



Socioeconomic Impacts of the 2006 Seasonal Flooding along Flood Prone Areas: The Case of Dire Dawa Administration, Ethiopia

Melesew Zenebe^{a*}, Anteneh Derribew^b

^{a,b}*School of Geography and Environmental Studies, Haramaya University, Dire Dawa, P.O Box. 138, Ethiopia*

^a*Email:melsewzenebe@gmail.com*

^b*Email:antenehd800@gmail.com*

Abstract

Floods are the most common of all environmental hazards. Every year, floods claim over 20,000 lives and adversely affect around 75 million of people worldwide. The relation lies in the wide spread geographical distributions of river flood plains and low-lying coasts, together with their long standing attractions for human settlements. The overall objectives of this study is to assess the socioeconomic impacts of the 2006 seasonal flooding along the flood prone areas of Dire Dawa Administration and find out recommendations which is more applicable in the administration. The researcher has used descriptive survey method and employed both quantitative and qualitative approaches and also employed purposive sampling technique to select studied kebeles.(kebele :lowest administrative division) Data collection techniques of this study were questionnaire, interviews and researcher's personal observation. Primary data were collected from selected 138 HHs(Households) (by using systematic sampling technique) and concerned officials, whereas, secondary data were collected from published and unpublished materials and internet sources and analyze using SPSS software. The result was presented using tables, bar graph, Figureures, maps and photos.

* Corresponding author.

The study confirmed that, the main causes of the 2006 flood in Dire Dawa were the combined effects of human induced and natural causes. Besides, heavy rain falls, topographic nature of the surrounding Oromiya uplands with degraded vegetations and extensive cultivation, deforestation, overgrazing and quarrying along flood plains contributed for the generation of flash floods in the administration. In addition, the incidence impacted on the health problems like psychological (stress), injuries, illness, losses of their family members/ relatives, displacement, and losses of their livestock. The incidence of 2006 also damaged substantial number of productive and non productive assets.

Keywords: Households; Flood prone area; Impact; Socioeconomic; Seasonal flood.

1. Introduction

Floods are the most common of all environmental hazards. Every year, floods claim over 20,000 lives and adversely affect around 75 million of people worldwide. The relation lies in the wide spread geographical distributions of river flood plains and low-lying coasts, together with their long standing attractions for human settlements [1]

According to [2] River flooding is a natural process and part of the hydrological cycle of rainfall, surface and groundwater flow and storage. Floods occur whenever the capacity of the natural or manmade drainage system is unable to cope with the volume of water generated by rainfall. Floods vary considerably in size and duration. With prolonged rain falling over wide areas rivers are fed by a network of ditches, streams and tributaries and flows build up to the point where the normal channel is overwhelmed and water floods onto surrounding areas.

Flood losses reduce the asset base of households, communities and societies through the destruction of standing crops, dwellings, infrastructure, machinery and buildings, quite apart from the tragic loss of life. In some cases, the effect of extreme flooding is dramatic, not only at the individual household level, but in the country as a whole [3]. In addition to this, according to [4] states that Flooding has significant impacts on human activities; it can threaten people's lives, their property and the environment. Assets at risk can include housing, transport and public service infrastructure, and commercial, industrial and agricultural enterprises. The health, social, economic and environmental impacts of flooding can be significant and have a wide community impact. Conversely, [5] also added that induce diseases is an impacts of flooding.

In recent years, floods in Ethiopia have become more frequent and of increasing severity. For instance, floods in 2006 have battered huge portions of southern, Eastern and northern Ethiopia. It has killed at least 620 people and displaced about 118,000 people nationwide [6].

The rainy season in Ethiopia is concentrated in the three months between June and September, when about 80% of the rains are received. Torrential downpours are common in most parts of the country. Large scale flooding is rare and limited to the lowland areas where major rivers cross to neighboring countries. However, intense rainfall in the highlands causes flooding of settlements close to any stretch of river courses [7].

In Ethiopia, policies and regulations that adequately protect areas from flood hazards have not been enacted.

There are no regulations to legally protect the existing channels of Dire Dawa Administration from various damages. People are not penalized when disposing solid and liquid wastes or construction materials in to the drainage channels which has the consequences of blocking storm water conveyance. Similarly, there are no land policies and regulations that protect the flood prone zones from informal settlements [8].

Since Dire Dawa lying at the foot of a mountain range, it is subjected to annual flooding by runoff from the mountain during torrential rains and it still occurs when there is heavy rainfalls in the surrounding high land areas of Haramaya, Kersa, Dengego and Qulubi. According to [9] since the 1970s, the duration and intensity of floods and droughts have been increasing particularly in the tropics and sub tropics. Many people have been associating floods and flash floods of Dire Dawa Administration with the torrential rainfall occurring in the main rainy season. In line with this in the Dire Dawa Administration the seasonal rainfall has a bimodal distribution with peak in April and August. The two seasons are 'Meher' and 'Belg' and they receive about 80% of the annual rainfall separated by a short dry spell in June. The mean annual rainfall is 657mm and mean monthly values varies between 5.7mm (December) and 119mm (April).

Flood hazards are not new in Dire Dawa, since the city is surrounded by the highland areas; the city and Jelo-Belina and Ija-Aneni rural kebeles has often been repeatedly devastated by power full flood disasters in the past. Several factors are believed to be cause floods in Dire Dawa [10]. The flood hazard in Dire Dawa Administration is a function of topographic position, the land management condition, rainfall characteristics, the management of river corridor and inappropriate resettlement and construction.

