people (Devereux, 2000; Gráda, 2009).

Before the 1921–1922 famine occurred, the Soviet Union had been experiencing a vulnerable and fragile economy, as it experienced nearly three and half years of war through World War II and the Russian Civil War. Many battles took place within the Russian territory, with nearly 7 to 12 million casualties, most of whom were civilians.

Intermittent droughts in 1921 worsened the situation; therefore, there was almost no possibility of producing crops. Within a short period, the situation turned into a national catastrophe. Hunger was widespread, and people started consuming seed grain rather than preserving it for sowing. The food distribution system was disrupted notably. Sometimes food aid providers were required to give additional food to the railway staff to carry food assistance for the famine-affected people (Pipes, 2011).

Before the famine began in 1921, all the political groups involved in the Russian Civil Wars (1918–1921) consumed food that was seized from ordinary peasant producers. The producers lost interest in producing surplus grain, and many of them tried to sell them in black markets. Storehouses were looted, and food shortages ensued.

At the initial stage of famine, outside aid and food support were rejected. The assistance from American Relief Administration (ARA) was also rejected by the Russian government. Lenin declared his new economic policy on March 1921, which failed to bring fruitful results to stop famine. Later, in an open letter to “all honest European and American people,” Vladimir Lenin

and Maxim Gorky appealed to “give bread and medicine” (The Economist, 2019). Both the American government and the European community responded to the appeal (Vogt, 2009). As historian Douglas Smith noted, the food relief efforts helped “save communist Russia from ruin” (Smith, 2019).

The Russian famine, which started after nearly six years of political unrest and violence, escalated political debate over which party should be blamed for creating the famine. Church properties were looted, golden rubles were seized, and only a small amount was distributed as famine relief. In a secret letter to Politburo, Lenin claimed that famine creates opportunities against the church. Essentially, famine was used as a political weapon and an excuse for the Bolshevik leadership to persecute the Orthodox Church (Pipes, 1995).

Table 5.2 Major Famines of the 20th Century

Year	Country	Major Cause/s	Number of Deaths			Other Major Consequence/s
			Excess Mortality (Midpoint)	**Excess Mortality** (Lower)	**Excess Mortality** (Upper)	
1900–03	Cape Verde	Drought	15,500	11,000	20,000	Starvation and disease
1903–06	Nigeria (Hausaland)	Drought	5,000	5,000	5,000	Starvation, malnutrition and disease
1904–07	Namibia	Genocide	55,017	34	110,000	Starvation and migration
1906–07	Tanzania (south)	Repression of rebellion	118,750	37,500	200,000	Starvation and hunter-induced diseases
1907–08	India	Drought, colonialism	2,683,782	2,148,788	3,218,776	Hunger and disease
1910	Niger		85,000	85,000	85,000	
1913–14	West Africa (Sahel)	Drought, colonial conquest	125,000	125,000	125,000	Widespread hunger and disease
1915–18	Greater Syria (including Lebanon)	War, blockade, locusts	350,000	350,000	350,000	Widespread hunger and starvation
1915–16	Turkey (Armenians)	Genocide, forced deportation	400,000	400,000	400,000	Starvation, dehydration, exposure and disease

1917–18	Germany	Blockade	763,000	763,000	763,000	Mass torture by Ottoman Army
1917–19	Persia (now Iran)	War, drought	455,200	455,200	455,200	Starvation, epidemic, pandemic of contagious diseases
1917–19	East Africa	Lack of rainfall	300,000	300,000	300,000	Widespread hunger and starvation
1919	Armenia	Post conflict	200,000	200,000	200,000	Widespread starvation, exhaustion and disease
1920–22	Cape Verde		24,500	24,000	25,000	Starvation and disease
1920–21	China (Gansu, Shaanxi)	Drought, economic crisis	500,000	500,000	500,000	Hunger, malnutrition, and diseases
1921–22	USSR	Economic crisis, civil war, govt. policy	9,000,000	9,000,000	9,000,000	Widespread hunger, malnutrition, and disease
1927	China (northwest)	Drought, crop failure, war	4,500,000	3,000,000	6,000,000	Hunger, malnutrition
1929	China (Hunan)	Drought, war	2,000,000	2,000,000	2,000,000	Hunger, malnutrition, and diseases
1930–31	Libya	Concentration camps	50,000	50,000	50,000	Starvation and hunger-induced diseases
1932–34	USSR (Ukraine)	Collectivization	5,650,000	3,300,000	8,000,000	Acute rural starvation, malnutrition-related disease
1932–34	USSR (Russia, Kazakhstan)	Collectivization	1,500,000	1,500,000	1,500,000	Starvation, malnutrition-related disease
1934, 1936–7	China (Sichuan)	War, economic crisis	5,000,000	5,000,000	5,000,000	Mass starvation
1940–43	Cape Verde	Drought	20,000	20,000	20,000	Mass starvation and disease
1941–50	Europe/USSR (collection of WWII-related events)	War	6,333,000	6,333,000	6,333,000	Homelessness, destroyed infrastructure, hunger-induced diseases
1941–45	East/Southeast Asia (collection of	War	5,444,000	5,444,000	5,444,000	Post-war complexities

	WWII-related events)					
1943	China (Henan)	War	3,250,000	1,500,000	5,000,000	Displacements, starvation, and disease
1943	India (Bengal)	Government wartime policy	2,550,000	2,100,000	3,000,000	Hunger, widespread malnutrition
1943–44	Rwanda	Drought	300,000	300,000	300,000	Starvation and migration
1944	Netherlands		10,000	10,000	10,000	Hunger and malnutrition
1946–48	Cape Verde		30,000	30,000	30,000	Starvation, malnutrition-induced disease
1946–47	USSR (Ukraine and Belorussia)	Food shortage and policy	1,300,000	600,000	2,000,000	Hunger and malnutrition
1957–58	Ethiopia (Tigray)	Drought	248,500	100,000	397,000	Starvation, malnutrition-induced disease
1959–61	China	Government policy	24,000,000	15,000,000	33,000,000	Widespread hunger, reduced births
1966	Ethiopia (Wallo)	Drought	52,500	45,000	60,000	Hunger and malnutrition
1962–68	Indonesia		67,700	-	135,400	Mass starvation
1968–70	Nigeria (Biafra)	War, blockade	750,000	500,000	1,000,000	Mass starvation, and disease
1969–74	West Africa (Sahel)	Drought	50,500	-	101,000	Starvation, malnutrition, and disease
1972–73	India (Maharashtra)	Drought	130,000	130,000	130,000	Starvation induced disease
1972–75	Ethiopia (Wallo & Tigray)	Drought	350,000	200,000	500,000	Widespread hunger, malnutrition, and disease
1974–75	Somalia		20,000	20,000	20,000	Hunger, malnutrition-induced disease
1974	Bangladesh	Floods, cyclones, economic crisis	1,000,000	500,000	1,500,000	Widespread hunger, and disease
1979	Cambodia	Conflict	1,605,000	1,210,000	2,000,000	Forced labor, violence, and denial

1980	Chad	Year Zero	3,000	3,000	3,000	Starvation
1980–81	Uganda		30,000	30,000	30,000	Long-lasting cognitive and health effects
1982–85	Mozambique	Drought	100,000	100,000	100,000	Mass starvation
1983–85	Ethiopia	War and drought	795,000	590,000	1,000,000	Huge internal displacement and outmigration, destruction of infrastructure and economy
1984–85	Sudan (Darfur, Kordofan)		245,000	240,000	250,000	Severe food shortage, starvation, and malnutrition-induced diseases
1988	Sudan (south)	War, drought Drought, economic crisis	175,000	100,000	250,000	Humanitarian disaster, acute hunger
1991–93	Somalia	War	360,000	220,000	500,000	Destruction of agriculture, widespread hunger
1995–99	North Korea	War, natural disasters, economic mismanagement	420,000	240,000	600,000	Militarization of the economy, widespread malnutrition, and healthcare crisis
1998	Sudan (Baht el Ghazal)	Sanctions, war, and dictatorship	85,000	70,000	100,000	Huge displacement, outmigration
1998–2007	Democratic Republic of Congo	Food shortage and government policy	3,131,500	863,000	5,400,000	Atrocities and fatalities followed by severe food shortage

The 1943 Indian Famine or the Bengal Famine of 1943

The Bengal famine of 1943 greatly affected the Bengal in colonial India. The faulty policies that British Raj took are often criticized because the policy failure greatly affected the death toll. Nearly three million people died due to inadequate food supply, starvation, and malnutrition-related diseases (Encyclopedia Britannica, 2022).

