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Article

Impacts of Flooding Disaster Risk Management Policy For Resilience Building in Pastoral and Agro-pastoral Community: The Case of Dassenech, Southern Ethiopia

Seid Ahmed[1*]

[1] Hawassa University, P.O. Box 05, Hawassa, Sidama Region, Ethiopia; seidahmedSOSW@gmail.com.

[*] Correspondence: seidahmedSOSW@gmail.com; tel.: +251-984-658-086

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ABSTRACT

Disaster risks management policy framework and action undertaken significantly influence disaster resilience capacities of pastoral and agro-pastoral communities of the lower Omo Valley region. This was widely hindered by the government's inability to take effective infrastructural, institutional, social, and economic measures in response to its critical function at the desired level when the lower Omo Valley Dassenech rural communities were exposed to the Omo River flooding disaster. This article aims to explore and investigate the impacts of disaster risk management policies and strategies on building disaster-resilient pastoralist and agro-pastoralist Dassenech communities. Throughout the study, the researcher employed an interpretativist epistemological paradigm. Consequently, the study's findings reveal that the existing policy framework overlooks the pastoral and agro-pastoral concerns associated with the recurring occurrence of the Omo River flooding disaster in the area. Therefore, building disaster-resilient pastoral and agro-pastoral communities has a substantial impact on the realisation of effective disaster risk management while ensuring sustainable socio-economic development in the lower Omo Valley southern regions of the country.

KEYWORDS

Disaster risk management; disaster resilience; flooding; climate change; pastoralist; agro-pastoralist; community.

1. Introduction

The world today faces increasingly frequent, severe, and complex social, economic, and climate risks, where shocks and stresses undercut sustainable development gains and overall human well-being (USAID, 2024). The geospatial distribution of both natural and man-made (technological) disasters across the continent from 1900 to 2024 reveals significant trends and patterns in the frequency and spread of various disaster types worldwide (Cvetkoic et al., 2024). According to Cvetkovic et

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al. (2024), a total of 25,836 disasters were recorded worldwide, of which 69.41% were natural disasters, and 30.59% were man-made (technological) disasters. Most natural disasters predominantly occurred in Oceania, accounting for 91.51% of all recorded natural disasters. Indeed, man-made disasters or technological disasters were most prevalent in Africa, occurring in 43.79% of all disasters (Cvetkovic et al., 2024). Hard-won social and economic gains can easily be undermined by recurrent shocks and stresses, sending rural people back into poverty. Meanwhile, ongoing and compounding crises, including global climate change, food crises, rising inequality, and conflict, are generating spiralling humanitarian needs while increasing fragility and poverty backsliding (USAID, 2024). Even though this crisis is more severe in the Sub-Saharan countries. Over the last few decades, Ethiopia has faced multiple disasters, both natural and human-made, including floods, droughts, stormy rains and winds, landslides, locust swarms and pest infestations, disease outbreaks, conflicts, endemic diseases, and pandemics (ERCS, 2021). The intensity and frequency of disasters in the country have been increasing due to several underlying factors, including widespread poverty, climate change, high population growth, severe environmental degradation as well as violence and conflicts often recurring in various parts of the country, which collectively increase most rural peoples vulnerability to disastrous risks, food insecurity, and social, economic and political marginalisations (ERCS, 2021). The situation is much more severe in the pastoralist and agro-pastoralist regions of the country. These modes of life are mainly dependent on animal husbandry accompanied by subsistence crop production. Livestock production is of crucial importance to the incomes, economies, and livelihoods of hundreds of millions of Africans, particularly and the world at large (Abduletif, 2019; FAO, 2021). In countries like Ethiopia, pastoralists and agro-pastoralists are primarily found in the lowlands, which are commonly characterised as arid, semi-arid, and sparsely populated (Kurt, 2003; FAO, 2018; Tofu et al., 2023). It covers 61% of Ethiopia's total landmass, with 97% of it concentrated in the northeast, East, and southern parts of the country (Tofu et al., 2023). It provides livelihoods for more than 12 million of its population, who drive most of their income from livestock herding and complement it with small farming (CSA, 2013; FAO, 2018). Economically, the sector contributes 20% to the national GDP through the livestock sector (Abduletif, 2019; Ayele et al., 2020). Despite this, the progressive policy shift was demonstrated when the country promulgated the 2013 National Disaster Risk Management policy.

This shift has transformed the country's disaster risk management approach from a predominantly drought- and food insecurity-focused, relief-oriented model to a multi-sectoral disaster risk management approach (EDRMC, 2022). Even though, the fundamental misconceptions about pastoralist and agro-pastoralist production systems in the country have led to a general perception among policymakers that "pastoralist and agro-pastoralist land are underused and therefore should be developed" (Elias & Abdi, 2010). Such misconceptions have led to the social, political, and economic marginalisation of pastoral and agro-pastoral communities. Most disaster risk management policies and strategies have favoured externally imposed development schemes, which often alienate and expropriate pastoral and agro-pastoral lands in favour of large-scale commercial and River dam investment activities. The curtailment of natural resources and mobility has rendered pastoral and agro-pastoral rural households vulnerable to frequent droughts, food insecurity, and famine (Elias & Abdi, 2010). According to Auma and Mahiri (2022), communities living in floodplains are predisposed to disaster risks due to geophysical factors and behaviours, including apathy in community-based disaster preparedness activities. The Lower Omo Valley pastoralist and agro-pastoralist community of the Dassenech is among those subjected to the effects of natural resource alienation and a lack of recognition and protection through disaster risk management policies and strategies. Therefore, this paper aims to explore and describe the impact of flood disaster risk management policies on building resilience in pastoral and agro-pastoral communities, specifically focusing on the Dassenech people in Southern Ethiopia, through assessing the gaps and limitations of national DRM policies and strategies while building social resilience in the pastoral and agro-pastoral communities of Lower Omo Valley.

2. Methods

2.1. Description of Study Area

South Omo (or Debub Omo Zone) is a zone in the Ethiopia Southern Nations, Nationalities and Peoples 'Region (SNNPR). South Omo (Debub Omo) is bordered on the south by Kenya, on the southwest by South Sudan, on the west by Bench Maji, on the northwest by Kefa, on the north by Konta, Gamo, Gofa, and Basketo, on the northeast by Dirashe and Konso, and the east by the Oromia Region. The administrative centre of south Omo (Debub Omo) is Jinka. The area of the South Omo Zone is approximately 20,000 km² (ibid).

This area is named for the Omo River, a river that flows south into Lake Turkana on the western side. Mago National Park and Tama Wildlife Reserve are located on the eastern bank of the Omo River. There is Lake Chew Bahir, surrounded by Stephanie Wildlife Sanctuary, located at the eastern border of this zone. Notable high points include Mount Smith (2560 meters) and Mount Mago (2538 meters). West of the Omo is the most sparsely populated part of Ethiopia, inhabited by nomadic (Pastoralist) and semi-nomadic (agro-pastoralist) ethnic groups. The infrastructure of the Zone is "weak and for the most part non-existent; this is a disadvantage inherited from historical neglect of a typical marginal region (ibid)." It also observed that the South Omo Zone is "one of Ethiopian's socially most diverse zones. It contains a minimum of 12 different ethnic groups and possibly as many as 21. Social diversity, therefore, compounds the existing problems of isolation, acute shortage of basic infrastructure, as well as scarcity of professional and technical manpower."

South Omo has 462 kilometres of all-weather roads and 412 kilometres of dry-weather roads, resulting in an average road density of 37 kilometres per 1,000 square kilometres. According to the Central Statistical Agency (CSA), 1,364 tons of coffee were produced in South Omo in the year ending in 2005, representing 1.36% of the Southern Nations, Nationalities and Peoples' Region (SNNPR)'s output and 0.6% of Ethiopia's total output.

Based on the (2007) Census conducted by the CSA, this Zone has a total population of 573,435, of whom 286,607 are men and 286,828 women; with an area of 21,055.92 square kilometres, South Omo has a population density of 27.23. While 43,203, or 7.53%, are urban inhabitants, a further 25,518, or 4.45%, are pastoralists. A total of 125,388 households were counted, resulting in an average of 4.57 persons per household and 121,309 housing units. The eight largest ethnic groups reported were the Aari (44.59%), the Male (13.63%), the Daasanach (8.17%), the Hamer (8.01%), the Banna (4.42%), the Amhara (4.21%), the Tsamai (3.39%), and the Nyangatom (2.95%); all other ethnic groups made up 10.63% of the population. Aari is spoken as a first language by 44.34%, 14.25% speak Male, 8.17% Hamer, 8.16% Daasanach, 5.07% Amharic, 4.49% Banna, 3.03% Tsamai, and 2.94% speak Nyangatom; the remaining 9.55% spoke all other primary languages reported. 50.86% practised traditional beliefs, 30.44% were Protestants, 12.23% of the population identified as Ethiopian Orthodox Christians, and 1.33% were Muslim.