Existing evidence indicate that, the 2006 flood accident was one of the horrible incident events in the city history. The main justifications for the purpose of this study is that even though the Dire Dawa administration tried to use different mechanisms to minimize the impacts of flooding hazards in the Dire Dawa administration by constructing retaining walls, land and soil conservation activities, the action was not as such sustainable. Due to the nature of the soils which was the retaining wall lies was on the sand, most of the low income group resides along flood susceptible areas to the right and left sides of the river banks and most people use the flood areas/fields as a commercial center especially “*Qefira* and *Ashewa*” area and also the 2006 flood in Dire Dawa Administration was the most devastating and create calamity to the residents of Dire Dawa Administration. As a result of this, the investigator tries to assess the socioeconomic impacts of the 2006 flood and coping mechanisms in Dire Dawa Administration.

According to [6] in Rural Dire Dawa the communities apply “borate lola” (cutoff drain like structure), tie-rigging and hedgerow planting for enhancing soli infiltration and reducing the incidents of flooding. The Ministry of Agriculture and NGOs has also introduced terracing, check dams, water ways, area closure, reforestation and row cropping activities. After flooding in rural areas, communities assist each other through “guza”, a form of mutual assistance. They reconstruct houses and rehabilitation flooded crop fields of affected neighbors. On the other hand in urban areas after flooding incidences some of the coping mechanisms practiced by the communities are clearing blocked roads and river courses, and assisting victimized people.

The objective of the study is to assess the socioeconomic impacts of the 2006 seasonal flood along the flood

prone areas of Dire Dawa Administration.

2. Research Methodology

Dire Dawa is one of the largest cities in the country, and it has gained a reputation as an industrial and business center. Geographically it is located between 9° 27' and 9° 49'N latitude and 41° 38' and 42° 19'E longitude (Figure 1).

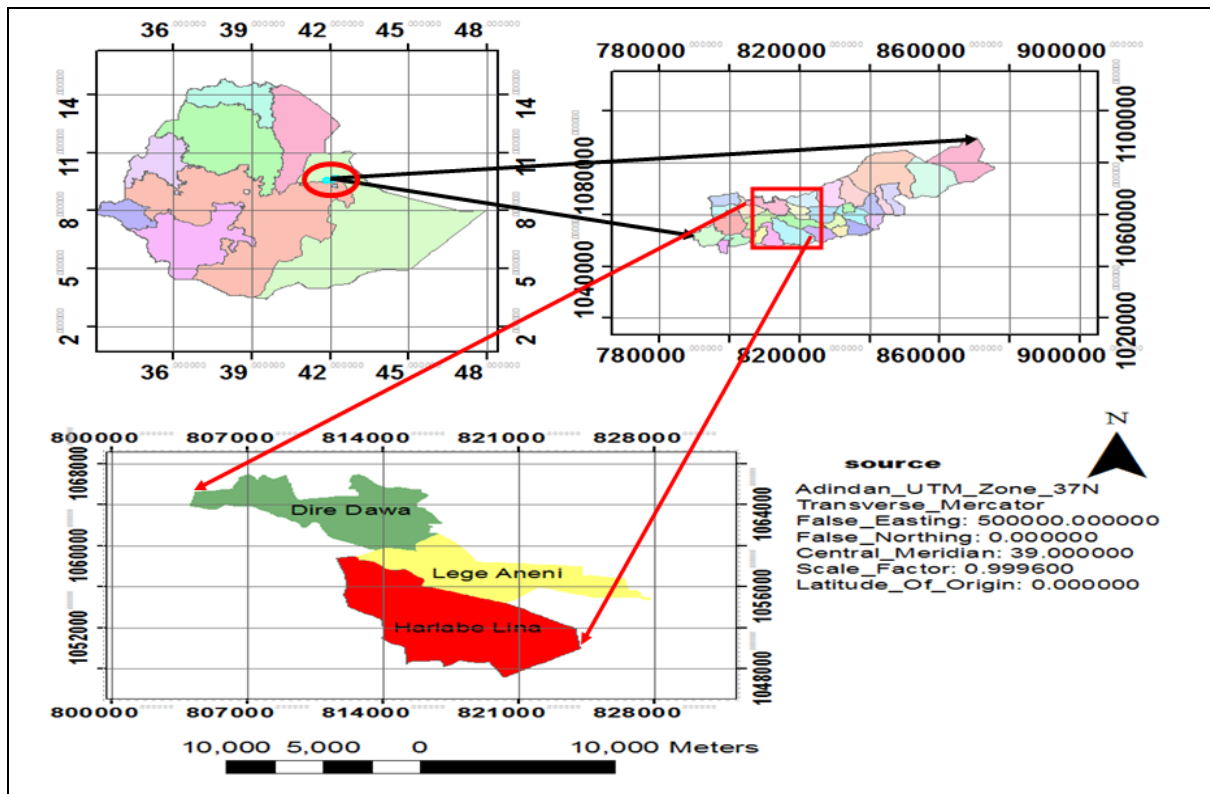


Figure 1: Location Map of Dire Dawa Administration

2.1 Flood Hazard Area of the City

The study was conducted on the total area of the urban boundary of the city Administration. Flood hazard analysis was computed by weighted overlay of drainage density, slope, elevation, and land use factors. From the flood hazard map (Figure 2), it was estimated that 75.09, 460.41, 1204.53 and 9109.66 ha of the area considered in Dire Dawa city were subjected respectively to very high, high, moderate and low flood hazard.

According to [10], 100% cultivated, 95.7% open land, 84.5% sand deposit, 83.4% built up area and 74.7% open shrub land faces low to moderate flood hazard. Besides (16%) of the built up area is categorized in to high to very high flood hazard.

