



Tigray:

Atlas of the Humanitarian Situation

Cover: This Tigrayan farmer decided to plough his field in May 2021 to survive at all costs. Most surrounding lands were still unploughed. © Sébastien Nemeth / RFI (published with permission)

TIGRAY: ATLAS OF THE HUMANITARIAN SITUATION

Version 2.2

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Link to configurable Web Application: <https://arcg.is/vmbWHO>

ABSTRACT

At the beginning of November 2020, an armed conflict emerged in Tigray, Ethiopia's northernmost region. The objective of this 'Atlas of the Humanitarian Situation' is to document and map the situation in which approximately 6 million Tigrayans currently find themselves. For this, we contacted key informants in different districts of Tigray to collect qualitative and quantitative evidence of the actual situation on the ground. We also confronted these data and testimonies with information disclosed by the Government of Ethiopia and by humanitarian organisations. The 27 maps in this atlas provide detailed information at the scale of districts (*woredas*) or sub-districts (*tabiyas*). Besides background information related to administrative divisions, social and natural resources - locations of internally displaced people, massacres and civilian casualties receive due attention. Humanitarian access and needs are particularly addressed; official data on humanitarian aid distribution are mapped, and contrasted to ground evidence related to such distributions. The final outlook, links up the emergency and famine conditions in Tigray to the current crop status and to the blockade and siege of the region.

Keywords: Civilian casualties; Internally Displaced People; Humanitarian needs; Humanitarian access; Humanitarian assistance; Ethiopia; Famine

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FUNDING & COPYRIGHT

From September to December 2021, there has been partial funding of this research by “Every Casualty Counts”. This atlas (text, illustrations and maps) is free from copyright and can be reused without restriction, subject only to the obligation to acknowledge the source.

DISCLAIMER

All maps have been compiled according to the best of our knowledge and do by no means reflect a political opinion. For questions or suggestions related to this atlas, please contact tigraymaps@gmail.com.

MAIN UPDATES IN THIS VERSION OF THE ATLAS (27 DECEMBER 2021) WITH RESPECT TO THE PREVIOUS VERSION

Several sections of this Atlas have been updated since the previous version, published on 11 October 2021. Here we provide a brief overview of the updates made. Previous versions of the maps can be consulted in the Web Application (<https://arcg.is/vmbWHO>).

No new updates of this atlas will be published in the foreseeable future. Our focus will be on upgrading the online database of massacres and civilian victims: www.ethiopiaticgraywar.com. If the reader comes across factual errors in this Atlas, or typos etc., please contact tigraymaps@gmail.com.

Updated maps*

- Map 11 – Reported conflict incidents (section 4.1)
- Map 13 – Heatmap of fully documented casualties (section 4.2)
- Map 14 – Heatmap of reported civilian casualties (section 4.3)

*Where maps have been updated, the corresponding text and references also have been updated.

New maps

- Map 10 – Gold and base metal potential; exploration concessions of foreign companies in Tigray (new Section 3.7)
- Map 15 – Occurrence of massacres in the Tigray War up to 16 November 2021, with sites visited by the joint EHRC-UNHRC investigation (Section 4.4)
- Map 16 – Occurrence of massacres & conflict incidents in the Tigray and Amhara Regions in Ethiopia (Section 4.5)
- Map 18 – Distribution of Internally Displaced People (IDPs) due to the Tigray War at the end of August 2021 (Section 5.3)

Other

- Update of Annex A (monthly casualties)

LIST OF ACRONYMS

ADF	“Amhara Defence Force” – it does not formally exist but we refer to it as a combination of combatants belong to the Amhara Region Special Forces, Amhara militias and armed Fanno militants
BoFED	Bureau of Finance and Economic Development
CSA	Central Statistics Agency of Ethiopia
EDF	Eritrean Defence Force
ENDF	Ethiopian National Defence Force
EPRDF	Ethiopian People’s Revolutionary Democratic Front
GCP	Ground Control Point
GIS	Geographic Information System
GoE	Government of Ethiopia
IDP	Internally Displaced People
JEOP	USAID Food for Peace supported Joint Emergency Operation
LUC	Land use change
MoP	Ministry of Peace
OCHA	UN Office for the Coordination of Humanitarian Aid
PP	Prosperity Party, the political party of Ethiopia’s Prime Minister Abiy Ahmed
REST	Relief Society of Tigray
TAMSAT	Tropical Applications of Meteorology using SATellite data and ground-based observations
TDA	Tigray Development Association
TDF	Tigray Defence Force
TPLF	Tigray People’s Liberation Front

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1. INTRODUCTION

At the beginning of November 2020, an armed conflict emerged in Tigray, Ethiopia's northernmost region, which borders Eritrea in the north and Sudan in the west. In the conflict, the Ethiopian National Defence Force (ENDF) and its allies – formal and informal military factions of the adjacent Amhara region (further referred to as “ADF” for “Amhara Defence Force”), the Eritrean Defence Force (EDF) and a minority of Somali soldiers – oppose the troops of the ousted Tigray Regional Government (further referred to as “TDF” for “Tigray Defence Force”), led by the Tigray People's Liberation Front (TPLF)¹² (Map 1). The TPLF is the political party formerly leading the Ethiopian People's Revolutionary Democratic Front (EPRDF).

In an official communiqué on 29 November, the Government of Ethiopia stated that the military operation in Tigray was completed, and Prime Minister Abiy Ahmed appointed an “Interim Government of Tigray”. However, as from that moment, the armed conflict has continued at large scale for another thirteen months (Map 11), hundreds of thousands of people have been internally displaced and the number of reports on severe atrocities against unarmed civilians has grown unabated. These reports systematically document massacres, widespread sexual violence, the destruction of civilian infrastructure, mass looting etc. As communication lines have not been fully operational since November, the existing reports in all likelihood only cover the tip of an iceberg and the full scale of destruction has yet to become clear.

In the conflict, the Government of Ethiopia (GoE), led by PM Abiy Ahmed, has for months denied the presence of Eritrean soldiers in the Tigray Region. On 3 March 2021, it issued an ambiguous statement to the effect that Ethiopia ‘did not invite’ Eritrean troops and on 26 March, the

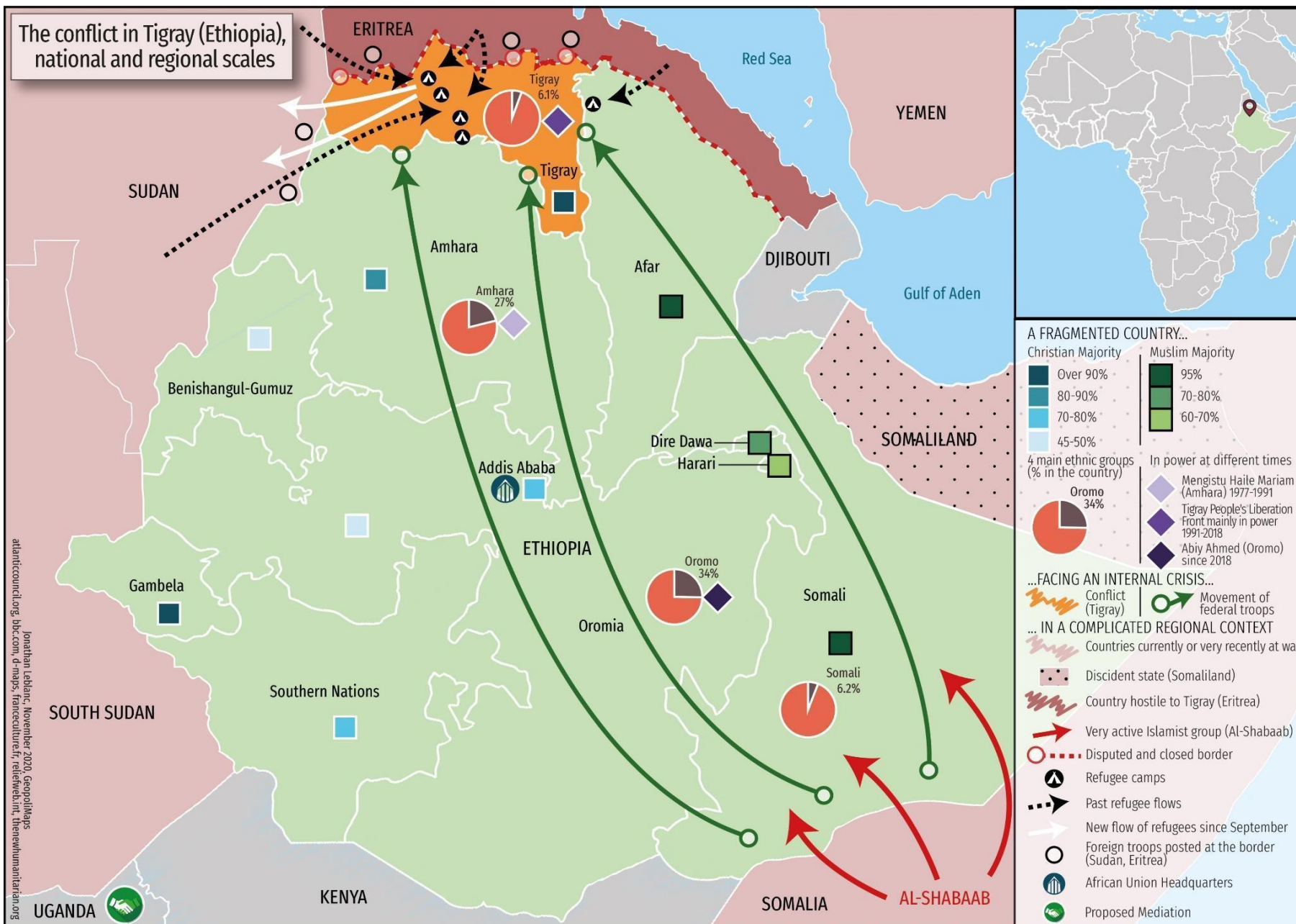
withdrawal of Eritrean troops was formally announced³. At the end of June 2021, however, Eritrean soldiers were more firmly entrenched than ever⁴.

On 28 June 2021, the Government of Ethiopia unilaterally declared ceasefire and withdrew most of its troops from Tigray⁵. The ceasefire is stated to last until the end of the farming season (i.e. end of September) and is intended to facilitate agricultural production and aid distribution, while allowing “rebel fighters to return to a peaceful road”. The withdrawal of the ENDF came after the TDF had launched a major offensive – Operation Alula – starting from 18 June and coinciding with Ethiopia's national elections on 21 June, and had recaptured several major towns in the region. On 28 June, the TDF recaptured the regional capital Mekelle and the TPLF leaders reappeared in public again after months of guerrilla warfare. A cheering crowd welcomed the TDF troops into the city⁶. The ceasefire is unilateral as the Tigray government poses strict conditions⁷; conditions to which the Amhara Region does not agree as they do not want to withdraw their forces from Western Tigray and parts of Southern Tigray. As communication lines are blocked again, information on events and evolutions occurring after June 28 only surfaces slowly. An important confirmed event is that one bridge (near Embamadre) and probably two other bridges over the Tekeze River were damaged⁸. As the Tekeze River is a major natural boundary dissecting the landscape and hence the region, this will further hinder the upscaling of the humanitarian response. In addition, as the Ethiopian Government is denying access to humanitarian actors, worsening the man-made famine conditions, the current situation is considered a siege rather than a ceasefire by many⁹. The Embamadre bridge has been repaired at the end of August 2021. Meanwhile, the

conflict has moved beyond the borders of Tigray resulting in more reported incidents that have affected Tigrayan as well as non-Tigrayan civilians. The focus in the atlas, however, remains on the Tigray region itself.

As a result of the conflict, which emerged in the aftermath of a destructive locust plague and in the context of the ongoing COVID-19 pandemic, many Tigrayans have become in dire need of humanitarian aid, food as well as medical supplies and health care services. In spite of the official line of the GoE, 'formal' humanitarian aid does not reach many of the people who need it most, due to restricted accessibility¹⁰. This is recognised by several government officials at the grassroots level, and was reiterated by senior humanitarian aid workers.

Considering this information, the objective of this 'Atlas on the Humanitarian Situation' is to document and map as much information as possible on the situation in which more than 6 million Tigrayans find themselves. For this, we contacted key informants in different *woredas* (districts) of Tigray and collected qualitative as well as quantitative evidence of the actual situation on the ground. With communication lines blocked, we document pieces of a bigger puzzle, yet to be fully reconstructed. By providing spatially explicit information, we hope to transfer useful information to humanitarian and development actors.



Map 1
National and international context at the start of the Tigray War.

Data source:
Geopolitical
(2020)

2. Methodology

2.1. Interviews

To collect qualitative and quantitative evidence on the actual situation on the ground, we conducted numerous interviews with people from different *woredas* in Ethiopia. This was possible given our long-term involvement in Tigray as researchers, through family links, as previous staff of the Bureau of Agriculture, as lecturers... Over time, a large network of friends and colleagues has been established.

In the context of these interviews, it should be noted that communication lines in Tigray were blocked on 4 November 2020, at the start of the conflict. In the month of November, there has been a continuous black-out for telephone lines as well as for internet connections. At that time, we started sending out email messages broadly to all our friends in Tigray, hoping that such “messages in a bottle” would be picked up by some (e.g. through satellite telephones) and could be distributed somehow. This also was the time at which PM Abiy Ahmed promised to conquer the town of Mekelle and the Tigray Region “at any cost” - which was later reworded in terms of conducting a “final offensive”¹¹.

From the end of November onwards, we managed to have some rare contacts through people finding telephone signals on mountain tops near the borders of Tigray. Since December, telephone communication has slowly become possible with Mekelle and a few other major towns in Tigray (with intermittences). Still on 30 April 2021, many of our interviews could only take place when people came to Mekelle or other major towns to take news from their relatives, or for cash withdrawals from the bank, which was then possible at a limited number of locations.

During May-June, when telephone connections were restored in many parts of Tigray, we managed to get in contact with our network again and started to conduct interviews. This atlas is largely founded on those telephone calls, for which we estimate to have included over 2000 telephone interviews.

These telephone interviews^{12,13} can be grouped in the following categories:

- Data collection
- > 300 semi-structured interviews¹⁴
- > 100 in-depth interviews¹⁵
- > 100 generalist interviews¹⁶ with office holders at regional, national and international levels.

For the semi-structured and in-depth interviews, we only have corresponded with people who we knew before the war started and whom we trusted both in professional and personal life. All interviewees accepted only to give information on the condition of strict anonymity.

At the start of our interviews in early January, people were afraid to speak, and used very indirect terminology. Starting May, most people talked openly on the situation and the numerous killings and other war crimes. One of the main reasons for this evolution was that there were hundreds of thousands of telephone calls narrating the plight to relatives. This makes that our correspondents assumed that when they transmitted information, it would not be singled out by security services. Another important reason was that the accumulation of negative war impacts had made people to

abandon their traditional precautions when communicating plight – which traditionally cannot be done over the phone.

Yet, still, much has not been narrated and is interiorised. Co-author Emnet, who is native from Adigrat had not been informed about a number of



Fig. 2.1. Google Earth view of Adigrat before (left) and after occupation by Eritrean troops (right). Shadows indicate that both satellite images were realised approximately at the same time of the day, around 11 AM.

The point here is that our interviews have allowed a sampling of the humanitarian crisis, but that large parts of the full picture still have to emerge. Important to note also is that the magnitude of the humanitarian crisis that we contribute to unearthing through our interviews and situation reports¹⁷ has been confirmed (for the worse) once media have had access

destructions in the town, until he discovered the most recent Google Earth image (Fig. 2.1). This satellite-based evidence subsequently helped to get new information from friends and family members.



On the December 19 image we observe many compounds with damaged structures, evidence of fire, bright “spickle” around buildings indicating looting, absence of vehicles along the streets. Though we telephoned with many people in Adigrat, none of them mentioned the damage that can be observed on this imagery.

to some parts of Tigray. And yet, in March-June these accessible parts were still small, with most media operating from Mekelle¹⁸ and reporting on Eastern and Central Tigray. After July, journalists are not allowed to travel, and have to establish their private communication with contact persons.

2.2. Secondary data

In addition to the numerous interviews, different secondary data sources have been consulted for this atlas. These data sources mainly include the nearly weekly updated situation reports from UN OCHA (Office for the Coordination of Humanitarian Aid)¹⁹, official communications by the GoE,

Interim Government (also often referred to as the 'Transitional Government') or governmental institutions such as the Ethiopian Ministry of Peace (MoP).