According to May 24, 2004, World Bank memorandum, 4% of the inhabitants of South Omo have access to electricity; this zone has a road density of 22.7 kilometres per 1000 square kilometres (compared to the national average of 30 kilometres) the average rural household has 0.4 hectares of land (compared to the national average of 1.01 hectare of land and an average of 0.89 for the former SNNPR) the equivalent of 1.5 heads of livestock. 11.5% of the population is in non-farm-related jobs, compared to the national average of 25% and a regional average of 32%. Thirty-seven per cent of all eligible children are enrolled in primary school, and 7% are enrolled in secondary schools. 77% of the zone is exposed to malaria, and 61% to Tsetse fly. The memorandum gave this zone a drought risk rating of 348. This Zone was selected by the Ministry of Agriculture and Rural Development in 2004 as one of several areas for voluntary resettlement for farmers from overpopulated areas; no specific woredas within this zone were identified in this program. The lower Omo Valley, downstream of pastoral and agro-pastoral communities, comprises Dassenech, Hamer, Nyangatom, and Selamago Woredas. This study has been undertaken in Dassenech Woreda, which has been vulnerable to the Omo River flooding disaster and its multifaceted effects for a decade.

Dassenech Woreda is located in the South Omo Zone of the former Southern Nations, Nationalities, and Peoples' Region (SNNPR) state in Southwestern Ethiopia. It is 860 km away from Addis Ababa and 205 km from Jinka. The woreda is bounded by Hamer woreda to the North and east, Kenya to the south, and Nyangatom woreda to the west and Northwest. The woreda covers a total area of 234,274 ha, with elevation ranging from 275 meters to 400 meters above sea level, and is found at a latitude and longitude of 4°48′N 35°58′ECoordinates: 4°48′N 35°58′E. It has only one Agroecological zone - Kolla (100%). The mean annual rainfall of the Woreda is about 350 mm. The annual mean temperature ranges from 30 °C to 40 °C (Dassenech Woreda Pastoral Development Office, 2024).

The Dassanech are the people who speak an East Cushitic language and live on the Ethiopia-Kenya border, on the northern shore of Lake Turkana, and further north along the Omo River. The population is estimated at 48,067 (CSA, 2007, p. 84), and according to the Woreda Health Centre, the population of Dassenech is currently estimated to be 80,000. According to unpublished data from the South Omo Zone Administration, the land area of the Dassenech is 2,575 sq km. Until 2006, the area was part of the administrative unit of Kuraz woreda. Following the 2006 administrative restructuring, Dassenech land was elevated to a District (Woreda) level, with its capital at Omorate, located approximately 852 km south of Addis Ababa. The Dassanech Woreda is divided into 40 units called kebele.

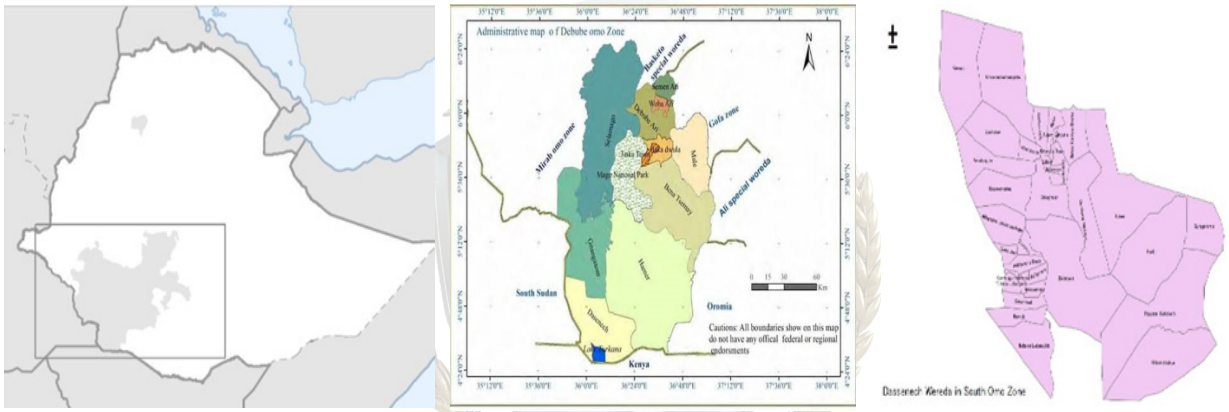

Figure 1: Dassenech Woreda Map at the right edge.

2.2. Research Approach and Design

In social science research, there are three major theoretical paradigms: positivism, phenomenology, and interpretivism. Among these phenomenological or interpretive traditions, there is a long history in philosophy and sociology (Berger & Luckmann, 1967; Bruyn, 1966; Husserl, 1962; Psathas, 1973; Schutz, 1962, 1966). As Jack Douglas (1970) wrote, "The 'forces' that move human beings, as human beings rather than simply as human bodies . . . are 'meaningful stuff.' They are internal ideas, feelings, and motives" that important reality is what people perceive it to be. The interpretive approach seeks to understand through qualitative methods, such as participant observation and in-depth interviewing, which yield descriptive data (Vanderstoep & Johnston, 2009). Through employing a qualitative research method, we are enabled to explore more profound insights into the real concerns and understand the complex concepts, perspectives, and experiences of target communities rather than collecting numerical data. Therefore, to understand social phenomena from the study participants' or actor's perspectives and points of view and to examine the world they experienced while exploring the trends and patterns of flooding disasters, disaster risk management systems, and their impacts on pastoralist and agro-pastoralist communities of Dassenech people perspective and experiences, the researcher employs phenomenological or interpretative epistemological paradigm.

2.2.1. Methodological Paradigm

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2.2.2. Study Approach and Design

As Glaser and Strauss (1967) suggest, "grounded theory" may be said to be grounded to the extent that it is derived from and based on the data themselves. Therefore, due to the exploratory nature of this study, the researcher employed a qualitative research design and utilised participatory rural appraisal tools and techniques to address the gaps in the proposed data collection methods of the study. The merit that qualitative research design and participatory rural appraisal tools and techniques bring to this study critically enables the development of concepts, insights, and understanding about the study area of emphasis in this research paper. As well as to analyse, theorise, or build theory rather than collect data to assess preconceived models, hypotheses, or theories with the assumption that knowledge is constructed. Therefore, to explore and describe the phenomena under study in this research, the researcher employed a narrative approach to identify the major themes. This approach enabled the researcher to gain insight from the perspective of the study's target population, which provided an understanding of their interpretations and experiences regarding flood disaster risk management, social resilience, and coping strategies among the Dassenech people.

2.2.3. Sampling Procedure and Sample Size

Qualitative researchers are sceptical that any conclusions can be broadly generalised to a large population because any effort to generalise extrapolates the characteristics of a sampling unit beyond the context that gives it meaning (Vanderstoep & Johnston, 2009). Researchers may employ several different sampling design methods when sampling target populations in the study area. The design will likely differ depending on the research type. Considering the purposes of this study and major themes, the researcher employs a purposive sampling procedure using a non-probability purposive sampling strategy. This enabled an in-depth understanding of the study area, which is the emphasis of this research. Additionally, to best represent the study population. To gather in-depth data, the researcher intentionally selected study participants based on their characteristics, knowledge, and experiences related to flooding disasters. This approach enabled an in-depth understanding of the study area. It ensured adequate representation of the study population, which is based on the representative attributes of participants studied throughout the analysis. Indeed, Sample size is usually determined by the level and type of study analysis planned. However, the key is to sample enough rare groups to have meaningful responses for the study. Select a sample size that yields meaningful results for the study being conducted.

However, for this study, the sample size is based on the major themes being explored. Therefore, the researcher tried to select an equal representation from the identified sample respondents of the study, which includes community leaders and elders, development agents, government entities representatives, such as pastoralist development affairs offices, Agriculture and natural resource development offices, pastoral productive safety net program (PSNP), Disaster response and resilience management (DRMM) sectors, Woredas Administrative Offices, Woreda health Offices, and livestock and fishery resource development offices. As well as representatives from non-governmental

organisations currently active and operating in the study area and representatives from the Ghibe-III dam or other relevant organisations. Which is constructed based on the data collection tools described in the section on each of the data collection instruments in this research thesis. Therefore, the researcher purposively selects sixteen (16) key informants, twelve (12) in-depth interviewees, thirty-two (32), and eight (8) focus group discussion and case study participants, respectively.

2.2.4. *Source of Data*

The researcher used primary and secondary sources of data for the study. Indeed, the primary sources of data have been collected through key informant interviews, in-depth interviews, Focus group discussions, and case studies with 68 respondents in the study. At the same time, previous research papers related to pastoralists and agro-pastoralist issues, especially about the study area and topic, unpublished research, reports, journal articles, and literature on historical, socio-economic, cultural, political, and ecological data, and project Intervention reports by GO and various NGOs working in the area have been used as secondary data sources. In addition, various research reports related to the lower Omo Valley communities, specifically those of the Dassenech communities, were critically reviewed by individual researchers and local and international institutions. Then, the data gained from both sources have been used as background information and a building block to strengthen the presentation of the study findings and analysis.

