Review Article

Journal of Drought and Climate change Research (JDCR)

Summer 2025, Vol. 3, No. 10, pp 111-132

10.22077/jdcr.2025.9277.1138

Impact of Livelihood-Based Social Protection on Climate Change Adaptation: Evidence from Rural Ethiopia

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Keywords:
Climate change, Livelihood, Social protection, Adaptation action, Ecological well-being, rural community.

Received:
24 April 2025

Revised:
26 May 2025

Accepted:
26 May 2025

Abstract

The concern of climate change and its multifaceted social, economic, ecological, cultural, and political effects spire almost all developing countries. This requires a long-term commitment from government and non-government developmental entities. As well broadened understanding of how human societies – and the activities that take place within them – drive climate change. So, this review paper aims to analyze and examine climate change-induced effects, and the impact of livelihood-based social protection on climate change adaptation of rural communities in Ethiopia. This has been carried out via a systematic literature review method to map out the thematic field under investigation through a scoping review and comprehensive assessment of findings, research, and practices regarding the concern of climate change. Indeed, most of the climate action undertaken in the rural part of the country lacks inclusiveness. Which is much more emphasized and viewed through the lens of ecological aspects. This undermines and neglects deep-rooted rural communities' livelihood systems and the social and attitudinal dimensions. Therefore, a rights-based approach holds considerable promise for injecting urgency and ambition into global climate action. While safeguarding the most vulnerable people in rural society focusing on equity and social justice offers both a compelling moral and ethical argument for action rather than the authoritative basis of advocacy. It helps to give voice to the most vulnerable groups, through designing livelihood-based social protection schemes as an approach and strategy for future climate change adaptation and mitigation action in the rural parts of the country.

How to cite this article:
Ahmed, A. (2025). Impact of Livelihood-Based Social Protection on Climate Change Adaptation: Evidence from Rural Ethiopia. *Journal of Drought and Climate change Research* (JDCR), 3(10), 111-132. 10.22077/jdcr.2025.9277.1138

Introduction

Climate change is widely acknowledged as foremost among the formidable challenges facing the international community in the 21st century. It poses challenges to fundamental elements of our understanding towards appropriate goals for social, and economic policy, through connecting economic growth, equity, and sustainable development. For most developing countries climate change is known as one of the most urgent and complex challenges for rural societies and their economies (UNDP, 2007). Which complicates existing challenges of poverty eradication (Adger et al., 2003) and the realization of Millennium Development Goals. Left unaddressed climate change contains the potential to reverse progress on sustainable development and compromise the well-being of the current and future rural communities' generations. Adaptation to climate change is necessary for all countries that seek to reduce the current impacts of climate change and increase resilience to future impacts. It is highly relevant for developing countries whose societies are already struggling to meet the challenges posed by existing climate variability (Yamin et al., 2005; Adger et al., 2003). For these countries, adaptation has grown from a minor environmental concern to a major challenge for human development and a crucial element in eradicating rural poverty (Davies et al., 2008), and food insecurity. The term adaptation is described and defined in various types and forms, including anticipatory and reactive adaptation, and autonomous and planned adaptation. To distinguish this, IPCC[1] (2007) referred to adaptation as the adjustment in natural or human systems in response to actual or expected climatic stimuli and their effect to moderate harms and exploit beneficial opportunities.

According to IPCC (2007) a case for more extensive adaptation by the need for a deep understanding of options and barriers to adaptation which is not fully understood. Moreover, the dominant discourse of adaptation is a top-down managerial approach starting with international bodies cascaded to national authorities through negotiations and financial transfers. Rural communities have important long-standing adaptation skills and experiences for tackling hazardous environmental conditions including climate variability (Ware, 2022). Whereby national and international climate policy regimes fail to reach the poor and vulnerable rural communities or they tend to plan interventions for communities instead of supporting initiatives led by rural communities (Yamin et al., 2005). To be effective, global efforts need to be aligned with local realities and focused 'on how policy can support the adaptive capacity and resilience of vulnerable rural communities' (Adger, 2003). Among the various adaptation strategies used by rural communities, including crop diversification, soil, and water conservation, and small-scale irrigation (Ware, 2022), which have a direct impact on their livelihood system.

According to Maddison (2007) expression given the impacts of climate change on livelihoods, response efforts to address contain two vital steps. The first is to perceive the risks of climate change, the second is to decide on adaptation measures. Both steps involve risk management and decision-making. Most rural People's perceptions are contextual, and grounded on complex sets of social, political, and

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environmental settings. Perceptions about climate change and especially about its causes are filtered through local knowledge, values, and moral norms. The IPCC (2007) recognized that the perception of climate change is about human behavior, which is one of the least understood components of the climate system. Therefore, it is important to understand how differently situated rural communities perceive, interpret, and act on climate change. The importance is magnified in the face of the claim that climate vulnerability studies ignore local perceptions and contexts that define quality of life and well-being (O'Brien et al., 2004).

Ethiopia is experiencing the negative effect of climate change and unpredictability on several front, including crop productivity, livestock production and rearing, land productivity, water availability, biotic growth, and rang-land quality and soil productivity (Daba et al., 2025). This shows that the country main sources of livelihood - agricultural sectors food production, and among of income generated from it negatively impacted by climate change on a national level. The country's concerns over the impact of climate change and variability on agriculture and food security have grown which have been highlighted in most recent years (Sinore & Wang, 2024). Due to the effects of climate change and its unpredictability there is highly growing need to further develop and execute adaptation and mitigation measures (Sinore & Wang, 2024). country's vulnerability to climate change variability is particularly pronounced because of dependency on rain-fed agriculture and natural resources as a driver of economic growth (Dendir et al., 2019; Sinore & Wang, 2024).

Despite in-built resilience factors, there is no denying that rural communities in Ethiopia are most affected since their livelihoods are directly dependent on climate-sensitive economic sectors, namely, agriculture. In this case, 95% of agricultural activity is dependent on rainfall to the extent that the country's GDP growth rate is closely associated with the pattern of rainfall distribution and agricultural production. However, such a link is weaker than originally thought (Conway & Schipper, 2011). Nonetheless, the link persists in less diversified agricultural systems dominated by few crops. Agricultural production in these systems is generally affected by climatic variables such as temperature, precipitation, wind conditions, and water availability. According to the IPCC (IPCC, 2007), rising temperatures and changing precipitation patterns affect crop growth, livestock performance, water availability and the functioning of ecosystem services. In the meanwhile, the World Bank (2008) recognizes that due to rising temperatures, rural people's exposure to malaria, dengue, and cardiovascular illnesses increases especially in the tropics. It expects diseases to increase up to five percentage in countries with per capital incomes below $6,000, while declining agricultural yields in some regions would increase malnutrition, thus reducing people's resistance to illness. The World Health Organization also predicted that the above diseases would worsen as the result of climate changes in which the lives and livelihood systems of the most vulnerable social groups become much more unprotected.

