

# The Effect of War on the Welfare of Households and Coping Strategies for Food Shortage in Tigray, Ethiopia

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## **Abstract**

Armed conflicts and war are known for their devastating effect on the economy. We attempt to assess the effect of conflict and war on households' welfare using data from 3,245 households in Tigray, Ethiopia. Firstly, our comparative analysis result indicates that war reduced the income of the households by 57.7 percent, expenditure declined by 37.7 percent, and the level of saving dropped to zero. Further, due to the war, 48.7 percent of the households became unemployed. Secondly, to cope with the war-induced shortage of food, households adopted various coping strategies: (i) reducing the quality and quantity of food they consume, (ii) selling off livestock and assets, (iii) using their savings, (iv) requesting support (financial and in-kind) from family, NGOs and government, (v) eating inedible green leaves, and (vi) going for migration or begging, and others. Finally, we suggest some policy recommendations for coping with food shortage in wartime.

**Key words:** War and conflict, Food shortage, Household welfare, Coping strategy, Tigray.

## I. Introduction

Conflicts are perceived as a daily phenomenon in the world which cause the loss of millions of lives and the destruction of economic resources. Armed conflicts are very complex circumstances that emanate due to political, economic, ideological, historical, and psychological motives and cannot be significantly explained by a single motive. Economic and ideological reasons are the major causes of international wars, and greed and grievances are the basic sources of internal conflicts (Nikolaos, 2023; Wim Van Doors, 2013). Collier and Hoeffler (2000) supported the finding that economic incentives are the main causes of the outbreak of violent uprisings. Other researchers also stated that civil wars are caused by intricate social processes that mainly depend on historical and regional matters (Cramer, 2002; Nathan, 2005). Studies indicate that the intensity of conflicts is higher in the least developed countries.

Conflicts have negative econozes both at the macro and micro levels. Conflict reduces significantly farming people through direct attacks, fear, forced displacement, malnutrition, illness, and death. As farming people escape, it reduces or stops farming production and raises food shortage in the wider war-affected areas (Marc and Per Pinstруп-Andersen, 1999). In the farming community in Yemen, conflict has reduced the crop, livestock, and fish production and as a result, their supply has been reduced to local markets (FAO, 2017). The three years of civil war in South Sudan affected negatively the households' livelihoods, coupled with poor economic growth and the rise of food prices (IPC, 2017). Conflicts expressed in terms of a large number of fatalities are correlated with a large estimated reduction in the national dietary energy supply of countries (Stijn, 2018). Verwimp (2012) also stated that conflict affects the food security situation of the farm households via its effect on income sources, local food chain, and political systems. Further, the conflict destroyed rural infrastructure, the loss of livestock, deforestation, the widespread use of land mines, and migration led to long-term food security problems (Teodosijević, 2003).

On the contrary, a study made in Afghanistan confirms the inverse relationship between conflict and food security. Households in provinces with higher levels

of conflict experienced lower levels of food insecurity than provinces with lower levels of conflict as there were staple food price increases in the provinces with lower levels of conflict (D'Souza and Jolliffe, 2013).

The war<sup>1)</sup> in Tigrai has a multi-faced effect on the welfare of households. It caused millions to die, and the destruction of social services and economic infrastructure. According to FAO (2021), the outbreak of the war in the Tigrai resulted in the destruction of livelihoods, internal displacement, and high levels of violence in the region. Furthermore, the armed-war has brought about the destruction of the social services providers which aggravates the incidence of food insecurity in the region. OXFAM (2021) also stated that the people of Tigrai had lost their farm tools, seeds, and livestock which made the livelihood of the people miserable and caused more than five million people to face extreme hunger. However, these works did not carry out a comparative analysis of the welfare variables before and during the war. Thus, we attempt to examine the effect of the war in Tigrai on households' welfare expressed by income per capita, expenditure per capita, average saving, unemployment, and perceived level of poverty and war-induced shortage of food coping mechanisms.

The remainder of this paper is organized as follows: the second section puts the methodology used in the study. The third section provides an empirical review of the literature, the fourth section is the results and discussion section and finally, the fifth section is the conclusion and recommendations.

## **II. Methodology and Data Sources**

### ***1. Source, Nature and Sampling Technique***

#### **(1) Description of the Study Area**

Tigrai, in Ethiopian history, is the base of ancient civilizations, the home of the Arc of Covenant, an exemplary host and center to exercise various religions, especially Christianity and Islam, and historic grave place for invaders, and a symbolic region of struggling for freedom, equality, and justice. Tigrai

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1) The study covered the impact of the first phase of the war which was carried out from November 4, 2020 to June 30, 2020 and it did not address the effect of subsequent wars and the complete siege in Tigrai.

is one of the ten regions of Ethiopia. Its capital, Mekelle, is 781 km away from Addis Ababa, the capital city of Ethiopia. The region has seven zones, namely, Western, Northwest, Central, Eastern, Mekelle, Southeast, and Southern. The zones are divided into 93 *woredas* and towns and 814 *tabias*<sup>2)</sup>, also referred to as *kebele* (OCHA, 2021).

In the year 2021, the population of the region is estimated at 5,685,598. With an average family size of 4.2 persons (2021 est.), 49 percent of the population were male-headed households, and 50.7 percent led by females. The age composition of the population is dominated by the young where 13 percent were estimated to be less than five years old and 50 percent were under the age of 18 years. Further, 30 percent of the Tigrai's population is living in the urban areas (OCHA, 2021).