2.2.5. Method of Data Collection

The backbone of every research is the collection of data that a researcher has identified as worthy of analysis (Papachroni & Lochrie, 2015). Interviews, survey questionnaires, publicly available information, and audiovisual materials are all potential sources of data for a researcher. However, collecting data can be a daunting experience, either because there is too little data or because what appears to be a rich dataset has turned into a nightmarish sense of data overload (Papachroni & Lochrie, 2015). It is, therefore, helpful for evaluating data sources, which saves valuable time and resources and also tends to lead to better analysis and more robust results. What constitutes good practice when collecting data is very much dependent on the research tradition within which the study is placed, either of qualitative or quantitative data collection tools; while considering the nature, purpose, and objective of this study, the researcher employed qualitative data collection methods such as key informant interview, in-depth interview, focus group discussion, and case study.

2.2.5.1. Key Informant Interview

Key informant interviews are qualitative interviews with individuals who possess in-depth knowledge and understanding of the specific topics or issues addressed in the study or community problem. According to Mikkelsen (2005), the representatives of key informant interviews were ordinary people, not necessarily specialists, and better educated than those in power or officials. According to Julie Laforest et al. (2009), key informants from the community under study are " privileged witnesses, people who, because of their position, activities or responsibility, have a good understanding of the problem to be explored. Therefore, to collect detailed data about the impact of Omo River Flooding and Communities' Vulnerability, Livelihood resilience, and coping mechanism, the researcher purposively selected four at most Omo River flooding disaster-affected clusters (Rate – Borkonoch, Kelem Cluster, Libemuket, and Delegnmur cluster). Indeed, the researcher conducted key informant interviews with 16 people, including purposively selected community leaders, elders, representatives from social institutions, and development agents, at these kebeles.

Figure 2: Interview with Delegnmur Kebele Communities Elder (2024)

2.2.5.2. In-depth Interview

An in-depth interview is a valuable qualitative data collection technique that can be employed for various purposes, including needs assessment, program refinement, issue identification, and strategic planning. According to Lisa et al. (2011), in-depth interviews are most suitable for situations in which the researcher seeks to ask open-ended questions that elicit in-depth information from a relatively small number of people (as opposed to surveys, which tend to be more quantitative and are conducted with large numbers of participants).

To collect and explore detailed information on proposed major themes under in-depth interview (i.e. vulnerability to the effects of disastrous events, mode of adaptation in the past and today, and government development programs, policies, and strategies), the researcher purposively selects twelve (12) respondent through purposive sampling method, which includes selected government entity representatives, such as pastoralist development affairs offices, Agriculture and natural resource development offices, pastoral productive safety net program (PSNP), Disaster response and resilience management (DRMM) sectors, Woredas Administrative Offices, Woreda health Offices, and livestock and fishery resource development offices as well as four (4) non – non-governmental organisations representatives who are currently active and operating in the study area. Despite planned in-depth interviews with Ghibe-III dam respective or concerned representatives not being carried out due to time and cost limitations. Even though the collected data, via in-depth interviews, helped the researcher address issues not addressed under FGDs and key informant interview questionnaires with detailed elaborations. Throughout the process, the researcher developed in-depth interview data collection guidelines and theme-based questionnaires to ensure the quality of the data collection process.

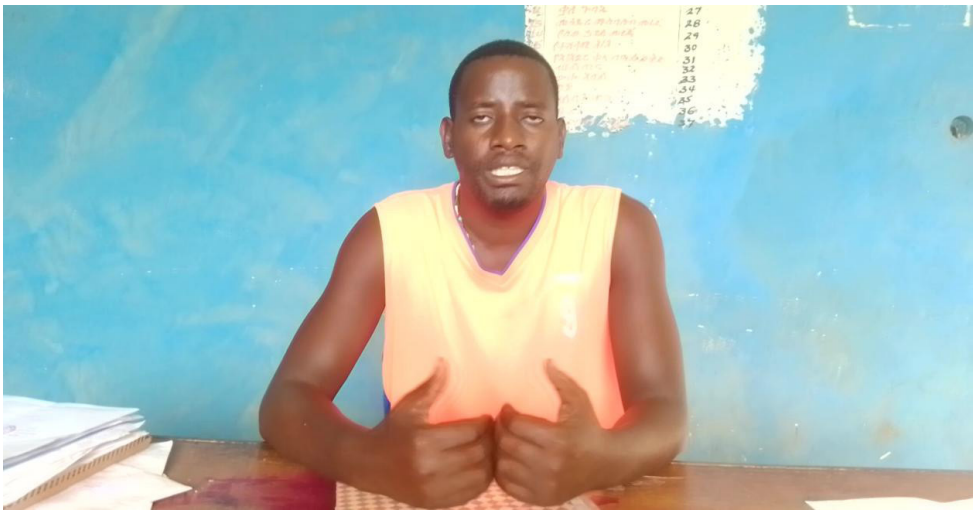

Figure 3: In-depth Interview with Dassenech Woreda Pastoralist Development Affair Office Senior Expert (2024)

2.2.5.3. Focus Group Discussion

Focus groups are considered a reasonable alternative to conduct several individual interviews with participants in the discussion, which is used to generate qualitative insights or produce direct quotes that can represent the view of the group under study, as well as to fill the gaps of other data collection tools, which have been used for this study while accessing the view of those who would not be will or able to speak up at larger, group meetings. This is possible because FGD groups can be comprised entirely of people from specific disadvantaged groups who may not feel comfortable discussing their particular opinions in a mixed setting (INTRAC, 2017). Therefore, for this study, the researcher brings together a group of eight (8) community members or people. The sampling of these selected group members for a focus group was random; intentional decisions were made to achieve the best group composition in light of the study's themes and probing questions. Then, under the guidance of an FGD moderator, the researcher engaged in a group question–and–answer discussion. As a result, nearly four (4) focus group discussions have been conducted. Each group constituted eight (8) participants, and 32 people in total were selected who live a long side downstream of the Omo River Valley village of Dassenech communities (i.e. Rate, Kelem, Arikol, and Seremret kebeles). Indeed, focus group discussions with these kebeles provided immense qualitative data or information about villagers' adaptation and coping strategies to the effects of hazardous events (drought, flooding, disease outbreak, i.e. human and livestock, conflict, etc.), effectiveness and impacts of government disaster risk management policy, government pastoralist, and agro-pastoralist resilience building program intervention has been the major themes of the discussion.

Figure 4: Focus group discussion with Rate - Borkonech villagers (2024)

2.2.5.4. Case Study

There are several types of case studies. A researcher may choose to conduct either a single-case study or a case study involving multiple cases. According to Scott W and Deirdre D. (2009), a collective case study involves a comparison of several related cases. A case study can also be focused on one person, known as a biographical case study, or on one event, referred to as a critical incident study. This method of data collection enabled the researcher to explore and describe the nature of Omo River flooding and its impact on the livelihood processes and strategies of pastoral and agro-pastoral households in the lower Omo Valley, as practised by the Dassenech people.

Throughout the data collection processes of this study, the researcher purposively selected four (4) villages. This is based on their vulnerability and exposure to the effects of flood disasters while also mitigating their impact. Then, villagers inquired about the impact of disaster management on local government. Details of the subjective aspect, such as feelings, beliefs, impressions, or interpre-

tations, enabled an in-depth understanding of the villagers' flooding disaster experience. Semi-structured interviews have been administered to collect detailed data from selected villagers. The types of livelihoods, vulnerability contexts, and coping strategies related to flooding disasters, as well as trends in access to and use of disaster risk management systems, have been the major themes explored in the case study of this research.

Figure 5: Case Study of Libemuket Cluster Kebeles (2024)

2.3. Data Analysis and Interpretation

The data gathered through the above qualitative data collection tools were organised in line with the objectives of this research study by employing qualitative analytical procedures. The data were categorised logically based on identified patterns within and between the concepts. Therefore, the research employed content analysis guided by the grounded theory approach. The transcribed data were then categorised according to the themes that guided the discussions in this study; finally, all collected qualitative data were analysed using thematic analysis. Connections and reflections between theory and practices on the ground have been discussed using the early warning system conceptual Framework Analysis, which guides the drawing up of conclusions and recommendations regarding the study.