Based on the flood hazard analysis map (Figure 6) shows that low and high flood risk zone is found along Gorro river sand sheets. Whereas low, particularly at the inlet and outlet areas of Dechatu river sheet, very high

and moderate flood risk zone also found along the Dechatu river sheet.

Kebeles were also classified in terms of flood risk level as it is an important domain to administer the population in the city. Kebele 06 subjected to very high flood risk zone of the city and 02 kebele particularly Gorro and GTZ areas were also subjected to high flood risk zone. However, kebele 03, 04, 05, 07, 08 and partly 02 were subjected to moderate to low flood hazard zone. Under this study kebele 01 categorized under low flood risk zone.

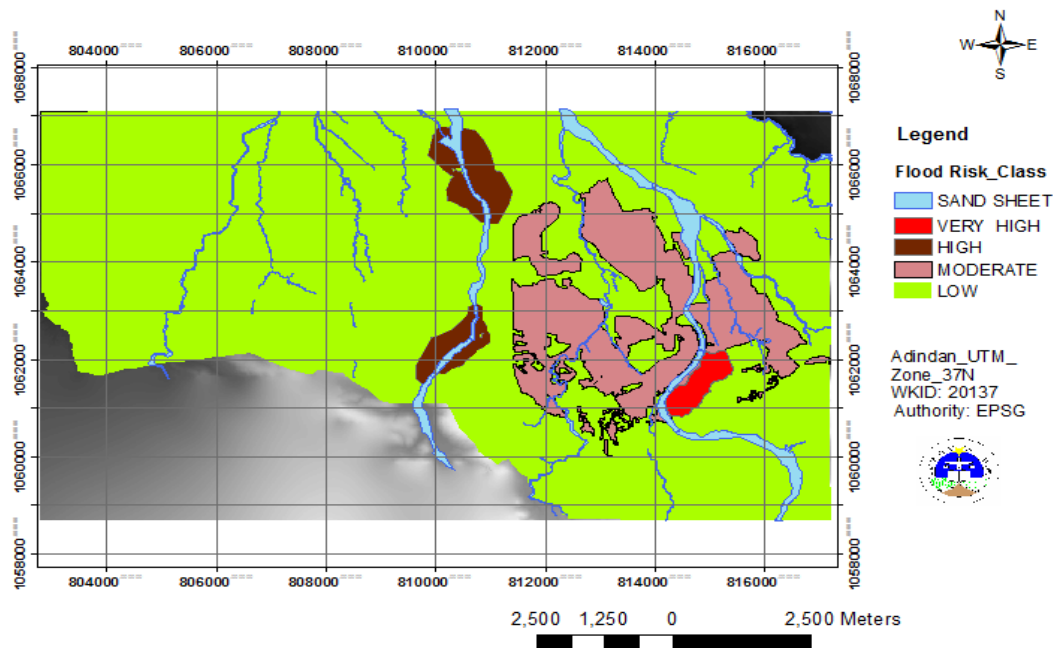


Figure 2: Flood Hazard Analysis map of Dire Dawa.

Source: Dire Dawa Land Development & Management Bureau, 2013

2.2 Research Design

In this study descriptive survey research method was employed to assess the socioeconomic impacts of seasonal flooding along selected urban and rural flood prone areas of the Dire Dawa administration. Accordingly, both qualitative and quantitative types of data were used. For this study both primary and secondary sources of data were used. Questionnaire, interview and personal observation were used as instruments to collect data. In the Dire Dawa administration, five urban Kebeles (kebele: smallest administrative division) (02, 03, 05, 06, and 07) and two rural kebeles were selected through purposive sampling technique. Out of the total households 138 respondents for questionnaire and 13 respondents for interview from different offices were selected.

3. Findings, Discussions and Interpretations

3.1 The Causes of 2006 Seasonal Flooding

According to International Journal of Humanities and Social Science (2011) Floods are purely environmental

hazards of meteorological phenomena, but very often induced by man’s improper utilization or abuse of the physical environment. In addition, [11] also stated that the causes of floods can be broadly divided into physical, such as climatological forces, and human influences such as vegetation clearing and urban development. The most common causes of floods are climate related, most notably rainfall. Prolonged rainfall events are the most common cause of flooding worldwide. Human impacts on river catchments influence flood behavior. Land use changes in particular have a direct impact on the magnitude and behavior of floods. Deforestation results in increased run-off and often a decrease in channel capacity due to increased sedimentation rates.

Table 1: Causes and Contributing Factors of the 2006 Flash Flood Hazard

Causes of the 2006 seasonal flood in Dire Dawa		Frequency	%age
Human induced		59	42.75
Natural Disaster		15	10.86
Both Human and natural Disaster		64	46.4
Total		138	100
Contributing factors		Frequency	%age
Human induced	Urbanization	16	11.6
	Deforestation	55	39.9
	Lack of Drainage system	41	29.7
Natural Disaster	Siltation of drainage	3	2.17
	Heavy rainfall in surrounding Oromiya uplands	18	13.04
No response		1	0.7
Others		4	2.89
Total		138	100

Source: Field Survey (2013)

About 46.4% of the households indicated that the main causes of the 2006 flood in Dire Dawa the combined effects of human induced and natural causes while 42.7% indicate human induced and 10.86 % natural disaster (Table 1).

The research also revealed that among the human factors, deforestation of the surrounding forests for charcoal and fire wood production, for house construction and shelters for their livestock protection took the lion share (39.9%) and 29.7% of respondents replied lack of drainage system contributed for flash flood formation in Dire Dawa. Moreover, urbanization process had contributed 11.6 % (Table 1).