Though food shortages and inadequate food supply caused many famines, the Bengal famine of 1943 was not caused by shortages in food production. There was no drought. The famine was caused by entitlement failure, where the affected population did not have access to food available in the market (Sen, 1982). The food distribution system was defective. The government did not have control over the market, and therefore dishonest businessmen increased the food prices, and artificial food shortages were created to maximize profit. A good number of research and economic reviews marked this famine as a result of anthropogenic factors, asserting that the faulty wartime economic policies caused and intensified the famine situation (Sen 1975; Sen 1982; Gráda, 2015); whereas some narrow views focused on natural disasters behind the famine (Bowbrick, 1986; Tauger, 2003).

There were other factors related to the Bengal famine too. Rice exports from Singapore and Burma (Myanmar) were disrupted by the complexity connected to World War II. Additionally, a cyclone in October 1942 demolished the autumn crops, which subsistence farmers depended on for yearly consumption and family maintenance. Finding no other way, the subsistence farmers consumed seed grain for the next year's plantation. Again, halting the 1942 rice imports to India did not cause the famine. Even the 1943 crop production was sufficient enough to feed the people. Still, a famine occurred.

Wartime factors also had a powerful impact on the artificial food shortage. The colonial government feared Japanese invasion and therefore stockpiled food to feed the army. The government also exported huge amounts of food to British forces in the Middle East. It also stopped ordinary small business operations and small economic activities like fishing in Chittagong, where it expected the Japanese invasion. Therefore, the fishermen and their customers who relied on fish for consumption and sale were greatly affected (Encyclopedia Britannica, 2022).

Even after that rice was available in the markets, the price skyrocketed over the days. The government then increased the price of the rice so that stockers may sell their stocked rice to the government, but it worked adversely, and prices continued skyrocketing. Price already went far beyond the capacity of the people a few months ago. The government's failure to control the price, halt rice exports and seek relief supplies from different sources ultimately killed millions in Bengal.

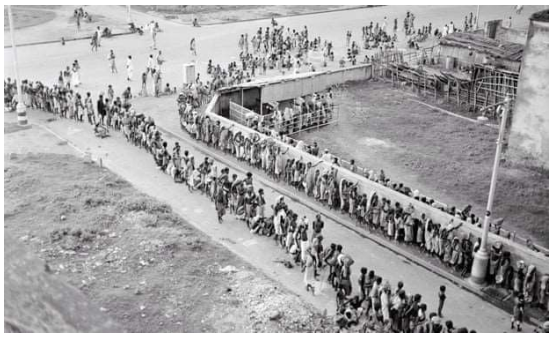


Photo 5.1: Hungry people waiting in front of a soup kitchen in the 1943 Bengal famine period. Source: *The Guardian, 2022*

Photo 5.2: An emaciated family reached Calcutta in November 1943 in search of food Source: *The Guardian, 2022*

The economic structure of Bengal had been predominantly agrarian. Nearly three-quarters of other rural people practiced subsistence agriculture in a “semi-starved condition” (Arnold, 1991; Greenough, 1982). People with a medium or small land parcel alongside the poor and landless all engaged in agricultural activities for their consumption. They practiced it over the centuries with few other means of subsistence (Greenough, 1982). Whenever these people face any kind of difficulty in agricultural production, they fall into a cycle of debt and lose their landholdings either systematically or forcefully (Chaudhuri, 1975; Chatterjee, 1986; Arnold, 1991). Famine crossed all these crises and resulted in a high death toll.

The government did not play an effective role in stopping famine, or saving emaciated and dying people. Even the provincial government denied the existence of famine at all, and the

humanitarian support was meager and ineffective even in the deadliest months of the Bengal famine.

The Great Chinese Famine of 1959–1961

The Great Chinese Famine of 1959–1961 was the world's greatest famine ever. The Great Chinese Famine was caused by defective radical agriculture policies, faulty economic management, social pressure, drought, and flood-like natural disasters in the vast agricultural farming regions. The 1959–1961 famine is known as the three-year greatest and most widespread famine in the history of the Peoples's Republic of China (PRC). It is also considered the greatest man-made disaster in human history. The provinces most affected were Anhui, Chongqing, Sichuan, Guizhu, and Hunan.

Key reasons for this famine were the policies of the Great Leap Forward and people's communes. Other factors include the inefficient food distribution system by China's planned economy that required inefficient agricultural techniques, the over-reporting of grain production, the Pest Campaign policy which reduced the sparrow population and, therefore ecosystem was badly affected, forcing millions of traditional peasants to engage into iron and steel production.

Production was dropped due to policy failure. Policy changes were made in line with droughts and flooding, which were incompatible with the actual situation. Consequently, the amount of production started decreasing and continued over the years. In 1959, for example, the harvest decreased by 15% compared to the previous year. The official data of China also shows that the production fell from 200 million tons in 1958 to 170 million tons in 1959 and to 143 million tons in 1960.

Decreasing crop production, natural disasters, and policy failure worsened the situation. Mass starvation and death toll increased. The CPP officials and international observers reported that the death toll might range between 15 to 55 million. Death statistics differ significantly. The

anti-communists wanted to depict a higher death toll as historian Mobo Gao discusses whereas the reporters sympathetic to the Chinese Revolution portrayed the number as low as possible (Gao, 2018).

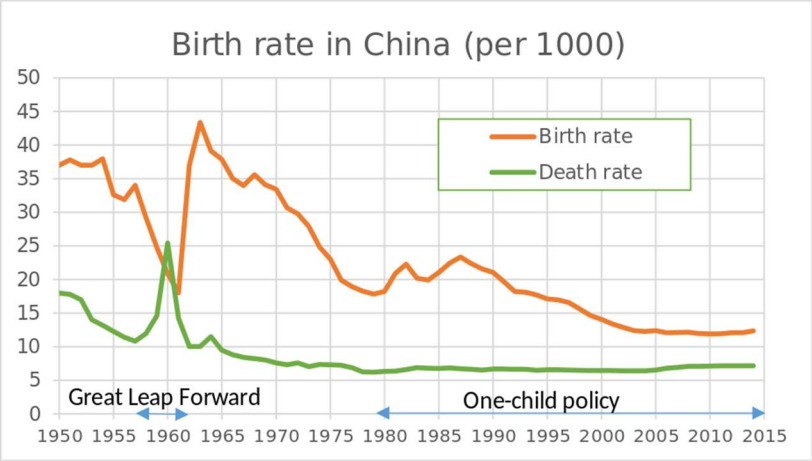


Figure 5.1 Birth and Death Rates in China (1950–2014)
Source: Guo et al., 2014 (National Bureau of Statistics of China: China Statistical Yearbook 2014)

The birth rate in China reduced drastically as a consequence of famine events. The reason behind this was the lack of food and incentives for marriage. The birth rate decreased and the death rate increased. Mortality peaked in 1961 and started decreasing rapidly after the famine was over. Therefore, a sharp population decline, as the figure above portrays, was inevitable. Though there are no official records, oral history suggests human cannibalism occurred in various forms (Bernstein, 1997; Jasper, 1998). As means of survival, people tried every possible means of survival, including stealing, killing, and eating earth and human flesh (Chen, 2014).

After the Reformation, the Chinese Communist party CPP officially stated in June 1981 that the famine was caused by the mistaken policy of the Great Leap Forward and the anti-rightist campaign. Natural disasters aggravated the situation on a greater scale.

The Congo Crisis and Starvation During 1998–2007

The Democratic Republic of Congo (DRC), known as Zaire until 1997, experienced two violent wars before the starvation period in 1998: the 1996 war was a direct result of the 1994

genocide in Rwanda, and another war in 1998, where seven countries and numerous mini militia groups were involved. Both wars negatively impacted the economy, and the economy of DRC aggravated a lot after the end of those wars. From 1998 to 2007, as the International Rescue Committee depicts, nearly 5.4 million people died due to conflict in DRC. This massive deaths toll was caused by various preventable diseases resulting from infrastructure collapse, displacement, food insecurity, and dilapidated healthcare systems.

Even a ceasefire agreement signed in Lusaka in 1999, and the UN deployment of a peacekeeping mission was failed to end the war. The armed groups were using extreme form of public violence, including killing, cannibalism, torturing and raping woman and girls, and terrorizing civilians (Human Rights Watch, 2003). The armed groups were engaged in sexual violence, open with weapons, targeting mutilation and creating parliament scare the victims, and these were very frequent throughout the conflict years (Meger, 2010). The national election of 2006 created hope, after few years of lethal wars. The government is still struggling to proper functioning.

Major Famines of the 21st Century: Key Reasons and Consequences

The 21st-century famines are more climactic in nature. In most famine cases in the contemporary world, climate change-related factors play a crucial role in aggravating situations and creating famine situations. The following sections depict major famines in the 21st century in Sudan, Uganda, and Somalia.