Like many other developing countries Ethiopia face the challenges posed by climate change and has been taken several measures to adapt to and mitigate its impact (Sinore and Wang, 2024). Despite, devoting significant efforts to implementing adaptation and mitigation strategies and approaches to tackle the challenges of climate change the country encounters

significant limitation with these strategies and approaches. Therefore, to deal with the issues and to comprehend and overcome these limitations is imperative for the success and enduring the effectiveness of climate change initiatives at national, regional, and local level. According to Sinore & Wang (2024) a range of ecological and sociocultural factors influence the country's sustainable uses of climate change strategies. These factors are interconnected and can significantly impact the success or failure of adaptation efforts undertaken either by government or non-governmental development entities. For instance, the country mostly characterized by diverse ecological zones, including highland, lowland, and arid regions with diverse topography creating a varied climate landscapes, such as changing rain fall patterns, increasing temperature, and land degradation. This poses substantial challenges to adaptation and mitigation efforts, in the highland parts of the country crop production is the primary means of livelihood system, shifting in precipitation and temperature impact crop yields. Whereas, in the pastoral and agro-pastoral communities in the arid and semi-arid lowland regions face challenges, including dwindling of water resources, loss of livestock grazing land, and disease outbreak. Therefore, these ecological factors shape the specific needs and priorities of these communities resides at different ecological zones of varied regions of the country. In the meanwhile, sociocultural factors are essentially crucial in influencing climate change adaptation strategies given the nation's diverse culture leading to a distinct sociocultural dynamic. Rural communities' traditional practices and knowledge system, as well as sociocultural norms play significant role in determining how rural communities respond to climate change, and often relay on indigenous practices and local knowledge at a foundation of adaptation strategies (Sinore & Wang, 2024).

Despite that, there is a growing recognition of the role of social protection in addressing various livelihood shocks and vulnerabilities to the effect of climate change. Many social protection schemes have targeted and contributed to the efforts to reduce vulnerabilities and create more inclusive and sustainable development pathways (Mesquita & Bursztyn, 2016). Thus, in recent decades, several developing countries that developed and strengthened their social protection systems following the success of Latin American countries (Cirillo & Tebaldi, 2016). Therefore, this review paper aims to critically discuss, and examine the knowledge gaps and limitations of social protection policy framework towards climate change adaptation and mitigation action in the context of rural communities. So, to analyze climate change-induced effect on the livelihood of rural Ethiopia, systematic review methods were employed accompanied by narrative analysis. Through a detailed review of existing literature (articles, books, research and reports), including debates relevant to this particular topic area of emphasis. Specifically, it gives due emphasis on the social dimensions of climate change and livelihood-based social protection. As well as analyze and discuss climate change adaptation national plans, policies, strategies, development programs and projects with the idea of a sustainable and equitable rural development perspective. Which is understood as "an irreducible holistic" framework where economic, social and environmental issues interdependent, while focusing on vulnerable rural communities and social groups that must be approached within a unified framework.

Materials and Methods

Systematic literature review

The goals of the literature review depend on which type of literature review to answer specified as well as concentrated research questions. That is why the method of systematic literature review can reduce bias in literature analysis (Booth et al., 2016). For this article systematic literature review is employed to identify, evaluate as well and summarize relevant studies to show a synthesis of evident climate change adaptation and mitigation action. To critically discuss and analyze climate change-induced effects on the livelihood of rural Ethiopia detailed review of existing literature, and debates relevant to this particular topic area of emphasis have been given. Through enumerating, describing, summarizing, and objectively evaluating the existing literature on climate change adaptation and mitigation action to determine what is known about climate-induced effects, national adaptation plans, and social protection policies. This enables how well-established knowledge will direct future research that might best be undertaken.

Jesson et al. (2011) suggested that systematic reviews have a clearly stated purpose, questions, a defined research approach and an appraisal of the articles. By following an explicit research methodology, the weaknesses of traditional approaches shall be overcome (Harden & Thomas, 2010). These weaknesses may include biases and philosophical mix-ups through heterogeneous sampling (Petticrew, 2001), or issues with the quality of assessment. Following this, the following steps have been undertaken. Phase 1- Mapping the field through a scoping review: Conducted a systematic literature review of the scope of the amount of relevant material, by identifying the most often cited texts and following up on the references therein. This gave the first impression of existing knowledge and knowledge gaps under this topic.

Phase 2- Comprehensive search: Here entered into the systematic literature review by using the process described through searches in keywords, titles, abstracts, and some themes using Google Scholar with other combinations of the search terms; Aligned with climate change-induced effect. This enables to presentation comprehensive background of the literature within the topic to highlight new research streams by identifying gaps or recognizing inconsistencies for refining, focusing, and shaping the direction for further research.

Phase 3- Quality assessment: The search was subsequently limited to specific publications related to ethnicity and minority in the urban context.

Phase 4- Data extraction. The articles were analyzed along with the nature of the article (empirical or conceptual), analysis method, theoretical perspective, findings or results, definitions or propositions, and quality-related comments have been summarized. To identify the main categories of this literature, the strategy was first to obtain a broad understanding of these articles, list the keywords of all of the selected articles, and summarize additional keywords by reviewing abstracts, introductions and findings. By grouping the keywords able to identify first-order concepts. Then continued by grouping these keywords into categories.

Phase 5- Synthesis: Relevant identified concepts and supporting sources identified to construct major themes, then analyzed pertinent to the finding of each reviewed article.

Phase 6- Write-up and diffusion: The next section addresses the synthesis of the analysis of the articles as a result and discussion of this article.