3. Results

3.1. Disaster Resilience

According to DFID (2010), the concept of Disaster Resilience is defined as the ability of countries, communities, and households to manage change by maintaining or transforming living standards in the face of shocks or stresses, such as drought, violent conflict, and flooding without compromising their long-term prospects. This concept has become more important for modern societies as states learn to adapt and manage disaster risks in ways that minimise their impacts. In general, resilience is understood as the ability of a system to withstand, recover from, or even become stronger after exposure to critical events or shocks. Accordingly, resilience is described as the capacity of the affected community to self-organize, move away from negative situations, and recover stronger than before (Zobel, 2010). On the other hand, according to Kırıkkaya (2017), disaster resilience refers to the ability of a society, community, or system to cope with disasters, minimise damage, and balance its social, physical, and psychological capacities. In other terms, the concept of disaster resilience is described as the capacity, ability, or competence of communities to cope with stress, crisis, or a disaster to return to pre-existing conditions (Lucini, 2014). In a broader sense, disaster resilience refers to a society or social system's ability to overcome disasters and emergencies and successfully regain

equilibrium with its social, psychological, economic, and physical capacities (Ahsan et al., 2018). Mayunga (2014) demonstrated disaster resilience as the capacity of communities to mitigate, prepare, respond, recover, and adapt to new conditions while learning from past experiences. This includes the capacity to reduce or prevent losses, control the effects of disasters, and recover with minimal social, economic, and local community disruptions. Resilience is a process, the state of continuous learning and taking responsibility to develop and maintain the capacity to cope with hazards (Cutter, 2008). While fully exploring and describing disaster risk management practices in the pastoral and agro-pastoral communities of the lower Omo Valley, the concept of disaster resilience is examined through the lens of its major dimensions.

3.1.1. Dimension of Disaster Resilience

Disaster Resilience has four major dimensions, including technical, organisational, social, and economic dimensions (Bruneau, 2003; Rodriguez, 2022). The technical dimensions of disaster resilience focus on the ability of physical or infrastructural systems to perform at desired levels when communities are exposed to disasters. This includes the provision of public services before, during, and after flooding disasters to the pastoral and agro-pastoral communities of the Dassenech. The organisational dimension of disaster resilience focuses on the ability of national and local institutions and organisations to respond to disasters and perform their critical functions effectively. At the same time, the Dassenech rural villagers are exposed to flooding disasters. The social dimension of disaster resilience encompasses measures taken to mitigate the exposure of communities and governments to the effects of the Omo River flooding disaster. The final dimension of disaster resilience, economic dimensions, refers to the capacity to reduce direct and indirect economic and livelihood losses caused by Omo River flood disaster risks.

3.1.1.1. Technical Dimension

According to Rodriquez (2022), this dimension covers the technical or infrastructures that can be disrupted by a disaster and may require assistance in case of a disaster emergency; it includes the following sub-dimensions:

Health - This quantifies the capacity of a community's health infrastructure to provide health services in the event of a disaster.

WASH (Water, Sanitation, and Hygiene), Electricity, Waste Treatment - This quantifies the capacity of available water, electrical power, sewage, and waste treatment infrastructures. It reflects inductors such as the number of households that can access electricity and water, the existence of alternative power sources, and the number of people who have access to water sanitation and hygiene services.

Figure 6: Koro Cluster Kebeles with limited infrastructural disaster resilience assistance

3.1.1.2. Institutional Dimension

This dimension of disaster resilience describes the institutional attitudes or behaviours towards disaster risk and regarding the implementation of disaster risk reduction, as well as post-disaster response and recovery, and includes the following sub-dimensions (Rodriquez, 2022)

Trust in Government - This sub-dimension measures the population's level of trust in local and national government institutions in the event of a disaster.

Disaster Preparedness and Mitigation - This involves the engagement of local and national governmental institutions in identifying risks, implementing mitigation measures, and producing and engaging communities in preparedness campaigns. It reflects indicators such as the capacity for disaster data collection, the availability of risk maps, the capacity of contingency planning, and the number of emergency drills, early warning systems, and disaster risk-related information campaigns.

Disaster Response and Recovery - This sub-dimension describes the capacity of local and national government institutions to assist communities during an emergency in an effective and timely manner and to provide the means to support a rapid recovery. It reflects indicators such as the types of civil protection systems that are in place, the availability of emergency funds, and multi-sector coordination.

3.1.1.3. Social Dimension

According to Rodriquez (2022), the social dimension of disaster resilience encompasses all the characteristics of vulnerable populations that enable them to cope with an external event and recover from it and has the following sub-dimensions, including:

Social fabric − This represents the composition of the vulnerable pastoral and agro-pastoral Dassenech population. It can help to define the potential post-disaster needs of the Omo River flood, and this sub-dimension reflects indicators related to household size, the number of female-headed households, the number of children per household, population growth, the social disparity index, quality of life, and educational level.

Awareness and Preparedness - This sub-dimension illustrates all characteristics specifically related to knowledge about risks, attitude towards risks and disaster preparedness, and risk reduction measures taken at the household or community level. It reflects indicators related to pastoralist and agro-pastoralist knowledge and perception of risk, risk aversion, and previous disaster-related experiences.

Social Capital − This sub-dimension encompasses all the characteristics that foster a sense of community cohesion. It reflects inductors related to social attachment to the place where they live, sense of community, trust in the community, participation in community activities, shared beliefs, and strong social networks.

Social Capacity − This sub-dimension encompasses all the qualities and skills that enable communities to withstand adversity but does not explicitly target disaster preparedness. It reflects indicators related to adaptive capacity, problem-solving skills, leadership, capacity building, and access to resources.

Social Support − This represents a household's access to support from institutions at different levels. This sub-dimension reflects indicators related to social security, financial support, social assistance, general social services, and entitlement to rights.

3.1.1.4. Economic Dimension

Disaster resilience - economic dimension encompasses all the available economic and livelihood resources of the communities at pastoral and agro-pastoral household and national levels that enable it to cope with external events and recover from them, and it includes the following sub-dimensions(Rodriquez, 2022):

Economic level − This sub-dimension represents the amount and sources of economic resources on which the pastoral and agro-pastoral Dassenech communities can rely. It reflects indicators related to the level of income, income diversification, and sources of income.

Wealth Distribution − This describes how wealth is distributed across the Dassenech rural population and among gender in the communities.

Pre-Disaster Financial Services − This sub-dimension describes the availability of financial services prior to a disaster for pastoral and agro-pastoral villagers.

Post-disaster Financial Services − This refers to the range of financial services that can be provided after a disaster has occurred.

Resources − This sub-dimension encompasses all the essential resources necessary to address an Omo River flooding disaster crisis and meet the response and recovery needs of the Dassenech communities.

Figure 7: Dassenech rural villagers with lack of pre and post-disaster resilience financial services (2024)

Trend of Disaster Risk Management in Ethiopia

The country is exposed to a wide range of disaster risks associated with its diverse geography, climate, and socio-economic conditions (FAO, 2022). Recurrent droughts and flooding pose significant challenges to the pastoral and agro-pastoral communities of the Lower Omo Valley, particularly the Dassenech. However, several other disasters, including conflicts, crop pest outbreaks, and livestock and human diseases, also impact communities, rural livelihoods, and the country as a whole. Despite the country's long-standing trend of recurrent drought and flooding, a formal DRM structure can be traced back to the drought and famine of 1973/74 (FAO, 2022). Before 1973, there was no well-established and organised disaster management institution, and responses to crises up until then were ad hoc (FAO, 2022). The first formal government disaster management institution was established in 1974 with the establishment of the Relief and Rehabilitation Commission (RRC) with a mandate to provide relief assistance to drought-affected rural people in the Northern part of the country (i.e. Wollo and Tigray regions/provinces). Under the first government response to disaster management policy and strategies - RRC, much attention was given to the highland agrarian rural communities of the country, despite the lowland pastoral and agro-pastoral communities being neglected and struggling with multiple disasters. Then the RRC was subsequently transformed into the Disaster Prevention and Preparedness Commission (DPPC) in 1995, following the implementation of the first National Policy on Disaster Prevention and Management (NPDPM) in 1993 (FAO, 2022).

The established DPPC had the responsibility of providing support for disaster-affected rural populations, particularly for those affected by severe drought. Although some research findings reveal that RRC achieved significant standards in its implementation of relief measures undertaken (Dewaal, 1997), it also suffered from shortcomings and gaps, specifically due to the lack of an early warning system as a crucial component of disaster risk management. This limitation was apparent when it was reported that more than 250,000 people died in the Central and Northern highland areas of the country following the 1973/74 famine (FAO, 2022), which was also one of the first drought and famine disasters in the country. The lack of national preparedness strategies and the absence

of an effective early warning system highlighted a pressing need to concentrate and strengthen the government's capacity to produce early warning information upon which to base its impact mitigation and response measures for future emergencies. This prompted the government of Ethiopia to rename DPPC to Disaster Prevention and Preparedness Agency (DPPA) in 2004, with a revised mandate to focus on emergency response (FAO, 2022).

Although DPPA has been highly practical and effective in saving the lives of rural communities, its contribution to reducing vulnerability to disaster risks and building resilience to recover from shocks was considered low (FAO, 2022). Consequently, in 2008, the power and responsibility of DPPA shifted to the Ministry of Agriculture and Rural Development (MoARD). Afterwards, MoARD established the Disaster Risk Management and Food Security Sector (DRMFSS), which comprised two major directorates: the Early Warning and Response Directorate (EWRD) and the Food Security Coordination Directorate (SFCD) in 2007 (FAO, 2022). This led to significant change, shifting from a strategy that primarily focused on drought and support for life-saving relief and emergency assistance during disasters to a comprehensive disaster risk management approach. Unlike the previous approach, this approach has been implemented to reduce disaster risks and their potential consequences by providing appropriate and timely responses to disasters through the establishment of a coordinated, accountable, and decentralised system of disaster risk management.