Famine in Sudan in 2003–2005 and 2017

The famine in the Darfur region of western Sudan was mainly due to deeper conflict, which the United Nations labeled the "world's worst humanitarian crisis" of the contemporary world. Many international observers have identified the conflict as deliberate genocide, with no possibility of ending the deeper crisis.

Throughout history, Sudan has been enriched with internal migration of different ethnic groups, intermarriage, and mixing. Darfur has a longer history of ethnic fluidity among various ethnic groups. Some groups like Fur, are politically stronger and more dominant over the years and decades. Thus, ethnic groups are identified in terms of political empowerment, social inequality, various religious and ethnic identities, and cultural heritage. The conflict can be considered part of the larger and deeper crisis. The conflicts are ingrained or deeply rooted in regional, political, and economic inequalities that remain connected to Sudan's colonial and post-colonial history. These divisions intensified the crisis, where the Arabic-speaking Sudanese elites held power and dominated the non-Arab and non-Muslim groups in many regions of the country.

A majority of Sudanese people are connected to agricultural farming, which is heavily dependent on soil fertility and seasonal rainfall. Such conditions make them vulnerable to climate change, natural disasters, and sudden weather events. During the 1980s and 1990s, the country experienced famines caused by drought, desertification, and unplanned population growth, resulting in a sharp decline in food production. Consequently, widespread famines frequently devastated the economy.

During the 2003–2005 Darfur genocide, nearly 1.8 million Sudanese died from hunger and malnutrition-related diseases. On February 20, 2017, famine was again declared in south Sudan. The 2017 Sudan had been experiencing several critical issues including violent deeper conflict, economic hardship, and inadequate rainfall. The conflict and famine caused a huge number of deaths and internal displacement. Darfur has been labeled as the "first climate change conflict" by many international observers.

Table 5.3 Major Famines of the 21st Century

Year	**Country**	**Major Cause/s**	**Number of Deaths**			**Other Major Consequence/s**
			Excess Mortality (Midpoint)	**Excess Mortality** (Lower)	**Excess Mortality** (Upper)	

2002	Malawi	War, bad weather	1,650	300	3,000	Widespread starvation
2003–05	Sudan (Darfur)	War	200,000	200,000	200,000	Conflict, ethnic cleansing, starvation, dehydration and disease
2003–06	Uganda		100,000	100,000	100,000	Nutritional condition for young children deteriorated, inadequate child feeding practices, high morbidity
2011	Somalia	War, genocide War, lack of rainfall, catastrophic famine	255,000	255,000	255,000	Huge number of child deaths, civil insecurity, lack of governance

The 2011-2012 Famine in Somalia

The Somalia famine in 2011–2012 is considered the worst famine in the history of Somalia. Nearly 3.1 million people, about half of whom were children died in the 2011 famine in Somalia (Maxwell & Fitzpatrick, 2012). The famine occurred due to a complex interplay of several factors, including drought, conflict, skyrocketing global food prices, and some other structural factors that have remained for a long (Maxwell & Fitzpatrick, 2012; Zarocostas, 2011; Zutt, 2011). Even in the high-yielding years, the country relied on additional imported food both for commercial imports and food aid. The increased food prices in the international food market exacerbated the crisis. The dominant Islamist insurgent group, Al-Shabaab, played a significant role in creating deeper conflict. The conflict fueled vulnerability and played a greater role in creating a famine situation.

The support system was largely disrupted in response to the government and others. Several factors were associated with such disruption, which aggravated the crisis altogether.

Some of those includes disrupted access to humanitarian agencies[6] and the absence of the World Food Programme (Maxwell & Fitzpatrick, 2012).

At present, a shocking drought has been ravaging Somalia, damaging crops and fueling the price of food items, that caused nearly 7 million people at risk of starvation and famine.

A Case Study: The Bengal Famine of 1943

The Bengal region experienced a total of four famines. The undivided Bengal experienced three famines, and the independent Bangladesh (what is a part of the previous Greater Bengal) experienced after its independence. The three famines that undivided Bengal experienced are: The Great Bengal famine of 1770 (also known as the "*Chhiattor-er Monnontor*", or "Famine of '76," since 1769–70 is the year 1176 in the Bengali calendar), Bengal famine of 1873–1874, and Great Bengal famine of 1943. All these famines took place under British colonial rule, whereas the Bangladesh famine occurred in 1974.

The Bengal famine is also known as "*Ponchash-er Monnontor"* (the famine of 1350, according to the Bengali calendar). This famine occurred in the Bengal province of British India, and nearly 3.8 million people died (excluding the Orissa area) from hunger, starvation, and disease. The famine event was further aggravated by population displacement, widespread malnutrition, inadequate healthcare, and unsanitary conditions. With the increasing number of deaths, the economy was further devastated, families disintegrated, and social ties were dismantled.

The Bengal region had been a predominantly agricultural economy. The people were rice growers and eaters (Famine Inquiry Commission, 1945). Finding no other solutions, affected

[6] Less than half the aid that donor countries pledged to the humanitarian response was actually funded, making many of those deaths preventable.

smallholder farmers started selling their land, abandoning families, and moving in search of work. Many of them started traveling toward Calcutta for food and relief.

Following the 1929–1939 Great Depression, the economic structure of Bengal was heavily affected, with increased household debt (Arnold, 1991). Traditional farming practices could not support the rapidly growing population, and economic inequality and social stratification were widening over time. Rural small landholders became paupers by losing their lands to survive and feed their families (Bose, 1982). Most people were poor and gradually became incapable of coping with the economic shocks, rapidly worsening situation, and increasing food shortages. Millions of Bengalis were on the verge of starvation (Mukherjee, 2015; Gráda, 2008; Arnold, 1991). The low agricultural productivity increased vulnerability (Islam, 2007). Debt bondage became common, and the debt provider Zamindars started grabbing the lands of the smallholders (Mukherji, 1986). Road transportation communication was not good enough, and water transportation was mainly used during rainy seasons. Railways were mainly used for military purposes.

During the 1942–1943 period, the Bengal economy experienced few shocks, including natural disasters and plant disease. The food demand was further increased by the increased military presence and sudden refugee influx from Burma, but inter-provincial trade obstacles did not allow them to obtain more food (Maharatna, 1992). The Japanese invasion of the neighboring country Burma further aggravated the crisis.

The situation worsened when Bengal experienced a series of natural disasters in October 1942. Widespread fungal brown spot diseases severely affect the production of the regular winter crop. Moreover, a mighty cyclone devastated croplands, killed many people, and destroyed many houses during mid-October. Severe food shortages started and were signaling something dangerous within a shorter period. Neighboring Burma's war situation greatly affected the food crisis in Bengal. Inflation and displacement became common features. Food distribution started,

but the upper class and middle class were prioritized. Food prices rose, and the clear signals of famine became apparent. The civil unrest further worsened the crisis. The food price was skyrocketing over the days and weeks, which were beyond the reach of the majority. The government tried to price control by bringing in rice supplies but failed (Sen, 1977). By March 1943, the provincial government rescinded price control, which resulted in an immediate dramatic price hike. The inflation between March and May 1943 was intense (Sen, 1976). The first death caused by starvation in Bengal was reported in May (Iqbal, 2011; Aykroyd, 1975).

The provincial government was not permitted to import food directly. The provincial government recommended and requested food imports, but Churchill's War Cabinet did not consider the request carefully. Food import requests were either rejected or reduced (Sen, 1981a).

Table 5.4 Cause-Specific Death Rates Pre-Famine and During-Famine Periods

Cause of Death	**Pre-famine 1937–41**	**1943**		**1944**	
	Rate	*Rate*	*%*	*Rate*	*%*
Cholera	0.73	3.6	23.88	0.82	0.99
Smallpox	0.21	0.37	1.3	2.34	23.69
Fever	6.14	7.56	11.83	6.22	0.91
Malaria	6.29	11.46	43.06	12.71	71.41
Dysentery/diarrhea	0.88	1.58	5.83	1.08	2.27
All other	5.21	7.2	14.11	5.57	0.74
All causes	19.46	31.77	100	28.75	100

Source: Maharatna, 1992

Though the food production shortage was shown as a critical problem for the 1943 Bengal famine, the view is widely debated (Gráda, 2015; Mahalanobis, 1944). Food shortage was not the sole reason. Food production in 1943 was only 5% less than the past five years and 13% higher than the food production in 1941, and no famine took place in 1941 (Sen, 1977). Government policies and their inability to control market and prices aggravated the famine and resulted in a massive death toll. Nearly 3.8 million people died during the Bengal famine of 1943,

but the rural deaths were under-recorded as a later estimation explored (Famine Inquiry Commission, 1945).