Result and Discussion

Dimensions of climate change

The concept of climate change has a wide range of meanings and definitions, and it is defined in various ways by social and natural science researchers across different disciplines and development practitioners. Indeed, almost agree that climate change is the global phenomenon of climate transformation characterized by the change in the usual climate of the planet (regarding temperature, precipitation, and wind, etc) that are especially caused by human activities. As a result of the weather of the earth, the un-sustainability of the planet's ecosystem become under threat as well as the future of human kinds, and the stability of the global economy, and social well-being. According to the United Nations Framework Convention on Climate Change (UNFCCC, 2021), "Climate Change" is defined as a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable periods. While the concern of climate change has a broad range of phenomena created predominantly by burning fossil fuels which add heat-trapping greenhouse gasses to the earth's atmosphere, these phenomena include the increased temperature trends described by global warming but also encompass changes such as sea-level rises (NASA, 2021). To be effective, global efforts need to be aligned with local rural communities' realities and focused 'on how policy can support the adaptive capacity and resilience of vulnerable communities (Adger et al., 2003). To deliver climate action UNDP (UNDP, 2024), embraces a partnership approach between local, national and regional levels, including the private sectors across the globe.

Ecological/Environmental dimension

The ecological dimension of climate change deals with the fragility of ecological and biophysical systems and their different functions under hazardous conditions to suffer damage and deterioration Kienberger & Zell (2014) in rural human society. Which describes the interaction that occurs between humans and natural aspects of the environment as well as the effect that they have on one another. Despite this, ecosystems are exposed to the effects of changing climates in different measures. However, the impacts of climate change may be difficult to detect since they are often combined with the effects of other activities, such as rural communities land use changes undertaken human ecology. The Global Biodiversity Outlook report (UNEP, 2010) identifies climate change as one of the main factors responsible for the current loss of biodiversity. Some aspects of biodiversity loss in the rural part of the country, including deforestation and the draining of wetlands, will exacerbate climate change by releasing centuries' worth of stored carbon to the environment. In the meanwhile, according to the UN Secretariat of the Convention on Biological Diversity (2010), climate change affects different ecosystems in different ways. Depending on the complexity and original characteristics of the system, geographical location and the presence of factors that may regulate the extent of the changes in the ecosystem. Degraded ecosystems are generally believed to be less resilient to climate change than intact ecosystems. Indeed, the increase in mean annual temperature is already affecting many ecosystems. Scientific studies predict that future changes will be much greater amplitude which will lead to the loss of the natural resource-based livelihood system of most rural communities in Ethiopia.

Economic and livelihood dimension

Livelihoods are the means that enable rural people to earn a living, this includes the capabilities, assets, income, and activities rural communities require to ensure that their basic needs are covered (Chambers & Conway, 1991). Therefore, a livelihood is sustainable when it allows rural people to cope with, and recover from setbacks and stress (such as natural disasters and economic or social upheavals), and improve the welfare of future generations without degrading the environment or natural resources base (Chambers & Conway, 1991). Dejen et al. (2024) argue that in rural communities to cope and survive the effect of disaster risk, livelihood diversification has a relevant impact, as well as for poverty reduction and to improve food security. However, changes in the mean climatic conditions (such as temperature and precipitation) affect soil moisture, water availability, and the incidence and distribution of plant and animal pests and pathogens. Eventually, these impinge on the growth and development of crops (Hertel & Lobell, 2014). Due to this given set of inputs, climate change is often regarded as analogous to technical change affecting agricultural production and rural communities' livelihood. Not only, has climate change also made future rural livelihood prospects unpredictable and unreliable which in turn may trigger out-migration either to increase earnings or to spread out risks. The impacts of climate change on agriculture are expected to be immediate, negative, and stronger in sub-Saharan African countries. This stems from the existing environmental conditions, least diversified and poor rural economies, and low level of agricultural development despite it being the main contributor to exports and the GDP of the country.

Human and social dimension

The social dimensions of climate change are those that relate to, in particular; health, gender, population dynamics, human rights, migration, access to decent work, and social protection for those most vulnerable social groups of rural society (UN, 2011). Unequivocal scientific evidence marshaled by the United Nations' Intergovernmental Panel on Climate Change (IPCC, 2007) shows that greenhouse gas (GHG) emissions from human activity—particularly burning fossil fuels for energy—are changing the Earth's climate. In the social dimension of this complex phenomenon, a detailed understanding is needed to underpin an effective global response. As a recent Human Development Report made clear, there are glaring inequities in the distribution of responsibility for the causes of global warming and the distribution of its impacts among the nations and peoples of the world (UNDP, 2007). Poor rural people in developing countries bear the brunt from its impacts while contributing very little to its causes. However, the human and social dimensions of climate change have been woefully neglected in the global debate—at least, until recently.

Without vigorous adaptation and mitigating measures, climate change is projected to further exacerbate the vulnerabilities of most marginalized rural people, place human health and security at risk, and impede sustainable development. Integration of social dimensions into these measures is vital (UN-HLCP, 2011). People are not only the victims of the negative impacts of climate change, they are the drivers of climate change, as well as the essential agents for redirecting development trajectories. This understanding–of the central role of people, social dimensions, and institutions–can profoundly reshape how policy-makers craft and implement

climate change policies and strategies. This is mainly important juncture when nations are committing to more robust climate change mitigation and adaptation strategies. The international community is deliberating on core elements of the next climate change paradigm amid pressing expectations for concrete results. At its most basic level, climate change impacts people and response measures, which depend on people themselves to be successful. The social dimensions of climate change and the interplay that exists between climate as a phenomenon, related policy and society, including the role of people as the victims, and agents of climate change are the most critical to the success of climate policy. To date, however, in most developing countries the human variable of the climate equation has been too frequently missing. As a result, the impact of climate change will increasingly affect the daily lives of rural people everywhere across the world in terms of employment and livelihood, health, food security, access to clean water and housing, as well as the realization of gender equality and human rights. These impacts are expected to hit harder those living in poverty due to their more prevalent dependency on the very natural resources affected by climate change. This is because they have less capacity to protect themselves, adapt and recuperate losses. Effective policies and measures to address these impacts and to reduce greenhouse gas emissions in large part depend on these same people, and thus largely depend on the transformation of social and economic relations that contribute to their vulnerability (UN-HLCP, 2011).

According to multiple sources of literature case studies and lessons learned from the history of human development, the inclusion of social dimensions is essential when the most powerful and resource-intensive Western societies are to change their consumption habits and patterns. Therefore, there is a need to establish essential synergies between the climate change agenda and complementary sustainable development and human rights agendas, both in terms of their objectives and their means of achievement. Through integrating social dimensions in climate policy, these synergies have significant potential to amplify concrete results to climate change adaptation and mitigation action via livelihood-based social protection schemes in most rural communities of the nation.