2.3. Mapping

Thematic maps were prepared based on various data sources, ranging from interviews with key informants to reports by humanitarian organisations, official communications from governmental institutions, news articles, and online data sources such as MapEthiopia²⁰ or the Humanitarian Data Exchange²¹.

The thematic maps are organised by categories:

- Background information
- Information on the humanitarian situation
- Information on the war and civilian victims
- Food and agriculture

All maps initially were prepared in ArcMap 10.4 as 'static maps', presented in this document. The GIS data layers used to prepare these maps have also been imported into a simple but configurable ArcGIS Online Web Application. This allows users to interact with the data layers, to zoom, to share and export maps according to user preferences. In order to avoid misinterpretation and miscommunication, the online maps always have to be consulted together with the explanatory notes and metadata provided in this document.

Link to the Web Application: <https://arcg.is/vmbWH0>.

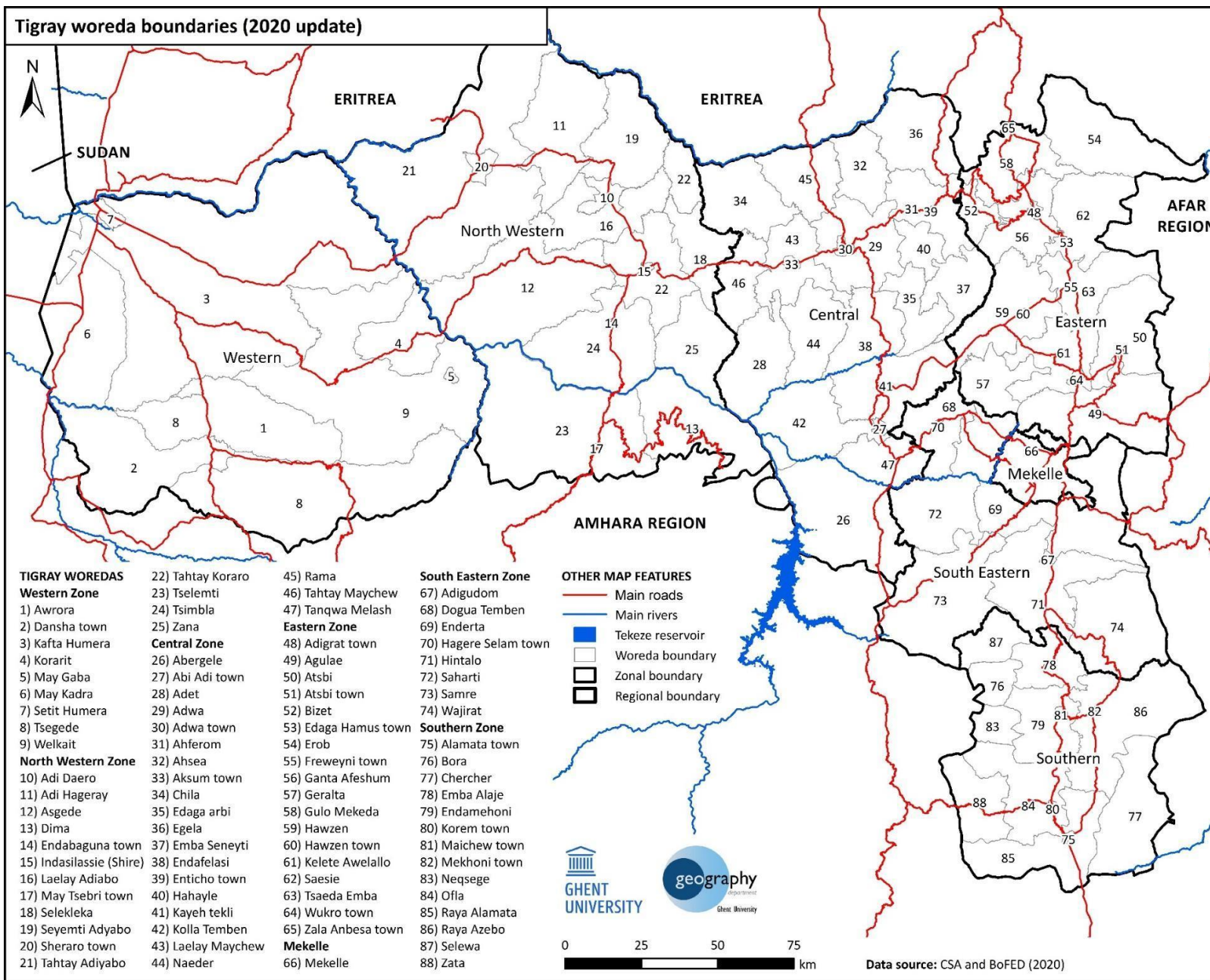
The administrative division of Tigray comprises, at the higher level), zones, each holding about a dozen districts or *woredas*. Each *woreda* includes then around 10-15 *tabiyas* or municipalities, the lowest administrative level. The *tabiyas*, in turn, hold 5-10 villages or *qushets*, which is the level at which daily life, say agriculture or church are organised. *Kebele* is an Amharic term, equivalent to *tabiya*, but also used for urban subcities.

In the early 1990s an administrative division of Tigray was established, comprising about 60 *woredas* or districts. Soon it became clear that there were insufficient resources to fully equip 60 *woreda* towns with all services deemed to be hosted by such administrative centres: branches of main ministries, bank, urban services, etc.

In the late 1990s, Tigray's *woredas* were regrouped into 35 larger *woredas*. These have been operational for about 20 years. The detail of these pre-2020 *woredas* is quite well rendered on Wikipedia²⁷.

Between 2018 and 2020, as part of a reform aimed to deepen and strengthen decentralisation, *woredas* were reorganised. As smaller towns had been growing, they were now providing a range of services (markets, even banks), so that people were travelling to the closest such towns for these services, but continued to have to travel to the formal *woreda* centre, often in a different direction, for most government administrative services.

A huge consultation, involving numerous village meetings, was organised in this period, and we witnessed heated debates, particularly in the more remote areas. Based on these consultations, Tigray was re-organised into 88 *woredas* in January 2020, basically along the lines of the 1991 *woredas* to which 21 independent urban administrations were added (Map 2).



Map 2

Administrative boundaries at *woreda* (district) level, as implemented in January 2020.

Data source:

CSA & BoFED (2020)

3.2. Topography and constraints of topographic roughness

The Tigray highlands have been uplifted by some 2500 metres in ca. 25 million years, since the Miocene²⁸. This has led to the creation of a steep escarpment on the eastern side of the region, towards the Rift Valley. As the edge of the Rift Valley is not one single fault, but a bundle of faults, so that locally level terrain is found along the escarpment, the so-called grabens²⁹.

The plateau itself, generally drops towards the west. Yet, as uplift has been rapid (in geological terms), deep valleys and gorges have incised (Fig. 3.2), the most notable of which are occupied by Tekeze, Weri'i and Giba rivers²⁸, with spectacular roads winding across them³⁰.



Fig. 3.2 Tselemti topography (woreda No. 23), with incision of a “young” gorge

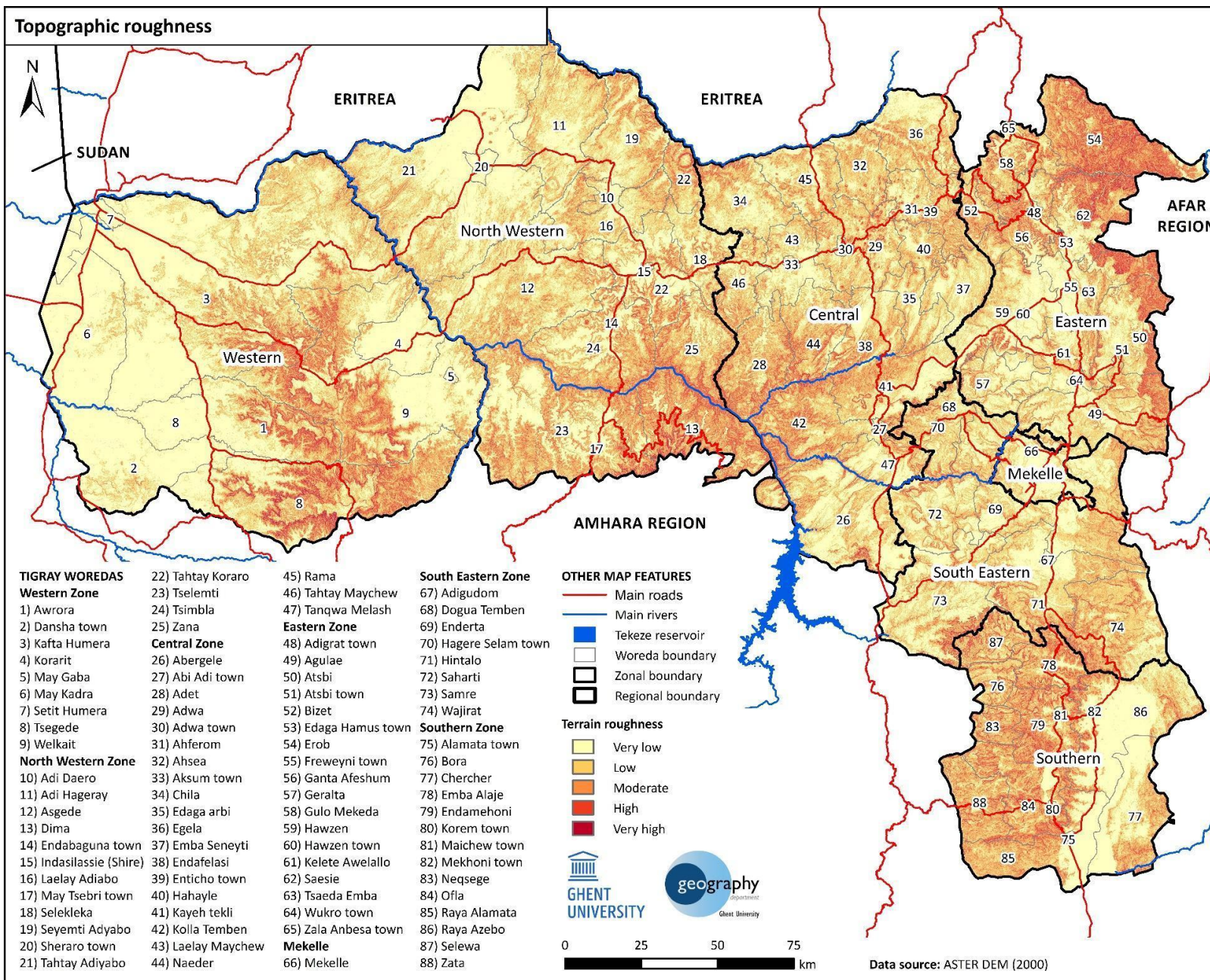


Fig. 3.3 Footpath to overcome the steep cliffs between Abiy Addi (No. 27) and Dogu'a Tembien (No. 68)

The geological formations of Tigray³¹ consist of alternating hard and soft subhorizontal layers, which contribute to the formation of a stepped morphology structure^{32,33}.

The Mesozoic sedimentary layers³⁴ are subhorizontal and present alternating hard (Fig. 3.3) and soft layers. The basalt flows^{35,36} that are on top of it, are also subhorizontal and interbedded with soft silicified lake deposits. Furthermore, intervening sills of Mekelle dolerite also form hard, subhorizontal layers³⁷. The relief thus consists of an alternation of flats and escarpments, reflecting the unequal resistance of the rocks subjected to weathering³⁸. Occurrence of ancient planation surfaces further contributed to the creation of a stepped landscape³⁹. The edges of the scarps are nearly horizontal, underlining the tabular structure.

This results in generally rugged landscapes, that are overall difficult to access. In historical times, most displacements were on foot, leading to the establishment of a dense network of long-distance trails^{24,40}. During the Italian control of the region, the first modern roads were established⁴¹; this network remained the basic road infrastructure until the mid-1990s, when a start was made to establish a modern network of mostly asphalted roads, that clearly avoids the areas with high relief. In addition, since around 2005, huge community efforts were done to establish rural roads, aiming at reaching all *tabiyas*⁴². These rural access roads however easily suffer from gully erosion⁴³, and need maintenance for securing access. In the rural *tabiyas*, the main means of communication is still on foot, with help of donkeys for carrying loads⁴⁴.

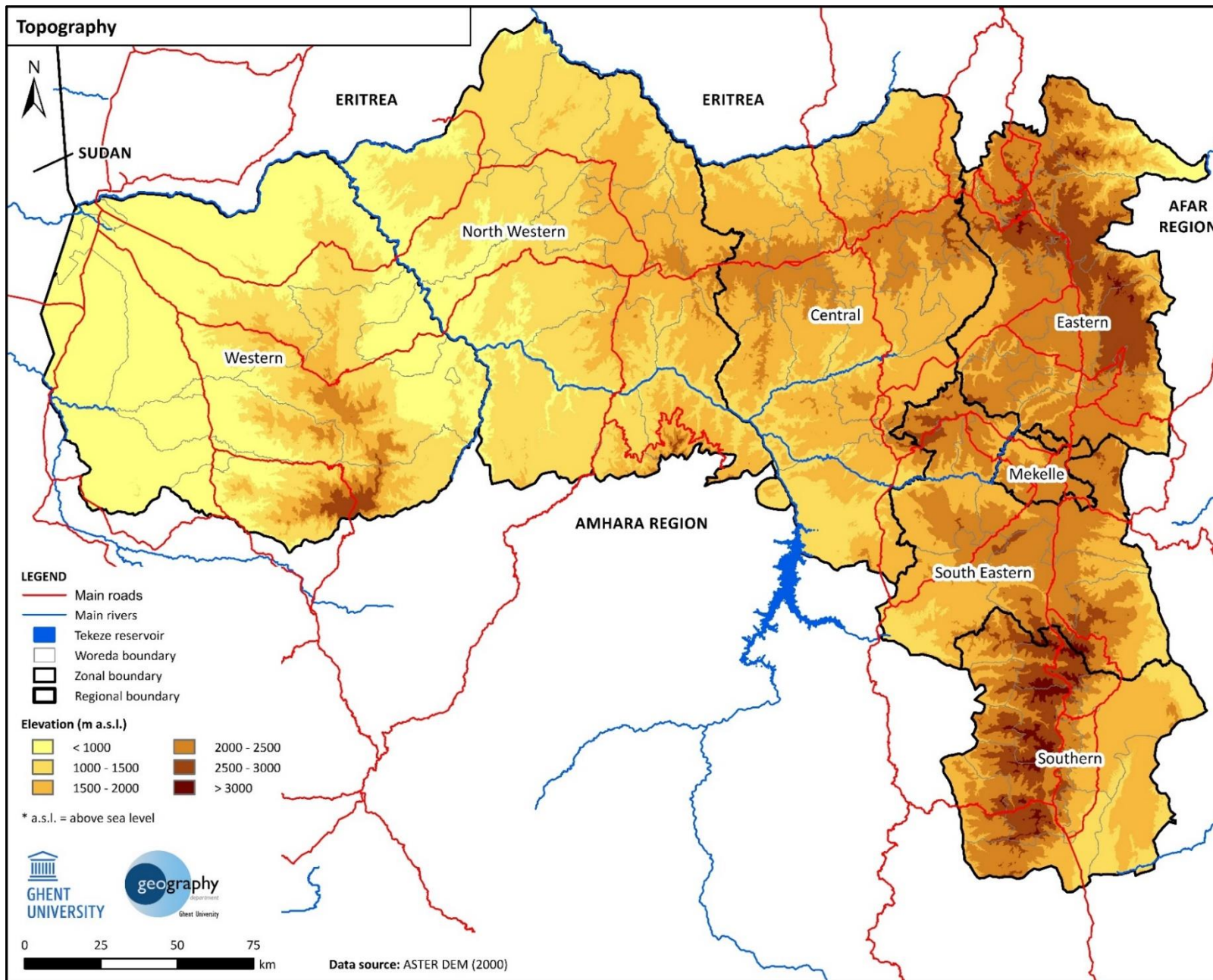


Map 3

Topographic Roughness Index, indicating contrasts in elevation.

Data source:

ASTER DEM (2000)



Map 4

Topography (absolute elevation above sea level).

