Livelihoods vulnerability of climate variability and coping mechanism in South Eastern Ethiopia

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Climate variability in rainfall patterns, both temporally and spatially poses particular risks to poor smallholder's Agro pastoral Communities in rural areas and pastoralists who endure a climate sensitive livelihoods and complete natural based lifestyle.

Similarly, Ethiopia is one of the most vulnerable countries experiencing drought and floods because of climate variability and change. Similarly, the Lowland Woreda of Bale Zone remain one of the hot spot areas for emergency mainly because of recurrent drought hitting the area for decades, which make them among the 290-food insecure Woredas and recipient of PSNP in the country.

To the knowledge of the researcher-limited studies was under taken on the study area, among which a research that shows a gap on farmers' awareness level and adaptation mechanism of in two Woredas namely Agarfa and Sinnana Woredas of bale zone.

Another key issue that triggers the researcher to conduct this research is that, a number of studies have been conducted on the impact of climate variability and vulnerability on livelihoods and coping mechanisms at the macro-level.

To fill all these gaps, this research is designed with the aim to assess the vulnerability of Pastoral communities to climate variability induced shocks and to identify the coping Mechanism adopted by the communities in rural livelihoods of arid and semi-arid of Bale zones at micro level (PA level).

The study area situated in southeastern Ethiopia, within the administrative boundaries of Rayitu, Guradamole and Dawe Qachen Woredas that geographically bounded from north to south by latitudes 5.87° N and 7.14° N and from west to east by longitudes 40.27° E and 41.91° E. Hence, the study was conducted in selecting Six Peasant Association (PA's) of the Rayitu, Dawe Qachen and Guradamole Woreda.

In order to achieve these objectives, the study collected data from primary and secondary sources. The primary data collected by using data gathering tools such as six FGDs (6), 50 key informant interviews with Developmental Agents (DAs) and experts *and 436* questionnaire for sample pastoralist household survey. Hence, the study used a total number of 486 respondents as a sample size. In the sampling techniques the study, used a combination of purposive and probability sampling techniques.

Moreover, in data analysis, descriptive statistics like frequency, cumulative frequency, percentage and averages were employed also used to analyze the dependent variable.

Results and discussion

i. Vulnerability of Pastoral communities to climate variability

Concerning the vulnerability, 2.75 % of Argo pastoral Communities revealed that yields over the past ten years have been increasing and 3.67% of Agro pastoral Communities said it is difficult to estimate over the years. Whereas, 75.52 % and 15.14 % of the Argo pastoral Communities replied that yields over the past ten years have shown great variation and has been decreasing, respectively.

The majority of all respondents confirmed that climate Variability and fluctuation are the main challenges for the fluctuation of Livestock and crop productivity over the years in the area. Accordingly, 77.52% (338) of the Agro pastoral Communities replied that there is a decline in livestock/ crop production while the reaming 22.48% (98) of the Agro pastoral Communities not.

With regard to the causes for agriculture production decline, from the total number of 338 sample survey who said yes, 84.32% (285) of respondent from Community survey and 84 % of developmental agents replied that climate variability is the principal factors for the fluctuation of livestock and crop productivity over the years.

Furthermore, the 285 sample respondents who said climate variability as reasons for decline of crop production were also asked which Climatic Parameters Influence Production and Productivity. In addition, the principal climatic parameters that dominate the production and productivity of agriculture, particularly Crop and Livestock productivity in the study area, majority of the respondents perceived that rainfall and temperature are key factors. Because 92.28% of Agro pastoral Communities, 70 % DAs and selected Pastoral Development

offices strength this concept. While 4.21% of Pastoral, 30 % of DAs and the selected interviewed Pastoral Development offices strength this concept reported that frost as one of climatic factors that affects Crop and Livestock production and productivity. Generally, this implies that rainfall and temperature are significantly playing a great role in the fluctuation of crop and livestock productivity over the years.

Moreover, the 263 sample respondents who said Rainfall and temperature as reasons for climatic parameters were also asked which types of rainfall influence production and productivity.

Furthermore, the study shows that, the conserving the climatic factors of rainfall type in general, all Agro pastoral Communities and developmental agents were asked to reply which types of Rainfall Influence Production & Productivity in the study area. Accordingly, about 76.23% of the Pastoral', 46 % of DAs and selected agricultural expert of sample survey verified the factors that influence agricultural production are seasonal variation and erratic rains. While 9.82% and 8%, of Agro pastoral Communities', and DAs and selected agricultural expert respectively consider annual fluctuation as the major for the decline of Livestock and Crop production and productivity in the study area.

Further about 8.27% and 42% of Agro pastoral Communities' and DAs and selected agricultural expert replied that Decline of rainfall throughout the year is the factors that determined Crop and Livestock production and productivity in study area. Whereas 5.68 % Agro pastoral Communities' respondents support Intensity of rainfall during summer and storm as one of the factors and the majority, 76.23 % replied Seasonal variation and erratic rain.

From general point of view, one can understand that climate variability can positively and negatively affect agriculture in general, crop, livestock production, and productivity in particular. The result of interview and FGD also support that climate shows variability in the study area. Because majority of key respondents have said that climate has been fluctuated.

The survey result shows that the highest percentage of the respondents 77.75% estimated that trends of climate in locally have been varies from time to time. Only 7.57 percent of respondents were perceived as trends of climate in locally have been improved.

ii. Pastoralists' Climate Vulnerability Coping Mechanism

Concerning income Sustained to Pastoralists' Climate Vulnerability of Coping Mechanism, 66.41 %, 31.82 % and 1.77% of the Pastoralist replied the household income was not enough, enough and more than enough to sustain their family all the year round,

respectively. Furthermore, Pastoralist used some coping mechanisms since their income did not enough all-round the year. Among which, some of the coping strategies about 1/4 of them used diversification of their income and small scale business like peaty trade were practiced. The majority reported, “Selling their livestock’s and other assets, credit from rural moneylenders while institutional coping Mechanism are rare. In addition to this, they have been coping by minimizing their daily consumptions, engaging in off-farm activities such as peaty trade and temporal and permanent migration.

Therefore, the study concluded that climate fluctuation creates vulnerability that is exacerbated the by lack of adaptation and commitment from both pastoralists and local institutions. Since pastoralists are prioritizing their immediate benefits rather than sustainable development. Almost half of communities still were not clearly identifying the cause and long-term consequences of climate variability on their activity and livelihood. The pastoralists have been using traditional coping Mechanism such as selling their livestock’s and other assets, credit from rural moneylenders while institutional coping Mechanism are rare.

In addition to this, they have been coping by minimizing their daily consumptions, engaging in off-farm activities such as peaty trade and temporal and permanent migration. Thus, most of the coping Mechanism pastoralist have been using are destructive rather than constructive and depletive ones.

In light of the findings of the study, the following recommendations forwarded to overcome the problems. To cope with the vulnerability the societies use saving, migration diversification, dissemination of technology and provision of safety nets to some lowlanders and emergency aid is among the coping Mechanism provided by the government institution. These needs to diversify their engagement and source of income generating activities.

Moreover, improve agricultural production, build on existing people’s knowledge and practices, strengthen local capacity to manage risks through local civil society organizations, foster institutional linkages for livelihood sustainability, and improve the coverage and quality of climate data are the other possible recommendations of the study.

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