In 2013, the Ethiopian government passed another proclamation, shifting the DRMFSS to the National Disaster Risk Management Commission (NDRMC). This prompted the preparation and adoption of the National Policy and Strategy on Disaster Risk Management (NPSDRM) (FAO, 2022). However, NPSDRM is aware that global humanitarian actors are frequently criticised for establishing parallel structures and undermining existing systems. Despite this, the NDRMC has been mandated to serve as the central body for coordinating and implementing all government disaster risk management efforts. All humanitarian assistance, including local and international, was supposed to be coordinated and channelled through the established commission. In this manner, it has been possible to minimise the common pitfalls in the country due to the government actively assuming and defending its leadership role (IAHE, 2019). The close integration of international humanitarian and government responses was widely regarded as a key factor in explaining the successes of the drought response in recent years. The humanitarian crisis triggered by conflicts and the need to respond effectively and promptly to the concerns of millions of internally displaced rural people has prompted the government of Ethiopia to relocate the NDRMC from the Ministry of Agriculture (MoA) to the Ministry of Peace (MoP). Throughout, the overall trends in the country's disaster risk management response have placed much more emphasis on the Northern, Northeastern, and Western regions, as well as Southern highland rural communities. Almost all lowland pastoral and agro-pastoral communities are severely marginalised due to their limited consideration and inclusion in disaster management policies and strategies.

3.2.1. The Need for Paradigm Shift

Most rural parts of the country are exposed to a wide range of disasters, largely due to their extensive dependence on rain-fed subsistence agriculture, climate change, resource degradation, diverse climatic and socio-economic conditions, and conflicts (FAO, 2022), particularly among pastoral and agro-pastoral communities in lowland regions. Drought and floods are the significant challenges that Lower Omo Valley villagers face today; however, several other threats also affect rural lowland communities and their livelihoods, including conflict, desert locusts, fall armyworm, crop pests, diseases, livestock disease outbreaks, forest fires, and human diseases (FAO, 2022).

Multiple literature sources of evidence suggest that Ethiopia would feel the human and economic impacts of climate change intensity, and the impacts will only continue to grow if the country continues a business-as-usual approach to crisis response and will not be able to manage the increasing scales of the rural pastoral and agro-pastoral communities challenges (FAO, 2022). As a result, there is a consistent call from all stakeholders for a paradigm shift in the way the country addresses rural communities at risk to take preventive actions that reduce exposure, vulnerability, and impact at the local level. This requires moving away from a reactive system to the disaster that solely focuses on drought and supply of life-saving humanitarian relief and emergency responses during disasters

to a comprehensive, proactive disaster and climate risk management approach, including climate change adaptation, among which are interventions to enhance livelihood diversification, social protection programs and risks transfer mechanisms (FAO, 2022).

Although significant progress has been made over the last nearly 50 years in managing drought disaster risks through large-scale prevention and mitigation programs, with a focus on vulnerabilities, rural household asset building, and public works for environmental rehabilitation and generating livelihood diversification, much remains to be done. According to the Food and Agricultural Organisation (2022), preparedness has been enhanced by the development of various policies and strategies, including early warning and response systems, as well as economic, social, and physical infrastructures, to strengthen the local pastoralist and agro-pastoralist communities' economies and their livelihoods. In addition, an attempt has also been made to establish a humanitarian response mechanism, improve coordination, and enhance resource management and prioritisation.

3.3. Disaster Risk Management Policy and Strategy

The country's new national policy on disaster risk management provides a comprehensive framework of disaster risk management (DRM) measures, serving as an amendment to the 1993 national policy on disaster prevention and management (UNDRR, 2021). It includes general directions and major implementation strategies, such as decentralised DRM systems, early warning and risk assessment, information management, capacity building, and the integration of disaster risk reduction into the development plan. The primary objective of the national policy is to mitigate disaster risks and potential damage caused by disasters by establishing a comprehensive and coordinated disaster risk management system within the context of sustainable development. Specifically, the policy focuses on (i) reducing and eventually preventing disaster risk and vulnerability that pose challenges to development through enhancing the culture of integrating disaster risk reduction into development plans and programs, as well as by focusing on and implementing activities before, during, and after the disaster period to address underlying factors of recurrent disaster; (ii) to save live, protect livelihoods, and ensure all disaster affected population are provided with recovery and rehabilitation assistance; (iii) to reduce dependency on and expectation for relief aid by bringing attitudinal change and building resilience of the vulnerable people; and (iv) to ensure that DRM is mainstreamed into development plan and program across all sectorial institutions and implemented at all level. However, the policy lacks effectiveness due to a lack of active participation and involvement in local communities, as well as consideration of the needs and interests of the most marginalised and disadvantaged communities in the lower Omo Valley, including downstream pastoral and agro-pastoral villagers. In addition, the actual implementation of the proposed disaster risk management strategies is hindered by financial constraints, as well as the socio-cultural and livelihood systems of these vulnerable social groups.

3.3.1. Policy Direction and Strategy

3.3.1.1. Comprehensive Disaster Risk Management System

According to the FDRE Ministry of Agriculture and Rural Development's Disaster Risk Management and Food Security Early Warning and Response (2013), reducing the risk of disasters and their effects can only be possible through building resilience to withstand the impacts of hazards and related disasters, and by providing timely and appropriate responses to disasters. However, the existing disaster prevention and preparedness system, including productive safety nets and other related programs, serves as typical instruments to reduce disaster risk. To withstand the impacts of a disaster, these measures are being implemented as part of the system, which has primarily focused on rural areas of the country. At the same time, the response operation has primarily focused on saving lives by providing relief assistance following a disaster.

As a result, the existing system does not enable the identification of recovery and rehabilitation interventions based on hazards and related disasters. The local context should be considered a central and integral part of the response operation, implemented in an integrated manner with national

development plans and programs, following interventions to rehabilitate affected people and reduce future disaster risk and vulnerability. Thereof, to reduce the occurrences of disaster risk and damages caused by flooding disasters in the pastoral and agro-pastoral communities of the Lower Omo Valley, implementing necessary response intervention before, during, and after the flooding disaster period promptly and with the active involvement of all concerned actors build resilience and cope-up strategy towards the effects of Omo river flooding disaster among pastoralist, and ago-pastoralist communities of the Dassenech people. A comprehensive disaster risk management system should adopt multi-hazard and multi-sectoral approaches, shifting away from a disaster management system that primarily focuses on emergency relief assistance to a resilience-based approach.

3.3.1.2. Decentralized Disaster Risk Management System

For an effective disaster risk management system, the identification and assignment of roles and responsibilities at each level of government, as well as those of stakeholders (i.e., civil society, private sector, etc.) at all levels, are crucial for enabling the realisation of a decentralised system. However, even disasters that are considered mild in terms of scale and intensity and can be managed locally are being handled by the federal government, which undermines the wisdom and capacity of at-risk Lower Omo Valley communities or local people to deal with disastrous events. Due to this reason, withstanding the impacts of hazards and related disasters and reducing losses from disasters to the required level by providing timely and appropriate responses appears to be impossible. A decentralised disaster risk management system that identifies and assigns roles and responsibilities to each level of government, concerned entities at all levels, communities, and individuals regarding disaster management activities will enhance the effectiveness of disaster mitigation and preparedness for flooding disasters among the pastoral and agro-pastoral villagers of the Dassenech people.

3.3.1.3. Mainstreaming Disaster Risk Management into Sectoral Institutions

An effective disaster risk management system can only be achieved if disaster management is mainstreamed into every sectoral development plan, including at the grassroots level. Disaster risk management encompasses cross-cutting issues and the responsibility of multiple sectoral institutions. Thus, concerned bodies must implement it by integrating it into their regular development activities. Despite this, attention has not yet been given to the disaster mainstreaming of pastoral and agro-pastoral communities. Thus, unless disaster risk management is considered integral to the development plans and programs of sectoral institutions, it will not be implemented. Therefore, it can be challenging to ensure continued and sustainable development at national, regional, and local levels.

3.4. Climate Change Adaptation and Disaster Risk Reduction

Extreme events are also compounding severe risks, as poor and vulnerable rural communities of the Dassenech pastoralists and agro-pastoralists living on floodplains face repeated flooding. They risk an increase in water-borne diseases and food insecurity as livestock are killed and agricultural farm fields are destroyed. Given the increasing urgency and extensive impact, addressing extreme climate events is an issue of international and national concern. The Sendai Framework for Disaster Risk Reduction 2015-2030 places a strong emphasis on measures that address all dimensions of disaster risk, including resilience building, and acknowledges climate change as a key driver of disaster risks (Adaptation Fund, 2023). The framework sets clear targets to increase the number of countries with national and local disaster risk reduction strategies, enhancing international cooperation with developing countries through adequate and sustainable support to complement their national actions for the implementation of this framework by 2030. The framework also linked with the Paris Agreement's inclusion of climate change adaptation and disaster risk reduction through the global adaptation goal, Article 7.1, "enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change", and Article 8.1 ", minimising and addressing loss, and damage associated with the adverse effect of climate change (UNFCCC, 2015). However, the Lower

Omo Valley region is not only external to this framework but also alienated from its right to access adequate disaster-resilience supportive measures.