Data source:

Aster DEM (2000)

3.3. Precipitation

Overall, annual rainfall in Tigray shows a clear south-north gradient, with decreased annual rainfall as one moves away from the equator.⁴⁵

Topographical factors, especially elevation and general orientation of the valley and slope gradient over longer distances, determine the spatial distribution of annual rain, which varies between 400 and 1800 mm per year. Precipitation is highest nearby cliffs and other eminent slopes, perpendicular to the main valleys which are preferred flow paths for the air masses (Fig. 3.4). Due to the occurrence of large drop sizes rains can be very intense (Fig. 3.5).⁴⁶



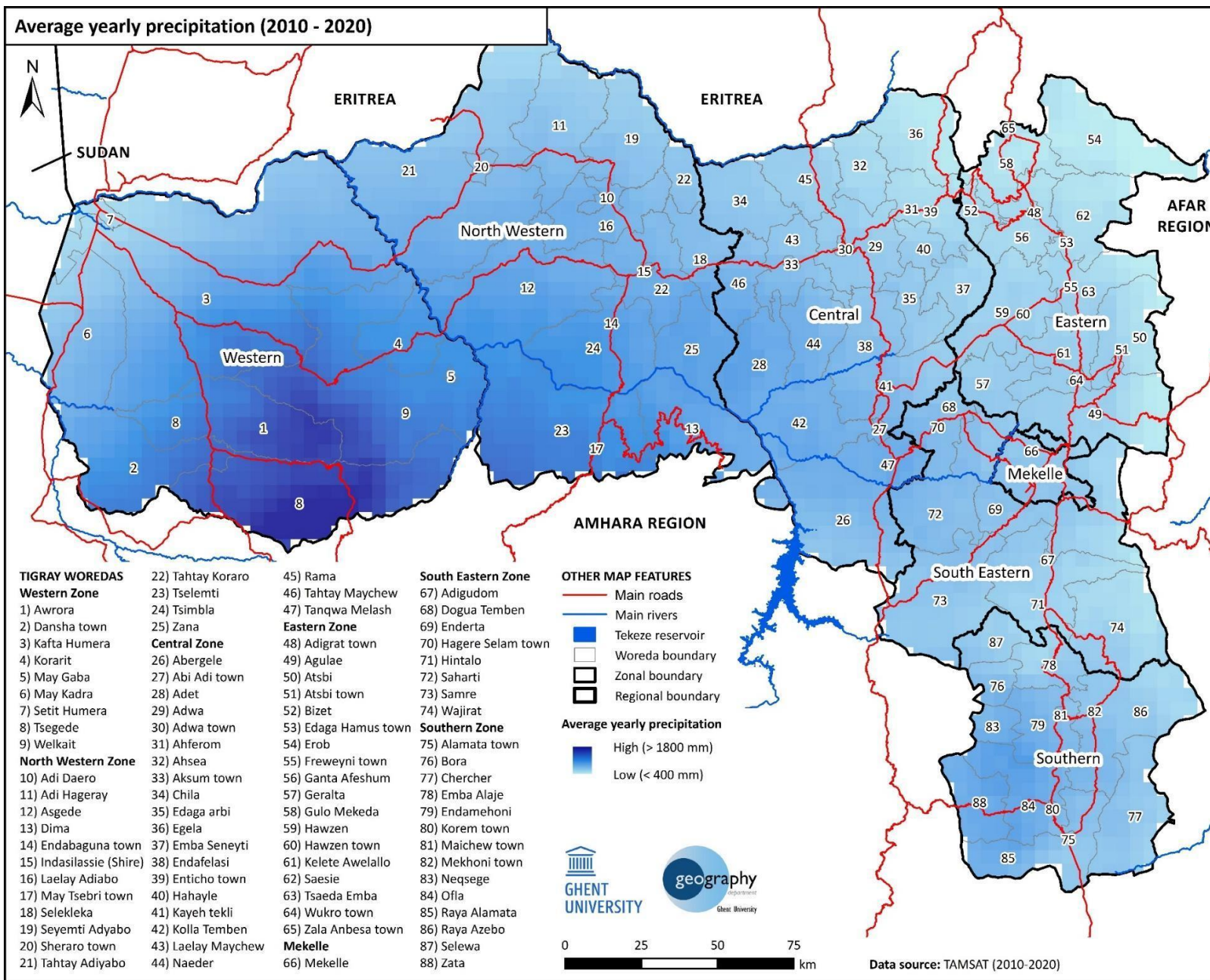
Fig. 3.4 Heavy rains over the Giba valley, west of Mekelle, as seen from far...

Locally, there can be strong contrasts in annual rainfall, in relation to intervening mountain ranges that create rain shadows.⁴⁷

The great rain depths in the southern part of Western Tigray are remarkable and would be in the first place attributed to orographic rains related to the Simien mountains. We are not aware of any study detailing this particularly humid area with rains up to 1800 mm per year.



Fig. 3.5 ...and from nearby.



Map 5

Average annual precipitation derived from TAMSAT satellite rainfall estimates.

Data source:

TAMSAT (2010-2020)

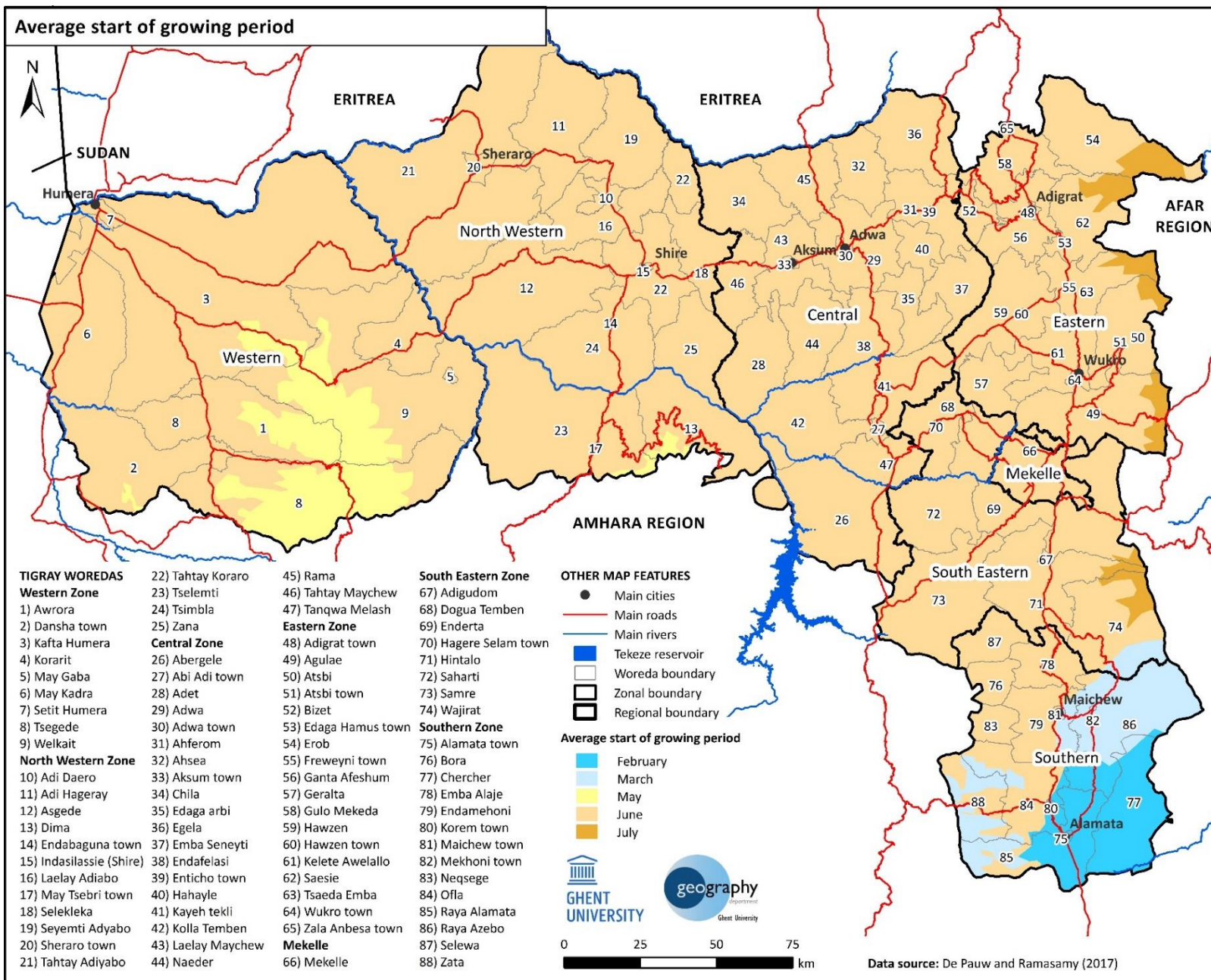
3.4. Average start and length of growing period

The start and length of the growing period – the period of the year in which crops and herbaceous plants grow successfully^{48,49} – typically depend on local environmental conditions, crop type, temperature limitations and inter-annual rainfall variability, which determines the moisture availability (from rain and moisture reserve in the soil).

Overall, in most places in the Tigray region, the growing period starts in the month of June (Map 6) and lasts 90 to 120 days (Map 7)⁵⁰. In the two to three months prior to the start of this growing period, the farmlands need to be well prepared⁵¹. In Tigray, fine seedbeds are typically prepared by ploughing the land two up to five times (depending on the crop type) with a non-reverting animal-drawn plough. Once the seedbed is ready and soil moisture has been replenished, the seeds are mainly sown by broadcasting.

When spring rains induce sufficiently-wet soil moisture conditions lasting up to the main rainy season (*kremti*), a good long growing season is possible (*azmera*), and farmers will select their crop types accordingly. Particularly at lower hence warmer locations, crops with longer growing requirements will be sown, such as maize, sorghum and finger millet⁵².

In northwestern and western Tigray, the growing period is longer, and maize and sorghum are frequently cultivated. Some areas in the northeast of Tigray and along the eastern Rift Valley escarpment have a growing period of less than 90 days, which is less than the minimum required number of days for most crops to grow. The overall short length of the growing period leads to a great chance of crop failure with the smallest variation in moisture availability, which is among the reasons Tigray is often at risk of crop failure⁵¹.

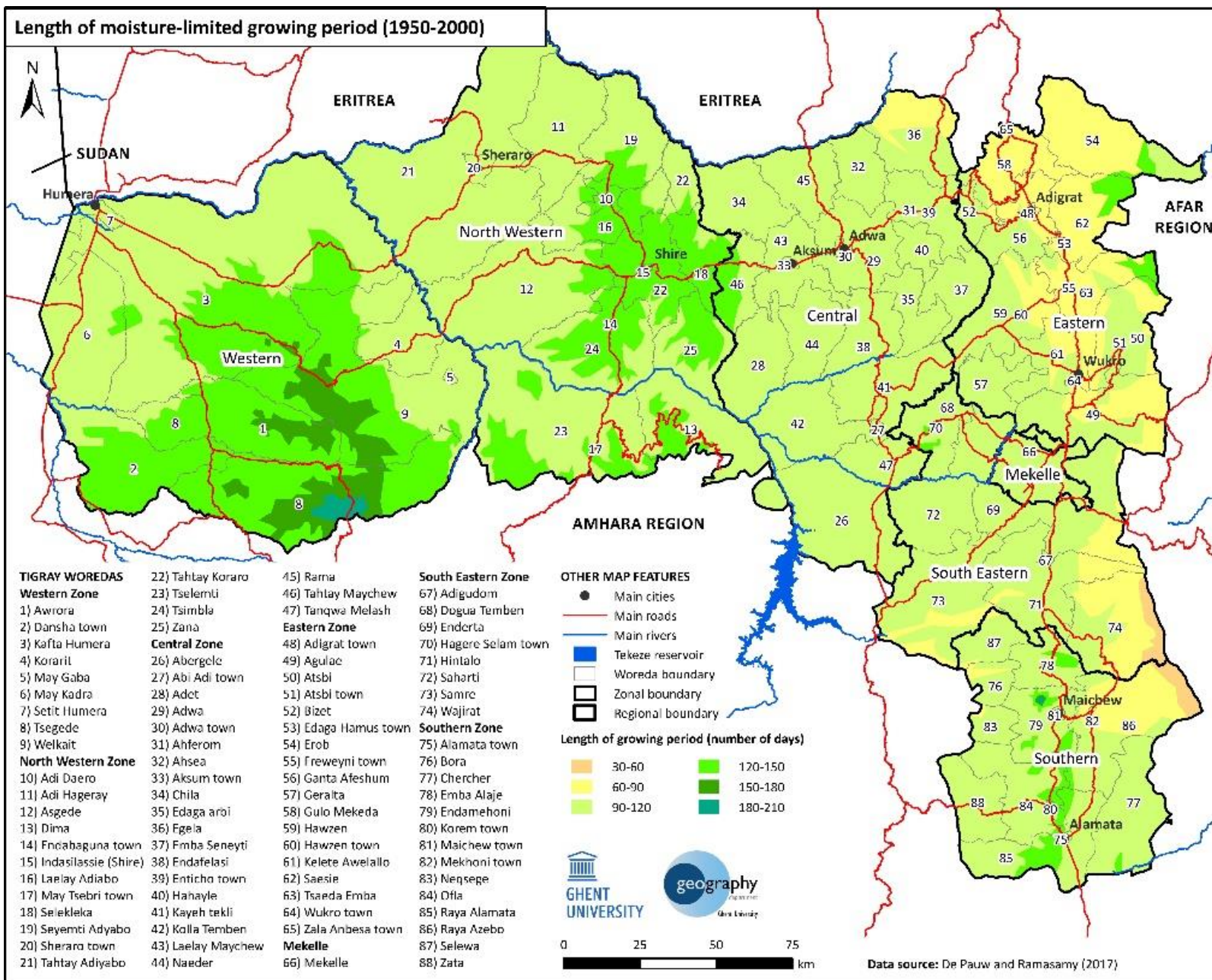


Map 6

Average start of the moisture-limited growing period.

Data source:

De Pauw & Ramasamy (2017)



Map 7

Average length of the moisture-limited growing period.

Data source:

De Pauw & Ramasamy (2017)

3.5. Population density

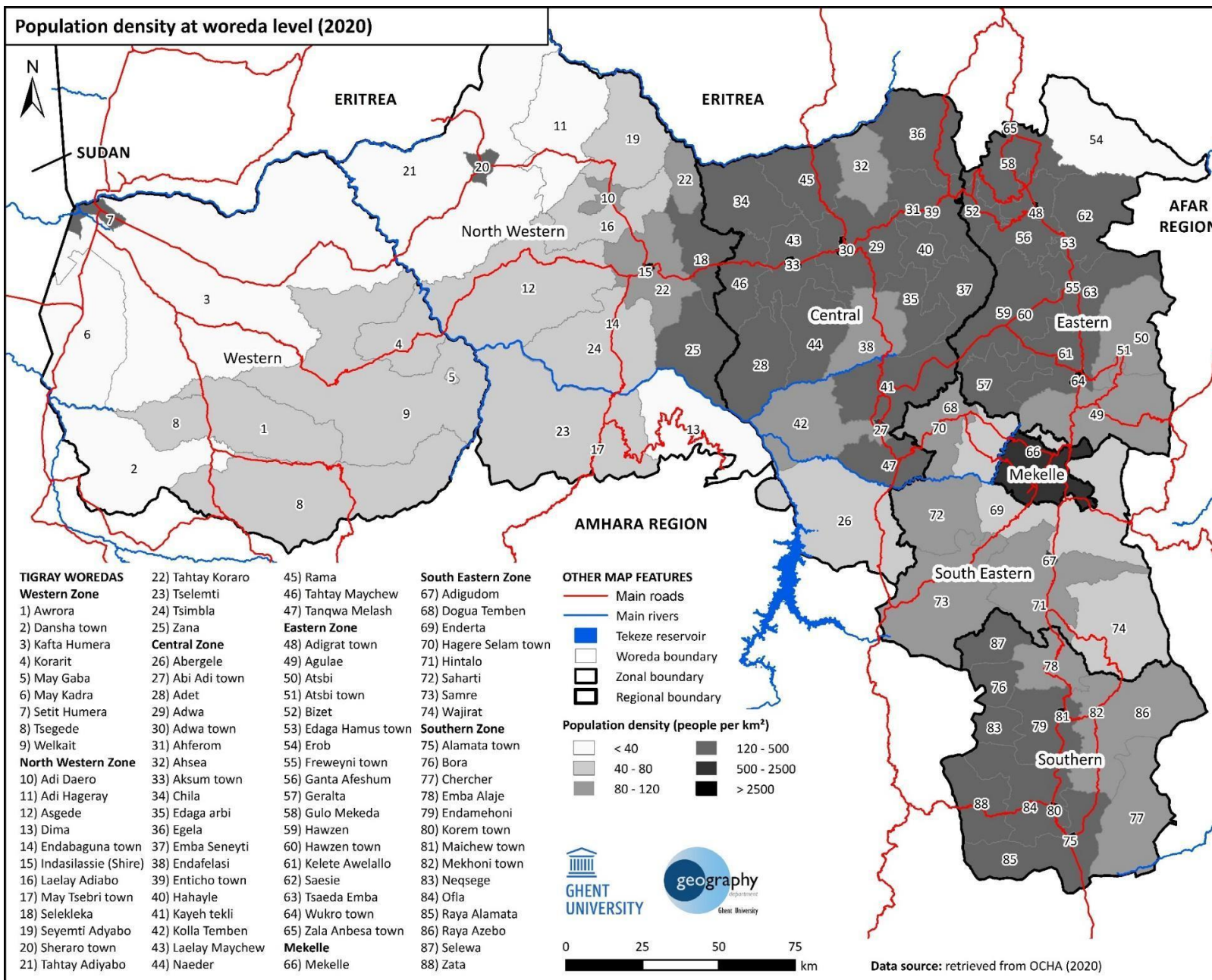
Tigray's population density strongly follows the “classic” distribution in the country, as presented already by Mesfin Woldemariam in 1972⁵³. High population densities are found in the highlands, in relation to several factors including more suitable climate (moister and less evaporation), lower incidence of diseases, and often fertile soils on volcanic materials. Rains can be intense everywhere, but in the highlands people typically have settled in places where intense rains are better seasonally distributed^{54,55}. Typically, where rains are more seasonal (i.e. where rainfall intensity is more concentrated) the population density is lower. This is the case, for instance, for Abergelle (*woreda* No. 26 on the map); the rainfall distribution here is highly seasonal, and rains fall annually in two dozen of very intense events⁴⁶.