The human intervention against the natural resources particularly clearing forests for farmland and to use forests as a source of energy along the high land belts of Dengego, Haramaya, kersa, langge and Qulibi areas assumed to have aggravated occurrence of the 2006 flood in Dire Dawa. For the practical illustration the picture below (*Figure.3*) shows physically degraded and deforested areas of Dengego and Harla areas.

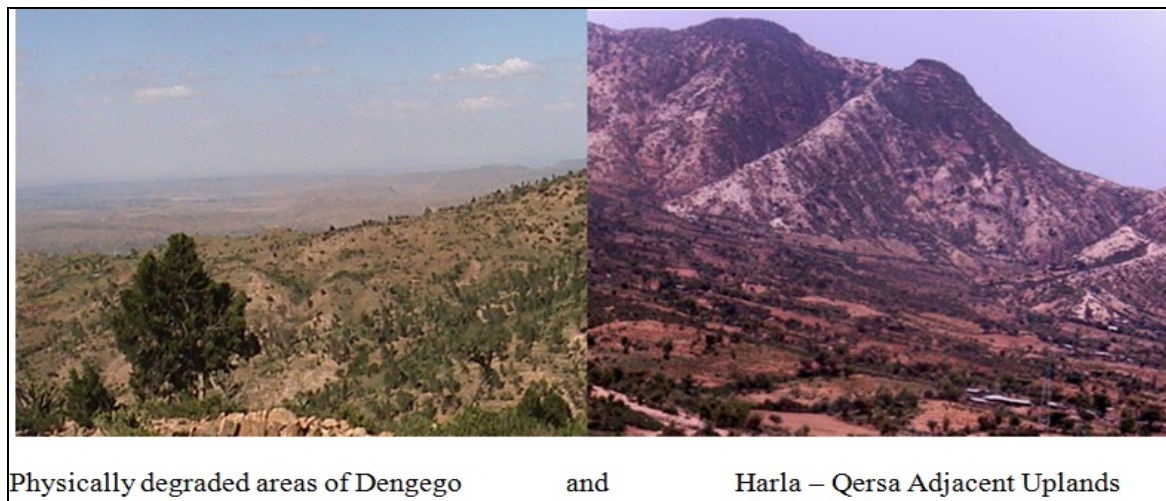


Figure 3: Physically Degraded area of Dengego and Harla – Qersa Highlands

Source : Field Survey (2013)

Among the natural causes, the study found that heavy rainfall induced run off from upstream watersheds of east Hararghe, Oromiya region and Siltation of drainage had 13.04% and 2.17% contribution respectively for flash flood formation in 2006 in Dire Dawa (Table 1).

The study also conducted an intensive interview to different institutions of the city administration. According to the city administration officials, the causes of the 2006 in Dire Dawa were related to the combined effect of physical (topographical) and socio-economic issues. Mr.Ahmed explained that *'the highland boundary area between Dire Dawa and east Hararghe assumed to have topographically steep slopes, degraded, poor vegetation cover and extensively cultivated that often generate flash flood'*. He also added that *'Socio-economic factors including cultivation of steep slopes, deforestation, overgrazing, quarrying, stone and sand extraction also contributed a lot.*

As far as deforestation is concerned, according to Ato Ahmed, at national level there is a direction to protect the forest resources by introducing alternative energy technology to all regions of Ethiopia. Among this, energy saving stoves was produced and disseminated to the rural kebeles of Dire Dawa.

Most importantly said Mr. Ahmed, *some cobble stone chisellers and pavers were illegally participated without the knowledge of Dire Dawa water, mines and energy office especially in environmentally and ecologically preserved areas. Some hilly areas which were treated by soil and water conservation activities were damaged by some cobble stone chiseller associations. Besides to this the stone quarry sites were given mostly in sloppy areas which could easily be eroded by rain and wind.* Besides, the irresponsible management system and practices adopted by associations affected the biodiversity and the ecosystem as a whole to a great extent.

Further, Mr. Adnan said that *in all rural kebeles, particularly in Harla, Jelo Belina and Ija- Aneni, the rehabilitation works were done to minimize the impacts of flood.* Among the rehabilitation works terracing and afforestation of physically degraded areas were crucially important. According to him around 750,000 trees were planted in several rural kebeles in the last two years. But out of these around fifty percent were properly grown. This situation indicated that the people’s awareness were less towards preservation of natural resources and some farmers left their sheep and goats to graze on rehabilitated areas which resulted further degradation. Ato Ahmed also emphasized that the absence of binding laws against prohibition of sands and quarry from protected areas have aggravated the impacts.

3.2 Socio-economic Impacts of the 2006 Seasonal Flooding in Dire Dawa

3.2.1 Social Impacts of the 2006 Flash Flood

As it is mentioned earlier the effects of flooding include injury, loss of life, damages on homes, buildings, roads, railroads, bridges, and communication systems. The secondary effects include short term pollution of rivers, hunger and disease, and displacement of persons who have lost their homes and disruption of livelihood, community breakdown, family blighted and reduced national gross domestic product [12].

As revealed (in Figure 4), almost all of the respondents were suffered from the 2006 flood events. Among the sampled household respondents, 38.4% indicated that they faced psychological (stress) problem during the event of 2006 flood. This was followed by illness (24.6 %), losses of their family members/relatives during flood event (11%), displacement (10.9 %), injuries (8.7%) and losses of their livestock (8%). This implies that flood had a negative impact on the community' and decreased revenue collection by the city administration. Besides, residents were displaced from the place where they lived for a long period of time alienated from their neighbors resulted in a disruption of long established social ties. So that, the loss of long established social tie and difficulty to adapt to the new area of residence were taken as the negative impacts of new settlement due to flood. On the contrary, the scarce urban land resource which was used for resettlement program would have been used for public investment if they were not affected.