## ***2. Research Design and Data Source***

This study employed a cross-sectional type of research design where the quantitative and qualitative types of data collected from the primary and secondary sources are used. The primary data was collected through a semi-structured questionnaire, focus group discussion (FGD), key informant interview (KII), and participatory rural appraisal (PRA). One FGD and one PRA were organized in each study *tabia* and seven participants were selected from the associations, like women's association, youth association, farmers' association, religious leaders, and community leaders. Further, 34 KII were done with food security cluster experts and the Relief Society of Tigrai (REST) focal person in the *woreda* who have ample information about the livelihood and food security situation of the people. The primary data was collected between May 4, 2021 and June 4, 2021, in the selected *woredas* of the region. The data was collected from 34 *woredas* in the region; 17 rural *woredas* and 17 urban *woredas*. The secondary data was collected from annual reports, statistical bulletins, and published and unpublished research works.

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2) *Tabia* is the lower government's administrative structure below the *woreda*.

### 3. Sampling Technique and Sample Size Determination

The study used *multi-stage sampling techniques* to select participants of the study. First, zones were classified based on accessibility and security criteria, depending on the military and transportation information, into three namely, (i) totally inaccessible and insecure<sup>3)</sup>, (ii) insecure but accessible, and (iii) both accessible and secure. Second, based on the intensity of wars and physical destruction that occurred<sup>4)</sup>, the relatively accessible and secure woredas were classified into three categories: (i) severely affected, (ii) moderately affected, and (iii) less affected. Two tabias from each woreda were randomly selected for the survey. Since the war destroyed the registry of the households in the tabia, the representative households were selected using the directional sampling technique. After obtaining informed consent from the participant’s household, the questionnaire was filled out.

In determining the sample size, the Kothari (2004) equation was employed as it is appropriate when the population size is large (>10,000) and finite. The proportion here is that 72 percent of the woredas were severely affected and the rest 28 percent were affected moderately and/or less. A total sample was determined from the total household population (1,339,831) of the region (TSA, 2020):

$$n = \frac{NZ^2p(1-p)}{e^2(N-1) + Z^2p(1-p)}$$

$$n = \frac{1,339,831(2.58)^2 0.72(1-0.72)}{0.02^2(1,339,831-1) + (2.58)^2 0.72(1-0.72)} = 3,346$$

where n = sample size, N = population size, p = population proportion, Z = confidence level, e = degree of error.

Thus, by taking a confidence interval of 99% (z = 2.58), margin/degree of error of 2%, and proportion (P) = 72%, the initial sample size was 3,346. By adding 20% contingency for non-return, incomplete responses, data loss, and

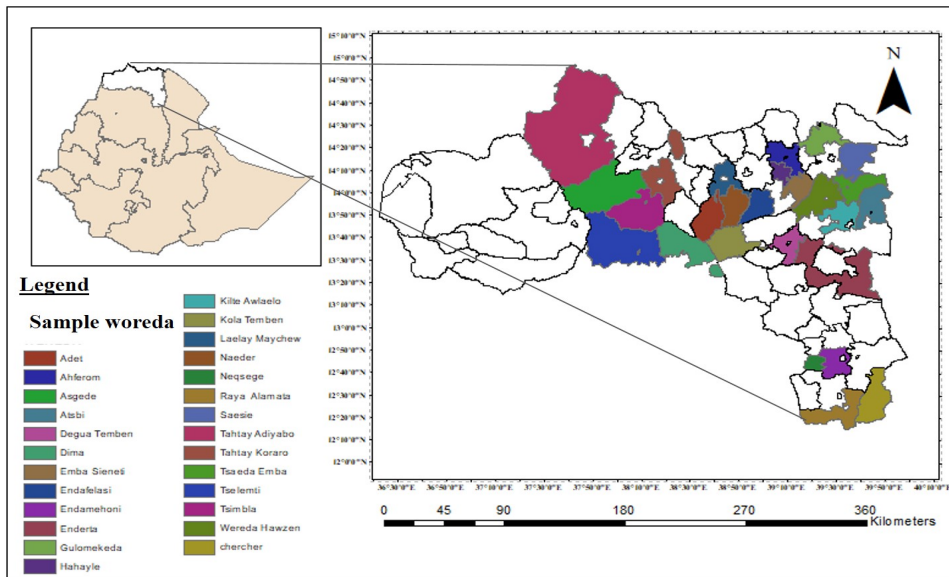
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3) All woredas in the Western zone are insecure and inaccessible during the data collection. Representative data were collected from the Internally Displaced People (IDP) of the zone who are residing in Shire and Mekele City and treated as IDPs in the analysis.  
 4) Information is gathered from the Ethiopian defense force and the interim government of Tigrai.

other defects, the total sample size was determined to be 4,016. Then, this was distributed to the zones, woredas, and tabias based on a proportional sample to population size (Appendix Table 1). The sample was also disaggregated by urban-rural proportions (urban = 1,354 and rural = 2,662).

However, data was collected from 1,345 urban and 1,900 rural residents. About 764 (19.1%) of the sample were not included in the survey due to the accessibility challenges. Besides, 7 observations were dropped for their incomplete consumption data.

<Figure1> Study area of woredas



#### 4. Method of Data Analysis

The study employed a *descriptive and qualitative method* of analysis. The average “before and after” welfare parameters are assessed, estimated, and presented using appropriate Tables and Figures. The average change of welfare variables was computed and analyzed. Moreover, the wartime household’s food shortage mitigation mechanisms were assessed using appropriate percentages. Qualitative results such as outputs from FGD, PRA, KII, and in-depth interview results were presented to substantiate the descriptive analysis.