High population densities in urban areas are expected, as well as the relatively high densities in the Raya graben (around 1400 m a.s.l.; *woredas* No. 77, 85 and 86), where irrigation agriculture has been strongly developed over the last decades^{56,57}. The expansion of irrigation along the lower Tekeze river⁵⁸ did not lead to higher population densities that would be visible at the scale of *woredas*.

The low population density of Inderta (a large *woreda* surrounding Mekelle on all four directions, No. 69 on the map) is counter-intuitive. However, this is partly an artefact due to the fact that eastern Inderta is located on the Rift Valley escarpment, with low population density. Another reason is the dry limestone environment, a characteristic of Inderta; the 2020 *woreda* borders have remarkably been adjusted to the limestone area.



Fig. 3.6 Areas with contrasting population densities: from very low population densities in the lowlands, to medium densities in the highlands and very high population densities in urban centres.



Map 8

Population density at *woreda* level, as calculated from population projections.

Data source:
OCHA (2020)

3.6. Land cover and natural vegetation density

The larger part of Tigray is constituted of rugged highland terrain occupied by a dominant land cover of cropland, followed by vegetated areas (bush-, shrub-, grassland and forests)⁵⁹.

Most inhabitants depend on agriculture for their subsistence, despite the difficult conditions for cultivating. Crop growth varies mainly according to altitude and soil type. The main crops grown in the *dogu'a* highlands are *Hordeum vulgare* L. (barley), *Triticum sativum* L. (wheat), *Eragrostis tef* L. (tef) and pulses, while *Zea mays* L. (maize), and *Sorghum bicolor* L. (sorghum) are widely grown in the *kolla* lowlands. In the transition zones, it is also common to see the lowland and highland crops growing next to each other⁶⁰. Tigray has dominantly an age-old⁶¹ grain-based oxen plough cropping system, which is practiced by a large number of farmers throughout the region.⁶² Livestock plays a key role for land preparation, agricultural input and output transportation, and providing farmyard manure for maintaining the soil fertility mainly in the homesteads. And obviously they can be sold when there is need for cash⁶³. Shortage of grazing land has led to a livestock feed crisis. Many areas are extensively cultivated, even on steep slopes and valley sides, going beyond agronomic limits. However, the situation has improved nowadays when compared to 1970s, when crop farming extension had resulted in high land degradation as few soil and water conservation measures were taken⁶⁴.

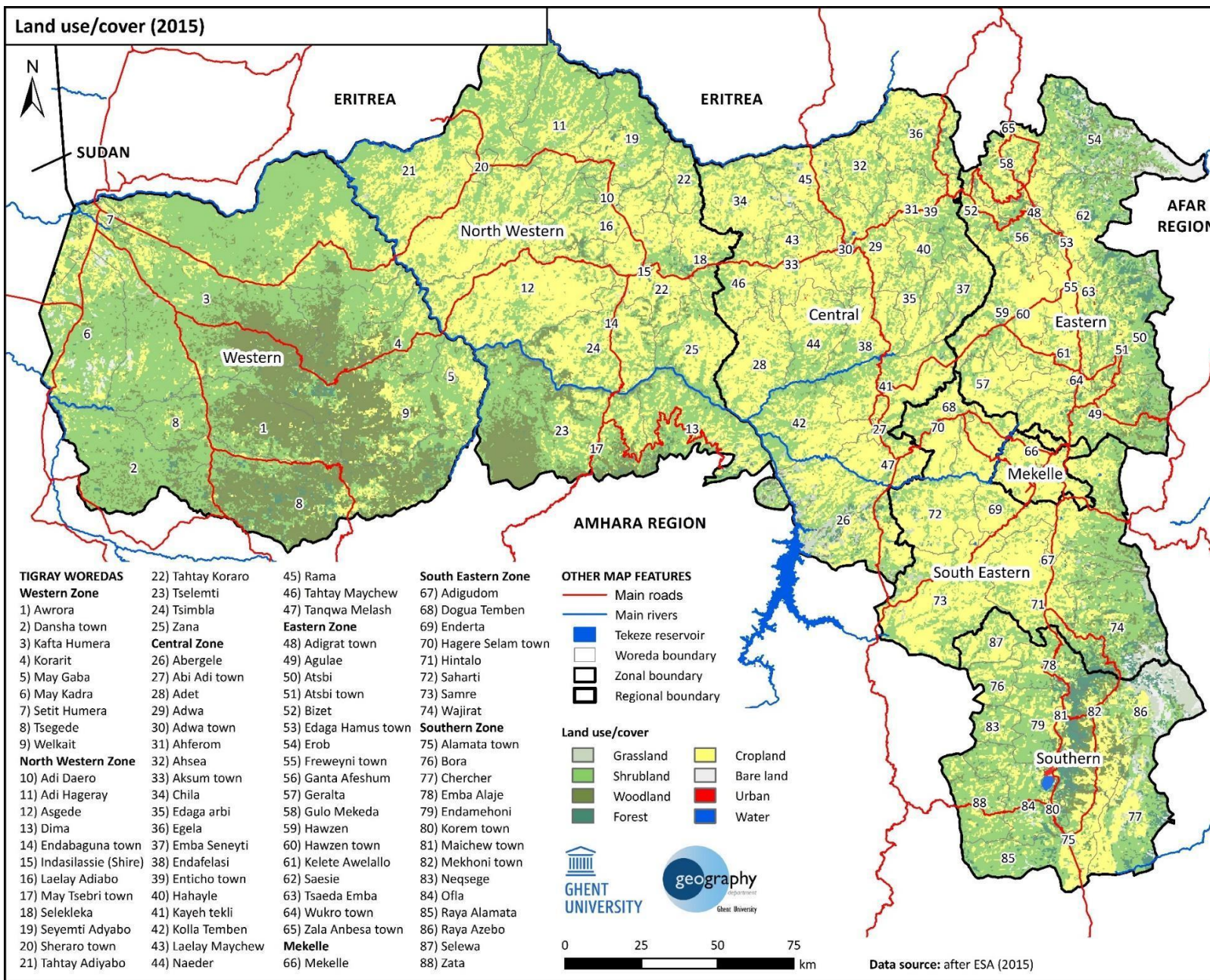
Open woodland of small shrub and tree species has regenerated during the past decades in exclosures⁶⁵, and semi-natural forest vegetation remains largely restricted to small, isolated patches holding different afroalpine forest types⁶⁶. Afroalpine vegetation occurs on the highest peaks in the Tsibet and Mugulat massifs⁶⁷ (Nos. 56 and 78 on the map).

Unlike the openfields of the Tigray plateau, woody vegetation still is a dominant feature along the eastern escarpment towards the Rift Valley, probably due to the marginal character and less favourable crop farming conditions⁶⁸. Along the escarpment, a clear environmental gradient with respect to humidity and temperature exists. Due to humans using the land, however, the vegetation shifted from true moist coniferous montane (climax) forests to semi-natural dry montane forests dominated by *Juniperus procera* and *Olea europea spp. africana* above 2200 metres such as in the Hugumburda (No. 50) and Des'a forests⁶⁹⁻⁷¹ (No. 80).

Western Tigray is less populated and still comprises large woodland savannah and forested areas. On the level but dissected Quaternary alluvial fan of the Tekeze River²⁸, large-scale commercial farming of sesame has been developed over the last decades⁷², crossing over into the Amhara Region and Sudan as well, and prompting large-scale seasonal labour migration as well as some spontaneous resettlement.

Especially since the 1990s, hard work has been undertaken to conserve soil and water throughout the Tigray region. This is testimony of the resilience of the Tigray people and land, and it visibly boosted soil water availability, hence also vegetation, and agriculture⁷³.

Irrigation agriculture is practised at local scale in many places, such as in the Raya graben⁷⁴, along the Tekeze river⁵⁸, downstream from numerous small reservoirs⁷⁵, and at any place where natural springs are present⁷⁶ – the discharge of which has often improved over the years as a result of the soil and water conservation activities⁷⁷.



Map 9

Land use/cover classification, as generalised from the ESA land cover classification.

Data source:

ESA (2015)

3.7. Mineral resources: gold and base metals

In Tigray, artisanal mining of gold in the low-lying areas with outcropping Precambrian rocks is one of the major off-farm income sources⁷⁸. The 17th C. Portuguese traveller Barradas had already mentioned gold production in Tembien⁷⁹. Rural youth seasonally migrate to inhospitable lowlands and gorges such as the largely uninhabited Wer'i river valley, to search for placer gold, washed out from weathered gold-containing quartz veins within the meta-sediments and meta-volcanics⁷⁹. In recent decades, large scale gold exploration and mining of gold deposits has been carried out in various parts of Tigray by local (such as the Ezana Mining Development P.L.C.)⁸⁰ and several foreign exploration companies particularly from Canada. It has also been suggested that one of the reasons for the Canadian government being very late in officially addressing the atrocities in the ongoing Tigray war, might be related to the country's mining interests in Tigray^{81,82}.

3.7.1 Gold and other metallic mineral occurrences

Notwithstanding the legendary story of Queen Sheba's gold in the ancient times, the first recorded mention of gold production in Tigray came from the 17th C. Portuguese traveller Barradas⁷⁹. The first compilation of the mineral resources (including gold) of Ethiopia has been done by Danilo Jelenc in the 1960s⁸³. Solomon Tadesse, et al. ⁸⁴ did a more comprehensive compilation of the mineral occurrences of Ethiopia, i.e., indications of mineralisation containing gold and other metallic minerals such as base metals - copper, zinc, lead, etc., producing a quantitative and spatially relevant gold and other metallic mineral occurrences map of Ethiopia. This compilation on mineral occurrences holds a very comprehensive record of the known metallic mineral occurrences (including gold) in Ethiopia, and the Tigray region is very well covered in it. Their maps show the locations of these occurrences and the detailed information is given in extensive tables.

These occurrences closely correspond to the spatial extent of the Precambrian basement rocks in Tigray. Most metallic occurrences are in Northwestern and Central Tigray, with some minor occurrences in eastern and southwestern Tigray, where most of the basement rocks are exposed. For lay people: think about the low-lying, rolling hills exposed along the lower Giba, Wer'i and Mereb Rivers, in lower Tembien, Abergele, Hawzen – Nebelet – Mai Kinetel – Edaga Arbi, and the localities north and west of Shire (such as Adiyabo), as well as in the deep gorges of Irob in eastern Tigray. In Western Tigray, there is little exposure of the basement except close to the Tekeze River banks.

3.7.2 Gold exploration and mining concessions

In Tigray, artisanal mining of placer gold occurs particularly in the lowlands of Western, Northwestern and Central Tigray where the metallic mineral rich Precambrian basement rocks are widely exposed^{78,85}. A joint trade chain of gold and incense (*Boswellia papyrifera*), even myrrh (*Commiphora myrrha*) from Tigray towards the Mediterranean around the turn of the common era has been reported, allowing to give credit to the biblical story of the three Kings who supposedly travelled from Tigray to the Holy Land, bringing gold, incense and myrrh in honour of the birth of Jesus^{86,87}. Over the more recent centuries, Tigray's rural youth have migrated in the off-season to lowlands and gorges such as the largely uninhabited Wer'i river valley, to search for placer gold, washed out from the weathered gold-containing quartz veins within the meta-sediments and meta-volcanics⁷⁹. Apart from artisanal mining of these placer gold deposits which have been exploited for generations, there has only been one active primary gold mine in Tigray: the Meli gold mine run by the Ezana Mining Development P.L.C. based in Tigray^{88,89}, in joint venture with a Canadian company (Sun Peak Metals Corp.), which has also other active exploration licenses in Northwestern Tigray⁸⁰.

The Ethiopian Mining Cadastre Map currently developed by the Ministry of Mines and Petroleum of Ethiopia⁹⁰ allows locating the currently active mineral exploration licenses, as well as applications for mineral exploration in Ethiopia including in Tigray. This cadastre map project at the Ministry of Mines is a work in progress and it was anticipated to be updated regularly. Most mineral exploration companies apply to explore gold and base metals at the same time as the mineral deposits containing these metals occur in close association in many cases within the Precambrian basement rocks. Map 10 shows the areas for which there are exploration licenses for gold; gold and base metals; copper, gold and base metals; base metals; and precious metals. All these licenses look for gold or other precious metals.

Among the numerous exploration concessions, the mining cadastre⁹⁰ indicates a large concession spanning the Tekeze river in the Northwestern Zone of Tigray, for which an exploration license would be held by the Chinese Donia Mining P.L.C.; however, according to most recent information⁹¹, the exploration concession was given to the U.S. company Newmont Exploration Pty Ltd. at a later date – area indicated in yellow on Map 10. The largest exploration license areas are concessions of Canadian companies, followed by the U.S. and the United Kingdom (Map 10).