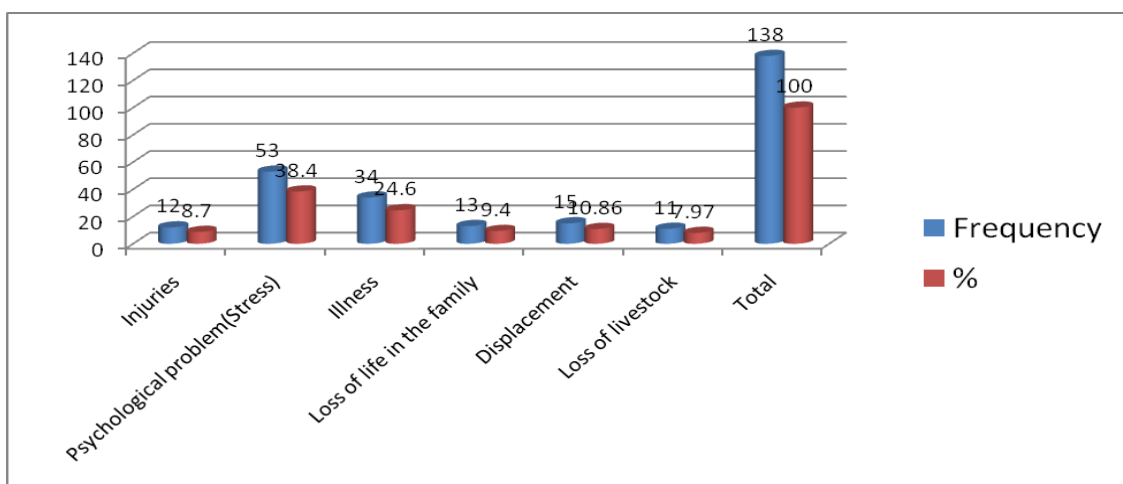


Figure 4: Social Impacts of the 2006 Seasonal Flooding

With regard to health risk of flood, out of the total sampled households 72.5% had at least one member of their household got sick during the flood event. The most significant diseases experienced among the sampled households were, malaria/fever (56%), diarrhea (21%) and cough (15%). Furthermore, 8% of the sampled households experienced other disease outbreak such as scabies, sores and rash (Table 2).

Respondents were also asked how to mitigate the impacts of the diseases. Hence, the research reveals that (Table 2) out of the total respondents 72.5% were caught by a disease after the 2006 flood and the remaining 27.5% reported not to have caught by a diseases. Besides to this the respondents used different mechanisms to reduce health risk problems of the flood. Based on the data gathered during the survey 79.7% used DDT sprays, mosquito bed net, drained accumulated water, wash hands, and used to drink boiled water.

Table 2: Types of Disease and Mechanisms to Reduce Health Risk from Post Flood Event

Post flood caught by a disease	Frequency	%
Yes	100	72.5
No	38	27.5
Total	138	100
Types of diseases infected after flood	Frequency	%
Malaria	56	56
Diarrhea	21	21
Cough	15	15
Skin related diseases	8	8
Total	100	100
Reduce health risk from post flood event	Frequency	%
Boling water	4	2.89
Wash hand after in contact with flood water	12	8.69
Drained accumulated water	2	1.44
Use bed net	8	5.79
DDT sprays	2	1.44
All	110	79.7
Total	138	100

It was concluded that malaria, diarrhea, and Cough were the most prevalent diseases which had a negative impacts on the health status of the victims. Besides, they employed diverse coping options to mitigate the impact of the flood and could be concluded that flood victims were aware of how to prevent such kinds of diseases. And victims were also they were supported by governmental and non-governmental organizations. Besides to this, according to one elder's said those health extension agents played a significant role in nursing and educating victims of the flood.

According to [13] during the 2006 flood event 256 people were dead, 9,956 displaced and 244 people missed,

presumed dead. Besides, the organization further highlights the subsequent homelessness of 3,427 households and damage to personal effects in terms of thousands of ETB per household. This shows that how much the August 2006 flood impacted severely on the livelihoods of households living in Dire Dawa City adjacent to the Dechatu and Goro wadis and upstream rural household. Even though death is a natural process and phenomena, the death which happened suddenly had its own psychological impact on the survivors. The data implies that many children became parentless, old aged survivors became support less, economic dependency increased, social instability raised, purchasing power reduced and also provision of medicines increased. Generally, this showed the flood had produced social, economic, political, cultural, physical, health and environmental damage.

Furthermore, According to the City Mayor and Head of Agriculture, Water, Mines and Energy Office, the 2006 flood left unforgettable psychological scar on the City of Dire Dawa and adjacent rural kebeles by devastating infrastructure.

3.2.2 Economic Impacts of the 2006 Seasonal Flooding

According to [14] Floods had several socio-economic and political implications which caused a wide range of complex issues. Some of the immediate consequences included the displacement of people, the destruction of infrastructure such as houses and roads, damage to crops and loss of cattle and livestock. The destruction of roads and other infrastructure delayed on-going development initiatives and political processes. In light of the above information, the data in Table 3 indicate that 76.1% of the respondents lost a substantial number of productive and non productive assets by 2006 flash floods. Of the productive assets which were lost, 10.9% were houses/buildings and 5.8% were income generating shops while the non -productive assets were furniture's like beds, chairs, clothes and blankets, and radios (7.2%). Most of the losses to these assets were attributed to households' proximity to flood prone areas. Discussions with some respondents revealed that some households indirectly lost their assets after their houses collapsed, some of the income sources got disturbed. This forced them to offload some assets to raise money to meet other household basic requirements.