Policy and institutional framework

The policy framework for climate change mitigation and adaptation has progressively evolved since the ratification of the United Nations Framework Convention on Climate Change (UNFCCC) in 1994. As part of its commitment, Ethiopia submitted to the UNFCCC its Initial National Communication (INC) in 2001 and Second National Communication (SNC) in 2015. The country also launched the National Adaptation Plan of Action in 2007, the Ethiopian Program of Adaptation on Climate Change, and Nationally Appropriate Mitigation Actions in 2010. The country has endorsed a Climate Resilient Green Economy (CRGE) strategy to build a green and resilient economy in 2011. Apart from this, sectoral policies and strategies have been formulated to provide tailored and sector-specific strategic interventions. These include: the Climate Resilience Strategy for Agriculture and Forestry (2015); the Climate Resilience Strategy for Energy and Water (2015); the Climate Resilient Strategy for the Transport Sector (2015); the National Health Adaptation Plan to Climate Change (H-NAP, 2017) and the Climate Resilience Strategy for

Urban Development and Housing (2017). In addition, for climate change adaptation contribution (NDC), Ethiopia has been putting in place various policy actions that enhance the implementation of climate change adaptation over the last decade. Core policy and institutional measures have been materialized by mainstreaming climate change adaptation into national and sectoral plans with an emphasis on implementing identified adaptation options across selected sectors.

Given the vulnerability of the country and less adaptive capacity to absorb external shocks emanating from the devastating effects of climate change including hazards such as drought and floods, the government of Ethiopia has made Adaptation a priority. Within this context, prioritization of adaptation interventions becomes a powerful approach to ensure the effective and efficient utilization of the scarce resources available.

Whilst, the initial national climate change strategy- the CRGE Strategy- did not sufficiently contain adaptation and resilience. Even though several sectors have affirmed the importance of building adaptive capacity to reduce rural communities' vulnerability as adaptation interventions grew substantially. Most recently, NAP formulated in 2017, spanning the agriculture, forestry, health, transport, energy, industry, water, and urban sectors reaffirmed this importance. Furthermore, the NAP implementation roadmap expanded the options. Despite this, is outlined under the NAP with actions, categorized into short-term priorities, such as capacity building, strengthening the enabling environment, and promoting research, with long-term priorities of sector-specific activities. In addition to the long-term priorities, from the NAP implementation roadmap, several potential adaptation commitments have been considered for inclusion in the NDC. The selection of 18 climate change adaptation options under the NAP, and the numerous adaptation actions under the implementation roadmap already reflect a lengthy, rigorous officially endorsed prioritization process that entailed in-depth stakeholder participation as detailed in the NAP's methodology of the country. This has been informed by an extremely broad range of national, sectoral, and technical studies (as noted in the NAP implementation roadmap methodology). Where an attempt was made to further prioritize a sub-set of interventions in the updated NDC of the country. Prioritization criteria were developed to select the optimal interventions (from within the NAP's adaptation options and the NAP Implementation Road-map's supplementary adaptation actions). The national NAP's and NDC internationally recognized and widely used PEStLE framework - as an analytical framework for multi-criteria decision making have been applied to each of the PEStLE categories, including economic, social, technological, legal (institutional), and environmental with four relevant criteria. Using the prioritization criteria to evaluate each adaptation option from the NAP, and each long-term adaptation action from the NAP implementation roadmap is so essential. Nearly 20 steps have been taken for each of the 52 interventions screened, ranging from cross-referencing with the ten Yearly Development Plan (YDP). Which include NAP-ETH relevant sectoral climate resilience or adaptation strategies aligned with the Sendai framework for disaster risk reduction, and African Union's Agenda 2063, and the AU's draft strategy on climate change 2015.

National adaptation plan

The national adaptation plan of the country (NAP-ETH) has been developed on ongoing efforts to address climate change in the country's development policy framework, including the climate resilient green economy strategy, and the second growth and transformation plan (GTP-II), as well as sectoral climate resilience strategies, and regional, and municipal adaptation plans. Its goal is to reduce rural communities' vulnerability to the effects of climate change through building adaptive capacity and resilience. The country NAP-ETH aims to strengthen the holistic integration of climate adaptation action in the country. Indeed, the long-term development pathway is supported by effective institutions and governance structures, finance for implementation and capacity development, and a strengthened system for disaster risk management, and integration among different sectors (NAP-ETP, 2019; FDRE, 2021) which is detail described under the national adaptation plan of the country.

Despite, viewing climate change as a problem that is social in both its causes and consequences, it requires a detailed explanation to contribute to the study of climate change. In recent decades, analyzing attitudes to climate change, the adoption of green behaviors, and issues of climate justice, has become clear from two recent reviews (Dietz et al. 2020; Klinenberg et al., 2020). Climate change rarely features outside field-specific journals, and there remain significant gaps in understanding the social nature of climate change as a global concern. As a global collective action problem; Hardin's (Hardin,1968) on 'the tragedy of the commons' neatly demonstrates that individual actors often lack the motive to take public interests, such as the preservation of the environment, fully into account. When their goal is to maximize utility in the short run, it can be entirely rational for actors to exploit collective resources, even when the whole community will eventually suffer losses as a result. This represents a classic case of a collective action problem or social dilemma, with every actor facing motives not to take any precautionary actions. Even though a collective failure to act will ultimately harm everyone's welfare and social protection, more significantly the rural communities.

Social protection typology

Social protection interventions are key supporters of inclusive rural transformation but require alignment with broader inclusive policies (Trivelli et al., 2017). Contextualizing social protection as a part of and fully integrating with anti-poverty policies, with such policies themselves being broadly convinced given the complex, multi-dimensional nature of poverty and deprivation Guhan (Guhan, 1994) distinguishes three types of social protection-related measures: protective, with the specified objective of guaranteeing relief from deprivation; preventive, directly seeking to avert deprivation in various ways; and promotional, aiming to enhance real incomes and capabilities (Trivelli et al., 2017). Despite this, this classification makes a methodological contribution in terms of highlighting the progressiveness from general to specify social protection measures towards rural communities' livelihood transformation.