### III. Literature Review

#### 1. *Conflict and Welfare*

In the literature, a significant number of empirical studies revealed that conflict reduces the welfare of certain households but improves the livelihood of other households.

The panel data study made by Verwimp and Bundervoet (2009) indicates that, in Burundi, village-level violence which is measured by the number of battle-related deaths or wounded reduces consumption growth by 9 percent for every 25 casualties. But joining an armed rebel group was found a profitable livelihood strategy as households with at least one member joining an armed group had 41 percent higher growth in household's welfare over the year 1999-2007.

The Israeli–Palestinian conflict suppresses demand and affects competition more significantly than it increases the costs of trading. Further, in the high-conflict intensity areas, there was a 15 percent reduction in total daily consumption but appeasement would yield a 20 percent welfare gain (Bar-Nahum *et al.*, 2020). Using cross-country panel data for the period 1960–2014, Bircan *et al.*, (2017) also found that violent conflict increases the level of income inequality which persisted until the early period of the post-war period.

Conflict also disturbs the market for goods and services. Ali and Lin (2010) using panel data from 41 countries, indicate that internal conflicts have positive and strong effects on the food cost but international wars have a weak but positive impact on the food cost as international wars can mobilize more resources to the economy.

The civil war that took place in Syria resulted in a deteriorating Syrian economy and growing severe food insecurity. Consequently, a negative growth was observed across the Syrian sectors. For example, the growth rate for the agriculture, forestry, and livestock sectors was -0.1 percent; the transport, storage, and communication sectors were -20.5 percent; and the mining and manufacturing sector was -10.5 percent (Humanitarian Programme Cycle, 2021).

More than two decades back, the armed conflicts in Bosnia and Herzegovina negatively affected the production in the battle areas of the country. The conflicts

reach all economic sectors of the battle areas of the country with a focus on the destruction of transportation networks that could leave most of these industries very ineffective. Also, the armed conflicts reduce the supply of labor in the war-affected areas of the country. Most importantly, in the war-affected areas of the country, the agriculture sector mainly reduced the total number of farm animals by half. Thus, the economic growth of the country was almost negatively affected due to the armed conflict which deteriorated the welfare of the population of the country (Slobodanka and Teodosijević, 2003)

## IV. Results and Discussions

### 1. *Conflict and Households' Welfare*

This section discusses and assesses the effect of the war on the welfare of the households. In the broader concept of economic well-being, the welfare of the households is expressed by income, consumption, saving, employment, and perceived level of poverty.

#### (1) Characteristics Respondents

The data tries to capture representative households from all zones of the Tigray region, social and economic status, and nature and type of households' settlement; including internally displaced people (IDP).

Regarding the distribution, the central zone accounts for 26.35 % of the sample households followed by the IDP, mainly from the Western zone (17.16%), Eastern zone (15.62%), Northwestern (12.63%), Southeast (12.54%), Mekelle (11.68%) and Southern zone (10.76%). Gender-wise, 64.28 % of the sample households were male-headed and the remaining share (35.72%) were female-headed households (see Appendix Table 1). The average age of the head of the households was 44.3 years and the mean family size was 4.5 persons.

The sample households had various levels of educational status. The major share was the illiterate households (32.54%) followed by primary education (27.92%), secondary school (16.64%), religious education (5.33%), first degree (9.77%), diploma holders (6.1%), second degree (5.14%) and terminal degree holders (0.15%). The married heads of households in the sample had a share of 74.79%, divorced (11.74%), widowed (10.08%), single (3.08%) and others

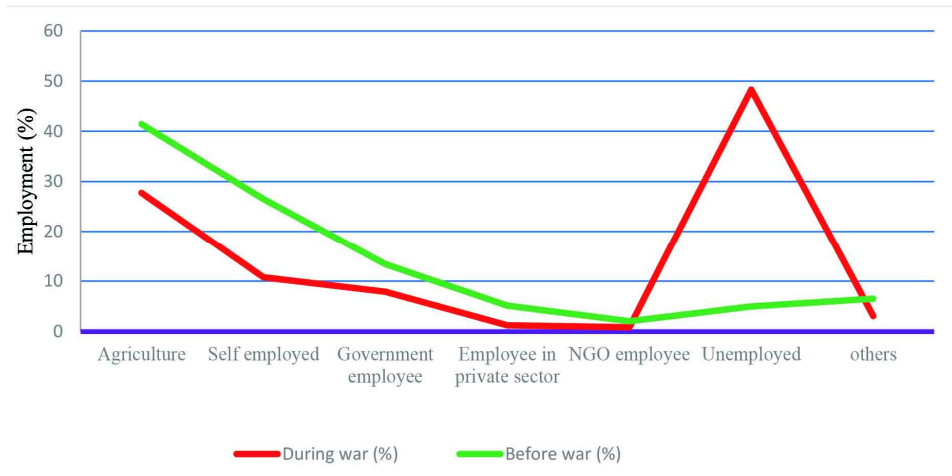


(0.31%). Religion-wise, orthodox accounted for 93.13%, Muslim (6.59%), catholic (0.15%) and protestant had a share of 0.12% (refer to Appendix Table 2).