Chapter 6: Results

The analysis demonstrated in this chapter is based on a few independent and a range of dependent variables. The independent variables include excess mortality midpoints, the total number of famines, and the famine duration in months. The excess mortality midpoints are calculated based on different mortality ranges reported in various publications. The midpoints are calculated and used in the measurements to avoid extremes. The total number of famines indicates the number of famines that a country has faced since 1801. The total number of deaths is calculated based on the total number of deaths of all the famines a country has experienced since 1801. The duration of famine has been calculated in months, based on their beginning and ending months.

The calculation of this resource focuses on several development-related variables. The development-related dependent variables include gross national income (GNI), the GNI per capita, gross domestic product (GDP), the Economic status of countries, the status of economic groups, the economic freedom a country enjoys, and the human development index (HDI).

Different causal factors are responsible for poverty. The poverty-related dependent variables used in this research include the poverty headcount ratio, poverty gap index, poverty line, poverty ratio, the infant mortality rate (IMR), and literacy rate.

This study also has a considerable focus on intergenerational poverty, which has been observed on the basis of the global mobility index. To understand intergenerational mobility, it is crucial to measure both absolute and relative mobility. This research developed a correlation between the famine data and the contemporary absolute and relative mobility data with a range of absolute and relative mobility indicators.

Results

Table 6.1 Countries Affected by Famine (1860s to 2020)

Continent	Sub Continent	Countries that affected by famine (1860s-2020)				
		Total Famine	Mean Duration	SD Duration	Mean Mortality	SD Mortality
Africa						
	Northern Africa	6	28	18.07	459166.67	758336.45
	Sub-Saharan Africa	30	41.2	34.19	379947.23	772374.83
Americas						
	Caribbean	1	36		1000	
	South America	2	54	8.49	875000	176776.7
	Northern America	1	24		763000	
Asia						
	Eastern Asia	9	33.33	19.7	5741111.11	7596016.13
	South-eastern Asia	17	31.06	15.33	1965538.12	1993379.41
	Western Asia	4	48	42.71	295750	94721.96
Europe						
	Eastern Europe	6	46	36.73	4009666.67	3480817.53
	Northern Europe	2	49	52.33	550000	636396.1
	Western Europe	1	24		763000	

In line with the summary statistics presented in Table 1, Asia and Africa experienced the highest number of famines since the 1860s. Both continents experienced extreme weather conditions end had the highest number of famine deaths. The countries in Sub-Saharan Africa are considered major famine hotspots and experienced famines nearly five times more than the countries in Northern Africa. Only six countries in northern Africa experienced famine, whereas 30 countries in Sub-Saharan Africa experienced famine since the 1860s.

Just after Africa, Asian countries are in the second position in terms of famine occurrence and the number of deaths. In Asia, countries in Southeastern Asia experienced the highest number of famines (total of 17), nearly twice that of the countries in Eastern Asia (experienced nine famines). The countries in Western Asia faced only four famines during the given period.

Europe is in a better position, in comparison to Asia and Africa, in terms of famine occurrence and the number of famine deaths. The countries in Eastern Europe experienced the highest number of famines across all the subcontinents in Europe. Western Europe experienced only one family during this time. Among all the continents Americas experienced the least

number of famines. Only one Caribbean country, one country from South America, and one from North America experienced famine during the given period.

The summary statistics also demonstrate the economic achievements of the countries that experienced famines across the four continents. The table shows that more famine-affected countries from Europe and the Americas had better economic performance and reached a prestigious economic condition than those from Asia and Africa. The famine-affected countries in Africa still lack remarkable economic growth and development, and some countries still face famine today. Famine-affected countries in Asia are in a better position than famine-affected countries, but they are still experiencing hunger and poverty-related problems at a remarkable scale.

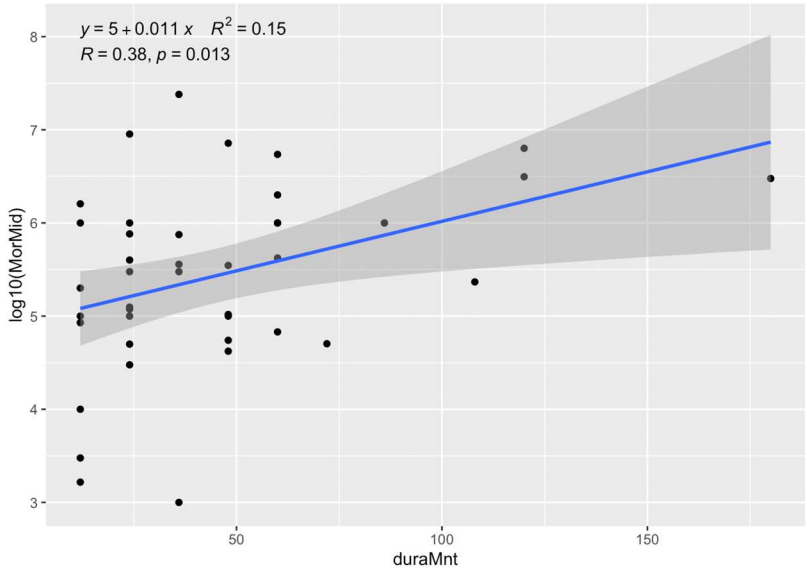


Figure 6.1 Famine Duration Versus Famine Mortality

This figure demonstrates famine mortality that is plotted against famine duration. The figure that relates to the classic example of the correlation would be doing modality and the duration of famine (in months). The figure shows that with the extended duration of famine, mortality increases. In other words, if the duration is longer, the mortality or the death toll becomes higher.

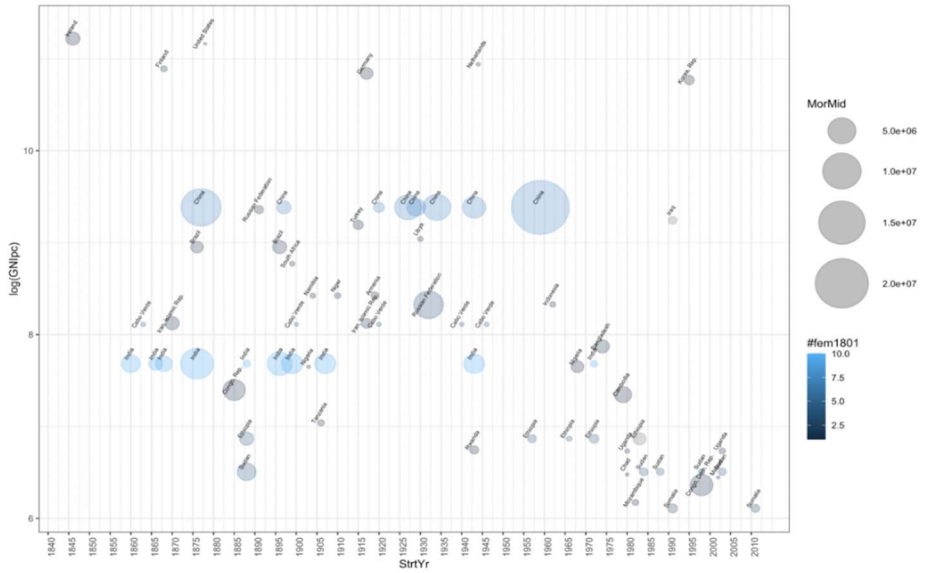


Figure 6.2 GNI, Mortality, and the Number of Famines

The figure above presents the number of famines that occurred, their starting years, famine mortality, and par capita GNI across countries. The X-axis presents the start year of famines, and the Y-axis presents the log of GNI per capita. The bigger dots represent higher mortality, whereas the smaller dot shows lower mortality.