Social protection policy trend

The government of Ethiopia recognizes the contribution of social protection to the realization of the development goals of the country and commits substantial human and financial resources to maximize the reach and impact of such programs to its poorest

and most vulnerable rural communities (World Bank, 2024). Social protection is not a new instrument in many African countries, and a wide range of social protection schemes after interdependence, including the provision of free health care, pensions for government employees, and food and agricultural subsidies. However, following the implementation of structural adjustment programs (SAPs, domestic expenditure on these items was reduced, and many programs were scaled down or terminated (UNEC, 2009). Hence during the 1990s, social protection programming was largely implemented in response to the negative impacts of structural adjustment policies, particularly in Latin America but also in Africa and Asia (Slater & McCord, 2009). This approach drew on the social risk and management framework developed by the World Bank in the 1990s (Holzmann & Jorgenson, 1999), and as a result, World Bank thinking dominated the design and implementation of social protection provision in middle and low-income countries. This approach promoted a residual form of social protection based on supporting those adversely affected by structural adjustment, and primarily concerned with the provision of social safety nets, as a response to shocks (Slater and McCord, 2009).

Under this approach, the role of government in the provision of social protection was limited to the implementation of social safety nets for risk coping (Devereus and Wheeler, 2004). Although by the turn of the century, the World Bank's position had widened somewhat from the safety net approach to take on a wider concept of social protection Holzmann and Jogensen (Holzmann & Jorgensen, 2000), the Bank's approach is still widely criticized for the fundamental underlying assumption that risk management the poor will be bounced out of poverty (Meth, 2008). While structural adjustment stimulated a range of interventions to support the poor through the temporary negative impacts of the adjustment process, one type of program in particular - conditional cash transfers - received strong support from the World Bank and Inter-American Development Bank in this way came to dominate social protection practices in Latin America (Slater and McCord, 2009). This domination continues to the most recent years. In Africa, the establishment of social action. Investment funds were a more common response, and these funds were frequently associated with the adoption of public works programs, providing short-term employment opportunities, as the dominant approach for delivering welfare to poor households, rather than a cash transfer approach (Slater and McCord, 2009). Social funds, largely funded by the World Bank, remain a cornerstone of social protection response across the African continent (Slater and McCord, 2009).

Social protection schemes change in Ethiopia

In Ethiopia, emergency appeals for humanitarian support have been launched every year since the famine of 1984, and in many parts of the countries, essentially predictable and chronic hunger has come to be characterized as unpredictable emergencies requiring repeated humanitarian response (Slater and McCord, 2009). Such a crisis led to a shift in the design of the response by the government and the international community, based on the realization that rather than the repeated humanitarian response at the time of acute need, a more appropriate response would be designed to address chronic vulnerability and the structural factors underlying vulnerability

by implementing social protection programs, in coordination with a range of other development initiatives (Slater and McCord, 2009). The consequence was a radical change in programming attempting to develop a predictable and medium-term response to the crisis. The result has been the emergency of medium-term developmental response which aims to meet not only immediate needs but also contribute to the reduction of vulnerability by promoting livelihoods, which also addresses the factors that cause vulnerability through the provision of appropriate infrastructure and systems. The Productive Safety Nets Programme (PSNP) in Ethiopia is the largest of such programs and has been designed to include medium-term intervention that contributes to protective, promoted and transformative social protection, focusing on support for developmental activities which are productivity-enhancing and environmentally protecting, as well as providing resources at household level (Slater and McCord, 2009).

The link between social protection and rural livelihood

According to Dorward et al., (2006), the link between social protection and agricultural growth in rural communities goes beyond positive feedback where reduced vulnerability promotes growth and reduced vulnerability. Social transfer has an effect if it takes rural people or economies across critical poverty trap thresholds and impacts also depend on other social protection schemes intervention in rural communities. Even though complementary roles for social protection and rural agricultural development policies revolve around their contribution to poor peoples' hanging in, stepping up, and stepping out strategies. The newer insurance and resilience-based social protection instruments may help people to escape from poverty traps so that they can step up or step out taking risks to engage in more productive activities (Dorward et al., 2006). As yet, the link between social protection schemes and rural livelihood is not strongly interlinked with climate change mitigation and adaptation action in the rural communities of Ethiopia.

Vulnerability of rural community to climate change induced disaster

For several decades the country has been vulnerable to the effect of climate change induced multiple disastrous events that affected the economic, social and environmental well-beings of most rural communities. In which overall lives and livelihood system mainly relays on over-sensitive sector i.e agriculture which makes it more vulnerable to the effects of diverse natural and man-made disasters. According to World Bank (2025) report nearly 22.4million peoples were affected by disastrous events, including drought and food insecurity (20 million), flooding (1.5 million), conflict (794,000), earthquake (90,000), and landslide (29,000) peoples have been severely affected within the last three years. Under Figure 1 described below the occurrence of drought and flood insecurity in most rural parts of the country more severe than other types of disastrous event. Whereas, flooding, and conflict takes the second and third paces compared to earthquake. To overcome these climate induced effects government adapted varied mitigation and adaptation strategies through social protection schemes to build and strengthen the resilience and cope - up capacity. Even though the strategies and approaches were inadequate due to limited consideration of local communities' socio-cultural and environmental factors.

Table 1. Rural communities vulnerability context to climate change induced disasters between 2023 - 2025 (Source: World Bank, 2025)

Disastrous events	Years	Number of People affected	Percentage
Drought and Food Insecurity	2023 - 2025	20,000,000	89.2%
Flooding	2023 - 2025	1,500,000	6.7%
Conflict	2023 - 2025	794,000	3.5%
Earthquake	2023 - 2025	90,000	0.4%
Earthquake	2023 - 2025	29,000	0.12%

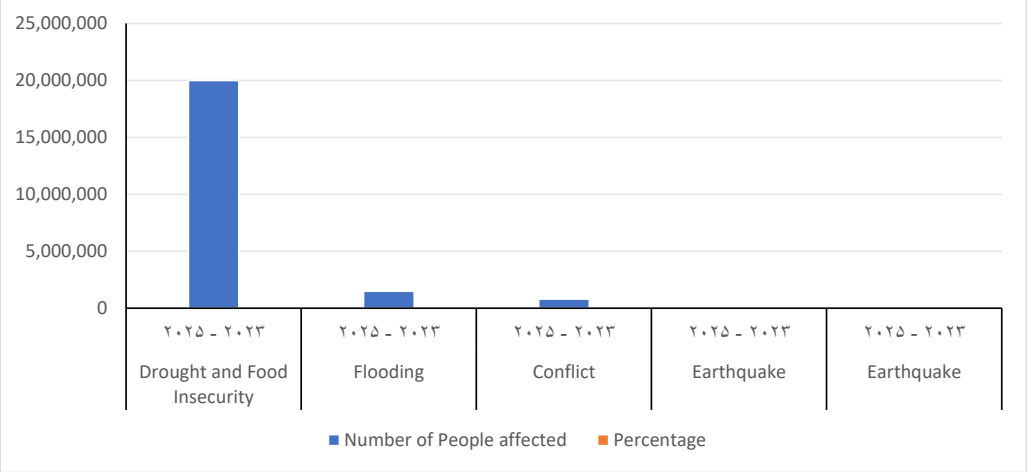

Fig1. Vulnerability context of rural community between 2024 - 2025 (Source: world bank 2025)