**(2) War and Level of Employment**

The war that took place in Tigrai contributed positively to the households’ level of unemployment. The findings of the study revealed that the share of the unemployed households was 48.32 percent which was 4.99 percent before the outbreak of the war. The highest rate was found in the urban areas (56.51 %) while the lowest was found in the rural areas of the region (37.51%). In the infant woredas, the unemployed households accounted for 55.33 percent. Furthermore, the study indicates that female-headed households had a higher rate of unemployment (53.93%) than their male-headed counterparts (45.21%).

<Figure 1> Employment status before and during the war by sector



Source: Computed from the TIPS survey data (2021).

The effect of the war on employment in the region is observed in Figure 1; there is a significant decline in the share of employees in each employment category. The number of employed households in the agriculture sector declined to 27.73 percent while the share of self-employed reduced by 15.71 percent. Though the share of employment in the private sector and self-employment was small compared to the agricultural sector, the reduction rates in employment were 75.5 percent and 59.3 percent, respectively. The reduction in employment

in the government sector was 40.8 percent which is the lowest in this study though the level was unconditionally high. The descriptive result on the effect of the conflict on employment reduction is inconsistent with the works of Marc and Per Pinstrup-Andersen(1999), IPC(2017) and FAO(2021).

The Figure 1 does not show the transfer of labor from one sector to another; simply depicts the reduction in the number of employed households. This is substantial evidence of the negative consequences of the war on the regional economy.

### **(3) Conflict and Households' Level of Income**

The war that took place in Tigrai negatively affected the level of income of the households. Due to the war, a significant number of people, from all sectors, became unemployed. Accordingly, the households' level of income has significantly been reduced in the region. To effectively manage the effect of the COVID-19 pandemic, Tigrai was in a state of emergency and was under blockade for about six months until June, 2019. In this study, the income of the households was investigated before the outbreak of COVID-19, during the COVID-19 period but before the outbreak of the war and during wartime.

The mean monthly income of the households was birr 3933.89 before the outbreak of the war but in the COVID-19 period. However, the income sharply dropped to birr 1662.5 during the wartime. The rate of change of average income of the households was -57.7 percent in the war period which is equivalent to birr 2269.9. The significant reduction in the income of the households might be associated with the reduction in the employment rate.

<Table 1> Income, expenditure and saving before and during the war by zone  
(unit: ETB<sup>5)</sup>)

Zone	Income		Expenditure			Saving			
	During war	Before war	Food	Non-food	Total during war	Before war	Before COVID-19	Before war	During war
Western	1633	7133.456	3340.33	504.55	3844.9	10711.3	10497.1	111338.1	0
Northwest	1368.7	3937.402	3578.52	28.75	3607.3	5097.6	4901	45003.4	0
Eastern	1559.1	4157.059	3241.42	136.75	3378.2	5179.5	5568.2	32588.6	0
Southern	2145	3363.51	3757.07	116.57	3873.6	3868.4	3972.1	19113.5	0
Mekelle	4140.7	3961.003	4001.03	114.5	4115.5	9423.7	9628.5	57098.2	0
Southeast	943.4	3206.155	3602.3	63.21	3665.4	3068.7	3415.2	22294.3	0
Central	1318.7	3545.523	3124.9	45.64	3170.6	4805	4702.8	33459.61	0
<b>Population</b>	<b>1662.5</b>	<b>3933.893</b>	<b>3453.1</b>	<b>123.4</b>	<b>3576.5</b>	<b>5736.6</b>	<b>5801.8</b>	<b>42711.5</b>	<b>0</b>

Source: Computed from the TIPS survey data (2021).

As people are not employed, certainly, they will not generate income to support their families. The change in employment directly affects the income of the households which, in turn, influences consumption and saving.

One interviewee expressed the effect of the war on income and welfare as follows:

*One widowed woman from Tahitay Maychew Woreda revealed that before the outbreak of the war, she had sufficient food for about 10 months from her agricultural farm and she participated in the handcraft business and sold her products to Aksum, Adwa, and Shire. She was getting a better income and was able to send three of her kids to school. However, due to the high intensity of war, transportation blackouts, and bombardments, she did not harvest her farm outputs and could not sell handcraft products produced before the war. There is no single food aid given by the government and NGOs which were plenty before the war. As a result, the family exhausted the food stock though they were eating less and escaping days without food. "My family will not die; even though my daughters became skinny and underweight, I am forced to send two of my daughters to Mekelle*

5) ETB (Ethiopian Birr) is the Ethiopian Currency which had an exchange rate of \$1 = 27ETB during the study period.

*to try their chance if they could get a housemaid work and generate income for the family and eat better food for themselves". However, late to getting support from her daughters, due to the communication problem, she did not know where her daughters were. She was not aware of the fate of her daughters in Mekelle. With an empty stomach, she was worried about the situation of her daughters.*

Theoretically, there is a direct relationship between employment, income, and consumption. The *descriptive* analysis also supports the direct relationship between employment status and income. The relationship between employment, income, and consumption might have different features as war victim households might get different supports, kind and cash, to cover their means of life with naïve contribution in return.

The rate of change in income varied across the zones though it remains statistically insignificant. The average income of households in the Western zone showed the highest decrement rate (77.1%), followed by the southeast zone (70.6%), northwest (65.2%) and central zone (62.8%). Only the Mekelle zone slightly showed an increment in mean income during the war (birr 179.7).

The employment and income figures (Figure 1 and Table 1) indicate the war-torn zones were, relatively, affected severely and the result is aligned with many empirical findings on the link between war and employment and income.