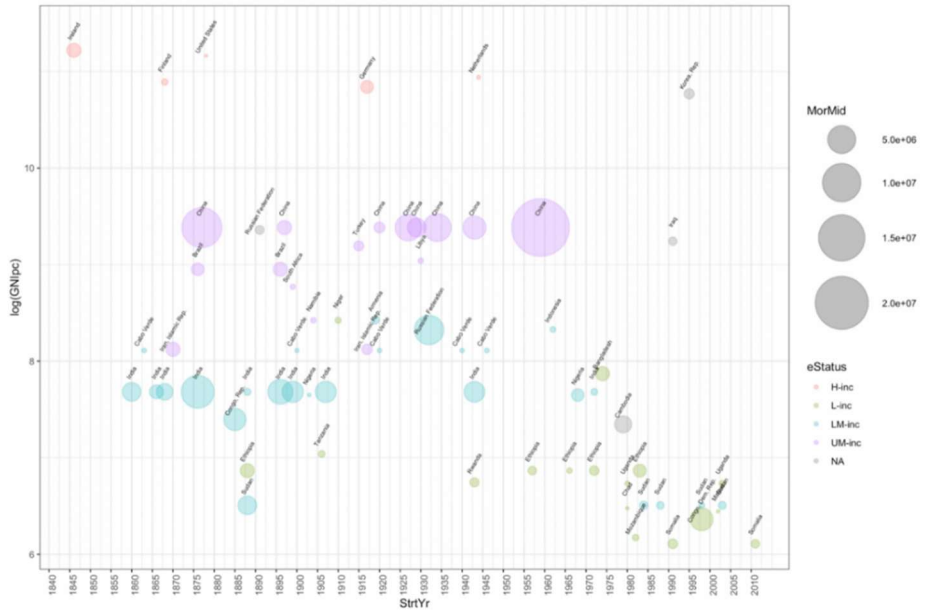


Figure 6.3 Famine Mortality, GNI, and the Present-Day Economic Status of Famine-Affected Countries

The above figure shows famine mortality and the present-day economic status of those countries that experienced famines in the past. The X-axis lots the start year of famine, and the Y-axis measures the log of per capita GNI. The bigger dot represents higher mortality, whereas the smaller dot represents lower mortality. Different colors represent the economic status of those countries that experienced famine in their history.

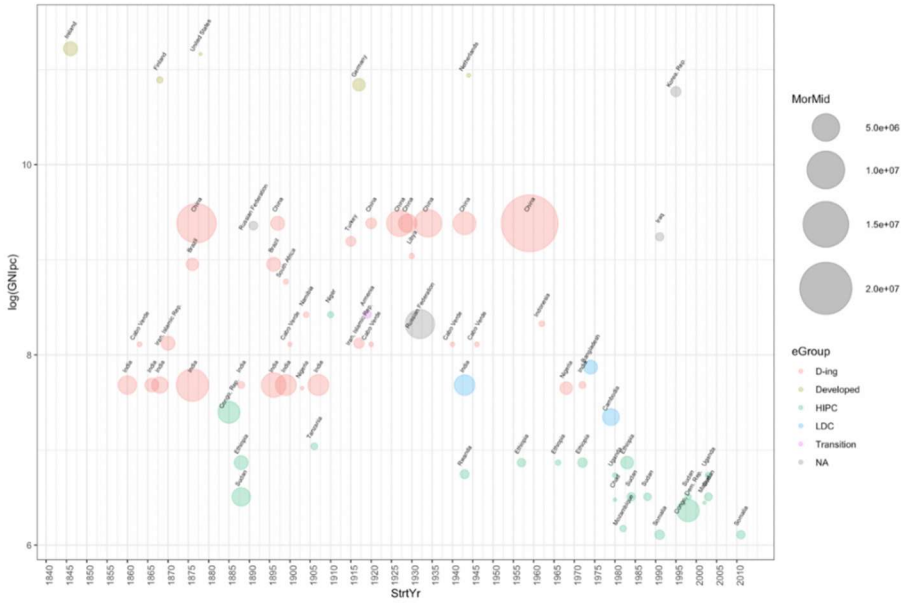


Figure 6.4 Famine Mortality, GNI, and the Present-Day Economic Status of Famine-Affected Countries

The figure above depicts famine mortality and the present-day economic group status. the X-axis represents the starting year of famines, and the Y-axis represents the log of per capita GNI. The economic group ranges from the developed economy, developing, transition economy, Less developed, And heavily indebted poor countries. The coloring dots represent different types of economic status groups.

Table 6.2 Summary Statistics

Variable Name	Mean & SD
Number of Famines	4.14 (3.22)
Child downward educational Mobility (to Q1)	0.37 (0.03)
Child upward educational Mobility (to Q3)	0.21 (0.03)
Child upward educational Mobility (to Q4)	0.13 (0.03)
Human Development Index	0.64 (0.15)
Literacy Rate	75.22 (22.80)
Log of duration in months	3.42 (0.64)
Log of GDP	12.60 (2.87)
Log of Mortality	12.71 (2.12)
Log of Poverty gap index	1.85 (1.01)
Child educational upward mobility from a person born in bottom half	39.41 (2.87)

The summary statistics presented above displace some important features of the frame in data. On average, as the summary table shows, each country experienced nearly four famines during the given period. The probability that a child moving from the bottom half ends up in the first quartile is 0.37. The probability that a child moving from the bottom half ends up in the third quartile is 0.21. The probability that a child moving from the bottom half ends up in the top quartile is 0.13. The average HDI for each country is .64. Having a higher HDI means a higher standard of living, whereas a lower HDI indicates a lower Standard of living. On average, nearly 75% of the population is literate in each country. Each country's famine average duration is 3.32 months. On average, the child's educational upward mobility from a person born in the bottom half is 39.41 percent.

Table 6.3 Correlation of Child Educational Upward Mobility from a Person Born in the Bottom Half against Famine and other Covariates

	Child educational upward mobility from a person born in bottom half	*Log of duration in months*	*Number of famines*	*Human Development Index*	*Log of Mortality*	*Log of GDP*	*Literacy Rate*	*Log of Poverty Gap Index*
Child educational upward mobility from a person born in bottom half								
log of duration in months	-0.087							
Number of famines	-0.363**	-0.092						
Human Development Index	-0.168	0.021	0.006					
Log of mortality	-0.420***	0.196	0.475***	0.14				
log of GDP	-0.502***	-0.049	0.399***	0.489***	0.416***			
Literacy Rate	-0.216	0.218	0.109	0.857***	0.354**	0.431***		
Log of Poverty Gap Index	0.031	0.151	-0.021	-0.669***	-0.15	-0.117	-0.495***	

Computed correlation used pearson-method with pairwise-deletion.

The log of duration in months is negatively but weakly correlated with the child's educational upward mobility from a person born in bottom half. Number of famines are negatively and strongly correlated with the child educational upward mobility from a person born in the bottom half. which means the higher number of famines, lowers the possibility of children's educational upward mobility from a person born in the bottom half. The correlation is statistically significant. The human development index is negatively correlated with the children's educational upward mobility from a person born in the bottom half.

The log of mortality is negatively end strongly correlated with child's educational upward mobility from a person bottom in the bottom half. The correlation is statistically significant at the 1% level of significance. The log of GDP is negatively and strongly correlated with child's educational upward mobility from a person bottom in the bottom half. The log of poverty gap index is positive but weakly correlated with child's educational upward mobility from a person bottom in the bottom half.

Table 6.4 Correlation of Child Downward Educational Mobility against Famine and other Covariates

	Child downward educational Mobility (to Q1)	*Log of duration in months*	*Number of famines*	*Human Development Index*	*Log of Mortality*	*Log of GDP*	*Literacy Rate*	*Log of Poverty Gap Index*
Child downward educational Mobility (to Q1)								
log of duration in months	0.177							
Number of famines	0.288*	-0.092						
Human Development Index	0.355**	0.021	0.006					
Log of mortality	0.447***	0.196	0.475***	0.14				
log of GDP	0.531***	-0.049	0.399***	0.489***	0.416***			
Literacy Rate	0.438***	0.218	0.109	0.857***	0.354**	0.431***		
Log of Poverty Gap Index	-0.068	0.151	-0.021	-0.669***	-0.15	-0.117	-0.495***	

Computed correlation used pearson-method with pairwise-deletion.

The log of duration of famine is positively but very weakly correlated with child downward educational mobility, which indicate that the longer duration in famine is correlated with higher child downward mobility. The number of famine is positively but weakly correlated with child downward educational mobility. Which means that with the higher number of famine

is correlated with the higher child download mobility, and the correlation is statistically significant at the 5% level of significance.

The Human Development Index is positively correlated with child downward educational mobility, which indicate that the higher Human Development Index is consistent with higher downward educational mobility.

Table 6.5 Correlation of Child Upward Educational Mobility against Famine and other Covariates

	Child upward educational mobility (to Q3)	*Log of duration in months*	*Number of famines*	*Human Development Index*	*Log of Mortality*	*Log of GDP*	*Literacy Rate*	*Log of Poverty Gap Index*
Child upward educational mobility (to Q3)								
log of duration in months	-0.129							
Number of famines	0.001	-0.092						
Human Development Index	-0.238	0.021	0.006					
Log of mortality	-0.345**	0.196	0.475***	0.14				
log of GDP	-0.229	-0.049	0.399***	0.489***	0.416***			
Literacy Rate	-0.352**	0.218	0.109	0.857***	0.354**	0.431***		
Log of Poverty Gap Index	0.198	0.151	-0.021	-0.669***	-0.15	-0.117	-0.495***	
								Computed correlation used pearson-method with pairwise-deletion.