Climate change-induced livelihood impact

Impact on agricultural sectors

The effect of climate change on rural livelihood is so much more multifaceted. According to MoFED (MoFED, 2021), agriculture remains the main activity in the Ethiopian rural economy, contributes on average 44% of GDP, and employs over 80% of the population. Smallholder rural households in the country produce more than 90% of the agricultural outputs and cultivate more than 90% of the total cropped land. As a result, crop production is the dominant sub-sector accounting for more than 60 percent of agricultural GDP, followed by livestock with 20 percent (EDRI, 2021). It is estimated that 16.5 million hectares (14.8%) of the country's land area is potentially suitable for agricultural production. The potential irrigable land in the country is about 3.7 million hectares (MoFED, 2021). The country has the largest livestock population in Africa, and tenth–largest in the world with about 70 million head of livestock (EDRI, 2021). With a current growth rate of about 2.8 percent per year, Ethiopia's population is expected to reach 129 million by 2030 (Rahel et al., 2021). Almost two million persons are added annually to the population. Given the high proportion of the population living in rural areas, this will increase pressure on natural resources accompanied by increasing demand for productivity and scarce arable land at the expense of greener land uses such as pasture, and forests which will bring further degradation to the ecological well-being.

Its impacts in 2030 on GDP are progressively worse as the climate change-

induced shocks become harsher (World Bank, 2008). In the worst-case scenario, real GDP in the final year would be 46 percent lower than in the base run. While productivity shocks occur only in the agricultural sectors, the negative impact also spreads across the economy. A simulation result of the CGE model showed that a 5.5 % reduction in the agricultural output has created a 10 % increase in the price level (Wolde, 2008). The same study revealed that from the industrial sector, the public agro-industry suffers the most damage with a 17 % reduction in output from climate change (EDRI, 2021). Under Figure 2 illustrated that impact of climate change on the agricultural sectors more severe on crop sub-sub sectors (60%), as compare to livestock sub-sector (20%).

Impact on non-agricultural sectors

Since the agricultural sector has a larger contribution to the country's economy, it is strongly linked with the non-agricultural sectors. The impact on this sector adversely affects the industry and service sectors of the economy (EDRI, 2021). Where the national productivity of the agricultural sector falls, in the meanwhile the industry and services sectors will decline consecutively. This simulation result scenario of the reduction in the total agricultural production leads to higher losses in the industrial sectors, and also the value of grain mill products, and prepared foods will decline by 27.6 and 24.9 percent in 2050 (Rahel et al., 2021; EDRI, 2021). Indeed, the service sector is also projected to decline by 24.6 percent and 33.9 percent, while hotel service decrease by 18.2 and 24.3 percent by 2040 and 2050, respectively (Rahel et al., 2021; EDRI, 2021)). Even though this projection focuses on certain sectors, climate change is so much more complex and its effect is further manifested in the rural social, and cultural system of rural communities. As described under Figure 3 the impact of climate change on non-agricultural sector by 2050 expected more significant on service sector (33.90) compare to industrial sector (24.90%), and others (24.30%).

Impact on household income

The rising prices of staple commodities may result in a substantial reduction in real income and an increase in poverty of households since their food consumption takes the highest share of the

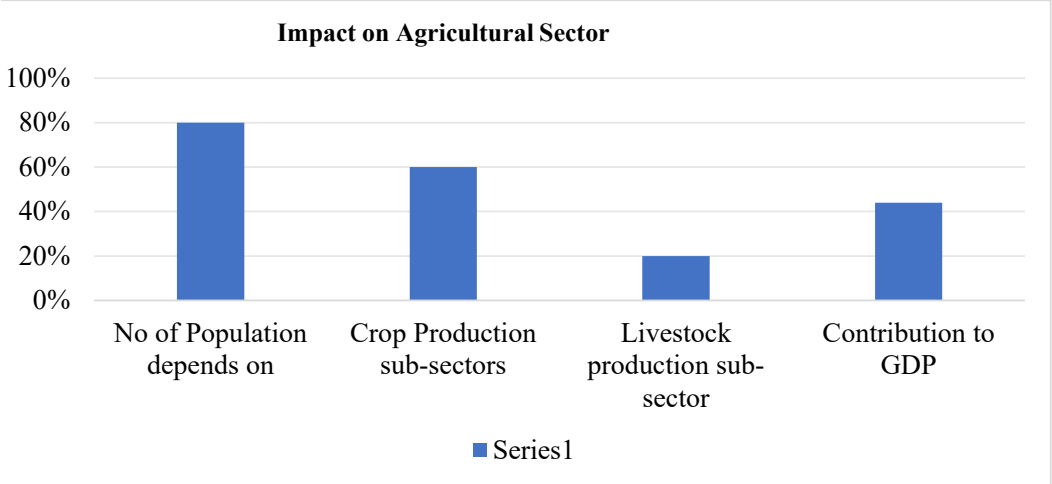

Fig 2. Impact on Agricultural sector (Source: Rahel et al., 2021; EDRI, 2021)