#### **(4) War and Household Expenditure**

The consumption of goods and services is a primary component of economic well-being and it is a primary indicator of households' living standards. Income and wealth are available to support consumption expenditure, at the present and in the future (through the saving that the generated income). A person with a higher level of consumption expenditure is considered to have a higher level of economic well-being than someone with a lower level of consumption expenditure while other things being equal. Consumption needs can be met through the spending of income, the running down of wealth, and borrowing from other sources. Not only does war destroy human life and assets, but also deteriorates the welfare of people and its human capital formation. Overall,

the findings of this study indicate that war had a negative impact on the overall households' consumption expenditure of households. When we compare the average expenditure of the households before the COVID-19 period before the outbreak of the war and during the war, it provides substantial evidence for the negative impact of the war on expenditure/consumption.

The descriptive statistics in Table 1 indicate that the average expenditure of the households (March) was birr 3576.47. In addition, the average household expenditure before the COVID-19 period and the war took place in Tigray was birr 5801.8 and birr 5738.6 per month, respectively. These numbers, in simple terms, indicate that the effect of COVID-19 on households' consumption was very minimal but the war reduced the household's consumption expenditure by 37.7 percent. The inverse relationship between conflict and households' consumption expenditure is consistent with the descriptive and empirical-based research findings of Teodosijević(2003), Verwimp (2012) and IPC (2017).

In the least developed countries, households spend a significant amount of their budget on the purchase of food items. In this study, 96.5 percent of the households' expenditure was spent on the purchase of food items and the remaining was the share of non-food expenditure of the households (3.5%). Except for the western zone, all the zones spent more than 95 percent of their expenditure on foodstuffs. In the western zone, 86.9 percent of the share of expenditure was for food expenses, whereas 13.1 percent belonged to non-food consumables. This might be a convincing figure as the data for the western zone was collected from the IDPs. So, the IDPs are expected to spend a significant amount of their monthly expenditure on the purchase of non-food items like clothes, utensils, beds, mattresses, and others as they fly leaving everything behind.

At a face value, while the expenditure of households, in March, in the Mekelle zone (birr 4,115.5) was the highest, birr 3,170.6 in the central zone was considered as the lowest and the range amount was birr 944.9. The study also shows that 100 percent of the households reported that their monthly income did not cover their monthly expenditures. As a result, households used different alternatives to fill the gap. The first five alternative means of filling the income-expenditure gaps were using their savings (45.06%), borrowing from

friends, relatives, and neighbors (13.78%), using savings & borrowing (5.7%), and sale of assets and livestock (4.5%).

### **(5) War and Households' Saving**

Generally, the war hurts the households' saving status. Since the war negatively impacted the level of income of households, households lacked security and deteriorated their confidence to save money in the banks as they were not sure to use them any time they needed. Saving in Tigray is believed as a means of mitigating the shortage of cash to start a new business, marriage, social festivities, and others. As a result, people save different amounts of money in banks, through the purchase of fixed assets, livestock, and consumables, and in social associations like 'Equb'.

Before the war erupted, 72.54 percent of the households had savings of various forms. However, during wartime, 100 percent of the respondents reported that they did not make any savings (both cash and in-kind). Rather, they used their savings to cover their expenditure gap and mitigate the shortage of food they faced. As indicated in Table 1 above, households had birr 42,711.5 amounts of savings of various forms before the war. The war in Tigray also destroyed the savings of the households. The amount of damage households faced to their saving was estimated at birr 49,327.42. These include the loss in cash and non-cash deposits of the households which were looted by the Eritrean and Ethiopian military forces (41.13%), both Eritrean, Amhara forces and the Ethiopia military forces (13.2%), Eritrean forces (10.57%) and Amhara forces (6.23%).

In Tigray, even before the outbreak of the war in the region, there was repeated internet blockage, and the introduction of binding and less attractive rules and regulations on the banking sector made people lose their confidence and question the trustworthiness of the banks in providing enough money to be withdrawn and transferred. These forced people to save what they have at their homes which affects the money in circulation in the economy and banks remain unable to provide sufficient money to their clients. Further, the poor functioning of the banking sector demotivates the people to save.

As a result, banks started rationing, a certain amount of withdrawal per month.

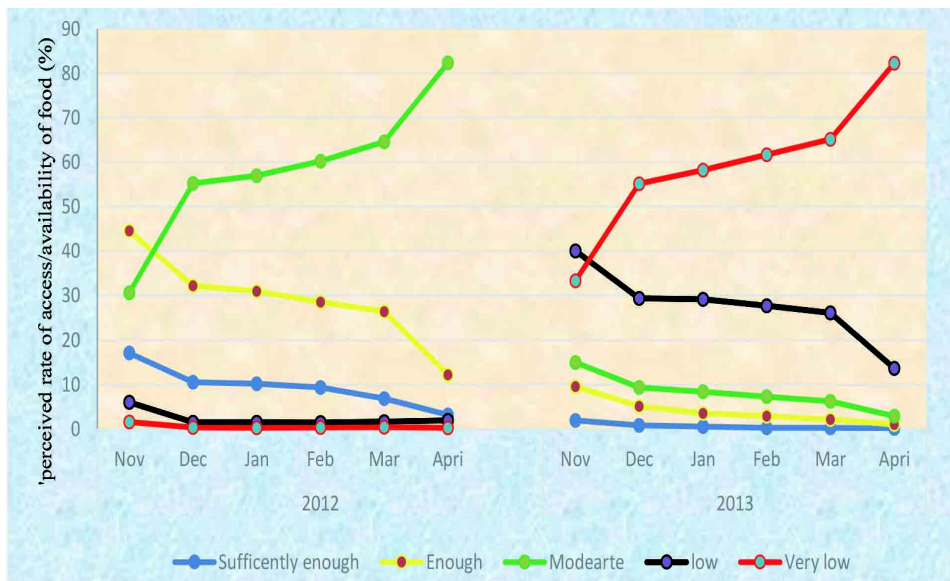
The giant commercial bank of Ethiopia which is the leading in the number of customers and the wealthiest bank in the nation was unable to provide services to its customers in Tigrai. This might be due to the sabotages that the federal government made to influence the war in Tigrai and to paralyze the economy of the region. As mentioned before, the use of savings, in the form of livestock, distress sale of land, and consumption of seed stocks are coping strategies widely adopted by rural households in the areas under study. The conflict, however, has left most of these households with already seriously reduced stocks of secure assets: assets, such as land, livestock, tools, and seeds have been destroyed or seized, or else the quality of these assets has substantially deteriorated. In addition, more intangible but equally important assets such as social capital have been affected; in fact, it was not covered in this study.