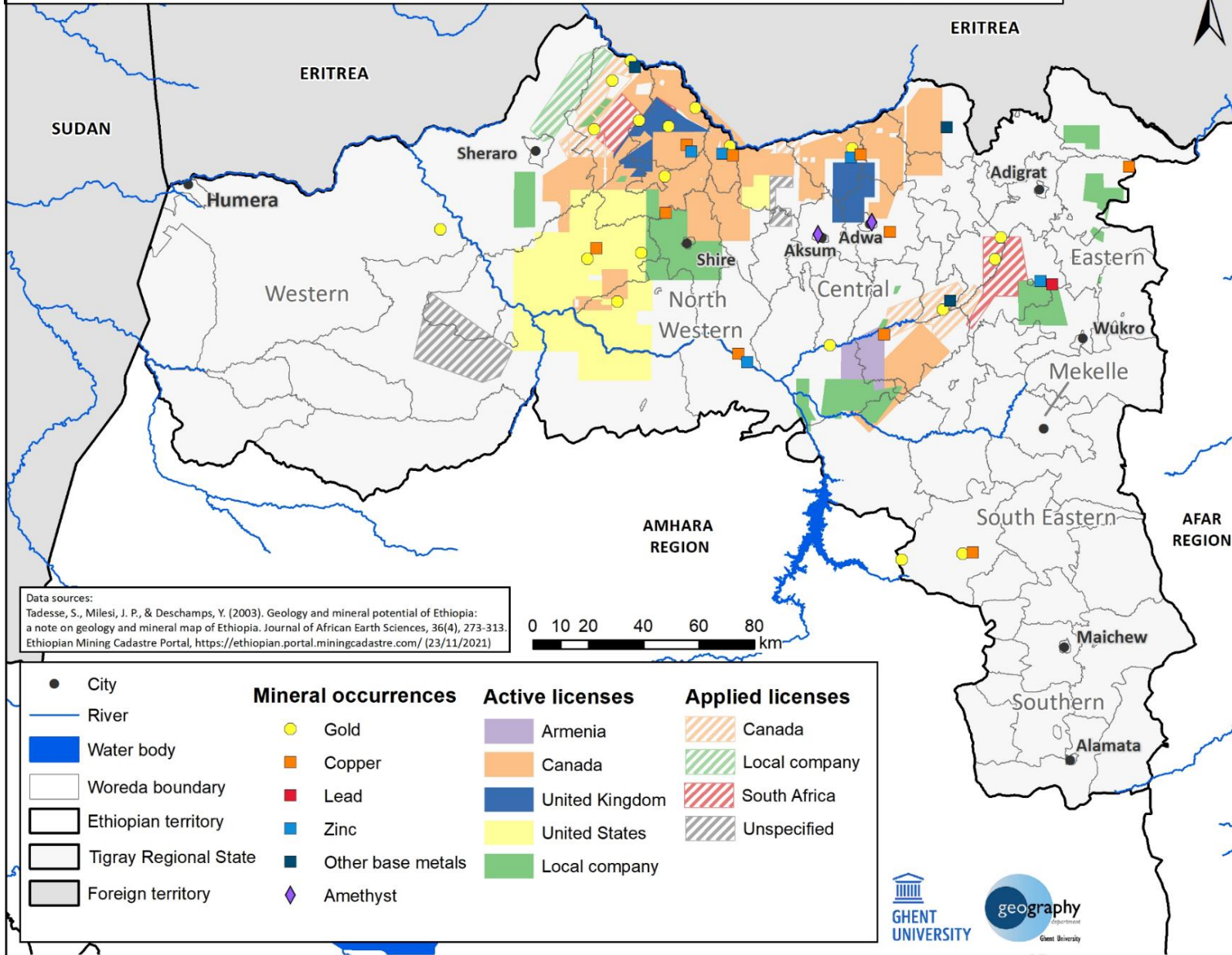
3.7.3 Gold and the Tigray war

We assume that in the ongoing Tigray war, the mineral resources (particularly gold) potential of Tigray has been an afterthought for the Ethiopian government and its allies rather than a cause of conflict – by November 2020 such insight which requires a serious geological and economic analysis has not been part of the mainstream discussion in the Ethiopian political corridors. Rather, the dominant narrative in these circles has been that Tigray is barren and economically worthless.

On the other hand, it has been suggested that one of the reasons for the Canadian government being very late in officially addressing the atrocities in the ongoing

Tigray war, might be related to the country's mining interests in Tigray^{81,82}. Yet, the perspective from the mining companies (such as the Canadian companies) is that there is a huge unexplored mineral frontier in Tigray and they do not want to lose the mineral exploration rights they have already secured in this part of the world. It is safe to assume that the Canadian companies want this conflict to be resolved in such a way that their exploration (and eventually mining) rights are secured.

Active and Applied Mineral Exploration and/or Mining Licenses of Foreign Companies in the Tigray Regional State



Map 10

Gold and base metal potential; exploration concessions of foreign companies in Tigray.

Data sources:

Mineral potential: Solomon Tadesse et al. (2003); mineral exploration: Altai Resources (2019); Ministry of Mines and Petroleum of Ethiopia (2019)

4. Information on the war and civilian victims

4.1. Conflict incidents and territorial control by different parties involved in the conflict

After eleven months of warfare and the unilateral declaration of ceasefire, the Tigray Region is mostly under ‘territorial control’ by the TDF, and Amhara/ENDF/Eritrean forces in the Western Zone. The situation is dynamic as fighting continues (see Map 11 for conflict incidents); the map represents the approximate situation on the ground as of the end of August 2021.

For this overview, we have extracted geographical information from the dynamic maps on territorial control by MapEthiopia⁹² (status on 26 December 2021) and have combined this with information obtained from key informants and media reports.

The main difference between our map and the situation presented by MapEthiopia is that next to the presence of ENDF, ‘ADF’ and TDF, we also include the presence of the Eritrean army. Whereas MapEthiopia frequently mentions the involvement of Eritreans in Tigray, they do not map the area controlled by them.

As compared to the earlier territorial control maps (still to be consulted in the [Web Application](#)), we observe the following evolutions:

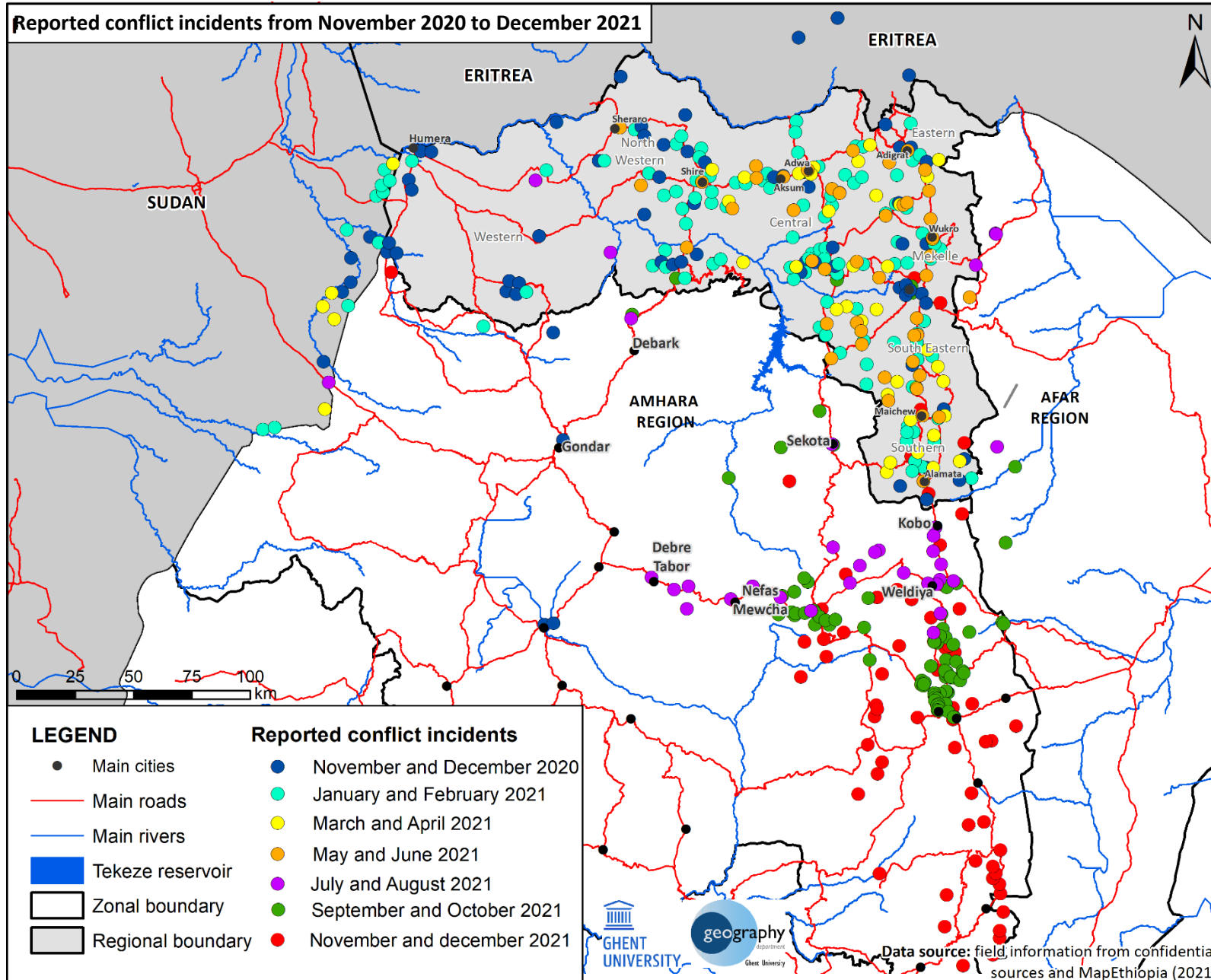
- The TDF has recaptured and reclaimed a lot of territory (in blue), after launching a major offensive in the second half of June (‘Operation Alula’). It is again in control of major towns such as the regional capital Mekelle, Shire, Axum, Adigrat, Adwa... and of the rural areas in

between. It also controls major access roads and the Tekeze Hydropower Dam.

- The ENDF has largely retreated its troops and remains present only in Western Tigray, alongside the Amhara militia, who have informally annexed that part of the Tigray region (in light yellow).
- The area under control by the EDF (in dark brown) has strongly declined and is now restricted to areas along the Ethiopian-Eritrean border. In addition to this, there is a heavy presence of Eritrean soldiers along the Ethio-Sudanese border and the Tekeze river in Tigray, which would prevent a humanitarian corridor from establishing.
- After a push south by TDF in August-November 2021 (see Map 11) and subsequent retreat (December 2021), frontlines tend to stabilise⁹³ on the same position as on 31 July 2021 (Map 12).

Over recent months, the conflict incidents are strongly linked to this southbound push by the TDF, as a lot of incidents are reported in the Amhara region close to and within the territory that was controlled by the TDF.

Most recent conflict incidents include drone bombings on Alamata, Chercher, Korem, Mones and Mekelle by the end of December 2021, with dozens of civilian victims.

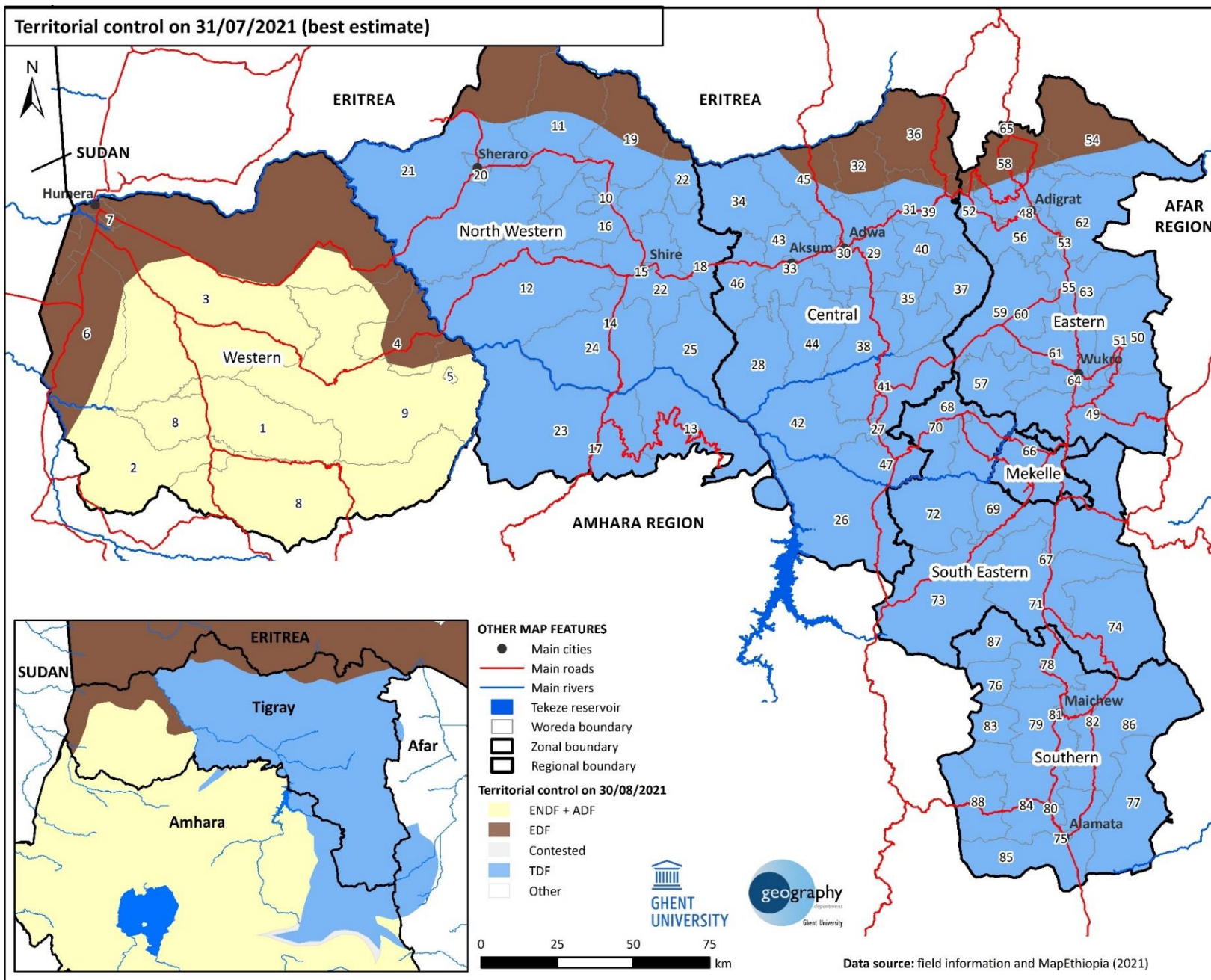


Map 11

Reported conflict incidents in the first fourteen months of the Tigray War, including battles, ambushes, air strikes, drone attacks and shelling (reported up to 21 December 2021).

Data source:

Field information from confidential sources and MapEthiopia (2021) (the map may not be fully comprehensive)



Map 12

Approximate territorial control by 31 July and 27 December 2021; inset map shows the situation on 31 August 2021.

Data source:

MapEthiopia (2021) in combination with information from key informants

4.2. Fully documented casualties

Whereas Ethiopian Prime Minister Abiy Ahmed in his “victory speech” for the federal parliament on 30 November 2020 claimed that not a single civilian had been killed⁹⁴, many names of civilians who lost their lives as a result of warfare have surfaced. The communication blackout and lockdown of the region make it very hard to get verified information, so the actual number of deaths is likely much higher than the sample that we have collected so far (also see section 4.3).

Through Tim Vanden Bempt ([@tvbempt](https://twitter.com/tvbempt) on Twitter), we have collected a list of verified identities of civilian victims in the Tigray war. This list⁹⁵ is populated from a mix of sources, ranging from social media posts, media reports, advocacy groups listings (for instance Irob Advocacy⁹⁶) and direct reports (as posted for instance on www.tghat.com⁹⁷). The social media posts are mostly from family members and friends who mourn the death of their loved ones, which they learnt about by telephone. For each victim, through our network, we have tried to contact one relative or friend to learn more about the circumstances in which the victim died. For this verification, some families also have provided a photo of the deceased person.

It is noted, however, that there are many families who, for various reasons, do not report the loss of relatives, which limits our sample of fully documented casualties. Additionally, there may be casualties in very remote areas and/or victims may not be locals of the area, which makes it difficult to fully document these deaths. Several reported casualties and massacres hence may not be well represented in our fully documented casualties list. Examples are the Hitsats (west of Shire), Debre Abbay (SSW of Shire), and Axum massacres.

Given this limitation, we represent the spatial distribution of fully documented civilian casualties in the form of a heatmap (instead of in absolute numbers), in which the varying colors visualize the intensity or magnitude and geographical distribution of casualties (Map 13). While no numbers exist for the total amount of civilian casualties, well-documented cases of **3240 deaths** (by 16 November) indicate that 8% of the dead are women, and **92% are men** (Fig. 4.1). This is in line with an often stated intention to “eradicate Tigray fighters, as well as the future generation of fighters”. Among the men, there are priests and deacons, traditionally people with authority in the community.

Casualties are dominantly victims of massacres, killing sprees, point-blank executions, in house searches, rounding up of civilians, or after arrest (including journalist Dawit Kebede) (classified under ‘Execution’ in Fig. 4.1).

Though impressive in video footage, only 1% of the known victims was killed during shelling and airstrikes, such as the one targeting the Togoga market (Southeastern Zone) on 22 June⁹⁸. People who died of hunger or due to the total collapse of the healthcare system are generally not reported, and make up less than 1% of the fully documented victims. However, the number of people who died of hunger was expected to be in the thousands already by early July, as 353,000 people were reported to experience famine conditions in early June⁹⁹, a number that was updated to 400,000 in early July¹⁰⁰. Two out of 10,000 of these people are expected to die of hunger every day, due to man-made famine conditions in the region¹⁰¹. (See further discussion, and upgrade in section 6.1). In addition to this, 66% of the fully documented victims was killed by violence that has

not been further detailed - most of the victims can be allocated to massacres or executions, although some of them also may have died in crossfire. In case of the latter, the perpetrator is indicated as 'not provided'. For female victims, deaths caused by sexual violence also may not be well represented in the list. As of June 2021, the victims of sexual violence that have been reported, were all women.