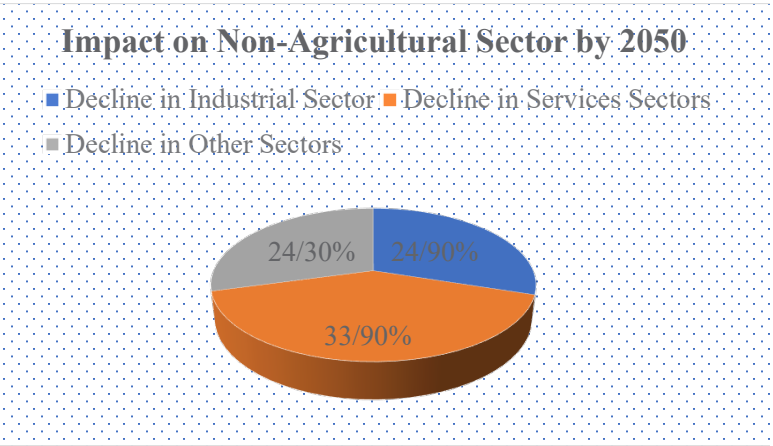

Fig 3. Impact on Non-Agricultural sector by 2050 (Source EDRI, 2021)

household's consumption budget (ERDI, 2021). According to Ethiopia Research Development Institutes (2021), the income of poor households is projected to decline by 20.4 % in the same year. Most notably, the rural poor households have lower initial per capita income expect to experiences the worst income losses. They severely suffer as they do not benefit from the higher prices for agricultural goods. At the same time, they spend a higher proportion of their income on household food expenditure. Which makes rural communities particularly vulnerable to food price changes and to the impact of climate change. Indeed, the impacts of climate change on rural household income sources vary across the different agro-ecologies of the country. In drought-prone highlands and lowland areas climate change impact tends to hurt the poor more due to their vulnerability and weak coping mechanisms. As described under figure 4, at household level the amounts of losses as result of recurrent drought are estimated to be 26.8 percent by 2050 (ERDI, 2021). In the pastoralist region, the non-poor rural households' real income will decrease by 6.8 percent, while the poor households gain 20.4 percent in 2050.

Socio-Economic determinants of vulnerability

According to the Intergovernmental Panel on Climate Change (IPCC, 2007) the vulnerability and the potential impacts of climate change are determined by the exposure, sensitivity, and adaptive capacity of people and societies of rural communities. In 2007, the IPCC noted shortcomings in its definition of vulnerability, particularly in its lack of consideration of 'social vulnerability', the need to address the determinants of adaptive capacity, and the need to consider human development as an essential mediator of climate vulnerability. Building on the IPCC definition of vulnerability, the factors that affect adaptive capacity and make rural people exposed or sensitive to climate change. Mostly, adaptive capacity, exposure, and sensitivity in rural societies are shaped by non-climatic, and socio-economic factors, such as access to, and control over economic, social, and institutional resources. These resources comprise: Human capital, such as good health, skills, knowledge, and education; Social capital, including the power to influence decision-making, voting rights, and social connectedness, whether

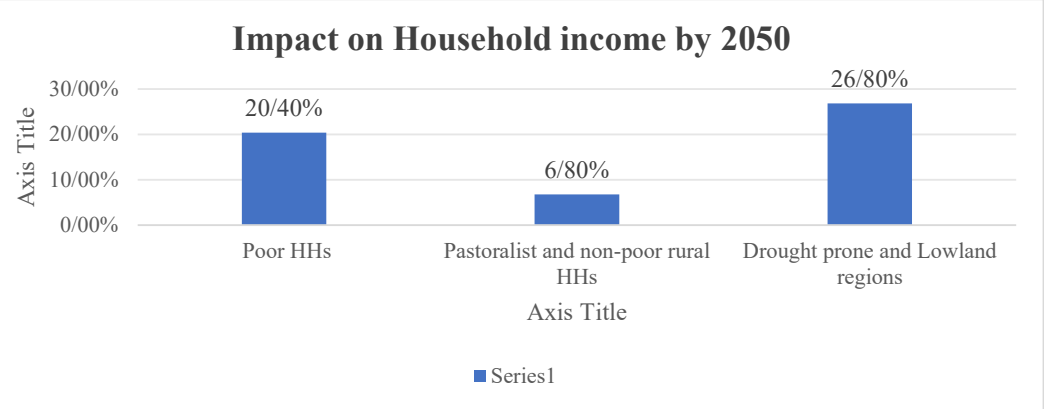

Fig 4. Impact on Household income by 2050 (source: ERDI, 2021)

to relatives, neighbors, civil society organizations, business or government agencies; Physical capital, such as shelter, farming tools, but also community infrastructure such as embankments or terraces that protect a watershed and health care facilities, for example; Natural resources, including forest, land and water; and Financial capital, such as income, savings or credit.

Socio-economic factors and institutions not only influence adaptive capacity but also exposure and sensitivity to climate-related hazards. Exposure is often considered a static factor that influences vulnerability, rather than itself being shaped through a range of political, socio-economic, and demographic processes (UN-HLCP, 2021). Changes in the number and spatial distribution of people, through population growth or decline and processes like seasonal or international migration and urbanization, can significantly change the exposure of rural populations. Availability and access to human, social and financial resources, as well as policies that support and plan for mobility, or those that attempt to restrict them or fail to plan for coming population change, are key determinants of where people live. Poor people in rural villages tend to live in hazard-prone areas, such as steep slopes or riverbanks, because they cannot afford to live in safer places, and because political, economic, and governance factors such as lack of employment and income opportunities, the absence of social services or conflict causes them to migrate to urban areas. Even among the poor, women and children can be at higher risk as they are prone to work and live in structures of lower social value and that are more poorly constructed, such as schools as compared to office buildings. Similarly, high dependence on natural resources, a key indicator of sensitivity, is linked to and shaped by economic and social structures. Policies on agriculture, land tenure, urban planning, and many others can enhance or limit people's ability to change to livelihoods that are less sensitive to climate change.

In sum UN-HLCP (UN-HLCP, 2021), the people most vulnerable to climate change are usually poor, undernourished, of poor health, live in precarious housing conditions, farm on degraded lands, have low levels of education, lack rights, have little opportunities to influence decision making, work under precarious conditions, and reside in regions, Zones, District, etc. with non-resilient health systems, limited resources and sometimes poor governance

systems. Therefore, social, cultural, and political circumstances, often including inequalities and discriminatory practices, deprive them of access and basic assets. The entitlements and the institutional support need to make a living to ensure their well-being even under normal conditions. Let alone for mastering the increased and additional challenges posed by climate change. These non-climatic factors and the socio-economic context in which climatic problems occur in rural communities are likely to be as important, if not more so, than climate-related hazards themselves. In how rural communities perceive and understand the social dimension of climate change.

The social construct of climate change

According to Lindgren and Neumann (1981), society depends on climate. But what is the effect of climate anomalies on society? Which are beyond the time horizon of everyday life, and are relevant for climate change, be it human-made or due to natural processes. The slow variations appear to have had little social and economic impact in the past. Fast variations have produced irreversible social, economic, and cultural changes either by their impact on the natural environment of a society (e.g. land loss, desertification, etc.) or by demographic (rural exodus, mortality), cultural (emerging values) and economic changes (standard of living, trade patterns, the organization and location of production, agricultural yields).