## **V. Households' Coping Strategies for Food Shortage in Wartime**

This section focuses on the major *coping strategies* that households employ in times of armed-war or conflict to mitigate food shortage in terms of acute food insecurity, the role of productive assets in their coping strategies, and their capability to choose from these bundles of coping strategies.

Accordingly, significant food shortage and associated factors as major challenges still prevail in Tigrai, resulting in many people in need of humanitarian assistance. It is usually common to practice livelihood coping strategies in times of hardship, war, or conflict. As indicated earlier, the largest proportion of the sample households were found to be acutely food insecure due to the war that took place in Tigrai. Further, the perceived availability of food at the household level was declining badly. As indicated in Figure 2, from November until April, the households rated the level of access and availability of food at their households as low and very low. The very low rate increased across the war months. Very sufficient, sufficient, and moderate rates were declining across the months.

<Figure 2> Perceived Availability of Food at Household Comparison by Month and Year



Source: Computed from the TIPS survey data (2021).

33.4 percent of the respondents rated their food availability and access in November as very low, low (40.09%), moderate (14.98%), enough (9.61%), and sufficiently enough (1.97%). In April, the rate was completely changed and 82.28 percent of the households reported that their households’ food access and availability was very low, low (13.65%) and only 0.12 % rated it sufficiently enough.

When we compare the perceived current households’ access and availability of food to 2020 in the same months, we can observe a complete reverse of the situation where the moderate and enough rates were dominating the months. Whereas the low and very low rates of access to food were governing the months under study. In 2020, from April, 2.97 percent of the respondents rated their access to food as very low and low; but in 2021, the same months, 87.03 percent of the households rated it as very low and low. Despite the challenges in recalling the households’ access to food months back, Figure 2 helps to indicate to what extent the war affects the households’ access and availability of food. What so over, the empirical and qualitative data analyzed are providing



substantial evidence for the devastating effect of the war on food availability and access.

The war-induced conflict in Tigrai forced households to practice *coping strategies*. Households were using single and multiple means of mitigating the shortage of food they had. As indicated in Table 2, there is consistency of adopting, almost, similar basic copying strategies from November till February. Therefore, the major 14 livelihood coping strategies employed during the wartime are: (i) reduction both in quantity and quality of food they eat (22.92 %), (ii) sale of livestock (20.48%), (iii) borrowing both cash and in-kind from family, friends, and neighbors (8.67%), (iv) sale of livestock, and productive assets (7.19%), and (v) requesting cereal supports form religious and non-governmental organizations (6.93%).

In addition, the households were also tackling the lack of food through (i) the sale of livestock and support from a religious and non-governmental organization (4.31%), (ii) sale of livestock and support from religious organizations (3.58%), (iii) in-kind support from the government (3.58%), (iv) sale of both productive and households' assets (3.04%) and (v) sale of livestock and supports from religious and NGOs (2.57%). Further, to a lesser extent, (i) the sale of livestock and support from the government (2.39%), (ii) the sale of livestock & supports from families, friends, and neighbors (2.29%), (iii) sale of livestock, supports from family and religious and NGOs (2%), (iv) family, friends, and neighbors support (1.95%) and (v) supports from the government (1.86%) were the strategies used during the war period.

Among the alternative coping strategies, 50.25 percent of the households used the sale of livestock, sale of assets, borrowing, and support from religious and NGOs as the leading means of survival during wartime. Even though evidence was not available from the survey whether households were eating inedible and less edible leaves, the FGD and KII results came with such findings.