The above correlation table shows that both the log of duration in months and the human development index is negatively but weekly correlated with child upword educational mobility, showing that both those variables has a very weak influence in present-day child upward mobility. The table shows that the log of mortality and the child upword mobility is negatively correlated, which indicates that the higher mortality is negavely correlated with child upword educational mobility and the correlation is statistically significant.

Table 6.6 Correlation of Child Upward Educational Mobility against Famine and other Covariates

	Child upward educational Mobility (to Q4)	*Log of duration in months*	*Number of famines*	*Human Development Index*	*Log of Mortality*	*Log of GDP*	*Literacy Rate*	*Log of Poverty Gap Index*
Child upward educational Mobility (to Q4)								
log of duration in months	-0.021							
Number of famines	-0.393**	-0.092						
Human Development Index	-0.019	0.021	0.006					
Log of mortality	-0.368**	0.196	0.475***	0.14				
log of GDP	-0.446***	-0.049	0.399***	0.489***	0.416***			
Literacy Rate	-0.066	0.218	0.109	0.857***	0.354**	0.431***		
Log of Poverty Gap Index	-0.075	0.151	-0.021	-0.669***	-0.15	-0.117	-0.495***	
								Computed correlation used pearson-method with pairwise-deletion.

The correlation above demonstrates that the famine duration in months are negatively and weakly correlated with the child upward educational mobility. The number of famine is negatively correlated with the child upward educational mobility (Q4), which indicates that the higher number of famines is negatively correlated with child upward educational mobility. The correlation is statistically significant.

Regression

Table 6.7 Regression 1 [With Child Educational Upward Mobility from a Person Born in Bottom Half/ MU050]

	Model A **Independent Only**	Model B **Significant Independent with Control**	Model C **Significant Independent Only**
Predictors	Estimates	Estimates	Estimates
(Intercept)	46.41 *** (2.36)	54.19 *** (4.39)	49.28 *** (2.45)
log of duration in months	-0.35 (0.53)	-0.09 (0.59)	-0.48 (0.50)
Number of famines	-0.19 (0.11)	-0.14 (0.13)	-0.13 (0.11)
Log of mortality	-0.40 * (0.17)	-0.38 (0.20)	-0.26 (0.17)
Log of GDP		-0.40 ** (0.14)	-0.35 ** (0.12)
Literacy rate		-0.03 (0.04)	
Population growth		-0.93 (0.64)	
Observations	66	60	66
R2 / R2 adjusted	0.222 / 0.184	0.354 / 0.281	0.315 / 0.270
log-Likelihood	-154.073	-135.518	-149.863

p<0.05 ** p<0.01 *** p<0.001

In model A we see that mortality rate is significantly associated with child educational upward mobility from a person born in bottom half but after controlling for GDP the linear model (Model C) lack power to detect the association.

Table 6.8 Regression 2 [With Child Downward Educational Mobility (to Q1) BHQ1]

	Model A **Independent Only**	Model B **Significant Independent with Control**	Model C **Significant Independent Only**
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	0.260 *** (0.028)	0.182 *** (0.051)	0.220 *** (0.028)
Log of duration in months	0.009 (0.006)	0.007 (0.007)	0.011 (0.006)
Number of famines	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Log of mortality	0.006 ** (0.002)	0.004 (0.002)	0.004 (0.002)
Log of GDP		0.004 * (0.002)	0.005 *** (0.001)
Literacy rate		0.001 (0.000)	
Population growth		0.006 (0.007)	
Observations	66	60	66
R^2 / R^2 adjusted	0.245 / 0.208	0.409 / 0.342	0.371 / 0.329
log-Likelihood	138.924	132.209	144.942

p<0.05 ** p<0.01 *** p<0.001

In model A, we see a strong association between mortality after controlling for number of famine and length of famine. This association is not significant when it is controlled for GDP (Model C). Other way, we can say that we do not have enough data to conclude association between mortality rate and BHQ1 after controlling for GDP.

Table 6.9 Regression 3 [With Child Upward Educational Mobility (to Q3) BHQ3]

	Model A **Independent Only**	Model B **Significant Independent with Control**	Model C **Significant Independent Only**
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	0.272 *** (0.022)	0.233 *** (0.042)	0.281 *** (0.024)
Log of duration in months	-0.003 (0.005)	-0.003 (0.006)	-0.003 (0.005)
Number of famines	0.001 (0.001)	0.003 * (0.001)	0.002 (0.001)
Log of mortality	-0.005 ** (0.002)	-0.005 * (0.002)	-0.004 ** (0.002)
Log of GDP		0.000 (0.001)	-0.001 (0.001)
Literacy rate		0.000 (0.000)	
Population growth		0.010 (0.006)	
Observations	66	60	66
R^2 / R^2 adjusted	0.162 / 0.121	0.273 / 0.191	0.173 / 0.119
log-Likelihood	155.460	144.108	155.924

*p<0.05 ** p<0.01 *** p<0.001*

The mortality rate is significantly associated with child upward educational mobility (to Q3) after controlling for the number of famine and length of famine. 1% increase in mortality decreases in the Child's upward educational mobility (to Q3) by 0.00005. We see a statistical significant relationship between mortality and the child's upward educational mobility (to Q3) even after controlling for GDP (Model C).

Table 6.10 Regression 4 [With Child Upward Educational Mobility (to Q4)/ BHQ4]

	Model A **Independent Only**	Model B **Significant Independent with Control**	Model C **Significant Independent Only**
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	0.183 *** (0.025)	0.269 *** (0.046)	0.209 *** (0.027)
Log of duration in months	-0.001 (0.006)	0.002 (0.006)	-0.002 (0.006)
Number of famines	-0.003 * (0.001)	-0.002 (0.001)	-0.002 (0.001)
Log of mortality	-0.003 (0.002)	-0.003 (0.002)	-0.002 (0.002)
Log of GDP		-0.005 ** (0.002)	-0.003 * (0.001)
Literacy rate		-0.000 (0.000)	
Population growth		-0.013 (0.007)	
Observations	66	60	66
R^2 / R^2 adjusted	0.199 / 0.160	0.342 / 0.267	0.262 / 0.214
log-Likelihood	145.327	138.133	148.068

*p<0.05 ** p<0.01 *** p<0.001*

In model A we see that number of famine is significantly associated with child upward educational Mobility (to Q4). One more famine decreases a child upward educational Mobility (to Q4)by 0.003. After controlling for GDP we don't see a statistically significant association of any independent variable with child upward educational Mobility (to Q4) (Model C).

For further verification and clarity, a robustness test (available in Appendix B) was conducted based on the famines that occurred from 1950 to 2020. A total of 26 famines happened during this time. In the robustness test, only one variable (The probability of a child from the

bottom half ending up in the first quartile or BHQ1) is statistically significant. With these few observations, the statistical model does not have adequate power to detect any association.

Chapter 7: Discussion and Conclusions

Famine is a many-headed evil. It may occur for various reasons, but its manifestations share similarities across continents and regions. Historically, few countries that have experienced famine are now fully developed economies. However, countries that formulated and implemented deliberate policies, successfully managed conflicts, established stable governments, and alleviated poverty and hunger emerged as developed economies in later years. Whereas most famine-affected countries in Europe and the Americas have successfully managed their challenges and emerged as developed economies, most famine-affected African countries failed to manage conflicts and other challenges.

Discussion

Based on available data, Africa and Asia can be considered major famine hotspots, as most famines occurred on these two continents. Europe is in the third position regarding frequency, whereas America experienced the fewest famines during the given period. Countries in sub-Saharan Africa experienced the most famines than any other subcontinent. A total of 18 countries experienced famines in that region, and some are still experiencing famine and extreme hunger today.

Asian countries experienced similar famine to African countries, though the famine mortality and other consequences vary greatly. Among the three Asian continents that experienced famine, southeastern Asia can be considered an Asian famine hotspot. A total of 17 famines occurred in southeastern Asia. Eastern Asian countries have experienced nine famines since the 1860s. While no country in Asia is currently experiencing famine, poverty and hunger are still notable.

Among the three European continents that experienced famine, the Eastern European countries experienced more famine than the others. A total of six famines occurred in Eastern Europe. Countries in northern Europe experienced only two famines, and Western Europe experienced only one famine.

As a continent, the Americas experienced the least number of famines. South America experienced two famines, and the Caribbean and North America experienced only one.

The countries that had famine experiences in the past are performing very differently in terms of economic growth and development. Some countries have evolved from their deadly past, overcome the challenges of the famine's influences, have successfully lifted out of poverty and appeared as flourishing economies. Indeed, some countries are upper-middle or lower-middle-income countries, given their economic performances, growth, and development. Yet, many countries could not overcome the challenges and are still experiencing poverty.