Table 3: Impacts of Infrastructure Damage due to 2006 Flash Flood

Physical properties lost during 2006 Flash Flood	Frequency	%
House/building	15	10.9
Furniture	10	7.2
Business /Shops	8	5.8
All	105	76.1
Total	138	100
Damage of social and economic infrastructure	Frequency	%
No impact	8	5.8
Mild impact	24	17.4
Serious impact	106	76.8
Total	138	100

Beside to this, the study also pointed out that in the evening of August 5, 2006 Dire-Dawa experienced the worst flood devastation in the history of the city which causes an impact on physical and social infrastructure (Table 3). Out of the total respondents, 76.8% of household heads replied the flash flood has damaged seriously the physical and social infrastructures of the surrounding environment and 17.4% of the respondents responded that there was a mild impact on infrastructure and the remaining 5.8% replied that there is no impact.

According to the heads of kebele 05 and 07 added that beyond the physical properties devastated by flood many flood victims suffered from hunger, diseases and shortages of food and water. The city administration, nongovernmental organizations and the peoples of Dire Dawa have provided food and non food items to the victims.

The table 3 shows that due to the destruction of physical properties the number of homelessness increased and shortage of rent houses occurred. This implies that the price of rent houses in the City increased. The rate of unemployment had grown up. It was concluded that the social security, social problems (prostitution, crime, beggary, robbery, etc) increased and created a sense of dependent syndrome. Apart from this, most of the time public toilets which were constructed within the flooded zone were washed away and this in turn resulted in the contamination of water boreholes in the downstream areas.

Table 3 indicates that infrastructural facilities have crucial importance on the economic activities and attracts investment to the City administration. Hence, the Government has embarked upon a comprehensive infrastructural development program in the transport, telecommunications and energy sectors. The road transport system is the most important means of passenger and freight transport in Dire Dawa. The main road radiating from the central market to some rural Kebeles and Cities had been damaged seriously and commercial transaction, industrial and flow of agricultural goods and services have been hampered. As a result the price of food items were sky rocketed and the cost of living hits top. On the other hand, telecommunication facilities which were relatively efficient in rendering service in exchanging information prior to the flood found disrupted and interrupted. Since communication was denied it was impossible to get market and other market related information on time.

While power supply structures had also been crushed severely by the flood and resulted in power interruption. It failed to meet requirements of the residents, government institutions and private business industries to operate normally. More specifically health clinics, banks, primary and secondary schools in the flood affected zone of the administration which were giving day to day services had paralyzed economic activities and produced significant socio economic impact. These impacts in turn affected not only livelihoods through downing income of households but also reduced the amount of government revenue that could have been generated from the economy. Dozens had been displaced from their original homes and were forced to camp in other area for emergency food aid and support. The humanitarian and infrastructure impact induced from flooding added extra public expenditure on government in providing emergency aid and rehabilitation tasks which ultimately reduced the gross domestic product of the administration.

Generally, it was concluded that according to the information obtained from interview, and secondary data, the

2006 flood in Dire Dawa had brought social impact on the people residing along Dechatu and Gorro river sheet. And the flood had debilitating impact of being displaced, resulting in loss of own business or job, and income being replaced by remittances from elsewhere.

Table 4: Impact of the 2006 Flood Disaster on Infrastructure in Monetary Terms. Source [15].

S.N.	Damage on urban infrastructures	Estimated cost of damage (Birr)
1	The rehabilitation of Dechatu main bridge, which was done few years back by 2.4 million birr (from the previous damage)	3,000,000.00
2	Taiwan Irish crossing that joins Taiwan with Number-1 area.	900,000.00
3	Halfkat Irish crossing which connects Halfkat and Vera pasta areas	500,000.00
4	Dechatu retaining wall in two parts (60m)	400,000.00
	Kefira guide wall about 120m has been destroyed	950,000.00
5	About 100m retaining wall along Goro River in GTZ settlement area	930,000.00
6	All the roads with in the radius of 40m from Dechatu River bed covered by silt brought by the flood	517,100.00
7	Electric poles and lines	500,000.00
8	Telephone poles and lines	6,098.36
Total		7,703,198.36

Monetary estimation of flood damage was not easy task and sometimes impossible but depending on the available information different valuation methodologies can be used. It is a well understood fact that there are few environmental goods and services that can be measured in terms of market value, as contingent valuation, through the use of indirect or proxy procedures. According to [15] report, flood damage on urban infrastructure was estimated in monetary terms to be more than seven million birr. The Government was compelled to inject this huge amount of money to rehabilitate and build damaged infrastructure which could have been invested on development projects that help achieve the millennium development goals. Since some spare part materials used for maintenance of buildings were not available at local markets, it was imported from abroad with hard foreign currency which could further widened the balance of payment deficit. Moreover, occurrence of flood hazard would shrink government tax revenue capacity which is the major source of budget, The flood damage left many individual unemployed and increased layoff from business organizations. It has been recorded that such a flood hazard in the city appears once in a decade and believed to have detrimental effect on the overall growth of the economy. This simply shows that disaster risk reduction has to be a complementary or integral part of development policies and programmes. It can be included within project concept, programme cycle management and conceptually sits comfortably within the livelihoods model. This requires undertaking a risk assessment that identifies the probability of a hazard occurring and its likely impacts on the community. It furthermore requires

knowledge of some of the wide range of measures that can be included in programmes in order to reduce risk to communities and individuals. Now a day government and other development partners have given due attention to disaster risk reduction and risk management plans. To summarize, for the development of any nation the three development pillars, transportation, electric power and telecommunications played irreplaceable role and also considered as economic ladder. So that, the disruption of these development pillars means it can be saying that "halt economic throat of the country". Furthermore, in rural areas of Dire Dawa, farm lands with crops (cereals, vegetables, fruits, and cash crops), estimated to be 257.6 hectares and soil and water conservation infrastructures across 17 kebeles, water schemes in seven kebeles and irrigation schemes in five kebeles were damaged. About 6 houses were washed out and a total of 10,809 people were affected in one way or another [15].