<Table 2> Households' Food Shortage Coping Strategies

November		December		January		February		March		April		Average	
Strategy	%	strategy	%	strategy	%	strategy	%	strategy	%	strategy	%	strategy	%
A = Quantity and quality reduction	24.79	A	26.3	A	21.4	A	18.43	A	18.07	A	28.52	A	22.92
B = Sale of livestock	17.29	B	21.57	B	20.46	B	19.66	B	18.97	B	24.91	B	20.48
BE = sale of livestock and asset	6.61	BE	7.73	BE	7.92	BE	8.6	BE	6.5	BE	5.78	E	8.67
BEI = Sale of animal, asset and use savings	2.31	BF	2.31	BF	2.31	BF	2.81	BI	4.31	BEI	1.68	BE	7.19
BF = Sale of animal & asking for support from family	2.58	BG	2.74	BG	2.53	BG	1.58	C	4.37	BF	1.44	I	6.93
BG= Sale of livestock and support from Government	2.69	BI	1.58	BI	2.7	BI	3.04	E	8.23	BI	2.89	BI	4.31
BI = Sale of animals & support from religious organizations	2.65	C	3.1	C	3.47	C	3.28	F	1.67	C	1.56	G	3.58
C = Sale of asset	2.44	E	8.73	E	9.41	E	9.36	G	4.12	E	6.98	C	3.04
E = Loan (cash & kind) from relatives and community	8.88	F	1.58	F	1.65	G	3.34	H	1.86	F	2.89	EBI	2.57
G = Support from the government	3.75	G	3.68	G	3.91	I	6.26	I	7.59	G	2.65	BG	2.39
												BF	2.29
												BEI	2
												F	1.95
												H	1.86

Source: Computed from the TIPS survey data (2021).

Likewise, the FGD, PRA, and KII qualitative analysis revealed that their food consumption was affected by the war that occurred in Tigrai. Therefore, the community was forced to adopt livelihood coping strategies to address their acute food insecurity. Therefore, the qualitative analysis indicates that the following key livelihood coping strategies were employed by the community at large in support of the household-level analysis.

From the community perspective (FDG, PRA, and KII), the major livelihood *coping strategies* adopted in war-torn Tigrai are:

- Reduce the quantity and quality of food they consume: substituting the expensive food items such as ‘Taff’ by other relatively cheap food items such as maize, wheat, sorghum, rice etc.
- Reduced the nonfood items consumption and shifted the expenses to the food items.
- Sale of livestock and assets (productive and household assets).
- Borrowing from relatives, friends, and neighbors to be paid in long terms.
- Prioritizing to feed children and the remaining family members consume the remaining available foods.
- Reducing the per day meal consumption from three to two or even to one meal consumption per day.
- Searching & negotiating with government, NGOs, and religious institutions to get humanitarian support.
- Eat commonly inedible green leaves like “Moringa” and vegetables.
- Migration especially people went to the zonal and regional cities (Mekelle) as IDPs.
- Begging door to door and in churches and mosque.

Here is one case developed from the FGD carried out in Adwa town:

*There were situations in Adwa where households were forced to eat green leaves (boiling ‘moringa’, ‘Birnihyo’, and others and mixed with flour); normally it is not among the human feeds in the locality. Households were eating mainly once a day, reducing the quantity and quality of food they ate and using any kind of flour as a sauce ‘Tsebhi’ as they could not*

*get pulses, oilseeds, and beans which serves as sauce 'Tsebhi' in Tigrai. Further, to a larger extent, some households used roasted and ground maize as sauce. They used flour soup 'Suwqo' to escape the shortage of food; this type of meal is mainly used during critical shortages of food. Further, some households used 'water and salt' as a sauce. More importantly, some households started begging for cereals from their neighbors and community and lastly migrated to other areas. Moreover, the FGD result depicts that the cause of death of people children, and mothers was malnutrition, like in Ahferom, Aksum, rural Adwa, Adwa, Naeder, and Rama. These all cases or events are evidence of the presence of extremely large food gaps and severe food insecurity in the region.*

## **VI. Conclusion and Recommendations**

### **1. Conclusion**

The war in Tigrai had a devastating effect on the welfare of the households. The expenditure, employment, income, and savings of the households were significantly reduced during the wartime; unemployment rose from 4.99 percent to 48.32 percent, income was changed by -57.7 percent, consumption expenditure declined by 37.7 percent and savings reduced to zero. The extreme reduction in the households' welfare indicators directly influences the level of consumption and health situation of the households. To mitigate the war-induced shortage of food, households used different alternative mechanisms where reduction in the quality and quantity of food (22.92%) dominates the alternatives. The second-best alternative was the sale of livestock assets households had (20.48%), the combined sale of livestock and assets (8.67%), a combination of the sale of livestock, assets, and using savings (7.19%) and sale of livestock and supports from families and relatives. Besides, the extreme severity of food insecurity forced households to eat inedible leaves such as 'moringa' and 'Birmiho', they boiled the leaves, mix with flour and red paper and salt; using flour as a sauce as they could not get beans, and chickpea and lentil and others which were normally used as a sauce. Further, households were tackling the food shortage they had used 'water and salt' as sauces to moisturize their food.

## *2. Some Recommendations*

(1) Provide emergency livelihood support, including the provision of agricultural and livestock support (seeds, extension services, livestock feed, and veterinary services) to ensure the major agricultural season does not result in a second lost harvest.

(2) Support trade to stimulate economic activity such as protection for traders and safe markets, ensure livelihood support for populations not displaced to access their farms and agricultural inputs. As access improves, repair damaged social and economic infrastructure. Ensure fully functional telephone communications, and financial services, including banks, markets, and transportation services.

(3) Take all necessary steps to ensure immediate and continuous access for humanitarian organizations to all populations in need of assistance and the overall respect of the humanitarian space so that the people's basic rights can be fulfilled. This also includes unhindered access to the available services.

(4) Restore and enhance the livelihoods of internally displaced people returnees as well as rehabilitation of vulnerable farming (assets) communities by subsidizing basic commodities and agricultural inputs. Also, diverse, and sustained humanitarian interventions aimed at improving access to food and restoring employment opportunities disrupted by the war-induced acute food insecurity in Tigray have to be immediately implemented.