Sub-Saharan Africa, for example, experienced nearly five times more famines than Northern Africa. Of the 18 countries that experienced famine in sub-Saharan Africa, 10 are still poor, two have become upper-middle-income countries, and none have become high-income countries. Among the two countries that experienced famine in northern Africa, one country appeared as an upper-middle-income country, while the other appeared as a lower-middle-income country.

Three subcontinents in Asia experienced famine. Among the four countries that experienced famine in Western Asia, only one successfully overcame economic challenges and appeared as an upper-middle-income country. Among the seven countries in southeastern Asia, only one ranks as an upper-middle-income country; two are lower-middle-income countries and one is still poor.

European countries that experienced famine in the past are doing great today. Two countries in Northern Europe and one in Western Europe that experienced famine in the past

overcame the famine-induced challenges in their later years and became high-income countries. Two countries in Western Europe are also showing flourishing economic performances.

In the Americas, three subcontinents experienced famine. Some countries have successfully overcome the famine-induced challenges and are now high-income countries. Only one country in the Caribbean region experienced famine and has become a high-income country today. One North American country experienced famine and turned into a developed country. Two countries experienced famine in South America; one of them has overcome the challenges and appears as an upper-middle-income country.

I generated correlation coefficients between famine variables (including farming mortality midpoints, total mortality, the total number of famines, and famine duration) and control variables (including GDP, GNI, GNI per capita, HDI, and population growth). The correlation coefficients (presented in Correlation 1) indicate that famine duration in months is negatively correlated with a child's educational upward mobility from a person born in the bottom half. The correlation is significant. The same table also shows a significant correlation between the famine duration and a child's educational upward mobility from a person born in the bottom half. These data suggest that famine mortality and famine duration are still influencing poverty outcomes and deepening poverty in many countries that experienced famine in the past.

The correlation coefficients of the famine variables (presented in Correlation 2) with some of the poverty indicators (including poverty ratio, poverty gap index, and poverty headcount ratio) are demonstrated in Table 3. The correlation coefficients indicate that the number of famines is positively correlated with the downward mobility of the children. This suggests that higher famine mortality may increase downward mobility. And the correlation is statistically significant.

I plotted the correlation of famine variables with some other variables related to poverty in Correlation 4. The correlation coefficients also indicate a very weak correlation between

famine and mobility variables. The correlation coefficients demonstrated that both famine mortality and famine duration are negatively related to the child's upward mobility to the top quartile. This means that when famine duration and mortality are higher, a child is less likely to attain upward mortality to the top quartile. Some variables are not strongly correlated; in that case, my existing data is not sufficient to prove their strength. More specific data might help us draw more precise conclusions.

The weaker correlation between the independent and dependent variables does not necessarily mean that famine events do not impact present-day poverty. Rather, it implies that individual countries can develop their own policies and stimulate economic growth to avoid the gruesome impact of famines.

The correlation tables and their coefficients help us to conclude that famine-experienced countries are capable of avoiding the long-term impacts on development through poverty alleviation efforts. Such approaches can help countries reduce poverty and improve outcomes across generations. Both absolute mobility and relative mobility indicators and their coefficients with the famine-related variables demonstrate that famine-induced poverty has very weak correlations with little chance of poverty continuing through intergenerational mobility.

Conclusion

The present study was conducted with two objectives in the center. The first objective was to explore whether past famines are influencing or deepening poverty for countries that have experienced famine in their past. The next chapter focused on major contributing factors of famine events. It considered climate change as a major contributing factor to hunger. The second objective was to explore whether famine events impacted poverty outcomes and fueled intergenerational poverty, in terms of intergenerational educational mobility.

In line with objective one, the deeper connection between poverty and famine is elaborated in chapter five. In understanding those connections, I draw examples from Asia, Africa, and European countries. Country-specific consequences are broadly discussed in chapter 4. The chapter explores that hunger is the consequence of continuing poverty. People who live below the poverty line often experience hunger situations. Natural disasters are also triggering factors that may result in hunger situations; if governments are incapable of dealing with hunger and supporting the poor, the condition may last longer. If the investment in agriculture is not efficient, that may result in lower production. This may not feed the entire population of an economy. The final connection focuses on the conflict and unstable governance. Conflict-induced famines are frequent in some African countries.

Chapter three focused on the contributing factors of famine events and how climate change has become a major triggering factor in explaining famine in the contemporary world. It contains wide-ranging discussions about the major contributing factors to famine. This research identified major contributing factors to famine, including livelihood failure and lack of job opportunities; environmental factors and climate change; long-term food insecurity and a price hike among major food items; inequality; unstable markets; lack of democracy; myopic planning and policy failures; and Covid-19 and other pandemics. Chapter three also contains extended discussion on ways climate change explains hunger and famine events in many parts of the world today. Drawing relevant examples from various countries, the factors are discussed in detail. The results chapter shows that the available data fails to show that the past-day famine has a correlation with the present-day depth of poverty.

The major focus of objective two was to examine how famine events negatively influence contemporary poverty outcomes and explore long-term intergenerational mobility of the countries that experienced famine in the 19th and 20th centuries. This is widely discussed in chapter five, based on datasets published by the University of Oxford, Tufts University, the World Bank, the

World Economic Forum, the UNDP, and other reliable sources. Data has been plotted in different ways to make necessary conclusions. The correlation coefficients explore the influence of famine factors weakly correlated with present day influence on intergenerational poverty. I elaborate this discussion in chapter five with relevant quantitative tables and graphs. The data shows that previous famine events are negatively correlated with present day intergenerational mobility.

Recommendations

Following recommendations are designed to explore how developing countries, where unskilled labor and technology have been used in land use and agricultural production, can transform their traditional practices to modern knowledge and innovation-based farming practices and boost their production. In doing so, developing countries can effectively solve their food insecurity problems and build their own food networks. Thus, poor countries can avoid persistent hunger and the future possibility of famine in their territory.

A. Making Farming More Rewarding and Attractive

Farmers in developing countries use rudimentary technology and practices to produce crops. Such outdated methods are less effective, resulting in less output and more physical labor. Consequently, farmers may become frustrated with the less lucrative agricultural sectors and may encourage their children to choose jobs in service or other non-farming sectors.

Providing incentives to agriculture is not enough. It is crucial to building the human resources engaged in agriculture. Until farmers are aware of how important their work is, how they can use their full potential and boost their production thus transforming human liability into a human asset or capital the food insecurity problems in developing countries will not be solved.

B. Improving Livelihood Options and Employment Opportunities

Livelihood failure is a major issue for families after losing income opportunities. Families cannot find alternative jobs when the poor depend on agriculture like single job

opportunities. In disaster-prone areas, agriculture jobs become unavailable soon after a disaster occurs. Low-income families lack or have fewer options to diversify their livelihoods and therefore lack sufficient opportunities to maintain their families. Therefore, they skip meals to preserve food for their children. If sustainable jobs are created in poor countries or areas where poor people are concentrated, the poor won't have to starve, as jobs are stable and can continue earning. Jobs should have insurance protection plans and opportunities if employees are sick. Consequently, they may not lose their jobs immediately. This type of protection may help families not to starve.

C. Training and Skill-Building for the Young

Employment opportunities should not be limited to adult members of poor households. Young adults should have incentivized opportunities to work independently and contribute to their families. Incentives might boost their willingness to contribute. When jobs are there, they have a better chance to contribute, and ultimately the national economy would be in a better position with a greater labor force contributing to the economy.

Squandered potential among youth is a profound waste in developing economies. Many youths are willing to contribute to their families and communities. Opportunities should be open to them, so that they may contribute at a young age.

D. Building Urban-Rural Communication, Creating an Exchange Environment and Building an Effective Food Distribution Network

Rural farm workers may consider themselves of a lower status than urban workers, who often use more advanced technology and processes. Thus, they cannot fully concentrate on their potential and produce more crops. Connecting such workers to urban offices through production networks can make them aware of their contributions and their role in economic growth. As well, with advanced technology and knowledge, they can become more efficient in producing more crops with less physical labor.

Connecting young rural farming partitioners and urban suppliers (sellers) would lessen the possibility of middlemen taking the greater profit one cause of disengagement among farmers. The connection would create an opportunity for rural farmers to get proper prices for their produced items, which can boost their interest and economic stability. Once their savings are strong enough, they can invest more and produce better crops by applying scientific tools and techniques. This would further strengthen their financial stability and the national economy.

E. Improved Transportation System

This serious issue may improve food security and reduce the possibility of famine. Once farmers can obtain better transportation, they can get the just price. Improved transportation contributes great marketing opportunities for those engaged with it. It can easily transport resources and products from one place to another, from rural to urban centers, and from urban to rural areas.