Table 5: Damages Incurred by the 2006 Flood. Source [15].

No	Description	Unit	Total Damage
1.	Infrastructure damaged		
	Soil bund	Km	224.2
	Stone bund	Km	62.3
	Stone check dam	M ³	8600
	Water harvesting ponds	No	2
	Cut off drain	Km	43.85
2	Damage on farms	Ha	230.64
	Sorghum	Ha	203.36
	Maize	Ha	25.9
	Haricot beam	Ha	0.75
	Sesame	Ha	0.63
3	Fruits and Vegetables	Ha	17.21
	Fruit	Ha	15
	Vegetables	Ha	2.21
4	Cash crops	Ha	9.72
5	Different farm tools	Ha	292
6	Livestock killed	No	21
7	Water Schemes	No	10
8	Small scale irrigation schemes	No	5
9	Houses	No	6

Agricultural Development led industrialization (ADLI) is the policy directions of Ethiopian government to enhance the food security and increase its productivity from subsistence to commercial farming. Most of the time the combined effects of natural and manmade disasters like drought and flood hinders the development of African countries. The same is true in Ethiopia particularly in Dire Dawa administration such flood disaster causes immense casualties on lives, infrastructures and properties.

As clearly depicted on the table 5, the magnitude of damage on environmental resources and agriculture sector, had greatly challenged the effort that has been exerted to reduce poverty, ensure food self sufficiency and food security. Due to the recurrent problem of flood, the numbers of farm households who have been beneficiaries of productive safety net program remain unchanged for years and sometimes the number could surge further. Dire Dawa is known to be one of the most drought affected areas where the amount and distribution of rain is very scarce. It was customary to observe a flood damage which resulted from a run off coming down upper watersheds of neighboring Oromia region and the flood has taken farmlands and different types of water and soil conservation physical and biological structures installed with the aim of reducing run off, Crops mainly sorghums, fruits, vegetables, and coffee plantations had also suffered losses which were served as a major source of household income. Agricultural inputs, livestock, and small scale irrigation schemes, road networks and homes were blown hard and taken away totally. Agricultural production and productivity had fallen down and the price of food items soared. This had contributed a lot to make people depend on food aid. This shows that in urban areas the capacity of the people's purchasing power on food items become endangered due to soared prices. Due to low purchasing power of the people, the government forced to buy or imported food items and agricultural tools from abroad. This shows that it had significant would impact on foreign currency reserve i.e. the accumulation of Dollars in the bank would be reduced. In an effort to coup up, the families of victims were involved in off farm activities leaving school attendance behind. The combined socio economic effect of all these had jeopardized the progress towards goals and objectives set by government to attain food self sufficiency and food security and meet MDG goals as well.

According to the data obtained from [13] the combined socio economic effect of the flood had hampered the progress towards MDG goals and also had induced long term effects on DDA economy due to the divergence of the government budget to reconstruction and rehabilitation.

As shown in Figure 5, Dire Dawa Administration revenue increased in 2006/07 as a result of emergency aid and relief. This was estimated to be ETB 29.5 million, of which ETB 9.6 million was collected through a special account opened in Dire Dawa, while the balance 19.9 million ETB was collected through the federal Disaster Prevention and Preparedness Agency.