Increasing carbon emissions and diminishing carbon sinks around the world underlines the 'anthropogenic' nature of climate change and reflect the ways human societies' function and change over time. Tackling climate change thus requires a broadened understanding of how human societies – and the activities that take place within them – drive climate change in different ways (UN-HLCP, 2021). While human societies necessarily interact dynamically with their environment and reshape it in response to their evolving patterns of production and consumption, the specific interactions that currently generate concerns regarding emission levels and depleted carbon sink capacities are not an inevitable outcome of development. A more sustainable development model in rural communities can enhance the capacity to meet their needs. To achieve this, it is necessary to abandon familiar indicators by which growth and prosperity are measured according to the consumption of resources, in favor of an approach that looks more directly at levels of needs satisfaction. There are well-established, long-term linkages between economic growth and resource consumption, and between economic growth and needs satisfaction. Rethinking these relationships requires an understanding of the social structures that drive climate change.

Indeed, how people provide for their material needs determines or, in general, conditions the relations that people have with each other, their social institutions, and even their prevalent ideas. Because of the importance of how people provide for their material needs. This, along with the resultant economic and livelihood relations that rural communities have, is often referred to as the basis for rural ecological well-being including lack of access to climate adaptive technologies, limited infrastructure and so on which significantly interlinked with rural communities' long-standing traditional practices in which they have their environment.

Social impacts of climate change

The social impacts of climate change are much more complicated including the

risk of acute events like storms, droughts, floods, cyclical changes in precipitation, or long-term changes in temperature and sea levels. How do these trends impact rural people and societies matter the most? Most impact assessments and evaluations limit their focus to environmental and hard infrastructure impacts. However, climate change potentially affects a much wider range of sustainable social development issues – such as health, food security, employment, incomes and livelihoods, gender equality, education, housing, poverty, and mobility – either directly or indirectly (UN-HLCP, 2021). Climate change and extreme weather events affect multiple aspects of rural people's lives. The impact on health and nutrition and the ability to work and build resilient livelihood are so significant. The most important health impacts are those determined by the basic requirements for health – clean air, safe drinking water, sufficient food, and secure shelter – and are also reflected in more frequent injuries and increases in social inequities.

According to HCLP (2021) UN system analysis of the social dimensions of climate change, and determinants of what makes people vulnerable show the extent to which climate change relates to, reflects, and affects all aspects of contemporary rural societies. Climate change poses a challenge to established policy frameworks because it cuts across institutional sectors and issues that are usually addressed separately. Compartmentalizing climate change policy responses into a series of sectoral agendas, such as energy, transport, agriculture, etc., overlooks some of the key features of climate change. A fragmented response does not respond adequately to climate change. Nonetheless, addressing climate change via a sectoral, traditionally economic, cost-benefit approach is common practice in policy responses, particularly concerning the emphasis on 'end-of-pipe' methods of greenhouse gas mitigation–for example, through taxation, trade policies, and technology approaches that do not adequately reflect the social infrastructure and consequences of such methods. Major social and economic opportunities can be seized if policies comprehensively incorporate the social dimensions of climate change and strong social pillars of climate policies need to emerge to complement the traditional science and environment components.

Conclusion

Challenges to the inclusion of social dimensions of climate change are not explicitly outlined in the national climate change adaptation plan nor are they explicitly included in climate-resilient green economic development strategies. Which undermines the inclusiveness of livelihood-based social protection schemes to the climate change mitigation and adaptation action in the rural communities of the country. This has been subject to much scrutiny and diverse interpretation among researchers, policy-makers, as well as government and non-government development entities towards addressing agro-ecological and environmental concerns of rural people's lives and livelihood systems. While the ultimate successes of climate responses may currently be judged based on economic and infrastructural damage versus protection, they depend in great part on the resilience of rural people, livelihoods, health, and ecological well-being. Strategies designed and implemented without appropriate consideration of the very rural communities that interact with and depend on natural resources can undermine success in climate change action. Conversely, integrating

social dimensions as a livelihood-based social protection system at all levels in the design, analysis, and implementation of sustainable development intervention in rural communities can lead to more efficient and effective climate action results on the ground. All of these require the active participation of the many and varied rural marginalized social groups within the community. Thus, the transformation of social relations with ecology to build equity, and empower success in climate change adaptation livelihood-based social protection action needs to be undertaken in the rural parts of the country.

Indeed, livelihood-based social protection within the social dimensions lens allows for a broader understanding of climate vulnerability. Directs attention to the socio-economic conditions that make rural people vulnerable in the first place, including the human and social resources, institutions, policies, and power relations that are traditionally aligned with development and poverty reduction interventions. For adaptation to be rural pro-poor for the result of enhancing resilience among the most vulnerable rural communities, addressing the socio-economic determinants of vulnerability needs to be part of adaptation strategies. At the same time, this allows accountability for climate change impacts on rural ecology, and social well-being, ranging from building the resilience of the ecological systems to sustaining social protection, and demographic factors that are critical elements of rural people's livelihood resilience.

Thus, the social dimensions of climate change, and the interplay between the social, livelihood, and rural ecology as a phenomenon. It's related to social protection policy, including the role of rural people as victims to and agents of climate change – are critical to successful climate policy, strategies, and approaches. However, to date, in Ethiopia, the human variable of the climate equation has been too frequently missing or weak. The impacts of climate change increasingly affect the daily lives of rural communities everywhere in terms of employment and livelihoods, health, housing, water, food security and nutrition, and the realization of gender equality. Impacts are expected to hit those living in poverty the hardest, partly due to their more prevalent dependency on the very natural resources affected by climate change and also because they have less capacity to protect themselves, adapt, or recuperate losses as a result of climate change-induced effects.

Therefore, climate change policies and strategies that focus on social drives can do more than ensure a climate-resilient and sustainable livelihood future for rural villagers. This also presents an opportunity to achieve more just and equitable rural societies, and advance truly sustainable economic development. So, the inclusion of social dimensions with the prospect of climate change mitigation and adaptation action has a significant ground impact on ensuring the effectiveness of livelihood-based social protection program schemes, policies, and strategies for sustaining the well-being of rural ecology across the country.

Acknowledgement

I would like to thanks Hawassa University - Department of Sociology Instructors for their invaluable technical support and advice which enables me to upgrade the skills, knowledge and experiences that I have had.

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