E. Reducing Scope for Conflict

In developing economies, like parts of Africa, agricultural production and food production opportunities are largely deterred by conflict. Conflicts should be resolved efficiently by any means with the involvement of international communities like the United Nations through discussions with conflicting groups. For the sake of national development, if the contradictory groups can work in the same direction to enrich the national economy, the hunger problem could be eliminated in the long term.

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Appendix A: Selected Variable Names and Their Explanations

Variable Name	Definition and measurement
Country	Country
Province	Name of the province where famine occurred. The province that experience famine includes: 1. Africa, 2. Americas, 3. Asia, and 4. Europe. Oceania never experiences any famine so far.
Year	Start and end year of famine
Start year	Beginning year of famine
End year	Ending year of famine
Time in Months	Specific start and end months of famine, used to calculate the duration of famine
Actual duration	Calculated based on the start and ending months of the famines
Continent	Continent where famine occurred
Sub-continent	Sub-continent where famine occurred
Duration in months	Duration in months, calculated based on the start and ending months of the famines
Number of famine	Number of famines occurred since 1801
Mortality midpoints	Excess Mortality Midpoints
HDI	Human Development Index
GNI recent	GNI of most recent year
GNI per capita	Per Capita GNI
Economic Status	Economic status of the country [currently]
Economic Group	Economic group that the country fall in [at present]
Poverty Line	Poverty_Line _%/ month
Poverty HCR	Poverty Head Count Ratio (%)
Poverty Gap Index	Poverty Gap Index (%)
Poverty Gap Index year	Most recent year of the poverty gap ratio
Poverty ratio	Poverty ratio
Poverty ration year	Most recent year of the poverty gap ratio
Social Mobility Index	Social Mobility Index published by the World Economic Forum
Democracy score	Democracy score by the Freedom House
Economic freedom status	Economic freedom status
Political right status	Score in terms of political rights
Civil liberty status	Civil liberty score
crpIndx	Corruption index, measured by transparency international
CAT	Absolute mobility based on 5 ISCED categories
YOS	Absolute mobility based on years of schooling
MU050	Expected child educational rank from a person born in the bottom half

BHQ4	Pr child from the bottom half ends up in Q4 (top quartile)
Q4Q4	Pr child from the top quartile stays in the top quartile
BHQ1	Pr child from the bottom half ends up in Q1 (lowest quartile)
BHQ2	Pr child from the bottom half ends up in Q2
BHQ3	Pr child from the bottom half ends up in Q3
Q4BH	Pr child from the highest quartile ends up in the bottom half

Appendix B: Robustness Test Using Famine Cases from 1951 to 2022

Correlation 1 [MU050]

	MU050	*logduraMnt*	*#fem1801*	*hdi*	*logMor*	*logGDP*	*LitRate*	*logpovGindex*
MU050								
logduraMnt	0.053							
#fem1801	-0.264	-0.094						
hdi	-0.540*	0.162	0.315					
logMor	-0.386	0.316	0.287	0.357				
logGDP	-0.283	0.182	0.145	0.652**	0.119			
LitRate	-0.396	0.384	0.037	0.854***	0.352	0.591**		
logpovGindex	0.257	0.145	-0.504*	-0.575**	-0.261	-0.045	-0.366	

Computed correlation used pearson-method with pairwise-deletion.

Correlation 2 [BHQ1]

	BHQ1	*logduraMnt*	*#fem1801*	*hdi*	*logMor*	*logGDP*	*LitRate*	*logpovGindex*
BHQ1								
logduraMnt	0.162							
#fem1801	0.088	-0.094						
hdi	0.638**	0.162	0.315					
logMor	0.454*	0.316	0.287	0.357				
logGDP	0.424*	0.182	0.145	0.652**	0.119			
LitRate	0.571**	0.384	0.037	0.854***	0.352	0.591**		
logpovGindex	-0.073	0.145	-0.504*	-0.575**	-0.261	-0.045	-0.366	

Computed correlation used pearson-method with pairwise-deletion.

Correlation 3 [BHQ3]

	BHQ3	logduraMnt	#fem1801	hdi	logMor	logGDP	LitRate	logpovGindex
BHQ3								
logduraMnt	-0.056							
#fem1801	-0.204	-0.094						
hdi	-0.357	0.162	0.315					
logMor	-0.426*	0.316	0.287	0.357				
logGDP	-0.025	0.182	0.145	0.652**	0.119			
LitRate	-0.337	0.384	0.037	0.854***	0.352	0.591**		
logpovGindex	0.328	0.145	-0.504*	-0.575**	-0.261	-0.045	-0.366	

Computed correlation used pearson-method with pairwise-deletion.

Correlation 4 [BHQ4]

	BHQ4	logduraMnt	#fem1801	hdi	logMor	logGDP	LitRate	logpovGindex
BHQ4								
logduraMnt	0.168							
#fem1801	-0.219	-0.094						
hdi	-0.493*	0.162	0.315					
logMor	-0.230	0.316	0.287	0.357				
logGDP	-0.297	0.182	0.145	0.652**	0.119			
LitRate	-0.322	0.384	0.037	0.854***	0.352	0.591**		
logpovGindex	0.177	0.145	-0.504*	-0.575**	-0.261	-0.045	-0.366	

Computed correlation used pearson-method with pairwise-deletion.

Regression 1 [MU050]

	Independent Only	Significant Independent with Control	Significant Independent Only
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	44.54 ***	49.47 ***	46.09 ***
	(3.48)	(6.29)	(4.18)
logduraMnt	0.74	1.54	0.93
	(0.91)	(1.05)	(0.97)
#fem1801	-0.11	-0.21	-0.08
	(0.23)	(0.25)	(0.23)
logMor	-0.59	-0.48	-0.61
	(0.30)	(0.37)	(0.31)
logGDP		-0.04	-0.17
		(0.30)	(0.24)
LitRate		-0.09	
		(0.06)	
popGrowth		-1.01	
		(0.90)	
Observations	20	20	20
R^2 / R^2 adjusted	0.250 / 0.109	0.388 / 0.105	0.273 / 0.079
log-Likelihood	-43.891	-41.859	-43.573

• *p<0.05 ** p<0.01 *** p<0.001*

Regression 2 [BHQ1]

	Independent Only	Significant Independent with Control	Significant Independent Only
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	0.254 ***	0.198 *	0.211 **
	(0.047)	(0.083)	(0.054)
logduraMnt	0.002	-0.009	-0.003
	(0.012)	(0.014)	(0.012)
#fem1801	-0.001	-0.000	-0.002
	(0.003)	(0.003)	(0.003)
logMor	0.008	0.006	0.009 *
	(0.004)	(0.005)	(0.004)
logGDP		0.002	0.005
		(0.004)	(0.003)
LitRate		0.001	
		(0.001)	
popGrowth		0.007	
		(0.012)	
Observations	20	20	20
R^2 / R^2 adjusted	0.265 / 0.127	0.431 / 0.168	0.360 / 0.190
log-Likelihood	42.065	44.623	43.457

• *p<0.05 ** p<0.01 *** p<0.001*

Regression 3 [BHQ3]

	Independent Only	Significant Independent with Control	Significant Independent Only
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	0.271 ***	0.242 **	0.258 ***
	(0.033)	(0.063)	(0.040)
logduraMnt	0.003	0.003	0.001
	(0.009)	(0.010)	(0.009)
#fem1801	-0.001	-0.002	-0.001
	(0.002)	(0.002)	(0.002)
logMor	-0.005	-0.003	-0.005
	(0.003)	(0.004)	(0.003)
logGDP		0.003	0.001
		(0.003)	(0.002)
LitRate		-0.001	
		(0.001)	
popGrowth		-0.000	
		(0.009)	
Observations	20	20	20
R^2 / R^2 adjusted	0.231 / 0.086	0.313 / -0.004	0.249 / 0.048
log-Likelihood	49.073	50.203	49.313

• *p<0.05 ** p<0.01 *** p<0.001*

Regression 4 [BHQ4]

	Independent Only	Significant Independent with Control	Significant Independent Only
Predictors	*Estimates*	*Estimates*	*Estimates*
(Intercept)	0.143 ***	0.206 **	0.158 ***
	(0.030)	(0.050)	(0.036)
logduraMnt	0.007	0.016	0.009
	(0.008)	(0.008)	(0.008)
#fem1801	-0.001	-0.002	-0.001
	(0.002)	(0.002)	(0.002)
logMor	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)
logGDP		-0.001	-0.002
		(0.002)	(0.002)
LitRate		-0.001	
		(0.000)	
popGrowth		-0.013	
		(0.007)	
Observations	20	20	20
R^2 / R^2 adjusted	0.143 / -0.018	0.399 / 0.121	0.175 / -0.045
log-Likelihood	51.184	54.732	51.568

• *p<0.05 ** p<0.01 *** p<0.001*