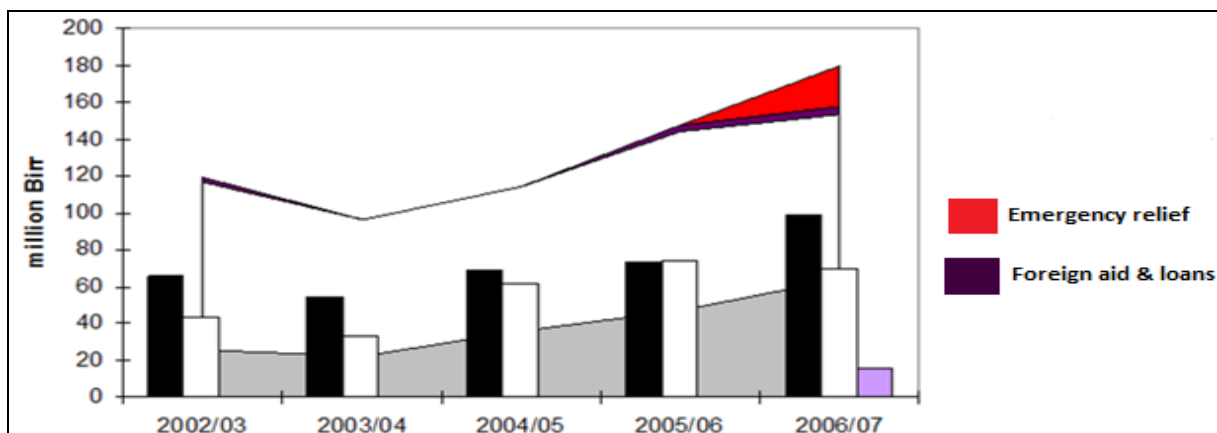


Figure 5: Dire Dawa Administration Budget 2006/7

4. Summary and Conclusion

The main objectives of this study were to assess the socioeconomic impacts of the 2006 seasonal flood along the flood prone areas of Dire Dawa Administration. The central purpose of this study is to identify the causes of seasonal floods, to assess the socioeconomic impacts of flood. The study adopted descriptive research design. The findings of the study reveals that the causes of the 2006 flood in Dire Dawa Administration were the combined effects of human induced and natural causes. Factors that exacerbated the 2006 floods in the administration were deforestation of the surrounding environment for fire wood and charcoal production, extensive cultivation on steep slopes, lack of drainage system, heavy rainfall in the surrounding uplands of Oromia (Dengego, Haramaya, Langge and Qersa weredas), quarrying of stones and sand collection, urbanization process and inappropriate resettlement and construction. Moreover, the study also reveals that the flood hazard had social and economic impacted on the communities residing along flood susceptible areas. The study also assessed the socioeconomic impacts aftermath of the 2006 flood and how to applying coping strategies to prevent the flash floods. The Data showed that the impact of the 2006 flood in Dire Dawa was terrible. People lost their family members/relatives, assets, and were displaced from the place where they lived for a long period of time. As a result, they are facing difficulties in running the daily lives in the aftermath of the flood. In addition, in rural areas of Dire Dawa, farm lands with crops (cereals, vegetables, fruits, and cash crops), estimated to be 257.6 hectares and soil and water conservation infrastructures, water schemes and irrigation schemes were damaged.

Moreover, agricultural inputs, livestock, and small scale irrigation schemes, road networks and homes were blown hard and taken away totally. Agricultural production and productivity had fallen down and the price of food items soared. This had contributed a lot to make people depend on food aid. This shows that in urban areas the capacity of the people's purchasing power on food items would endangered due to soared prices. The destruction of agricultural outputs on the other hand increased the number of displaced community members in the rural households. This implies that rural communities became homeless. Due to low purchasing power of the people, the government forced to buy or imported food items and agricultural tools from abroad. This shows that it would reduce foreign currency reserve i.e. the accumulation of Dollars in the bank would dwindle.

Furthermore, flood damage on urban infrastructure was estimated in monetary terms to be more than seven million birr. Government was compelled to inject this huge amount of money to rehabilitation purpose and build damaged infrastructure which otherwise would have been invested on development projects that help achieve the millennium development goals.

5. Recommendations

- An early warning system, with modest flood forecasting capacity, City administration should be given priority. In this regard, the use of reliable and timely meteorological information is important. In addition, there should be fast communication system, which helps to circulate flood warning information.
- As it is done before in all rural kebeles the soil and water conservation works, the City administration

should be continued rehabilitation project works especially in flood prone areas of the administration. Besides, it should also promote community based integrated water shade management through rehabilitation projects by collaborating with Oromiya regional state (its upper parts of Oromiya which is the main source of flood).

- City administration should be automatically banned and permission to the association to collect Sand and stone quarry sites within and along flood prone areas.
- Community initiated mitigation measures should be promoted so as to build community resilience.

References

- [1] Smith, K., 2001. Physical processes and human impacts. John Wiley and Sons Ltd., Chi Chester, England.
- [2] Debarati. 2006. Centre for research on the epidemiology of disasters Cred Crunch,“Disaster Data: A Balanced Perspective”. Jiramedha Advertising and Printing. Bangkok.
- [3] World Meteorological Organization (WMO), 2009. Integrated Flood Management. Geneva, Switzerland.
- [4] Gormley, J., and M. Mansergh, 2009. Guidelines for Planning Authorities: The Planning System and Flood Risk Management.
- [5] Palmiano, M., 2005. Analysis of community’s coping mechanisms in relation to floods: A case study in Naga City, Philippines. An Msc Thesis presented to the School of Graduate Studies International Institute for Geo-Information science and Earth Observation: Enschede, The Netherlands.
- [6] Bezuayehu Tefera and Ketema Abebe, 2007. A study on Flood Risk Mitigation in East Hararghe Zone, Dire Dawa Administrative Council and Shinile zone. PP. 47. Conference Proceedings on options for flood risk mitigations in Dire Dawa. Catholic Relief Services.
- [7] Kefyalew Achamyelch, 2003. Integrated flood management case study Ethiopia: Integrated Flood Management. Water Resources Consultant, Addis Ababa, Ethiopia.
- [8] Yalemtege Teruneh, 2007. Storm water management Issues in the current Dire Dawa Integrated Development planning. PP.79. Conference Proceedings on options for flood risk mitigations in Dire Dawa. Catholic Relief Services.
- [9] Tsegaye ketema, 2007. Hydro meteorological analysis and its Implication for Flood Risk reduction in Dire Dawa. PP.5. Conference Proceedings on options for flood risk mitigations in Dire Dawa. Catholic Relief Services.
- [10] Daniel kassahun, Yonas Tadesse and Sinework Dagnachew, 2007. Flood Disaster Impacts In Dire

Dawa: Some recommendations for Future risk reduction. PP. 27. Conference Proceedings on options for flood risk mitigations in Dire Dawa. Catholic Relief Services.

- [11] Nott, J., 2006. *Extreme Events: A Physical Reconstruction and Risk Assessment*. Cambridge University Press. New York.
- [12] World Meteorological Organization and Global Water Partnerships (WMO/ GWP), 2008. *Urban Flood Risk Management. A Tool for Integrated Flood Management*. Associated Program on Flood Management. World Metrological Organization and Global Water Partnership.
- [13] Ministry of Water Resources, 2008b. *Awash River Basin Flood Control and Watershed Management Study Project: SR 08: infrastructure Upgrading design final report*. Addis Ababa, Ethiopia.
- [14] Theron, M., 2007. *Climate Change and Increasing Floods in Africa: Implication for Africa's Development*.
- [15] Federal Multi Agency Assessment Mission (FMAAM), 2006. *Dire Dawa Flood Impact Assessment Report*, Dire Dawa, Ethiopia.