3.4.1. Flood Risk Management and Resilience Building Strategy

Despite decades of progress in understanding disaster risk within the pastoral and agro-pastoral communities of the Lower Omo Valley region, building resilience among vulnerable populations remains to be addressed. Although all impacts of hazards on local people, economies, and their environment cannot be avoided entirely, they can be substantially reduced. One of the "best bets" is to implement an early warning system (EWS). It nurtures learning and understanding of hazards, provides warning information, and gives time to enable taking early action and avoiding unnecessary consequences. Despite some progress in enhancing Early Warning Systems (EWS) globally, the most recent report on the state of climate services (WMO, 2020; cited in Golding, 2022) indicates that an early warning system does not cover one-third of the population, and only 40% have multi-hazard EWS. Among various disaster risks, recent flooding disasters have become more severe due to inadequate and ineffective risk management and resilience-building strategies.

Flood risk is increasing with climate change and socio-economic development. The current flood risk management measures are insufficient to cope with today's flood risk (Ward et al., 2017; Rezende et al., 2019). To resist, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structure and function, disaster risk management has a significant impact on the pastoral and agro-pastoral communities of the Dassenech, altering their disaster resilience dynamics. Flood risk management requires human recognition; however, human recognition can never be complete or absolute; flood risk management has the limitation of not being able to eliminate all risks. If resilience could mitigate the remaining risks and complement the inherently insufficient risk management, it would be beneficial to increase resilience (Heliyon, 2022) among the Lower Omo Valley villagers. This can be achieved by incorporating resilience-based flood disaster management strategies into the policy framework.

This resilience-based flood management strategy may enable a system to recover to a state that is better than its pre-disaster state because it enhances the capabilities of pastoral and agro-pastoral communities, such as the Dassenech villagers, to self-organise, learn, and adapt. As McClymont et al. (2019) note, flood resilience can cope with unexpected climate perturbations and is self-organising, and flood risk management has shifted toward a more resilient approach.

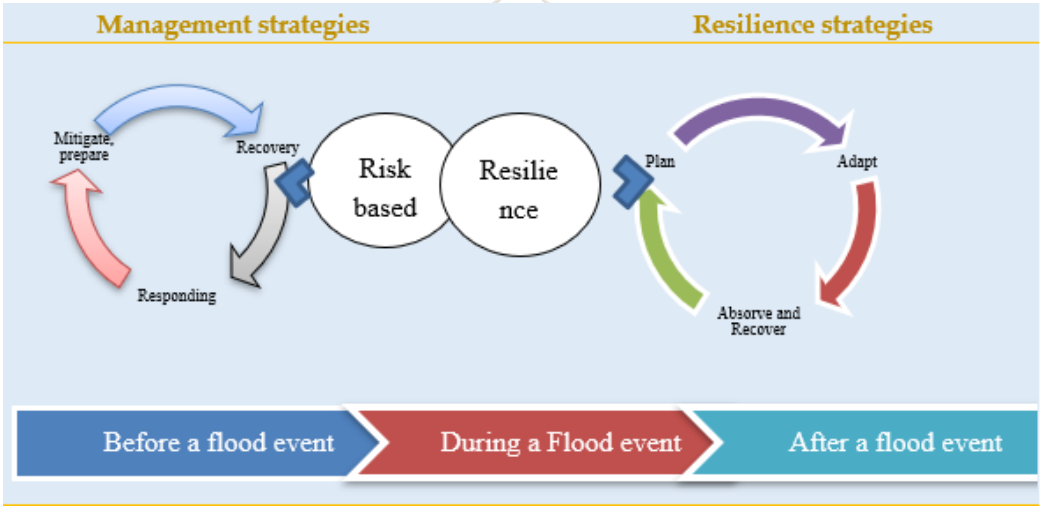

Figure 8: Based on Heliyon (2022). Risk-based and Resilience based flood management strategies

3.5. Resilience Building to Natural and Human-Induced Disaster

Building the necessary institutional infrastructure and mainstreaming disaster risk management practices in the pastoral and agro-pastoral communities of the Lower Omo Valley region into various sectors at national, regional, and local development and budgeting processes - all of which contributed to their disaster resilience to natural and human-induced disasters for quick recovery. According to the Food and Agricultural Organization (2022), For the last few decades, to counter the dehumanising effects of recurrent natural and human-induced disasters, the government of Ethiopia (GoE) responded by establishing a Relief and Rehabilitation Commission (RRC) in 1974 that has undergone various institutional reforms to respond to changing circumstances and a better understanding of disaster risk management and resilience building. Despite the established RRC's primary focus on coordinating humanitarian responses to the 1972/73 drought, its current form, the National Disaster Risk Management Commission (NDRMC), is believed to have significantly strengthened the legal and operational frameworks for a comprehensive and integrated national disaster risk management system at both national and local levels. This makes NDRMC responsible for coordinating early warning systems, disaster response, risk management, preventive measures, and recovery programs nationwide. It functions through a well-established organisational or institutional structure with clearly defined duties and responsibilities at each level.

The Ethiopian government has further developed and adopted various policies and strategies that have contributed to strengthening the resilience of local communities to natural and human-induced disasters (FAO, 2022). Starting with the adoption of the National Disaster Prevention and Preparedness Strategy (NDPPS) in 1989, relevant policies and strategies were periodically updated to reflect a deeper understanding of the circumstances and lessons learned over time about response measures and approaches. Indeed, resilience building in the country is enhanced by factors that drive transformation, such as sustained economic growth, human capital development, improved governance, and the political and economic inclusion of marginalised social groups (e.g., Pastoralist and agro-pastoralist communities of the Lower Omo Valley). Despite this, since the mid-1990s, Ethiopia has pursued policies and strategies that have helped the country achieve strong economic growth, relatively successful macroeconomic stabilisation, significant investments in the welfare and livelihoods of its people, substantial national poverty reduction, and increased resilience to shocks. It lacks inclusiveness, specifically in socio-economically and politically marginalised communities.

4. Discussion

4.1. Government Policy and Strategy of Pastoral and Agro-pastoral Concerns

Although the government implements diverse policies and strategies to address the concerns of pastoralist and agro-pastoralist communities in Ethiopia, the policies of the post-colonial government have led to the marginalisation of pastoralists and agro-pastoralists from mainstream national development programs. Over the years, there has been a tendency to neglect the needs and interests of pastoralists and even to envision the gradual eradication of pastoralism, as most government policies focus on the interests of agrarian and urban dwellers, thereby marginalising pastoral communities (Abduselam, 2019). The various narratives influence the decisions and policies made by governments and development organisations regarding pastoral and agro-pastoral concerns. However, these are often poorly suited to the situations faced by pastoralists, service providers, and other organisations in the drylands. A better understanding of pastoralism and agro-pastoralism is needed to improve decision-making that affects the people who live in pastoral and agro-pastoral areas (Andreas et al., 2017), as well as their livelihood systems.

Overall, pastoral and agro-pastoral communities in Ethiopia face a lack of inclusive development efforts, with government programs primarily focusing on human capital and investment expansion (Gebremeskel et al., 2019). Despite socio-economic and political ignorance, livestock producers in pastoralist and agro-pastoralist communities of the lower Omo Valley were thought to be the wealthiest part of the community. Still, nowadays, the situation has been reversed, and groups that rely on large-scale livestock herding for their livelihoods are among the most vulnerable and insecure (Yimer, 2015). Currently, Pastoral and agro-pastoral communities in the lower Omo Valley are

characterised by recurrent drought, high livestock disease outbreaks, mortality, and flooding, which threaten their viability and cause loss of livelihood, resulting in food insecurity, drought, and loss of life (Daniel et al., 2023). Moreover, the livestock grazing lands that pastoralists and agro-pastoralists depend on are shrinking rapidly due to various factors, including large-scale government and private investment, population growth, agricultural encroachment, land degradation, and ethnic conflict caused by the scarcity of natural resources. This intensifies the vulnerability of pastoral and agro-pastoral communities in the Dassenech to the effects of both artificial and natural disasters due to inadequate policies and strategies, as well as development intervention programs that fail to address the pastoral and agro-pastoral concerns of the lower Omo Valley communities.

4.2. Impact of Natural Resource Alienation

The most important asset owned by pastoralist and agro-pastoralist communities of the lower Omo Valley is their livestock resources. However, the cumulative effect of the dramatic cut in grazing lands and the loss of strategic pasture and water areas is a severe decline in the size of individual livestock holdings (EDRMC, 2020). This implies that pastoralists and agro-pastoralists of the Dassenech are worse off in both economic and socio-political terms today than they were in the past.