(5) Support ongoing initiatives on social cohesion and peace-building efforts to reduce the impact of conflicts on poverty, nutrition, and livelihoods of affected populations. The conflict-induced displacement has continued damaging the lives and livelihoods of the affected population. The humanitarian community, donors, and partners should continue advocating for and implementing an integrated approach to providing humanitarian assistance, in parallel to increasing the resilience of livelihoods and continuous monitoring of the IDP situation.

**Declarations:*****(1) Acknowledgment***

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***(2) Conflict of Interest***

There is no conflict of interest associated with this article.

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## ■ Appendices

<Table 1> Sample size by zone, woreda and sex

Zone	woreda	Female	Male	Total	Share	
Eastern	Adigrat Town	47	30	77	2.4	
	Ganta Afeshum	61	75	136	4.2	
	Wukro Town	28	24	52	1.6	
	KilteAwlaelo	51	94	145	4.5	
	Freweyni Town	13	19	32	1.0	
	Atsibi	14	11	25	0.8	
		<b>235</b>	<b>272</b>	<b>507</b>	15.6	
	Aksum Town	31	73	104	3.2	
	Adwa	62	158	220	6.8	
	Naeder	18	58	76	2.3	
Central	Laelay Maychew	16	88	104	3.2	
	Tahitay Maychew	13	116	129	4.0	
	Ahferom	23	58	81	2.5	
	Adwa_town	31	31	62	1.9	
	Rama/Aderbaete Town	6	19	25	0.8	
		<b>227</b>	<b>628</b>	<b>855</b>	26.3	
	Shire Town	76	80	156	4.8	
	Tahtay Koraro	29	67	96	3.0	
	Endabaguna Town	6	38	44	1.4	
		<b>154</b>	<b>256</b>	<b>410</b>	12.6	
Northwestern	EmbaAlaje	8	16	24	0.7	
	Endamekoni	30	64	94	2.9	
	Maychew Town	30	25	55	1.7	
	Raya Azebo	47	82	129	4.0	
	Mekoni town	20	26	46	1.4	
		<b>135</b>	<b>214</b>	<b>349</b>	10.8	
	Southern	K/K/semien	20	37	57	1.8
		K/K/Adihaqi	17	21	38	1.2
		K/K/Kedamayweyane	17	27	44	1.4
		K/K/Quiha	18	22	40	1.2
K/K/Hadnet		14	31	45	1.4	
K/K/Ayder		40	65	105	3.2	

	K/K/Hawelti	9	41	50	1.5
<b>Mekelle</b>		<b>135</b>	<b>244</b>	<b>379</b>	11.7
	Degua Temben	31	47	78	2.4
	Enderta	58	73	131	4.0
	Hintalo	45	46	91	2.8
	HagereSelam	25	23	48	1.5
	Adigudom	26	23	49	1.5
<b>Southeast</b>		<b>185</b>	<b>222</b>	<b>407</b>	12.5
<b>Western</b>		<b>88</b>	<b>250</b>	<b>338</b>	10.4
	IDP (Western+)	179	378	557	17.2
	Total	<b>1159</b> <b>(36)</b>	<b>2,086</b> <b>(64)</b>	<b>3,245</b> <b>(100)</b>	100.0

Source: Computed from the survey (2021).

Note: Value in brackets is the share from the total sample.

< Table 2> Household Features

Household Features								
Level of education			Marital status			Religion		
Category	Freq.	%	Category	Freq.	%	Category	Freq.	%
Illiterate	1,056	32.54	Married	2427	74.79	Orthodox	3022	93.13
Religious	173	5.33	Single	100	3.08	Muslim	214	6.59
Primary (1-6)	906	27.92	Divorced	381	11.74	Catholic	5	0.15
Secondary (7-12)	540	16.64	Widowed	327	10.08	Protestant	4	0.12
Diploma/TVET	198	6.1	Other	10	0.31			
First degree	317	9.77						
Masters	50	5.14						
Ph.D.	5	0.15						
Total	3245	100	Total	3245	100		3245	100

Source: Computed from the survey (2021).

<한글초록>

## 전쟁이 가구의 복지에 미치는 영향과 식량부족 대처 전략: 에티오피아 티그레이 지역의 경우

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무력 분쟁과 전쟁은 경제에 치명적인 영향을 미치는 것으로 알려져 있다. 본 논문은 에티오피아 티그레이 지역에 거주하는 3,245가구의 자료를 사용하여 ‘분쟁과 전쟁이 가구의 복지에 미치는 영향’을 평가하고, ‘식량부족 대처 전략’을 고찰하였다. 그 결과는 다음과 같다. 첫째, 비교 분석 결과 전쟁으로 인해 가구의 소득이 57.7% 감소하였고, 지출은 37.7% 감소했으며, 저축 수준은 0으로 떨어졌다. 또한, 전쟁으로 인해 48.7%의 가구가 실업자가 되었다. 둘째, 전쟁으로 인한 ‘식량 부족에 대처하기’ 위해 가구는 소비하는 식량의 질과 양을 줄이고, 가축과 자산을 매각하고, 저축을 사용하고, 가족, NGO 및 정부에 지원(재정 및 현물)을 요청하고, 먹을 수 없는 녹색 잎을 먹고, 이주를 떠나거나 구걸하는 등의 ‘대처 전략들’을 채택했다. 마지막으로, 전시 식량부족에 대처하기 위한 몇 가지 정책적 권고안을 제안하였다.

주제어(key words): 전쟁과 분쟁, 식량부족, 가구 복지, 대처 전략, 티그레이.

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