Perpetrators of the killings comprised Amhara militia (3.7%), Eritrean soldiers (44%), Ethiopian soldiers (19%) and an additional 17% that can be attributed either to Ethiopian or Eritrean soldiers (plus 1% by either

Ethiopian or Amhara soldiers), as they jointly carried out the killings. Killings by TDF are less than 1%. In 12% of the cases, the affiliation of the perpetrator is unknown. The fully documented casualties list does for instance comprise few victims that can be attributed to the TDF or allied forces. In contrast, these victims may be part of the 'reported casualties' list (section 4.3), which is often without known perpetrator for each reported casualty due to the limited data availability. However, the number of victims that can be attributed to the TDF or allied forces is expected to be relatively low.

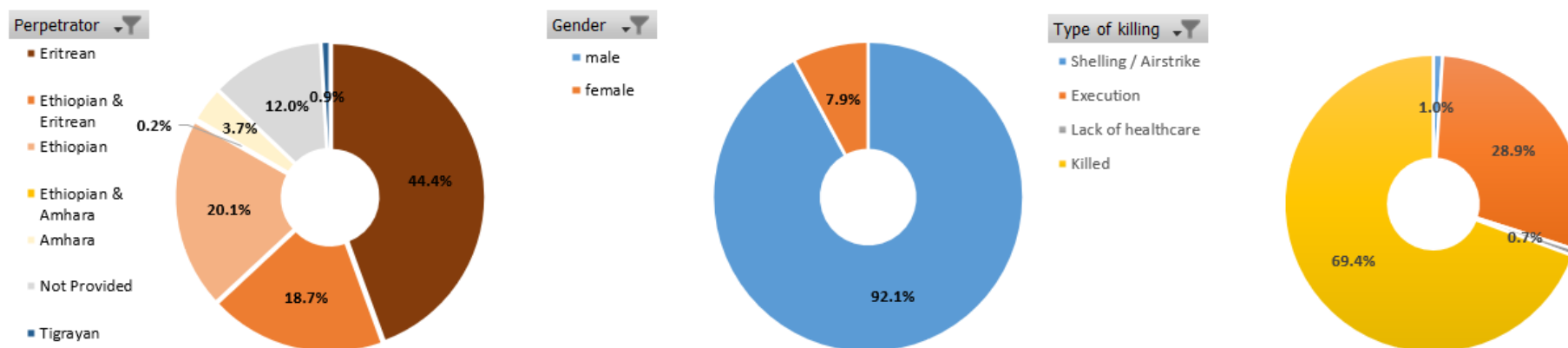


Fig. 4.1 Graphic representation of fully documented civilian casualties, by the end of November 2021

Among the victims, nearly all age groups are represented (Fig. 4.2), although there are deviations from the population pyramid. In our sample, fortunately, only 9% of the victims was under the age of 20 years, whereas this age group comprises approximately 50% of the Ethiopian population. Children are not frequently targeted, whereas many youngsters may have fled to safer areas in fear of reprisals (and their whereabouts are unknown) or may have joined the TDF fighters and hence cannot be considered civilian victims in case they die. The most frequently targeted age group is the group between 20 and 29 years old (23%), followed by the group between 30 and 39 years old (20%).

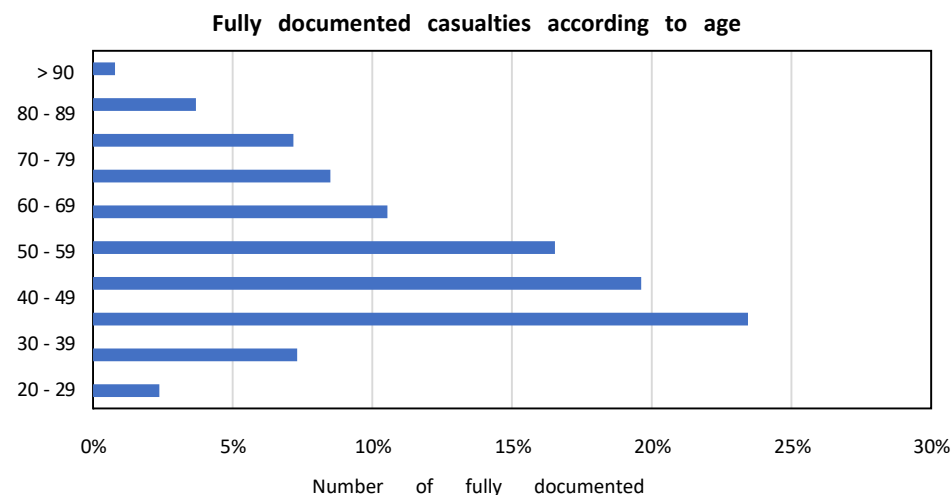
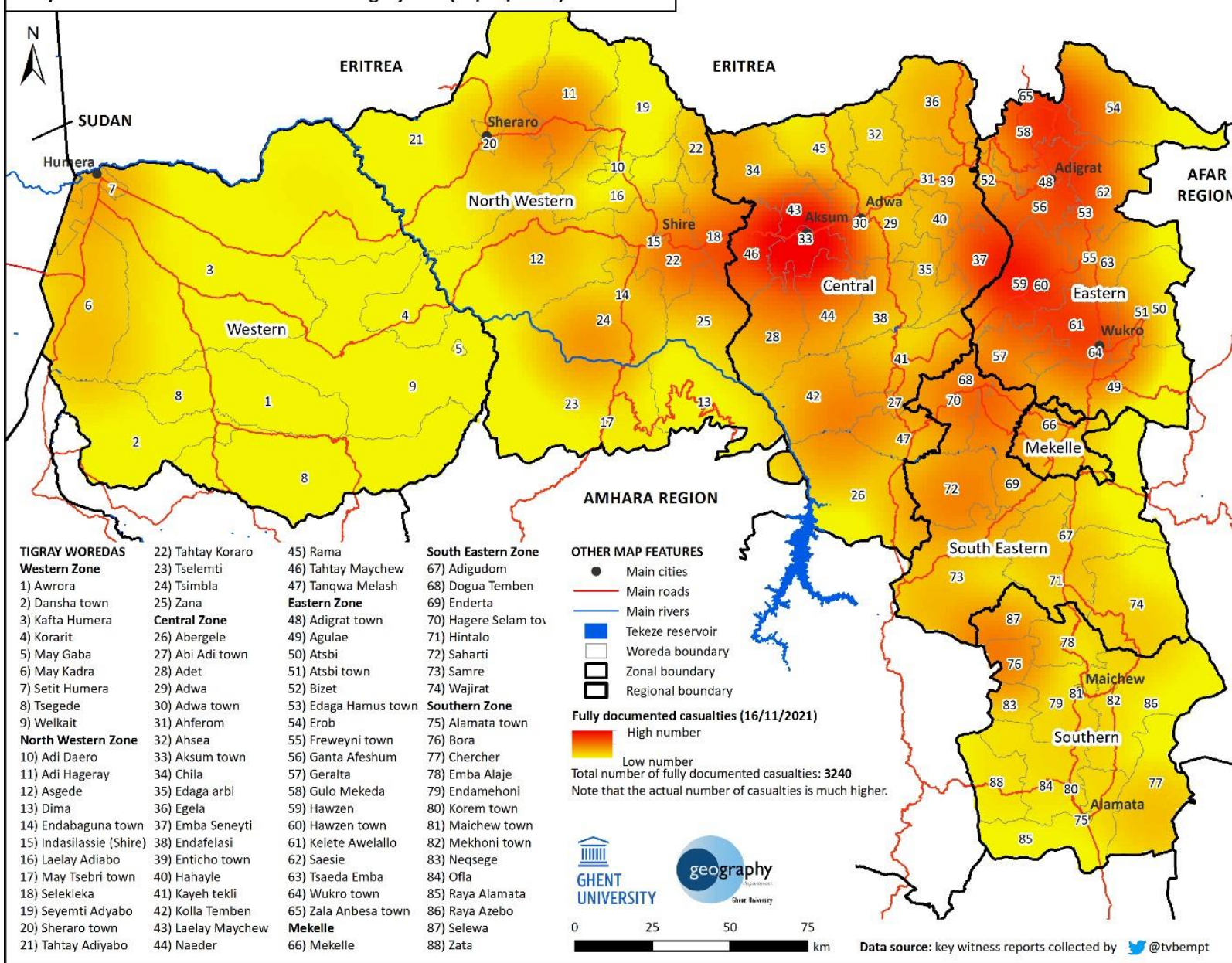


Fig. 4.2 Age distribution of the fully documented casualties, by the end of November 2021

In addition to the 3240 fully documented civilian casualties, at least **23 humanitarian aid workers** also have been killed in the Tigray conflict. Among the 23 victims are three employees of Médecins Sans Frontières (MSF), who were killed in late June¹⁰², and 11 staff of the Relief Society of Tigray¹⁰³, highlighting the difficult and dangerous working conditions for humanitarians.

Fully documented civilian casualties in Tigray war (16/11/2021)



Map 13

Heatmap of the fully documented civilian casualties in the Tigray War on 16 November 2021

Data source:

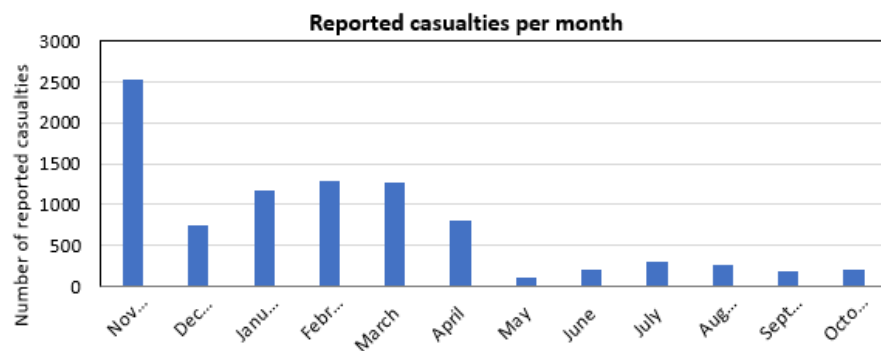
Verified social media posts, media reports, advocacy groups listings and direct reports

4.3. Reported casualties and massacres

In addition to the map on ‘fully documented civilian casualties’, Map 14 presents the **reported civilian victims** (a total ranging between **9124 and 11516**), as derived from **886** (social) media reports, reports of different NGOs and humanitarian actors and press releases. The number of casualties is most likely an extreme underrepresentation. As compared to the September edition of this work, the numbers appear a bit lower, because significant cross-checking was done, starvation cases removed, killing sprees over several consecutive days considered as one ‘event’. A few duplicates were also removed.

The main difference with the previous heatmap (Map 13) is that the names of the victims and the exact circumstances in which the civilians were killed, are mostly unknown yet or are not fully documented. The perpetrators also have not been reported for many of these cases. Based on the established database, a list of **283 massacres** was compiled. Their location is visible on the online database for civilian casualties:

<http://www.ethiopatigraywar.com/incidents.php>



For this purpose, a ‘massacre’ has been defined as ‘a conflict incident in which at least 5 civilians were killed on the same day at the same location’ – a definition that comes from historical studies of massacres, including those committed during the Armenian genocide^{104,105}. The documented massacres of the Tigray war are represented on Map 15, and contrasted to the few sites investigated by EHRC and UNHRC¹⁰⁶.

An important remark is also that these maps of civilian victims do not include deaths by starvation or lack of medical care. At this stage, this is still a totally under-documented aspect of the war.

In **ANNEX A**, as well as in Fig. 4.3, information on the timing of the reported killings can be found. As information often only becomes available some weeks or even months after the occurrence of a conflict incident, the presented number of casualties is not final and will be updated retroactively.



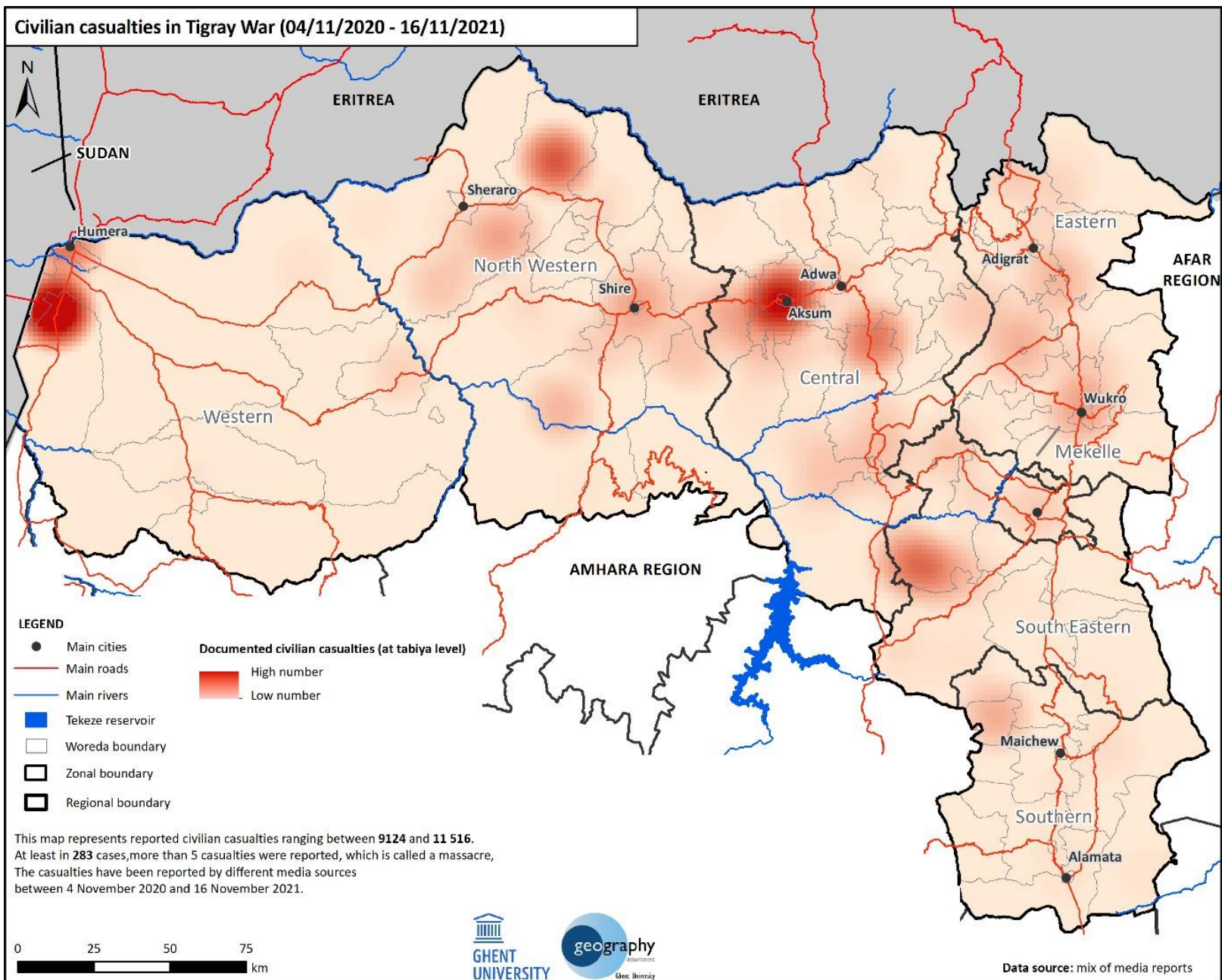
Fig. 4.3 Number of reported casualties (left) and massacres (right) between November 2020 and October 2021

4.4 Our findings contrasted to those of the EHRC – OHCHR joint investigation

A joint investigation on massacres in the Tigray war has been set up by the Ethiopian Human Rights Commission (EHRC) and the Office of the United Nations High Commissioner for Human Rights (OHCHR). The Joint Investigation Team (JIT) presented its [findings](#) on 3 November 2021. In a preliminary analysis of this report in [Bistandsaktuel](#) (see: [English translation](#)), we particularly noted that by then, we had mapped allegations of 260 massacres committed during the Tigray War. Many of which also have been thoroughly documented by the international press. It is then startling that the team behind this investigation has only visited nine of the places where massacres allegedly took place. The widespread massacre in Tigray's

holy city of [Aksum](#) (around 800 people killed by Eritrean soldiers) – which has been [thoroughly documented by a number of media](#) and independent sources – was not investigated on the spot. Other major massacres have also not been investigated by the team, such as the well-documented massacres in [Mahbere Dego \(73 killed\)](#), [Togogwa](#) (64 killed in airstrikes) and [Debre Abbay](#) (200 killed). Common to the last three is that Ethiopian forces are claimed to be behind it.