Figure 9: The Omo River flooding disaster affected the strategic pasture area of the Libemuket cluster (2024)

4.2.1. Challenges Faced by Pastoralists and Agro-pastoralists of the Lower Omo

According to FA-CAADP (2012), the African Union's policy framework for pastoralism in Africa recognises pastoralist contribution to national and regional economies – supplying a considerable number of livestock and livestock products. Pastoralist production systems are highly adaptive and constantly respond to market and livestock products, as well as human development and food security indicators, which indicate that they are among the lowest on the continent. As a way of life, nearly 20 million people across Sub-Saharan Africa, primarily pastoralists who depend on livestock or livestock products for income and food, typically graze animals on community-managed or open–access pasture and move with them seasonally (FA-CAADP, 2012). Additionally, agro-pastoralists drive 50% of their income from non-livestock sources, amounting to over $30 million in the greater Horn of Africa (FA-CAADP, 2012).

In Ethiopia, pastoral and agro-pastoral production are significant systems of livelihood practices in the country's lowland region, where livelihoods are heavily dependent on livestock rearing, which is supported by subsistence farming. Extensive livestock farming is the backbone of the economies in the lowland areas (FAO, 2018). In the lowlands of Ethiopia, livestock consists of large flocks

and herds of sheep and goats, cattle, and camels, which are mainly transhumant, with only surplus animals sold at local markets or trekked to major consumption centres (FAO, 2018; Tariku et al., 2020). Cattle dominate the livestock population in pastoral and agro-pastoral livelihood systems, followed by camel, goats, and sheep. Cows constitute about 40 per cent of the herd.

The major pastoral and agro-pastoral areas extend from the northeastern and eastern lowlands (Afar and Somali) to the southern and south-western lowlands (Borana and South Omo). Relatively larger flocks are maintained in the lowland (agro) pastoral systems. Approximately 3.1 million cattle-keeping pastoral/agro-pastoral households are estimated to exist, with an average herd size of 10–20; large herds of more than 200 heads are also common (Tariku et al., 2020). Typical breeds are entirely indigenous breeds are kept. Feed types for cattle primarily include predominantly communal rangeland pastures, with crop residues used to a limited extent in agro-pastoral areas (FAO, 2018b). The primary feed resources for sheep and goats include grazing on communal natural pasture, crop stubble, fallow grazing, roadside grazing, crop residues, browses, and non-conventional feeds (household food leftovers, weeds, crop tillers, and fillers) (Matawork, 2016; FAO, 2018b). The production of improved forages, the improvement of low-quality feed sources such as crop residues, and supplementary feeding (except for fattening) are almost non-existent (Solomon et al., 2008). Boreholes, deep wells, dams, rainwater, and rivers are significant sources of water. Milk production per unit area is low and highly seasonal. However, milk is usually produced in excess during the wet season. It is either sold fresh to nearby urban centres or processed into butter to be traded with the highlanders in the peripheral markets for grains (Tariku et al., 2020). However, pastoralists and agro-pastoralist communities in the lower Omo Valley area have been struggling for centuries with the effects of multifaceted artificial and environmental hazards, including drought and famine, loss of livelihoods, flooding, and high rainfall shortages, as well as desertification. They are resourceful, innovative, and entrepreneurial people by necessity. At the same time, there are significant challenges in establishing a secure livelihood.

4.2.1.1. Marginalization of Pastoralist (Agro) Livelihood

Pastoralism supports several hundred million households worldwide, contributes approximately 10% of the world's meat production, and provides food and ecological services, often being the only significant economic contribution in the world's poorest regions (Pastoralist Knowledge Hub, 2016). The Greater Horn of Africa and other arid regions where pastoralist communities reside are often isolated, remote, and underdeveloped. The creation of colonial policy promoted agriculture in highland areas and livestock development in the lowlands, primarily through ranching. Colonial attitudes and misunderstandings about pastoralist economies and mobility were often reinforced by the government after independence (FA-CAADP, 2012). They are still very evident in many African countries – in land policies, the resettlement of pastoralists to make way for more commercial investment, and the allocation of development support and services. Violent conflict, drought, and related humanitarian crises and famines are defining characteristics of the region (FA-CAADP, 2012). Each set of conflict and livelihood issues has a complex history that varies across countries and over time. Local conflict, trade, and livelihood are also invariably linked to national, regional, and international political and economic trends – from control over resources and international security issues to population growth, food prices, and climate change (FA-CAADP, 2012). At the same time, many pastoralists are responding to change, with significant benefits to themselves and the economy. However, not everyone succeeds – with dire consequences for those who fall short.

Despite this, pastoralism in the Horn of Africa does not represent a single form of livelihood. Pastoralists may have animals with different combinations of species, and they face difficulties in diversifying their livelihoods. These different pathways vary from place to place and over time, and pathways are influenced by shocks and stresses – including encroachment by agriculturalists, land grabs, drought and floods, disease epidemics, and livestock raids. It is the cultural backbone of long-standing civilisation (Nori & Devices, 2007). With its mobility and collective resource management, it is now recognised as a rational and sustainable livelihood strategy in marginal lands (Morton et al. and Jenet, 2017). Pastoral regions typically have several alternative economic options. However, despite their significant contributions to national economies, pastoral communities are

often marginalised and overlooked. While pastoralism is a risk-laden livelihood, it is still a viable way to utilise certain areas. This is especially true regarding climate change, population growth, and increasing competition for land and other natural resources. Understanding how it works is vital for efforts to reduce poverty, food insecurity, and drought in pastoralist communities (Jenet, 2017), as well as mitigate flooding disasters.

Historically, the pastoral and agro-pastoral communities of the Lower Omo have been marginalised both geographically and politically. To support pastoralists in the region, government and non-governmental organisations, as well as other development actors, have intervened in various ways. Notwithstanding those remarkable efforts, pastoralists and agro-pastoralists in different parts of the country operate over increasingly degraded rangeland due to increasing bush encroachment, population growth, land degradation, migration routes, and conflict triggered by scarce natural resources (Tariku et al., 2020). Climate change and variability also pose risks to pastoralists and agro-pastoralists who have an immediate, daily dependence on climate-sensitive livelihoods and natural resources in the area. In addition to the physiological effects of higher temperatures on livestock resources, the loss of animals due to recurrent drought and flooding disasters, as well as disease epidemics related to climate change, may thus increase. Indirect effects can be felt through ecosystem changes that alter the distribution of animals and a limited supply of livestock feed. Moreover, the special distribution of pastures and water is highly dependent on the patterns and availability of rainfall as well, and seasonal Omo river flooding was the most described feature of lower Omo Valley pastoral and agro-pastoral communities' marginalisation; this mainly manifested due to inadequate government development intervention on Omo river basin, as well disaster management policy and strategies.

4.3. River Basin Development of the Dassenech–Development Versus Disaster

Few development initiatives in Sub-Saharan Africa have the economic and political significance of river basin developments, whether in terms of the sheer scale of the undertaking, the magnitude of social and environmental transformation, the impact on the future of entire nations, or the controversy surrounding beneficial versus destructive outcomes. For African heads of state, the nearly unparalleled capital intensity of major dam and physical infrastructure projects, along with linked agricultural and industrial development, requires significant infusions of international capital—nearly always.

According to Claudia (2017), the lower Omo River basin and Lake Turkana region are one of Sub-Saharan Africa's most culturally diverse areas, home to at least thirteen distinct ethnic groups speaking languages of Cushitic, Eastern Nilotic, Omotic, and Afroasiatic origin. Those indigenous groups nearest the tri-notion border area – the Dassenech, Nyangatom, and Northern Turkana are primarily pastoral and agro-pastoral by tradition and have remained so far for centuries, although with many adaptations. The harsh semi-arid environment in which they reside has contributed to their complex and flexible survival strategies for coping with changing environmental and social conditions. The Omo River and Lake Turkana are core components of the survival systems for much of the region's indigenous groups, most of whose livelihood systems are transboundary. The survival of more than 500,000 pastoralists and agro-pastoralists in the region requires access to adequate water and living resources from the Omo River and Lake Turkana. The transboundary ethnic groups are linked together by a network of inter-ethnic material and social exchange relations – a system essential to the survival of each group. In recent years, however, nearly all transboundary groups have had to cope with a sharp decline in their capacity to sustain a pastoral and agro-pastoral life and livelihoods. This stress has reverberated throughout all groups in the lower Omo Valley.

The precipitous decline of the herding economy and pastoral and agro-pastoral life, which has virtually collapsed in some areas, is essentially the product of the dispossession of resident groups at the hands of powerful external economic and political forces. However, they have sustained complex and flexible strategies for coping with periods of prolonged drought, disease epidemics, social conflict, and other hardships for centuries. The region's ethnic groups no longer have the conditions

necessary for recovery from these significant periods of stress. For individual groups, these conditions centre on access to sufficient land, pasture, and water resources to implement long-term livestock herd diversification, overall production diversification, and the maintenance of strong internal reciprocity relations, among others. Whose segments of these Indigenous groups have been forced to migrate along the Omo River and around the shores of Lake Turkana in recent years? Tens of thousands of Dassenech people and Nyangatom residents have settled along the Omo River, where they rely primarily on various combinations of flood-recession agriculture, livestock raising, fishing, and gathering and hunting wild food. Thousands of other Dassenech have migrated from their Ethiopian homeland to join the Dassenech settlement along Kenya's extreme northeastern shores, making the group cross-border in extent and vulnerable to the effects of multiple disasters.