Map 15 contrasts the places the JIT has visited to localities where massacres have been reported.

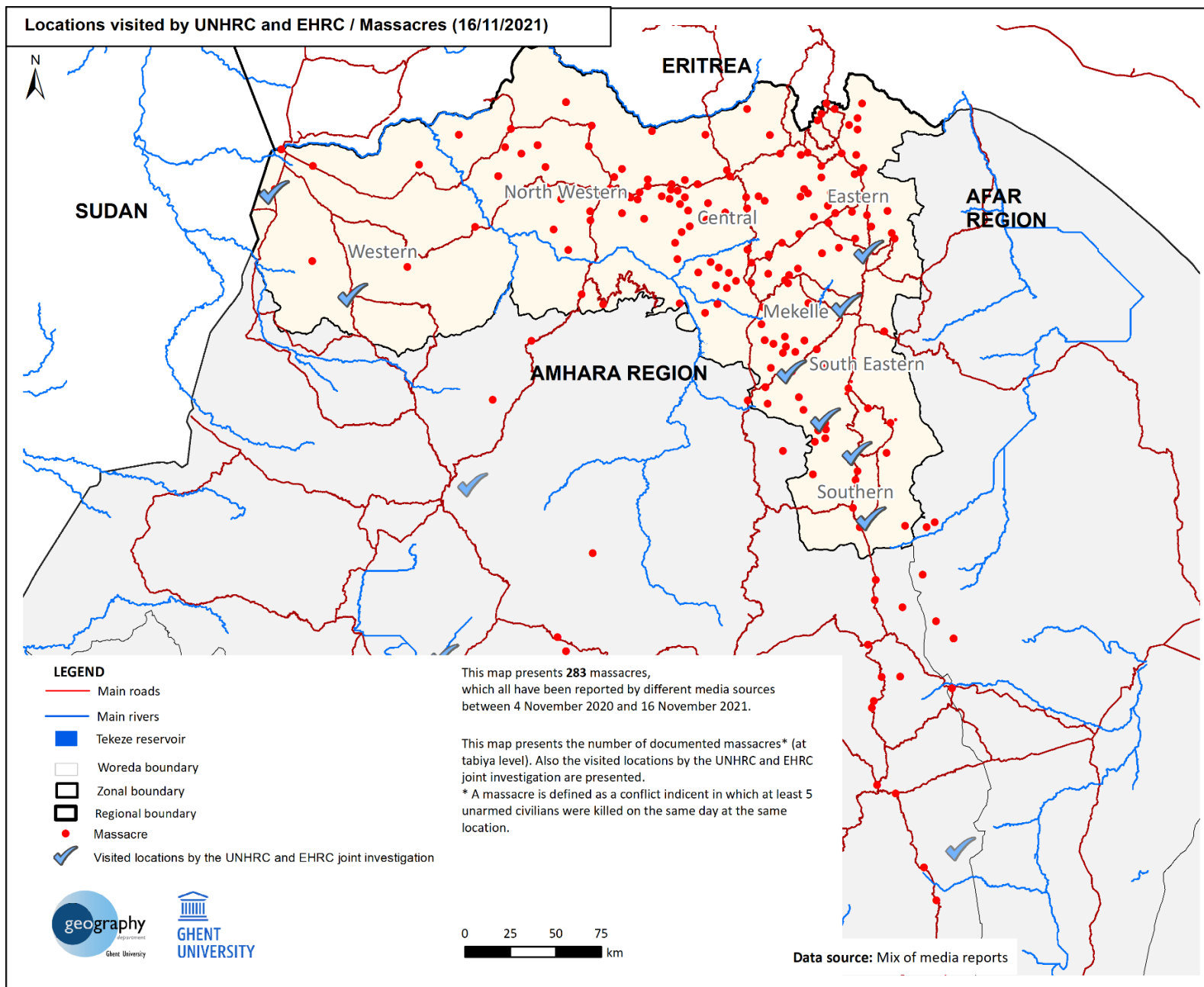


Map 14

Heatmap of civilian casualties in the Tigray War up to 16 November 2021.

Data source:

Social media posts, media reports, advocacy groups listings and direct reports



Map 15

Occurrence of massacres in the Tigray War up to 16 November 2021, with sites visited by the joint EHRC-UNHRC investigation.

Data source:

Social media posts, media reports, advocacy groups listings and direct reports

4.5 Contrasting place and time of massacres and conflict incidents

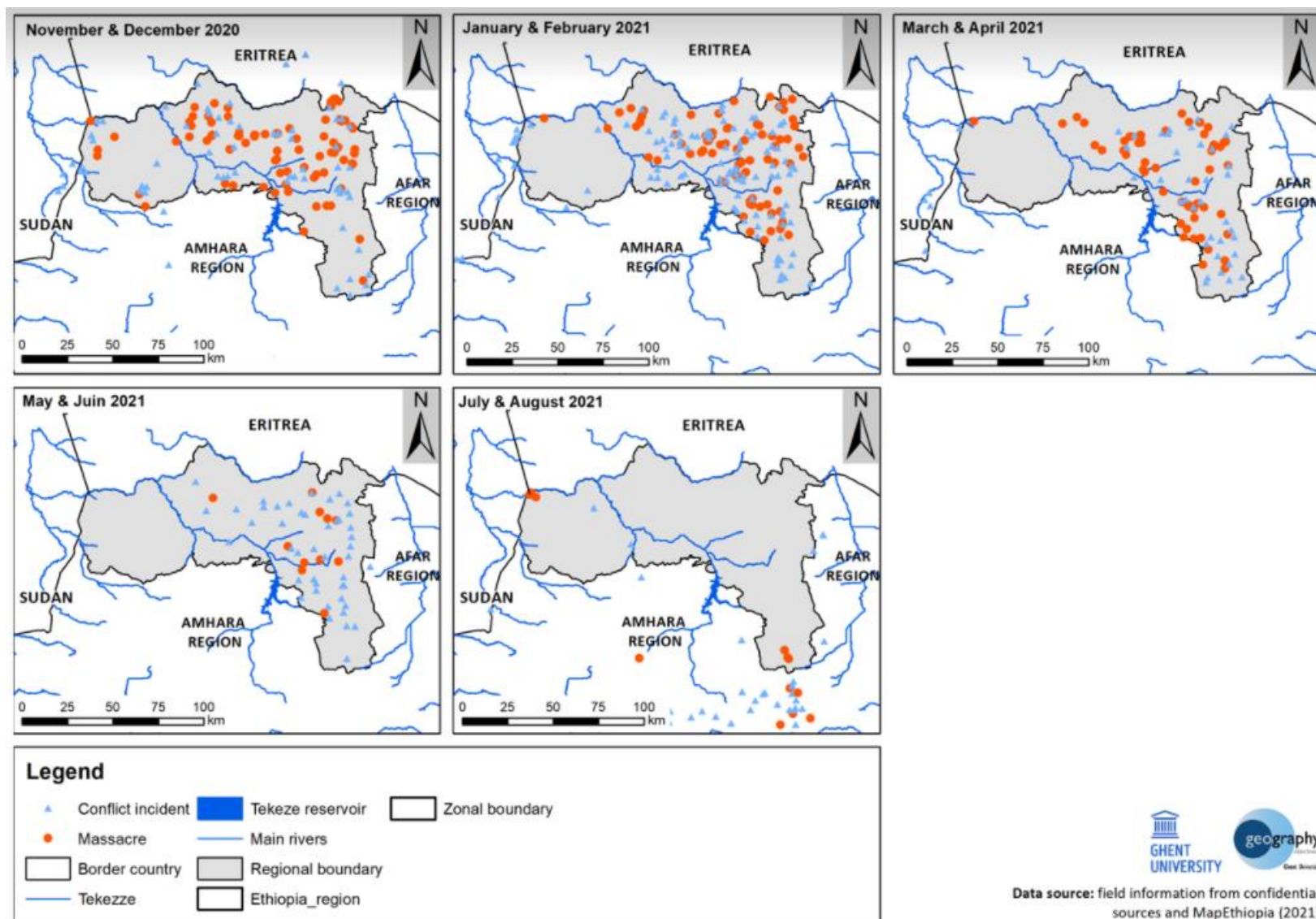
In the first twelve months of the Tigray War, many conflict incidents have been reported. These include battles, ambushes, air strikes, drone attacks and shelling. Map 16 contrasts the locations where conflict incidents were reported (based on confidential sources & MapEthiopia) with the locations where massacres occurred, using a two-months time step. A drawback in our data collection is that, despite the prevalence of peace in most of Tigray since July 2021, no further information on earlier massacres could emerge due to the internal and external blockade of communication lines.

In the first six months of the war, the spatial distribution of massacres fits quite well with that of conflict incidents.

The decrease in the number of massacres starting from May-June is noticeable. It might be an artefact in the sense that communication lines in the central part of Tigray had been shut down again in May. Also, in these months, many fights were also more “distant” with shelling and airstrikes instead of direct combats. The fights were larger, with faster movements of the different armed forces. This could explain an underrepresentation of the number of massacres. Possibly, also, ENDF and EDF soldiers feeling defeat coming, might have been afraid of still involving in massacres, with a risk of being recognized after capture as prisoners of war.

Throughout the one year of Tigray war, Western Tigray, and particularly Humera remained a hotspot of massacres, unrelated to conflict incidents. Here, numerous killings of Tigrayans took place, as part of an intense ethnic cleansing campaign.

From July onwards, the armed conflict moved south, towards the Amhara Region (and potentially to Addis Ababa and Gondar), and southeast towards the Afar Region, potentially towards the Ethiopia-Djibouti road. The collection of information about fighting and massacres in the Amhara and Afar Regions is complicated, because primary sources here are almost exclusively activists and government aligned media, such as ESAT and AMMA. More than two-thirds of the reports on shelling and massacres by TDF in the Amhara Region come from these media channels. Another source are Tigray-aligned media, especially when it comes to shelling of civilian areas in the Amhara Region by the ENDF. All this renders the verification of information on civilian casualties more complex, starting from August. For this period, we hardly have any reports coming from civilians mourning their direct relatives.



Map 16:

Occurrence of massacres & conflict incidents in the Tigray and Amhara Regions in Ethiopia. Source of conflict incidents: Field information from confidential sources and MapEthiopia (2021).

5. Humanitarian situation, access and needs

5.1. Restricted humanitarian access

Though the outer borders of Tigray remain closed, the humanitarian access *within* Tigray has strongly improved since July as aid convoys and medical teams can now reach out to the larger part of Tigray¹⁰⁷.

From November 2020 to June 2021, accessibility was largely impeded. For instance, the UN OCHA Tigray region humanitarian update of 30 March 2021 stated:¹⁰⁸ “The ongoing hostilities, with clashes and ambushes reported in most parts of the region, not only impact safety and wellbeing of millions of civilians but also constrain humanitarian actors’ ability to operate and support people affected. In parts of Southern and South Eastern Tigray, for example, access has been curtailed for over a month and the road from Alamata to Mekelle remains closed, blocking humanitarian operations in the area [...]

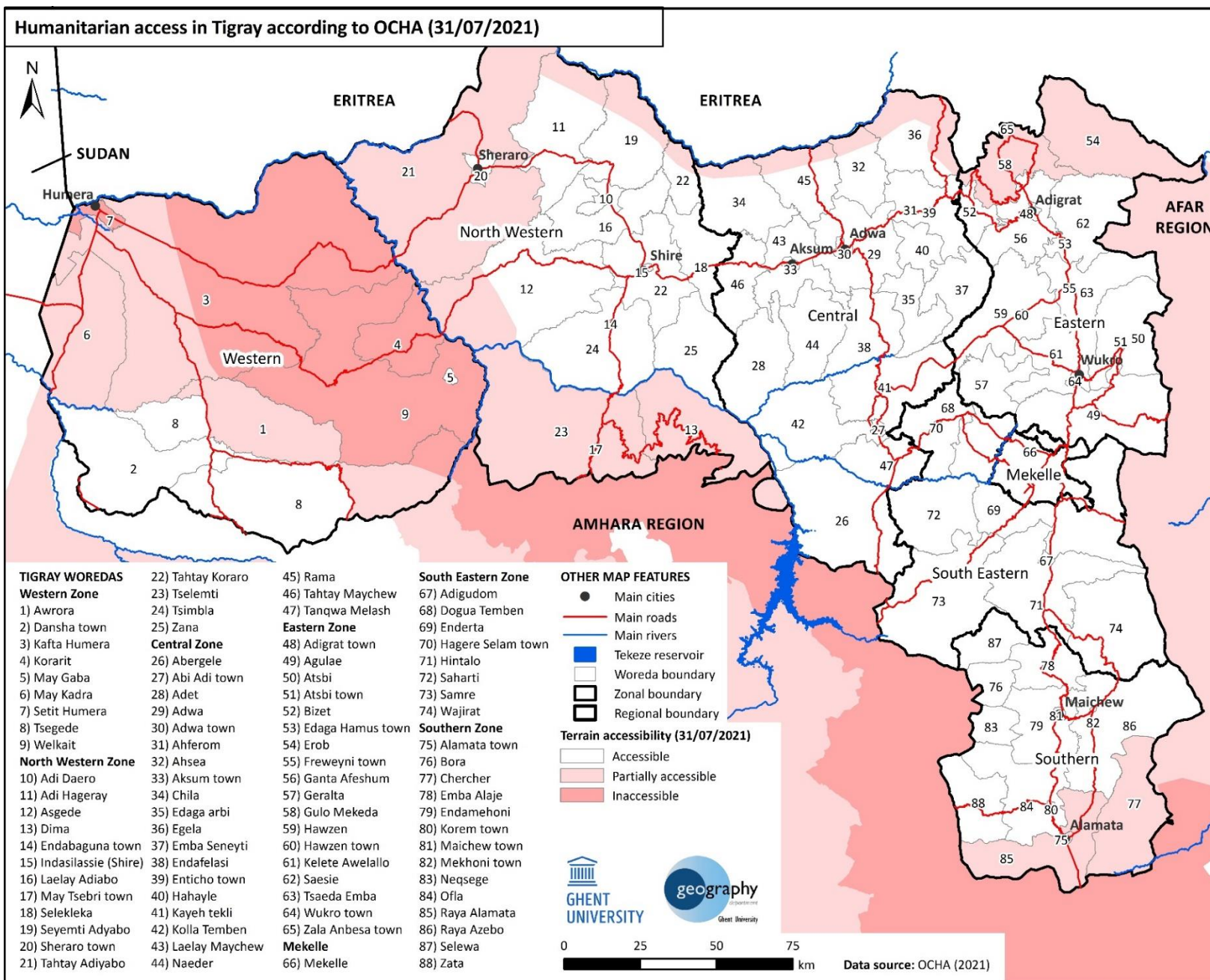
Overall, with the deteriorating situation and continued disruption of basic services, the UN and humanitarian partners are in a race against time to

respond to the rapidly rising needs. More funding is urgently needed to make sure aid organisations can assist every single person impacted by the conflict.”

As many people have moved out of towns to rural areas for safety reasons (see Section 5.3 on Internally Displaced People), it remains very challenging to reach most people who are in urgent need of humanitarian aid (food aid as well as medical supplies and health care services).

As stated, this situation has strongly improved, and the main challenge is to bring in the necessary aid (estimated at 100 lorries or cargo flights per day) into Tigray.

More recent versions of OCHA’s accessibility map indicate that access to the “inner Tigray” has become increasingly difficult for sake of lack of fuel.



Map 17

Restricted humanitarian access due to the ongoing conflict (31/07/2021). The situation was unchanged by 31 August 2021, with the notable exception that the northern and western parts of Tahtay Adiyabo (No. 21) had become inaccessible.