Figure10: Omo River flooding caused Forced displaced Dassenech villages (2024)

4.4. Community's Vulnerability and Coping Strategy

Vulnerability and exposure are distinct but closely linked. As Golding (2022) describes, exposure is a necessary but not sufficient determinant of risk. It is possible to be exposed but not vulnerable; similarly, vulnerability to hazard does not lead to impact until the vulnerable asset is exposed to the hazard. While vulnerability is described as a specific hazard, socioeconomic and livelihood factors, such as poverty and the lack of social networks and social support mechanisms in the early warning system, will exacerbate or affect the vulnerability levels of pastoral and agro-pastoral villagers in the lower Omo Valley, irrespective of the type of hazard and its impact.

The transboundary region of the lower Omo Valley, which includes pastoralist and agro-pastoralist communities, is culturally diverse, with Indigenous languages of Cushitic, Eastern Nilotic, Omotic, and Afro-Asiatic origin. Several ethnic groups, including the Nyangatom, Turkana, and Toposa, are members of the Karamojong cluster of cultures and speak multiple intelligible languages (Claudia, 2017). The Dassenech, on the other, had been Cushitic in linguistic affiliation. At the core of the region's indigenous economies and livelihood system are longstanding survival systems that are highly adapted to shifting environmental and social conditions with ethnic groups linked through complex exchange networks. According to Claudia (2017), in recent decades, increasing dispossession and marginalisation imposed by powerful external political influence, economic power, and demand have forced much of the region's pastoral and agro-pastoral population, particularly the Dassenech, to settle at the Omo River as a last option for survival. Despite centuries of resilience from even the most difficult times, the pastoral and agro-pastoral communities of the Dassenech people were pushed into extreme dependency on these two major water bodies and have significantly increased their vulnerability to various disasters and risks more specifically to the effects of natural and artificial Omo River flooding, even to stresses once familiar to them. They are now more severely vulnerable to the extreme destruction of their survival systems, with region-wide drought

and hunger, loss of livelihood systems and assets, human and livestock disease outbreaks, and new mortality caused by the Gibe III dams related to artificial flooding of the Omo River.

Figure 11: Flooding disaster vulnerability and coping strategies discussion with Arikol villagers (2024)

4.4.1. Indigenous Survival Strategy

The survival strategies of transboundary ethnic groups in the Lower Omo Valley, comprising downstream pastoral and agro-pastoral communities, have evolved from centuries of indigenous knowledge and highly adaptive survival systems. The ethnic groups that are heavily dependent on the Omo River are the Mursi, Bodi, Kwegu, Suri, Kara, Nyangatom, and Dassenech, primarily located in the lower Omo River Basin (Claudia, 2017). This long-standing indigenous survival system of the pastoral and agro-pastoral communities faces disaster. Their social system enables them to cope with the effects of Omo River flooding by adapting to the agroecology (environment) and the environment's needs through managing the relationships between their social and livelihood systems and the environment. This enables the pastoral and agro-pastoral villagers' social and livelihood system to sustain, maintain, and renew itself through traditional early warning, preparedness, and recovery mechanisms, thereby minimising the risk and damage of seasonal Omo River flooding. Additionally, according to Claudia (2017), the Ethnic groups in the transboundary region of the Omo River downstream have historically been emphasised, at least until recently, when vast numbers of them have had to resort to a firm reliance on agriculture, mainly livestock herding and flood recession crop cultivation. Like pastoral peoples throughout semi-arid Africa, their survival systems comprise strategies for both risk minimisation and recovery from setbacks to their livelihoods. Adaptability is key to the survival systems of indigenous groups throughout the lower Omo Valley region. This is especially true in the context of the transboundary area's wide range of environmental challenges and periodic principal stresses, including prolonged drought, livestock and human disease epidemics, severe crop losses, as well as shifting regional exchange relations and interethnic hostilities. Pressure on each group's capacity for adaptation is heightened by multiple decades of problematic government policies, especially the changes brought about by the anticipated Gibe III dam, along with its linked agricultural and energy transformation enterprises, which affect the social and livelihood survival systems of pastoral and agro-pastoral villagers.

Livelihood systems of the lower Omo Valley pastoral and agro-pastoral groups incorporate strategies for both risk minimisation and recovery from economic or livelihood losses caused by the Omo River flooding disaster. These general characteristics include the maximum accumulation of capital, with livestock historically being dominant as 'capital' for meeting both immediate subsistence and long-term food security needs, high mobility of livestock herds, and village settlement. Complex and flexible seasonal movements between upland pains environments and riverine or lake zones during Omo river flooding provide the ability to respond to changing environmental and social conditions. Diversification of livestock types (cattle, small stock – goat and sheep), economic diversification to alternative production activities, including:- flood recession agriculture (the only agriculture

possible in the lowermost Omo basin) on low flats along the Omo river and modern delta lands low enough to receive annual flood waters, fishing along the Omo river using primarily rafts and other minimal equipment's. Strong and pervasive social reciprocity and relationships within their social system, whereby material, labour, and other forms of social exchange among villagers provide precautionary as well as recovery measures during flooding disasters in the area.

These relationships are generally rooted in age-set-based authority systems, as well as clan, lineage, and affinal (in-law) relationships. From this complex set of pastoral and agro-pastoral survival strategies, the most common means of pastoral and agro-pastoral households villagers recovery from livestock loss due to drought, disease, conflict, and other hazards like;- temporary movements of herds into peripheral lands with available pasturage and water, short-term barter of small stock with the same or neighbouring ethnic groups to meet immediate food needs, exchange or sale of animals, farm and fishing products, raiding of neighbouring ethnic group herding camps and villages for livestock seizure, use of social exchange network (for loans, gifts, and labour cooperation meet household needs and rebuild livelihood systems, and a temporary firm reliance on subsidiary livestock production activities.

5. Conclusions

Extreme flooding events in the pastoral and agro-pastoral communities of Lower Omo Valley are compounding with severe risks. Poor and vulnerable rural communities living along the Omo River flood plains face repeated flooding, drought, the risk of an increase in water-borne diseases, and food insecurity as livestock are killed and flood recession and irrigation-based agricultural farm fields have been destroyed. Given the increasing urgency and extensive Omo River flooding impact, addressing these extreme climate-related events is an issue of the Dassenech rural peoples' concern, as well as national and local government entities. To increase the resilience of the pastoral and agro-pastoral villagers of the Dassenech, there is a need for an inclusive disaster management policy and strategic paradigm shift as a critical means to effectively and efficiently reduce the effects of the Omo River flooding disaster and its impact. This enables the creation of more disaster-resilient villagers as a way to protect future pastoralist and agro-pastoralist communities in the Lower Omo Valley region. Overall, this finding contributes to and will have practical policy implications for a deeper understanding of disaster risk management and community preparedness, particularly regarding the mechanisms and trends at play in the context of changing social, economic, and environmental realities in the lower Omo Valley's downstream pastoral and agro-pastoral communities. Based on the findings of this study, the following key recommendations have been made as insights for policymakers, local and national governments, non-governmental entities, local communities, and future researchers.

- Create an enabling environment for local institutions and communities to be involved in the entire pastoral and agro-pastoral disaster risk reduction policy-making process, improving their preparedness to respond to Omo River flooding disasters through short- and long-term action plans.
- Contextualise a people-centred early warning system approach, driven by pastoral and agro-pastoral communities at risk, enabled through multi-stakeholder collaboration (i.e., government and non-governmental entities).
- Strengthen the resilient ability of pastoral and agro-pastoral communities to respond to disasters through enhanced skills and knowledge of hazard risks, community participation, disaster preparedness, and set-up of early action systems.
- Enhance the capacity of pastoral and agro-pastoral villagers in the lower Omo Valley local entities to prepare for, respond to, and adapt to disasters, including DRR, resilience, and adaptation, to support anticipatory action interventions.

Policy Makers: Promote and support preparedness and early action of local actors and pastoral and agro-pastoral communities of the lower Omo valley in the design and implementation of disaster risk management policies and strategies through;

- Ensuring the inclusion of Lower Omo Valley pastoralist and agro-pastoralist concerns in the disaster risk management policy, strategies, and programs.
- Prioritise partnerships and strategies that seek to build national, regional, and local-level Omo River flood forecasting capacities and better connect risk information services to local actors and at-risk pastoral and agro-pastoral communities.
- Strengthen the enabling environment for collaboration and connection between local communities and national and local forecasts in the flood early warning system.
- Provide political commitment or financial and human resources to communicate and contextualise Omo River flood risk information to make it accessible to vulnerable at-risk pastoral and agro-pastoral communities.

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Appendix A

The appendix is an optional section that can contain details and data supplemental to the main text.

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