Data source:

OCHA (2021c)

5.2. Humanitarian needs

At the end of February 2021, 4.5 million Tigrayans were reported to be in urgent need of humanitarian assistance¹⁰⁹; a figure that was updated to 5.2 million people around mid-May¹¹⁰. The latter corresponds to more than 85% of the total population of Tigray.

On 27 May, the UN humanitarian chief Mark Lowcock warned that the humanitarian situation in Tigray is worsening and that “there is a serious risk of famine if assistance is not scaled up in the next two months”¹¹¹. In addition to this clear message, Lowcock also stated that “it is clear that people living in the Tigray region are now facing significantly heightening food insecurity as a result of conflict, and that conflict parties are restricting access to food”.

Indeed, in order to reach all people in need, full and safe access to all parts of the region is of utmost importance. Considering the terrain accessibility (Map 3), the pre-war population figures at *woreda* level and the number of internally displaced people (see section 5.3 and Map 18), we estimate that in early June 2021, only **32%** of the Tigrayan population was living in areas that were fully **accessible** to humanitarian organisations (i.e. the towns and surroundings of Shire, Aksum, Adwa, Adigrat, Wukro, Mekelle and Alamata). Of this 32%, nearly half of the people originates from other areas, and hence are fully dependent on aid. This also left 68% of the population in partially accessible and hard-to-reach areas.

Given the high level of food insecurity in the region¹¹², the earlier looting and destruction of public and private properties¹¹³, unpaid salaries since

June 2021 and blocked bank accounts¹¹⁴, a widespread aid approach (“blanket approach”) is necessary in the first place; after which fine-tuning can be done.

Our own earlier observations on food aid in Tigray¹¹⁵, show that it is crucial that aid is distributed in one or two locations in each *tabiya*; which is challenging as there are more than 700 *tabiyas* in the region. Under pre-war conditions, when the Regional Government and the Relief Society of Tigray were mainly managing food distributions, it was not allowed to load food onto motorised vehicles in order to decrease the risk of selling the supplied goods to merchants, either by the beneficiaries or the officers responsible for distribution. Rural people hence typically came with their donkeys to the distribution centres, after which they carried the aid to their homesteads.

A big additional problem for food distribution in the region, is that in most places grinding mills do not work due to lack of electricity or fuel¹¹⁶. Some of the humanitarian organisations (e.g. Tesfay) therefore had decided to distribute flour rather than grain¹¹⁷.

In addition to food, many people also are in urgent need of non-food items. The specific needs for children¹¹⁸, water, sanitation and medical aid are not (yet) mapped, however, and neither are the immense needs for curing the victims of rape and other gender-based violence¹¹⁹.

5.3. Internally Displaced People and refugees

5.3.1. Situation up until August 2021

After ten months of warfare, 1,850,000 Tigrayans have been internally displaced by the end of August 2021 (Map 18) and tens of thousands of Tigrayans have fled to neighbouring Sudan by crossing the Tekeze River (see data layer in the [Web Application](#) – presenting > 48,000 refugees). This amount has decreased with 100,000 between June and August 2021. The main reasons for the migration flows were safety issues – with active hostilities in nearly all Zones (Map 11)¹²⁰, the random killing of civilians and frequently occurring massacres (Map 15), the destruction and looting of civilian infrastructure and ethnic cleansing in Western Tigray¹²¹, where nearly all ethnic Tigrayans have been chased from their homes. The decrease in total Tigrayan IDPs between June and August can be explained by the fact that some of them have returned home, migrated to other, safer areas or might have been recruited in the TDF army.

Still, as many displaced people were living with relatives in larger towns that were considered safer, or were hiding in rural areas (e.g. mountainous areas, caves or bushes – Fig. 5.1), it is difficult to know the actual number of Tigrayan IDPs. However, with an estimated total of 1.85 million people, nearly one out of three Tigrayans is expected to have been internally displaced. In comparison, the number of IDPs in the whole of Ethiopia was estimated at 1.8 million people for the year 2020¹²².



Fig. 5.1: Tigrayan family hiding from warfare in a forest

The location of these nearly 1,850,000 internally displaced people at the end of August 2021 is known¹²³, of which 59% was living in the towns of Shire, Mekelle, Sheraro, Adwa and Aksum (Map 18). The remaining 41% of IDPs was living in other Tigrayan *woredas* and towns, and several other towns in the neighbouring Afar and Amhara regions (e.g. Koneba, Aba'ala, Dalol). Additionally, around 48,000 people were living in refugee camps in Sudan (e.g. in Hamdayet, Um Raquba and Tunaydbah). The migration flows of the IDPs, including their origin and endpoint, was only known up until June 2021. In the previous version of the Atlas (version 2.1), this was discussed in detail. It is also not clear how many IDPs might have returned home since the end of August 2021.

After the retreat of ENDF and allies from larger parts of Tigray on 28 June, 2021¹²⁴, a yet unknown number of “short range” IDPs have returned home trying to salvage the production of their farm, but great challenges awaited (e.g. the reconstruction of houses). For instance, between June and August 2021, there have been outflows of IDPs from hosting cities: Adwa (-9%), Mekelle (-8%), Sheraro (-1%) and especially Shire (-69%). In Axum the numbers of IDPs had increased with 4%. Hence, IDPs might have also travelled from their primary host town to other towns or *woredas*.

Whereas the Tigrayan refugees in Sudan arrive in formally established – though overcrowded – refugee camps with fairly well-developed facilities, internally displaced people often reside in very difficult living conditions. In

May 2021 in Shire, Sheraro, Mekelle, Adwa and Aksum, 11% of the IDPs was living outside without shelter, 10% was living in self-constructed shelters, 20% was living in (non-partitioned) communal buildings (e.g. school buildings – Fig 5.3) and 59% was living in permanent shelters. In Shire, where more than 670,000 IDPs were located early June¹²⁵, an estimated 12% of the displaced people was living outside without shelter. With the start of the rainy season, the living conditions of these people were expected to get worse and the risk of disease outbreaks to increase¹²⁶. However, by the end of June, more than 60% of the IDPs in Shire, Sheraro, Adwa and Aksum had permanent shelter and the number of IDPs living outside without shelter strongly decreased in these cities – which does not alter the fact that their living conditions were still miserable.

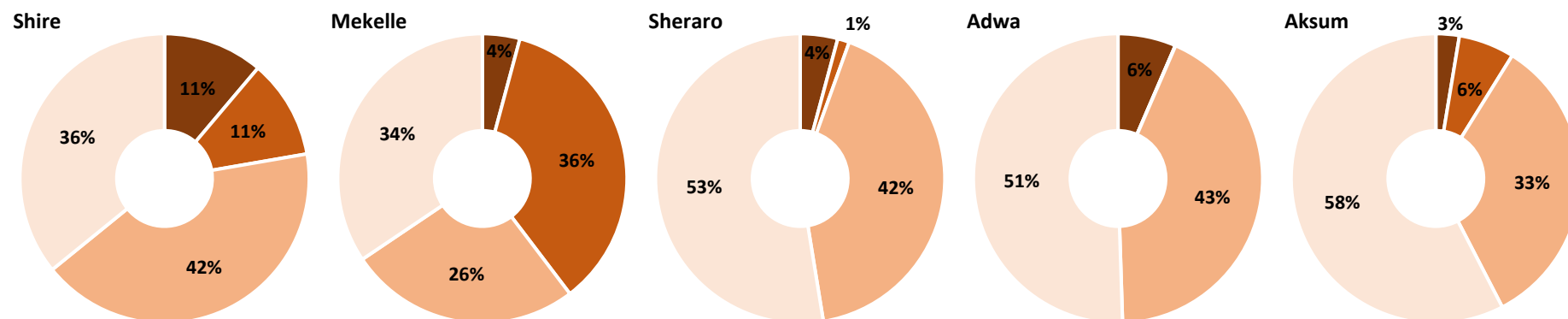


Fig. 5.2: Living conditions of internally displaced people in the five towns that host most of them by the end of June 2021, according to confidential sources: ■ living outside without shelter, ■ living in self-constructed shelters, ■ living in (non-partitioned) communal buildings, ■ living in permanent shelters



Fig. 5.3: A makeshift camp in a derelict building of the Shire Campus of Aksum University (23 February 2021 ©Associated Press¹²⁷)

By the end of August 2021, the living conditions have again undergone quite some changes (Fig. 5.2). The amount of IDPs in Shire and Mekelle living in permanent shelters has decreased again. In all cities, there is an increase in IDPs living in communal buildings, and in Mekelle more IDPs now live in self-constructed shelters. One possible explanation is that the former permanent shelters – that were mainly school buildings, medical centres or administrative centres – have been repurposed back to their original functions, forcing IDPs to move out. For example in Mekelle, the new shelters are located a bit outside the city. As many IDPs would not want to be far away from the community that provided them with food and other services, they might have chosen to stay in other locations in the city (i.e. self-constructed shelters). Another reason could be the relocation of IDPs, also including the IDPs returning home. Part of the permanent shelters have been abandoned and reused for other purposes, while the other people in the communal or self-constructed shelters decided to stay where they are.

In line with the continued blockade of Tigray over the summer months, many of the displaced people still did not have secure access to food, clean water and sanitation. Due to the below-standard living conditions, many people also require urgent medical assistance (Fig. 5.4). At multiple IDP sites, people are prone to diseases such as malaria, diarrhea, pneumonia..., pregnant women are in need of medical follow-up, and many people require urgent psychological assistance after experiencing traumatic incidents. Fortunately, the access to health care for the IDPs had slightly increased by the end of Augustus 2021. Almost 40% of IDPs gained access to health care, which is nearly a doubling since June. The access to clean water has also slightly increased. Meanwhile, the access to basic needs of the IDPs such as food assistance and electricity had decreased again. As a lot of schools have been used as shelters, the education of many children has been neglected.

Besides the still dire living conditions, internally displaced people have for months also not been (fully) safe at the displacement sites¹²⁸.

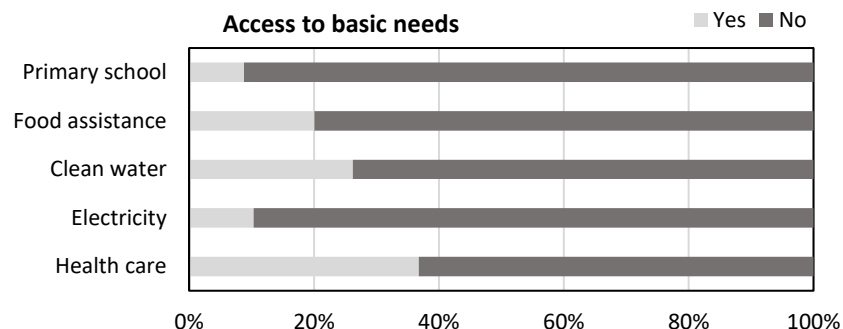


Fig. 5.4: Access to basic needs of the IDPs living in Shire, Sheraro, Mekelle, Adwa and Aksum by the end of June 2021, according to confidential sources.

The population pyramids (Fig. 5.5) indicate that elderly people and young children are underrepresented within the IDP population. There is however a strong overrepresentation of IDPs with ages between 15 and 17 years old. Also, for all ages, women appear to be more numerous than men among the IDP population. The underrepresentation of elders may be explained by their (physical) inability of travelling to IDP sites, causing them to stay in their home village. The lesser representation of men and young boys in contrast to women may be caused by their recruitment in the TDF army or by the targeting of young male travellers by the Ethiopian army. However, it can also be caused by the fear of being recruited or targeted, which lead to many men and young boys staying at home. Women, on the other hand, may prefer fleeing to IDP sites, because there it is relatively more safety due to the closeness of a community than in a remote homestead. In the previous war in Tigray between 1975 and 1991, that is still in the memory of many Tigrayans, men avoided movement to particular areas as well, to evade forced conscription, detention or harassment while women also risked assault and rape by military¹²⁹. Of course, it is unclear how many IDPs might have returned home by the end of August 2021.

Data shows that **more than 50% of all IDPs in Tigray require food assistance** in order to access food (Fig. 5.6). Another big proportion of IDPs can rely on donations from their host community, while some people access food through begging, buying food on markets, using their savings, or borrowing from friends and family. 5% of all IDPs do not have access to food. With this huge amount of IDPs depending on food assistance, the frequency of food distribution is decisive in the fight against famine. However, the frequency of the food distribution is irregular for 28% of the IDP sites (Fig. 5.7). **Only 17% of the IDPs have seen food distribution in less than one month**, while others haven't seen food distribution for one to

three months (20%) or even for more than three months (23%). 12% of the IDPs haven't seen any food distribution by the end of August 2021.

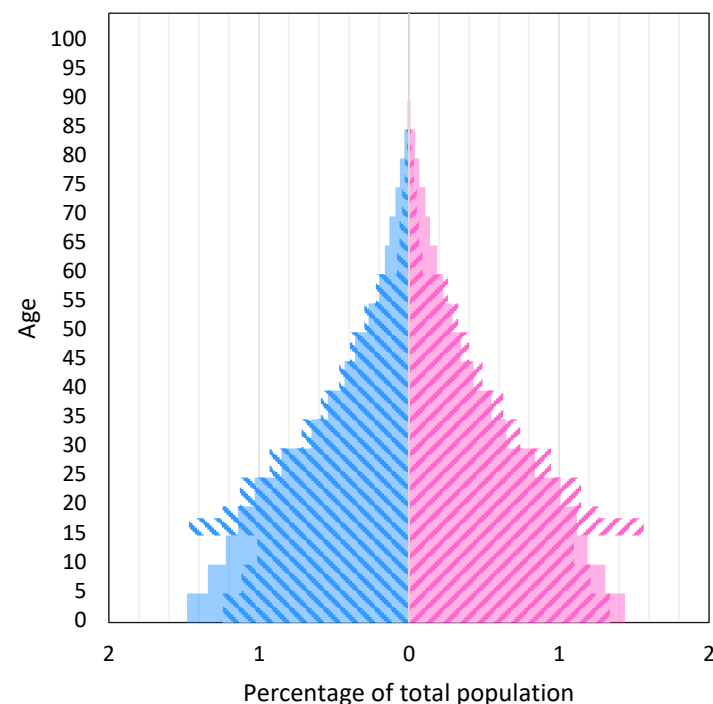


Fig. 5.5: Population pyramid of the Ethiopian population (2019)¹³⁰ with an overlay of the Tigrayan IDP population pyramid (by August 2021): ■ male population (Ethiopia), ■ female population (Ethiopia), ▨ male population (IDP) and ▨ female population (IDP).

How do IDPs access food?

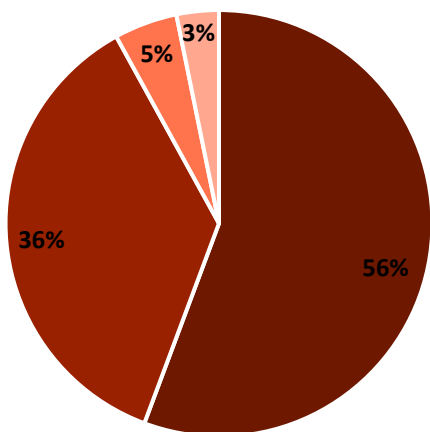


Fig. 5.6: How most IDPs in Tigray access food (by August 2021):
 ■ food assistance, ■ host community donations, ■ no access to food, ■ other ways of accessing food.

5.3.2. Situation between September and the end of November

Based on confidential sources, an additional 23,000 people got displaced in Tigray because of the conflict in September 2021. Most IDPs were displaced within the Southeastern and Central zones, but there were also small groups of IDPs who fled the Western zone in Tigray and took shelter in Sheraro or other *woredas* in the Northwestern zone. By the end of September 2021, an estimated 21,000 Tigrayans have returned home. Food, drinking water and medical services are significant priority needs for

Last food distribution

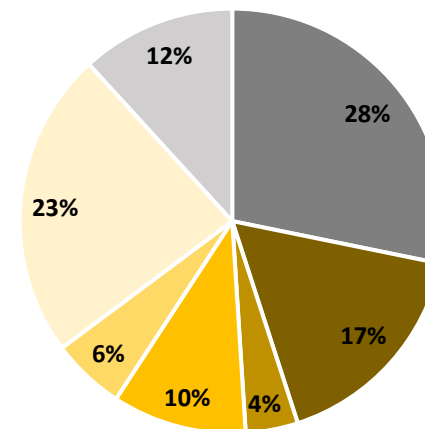


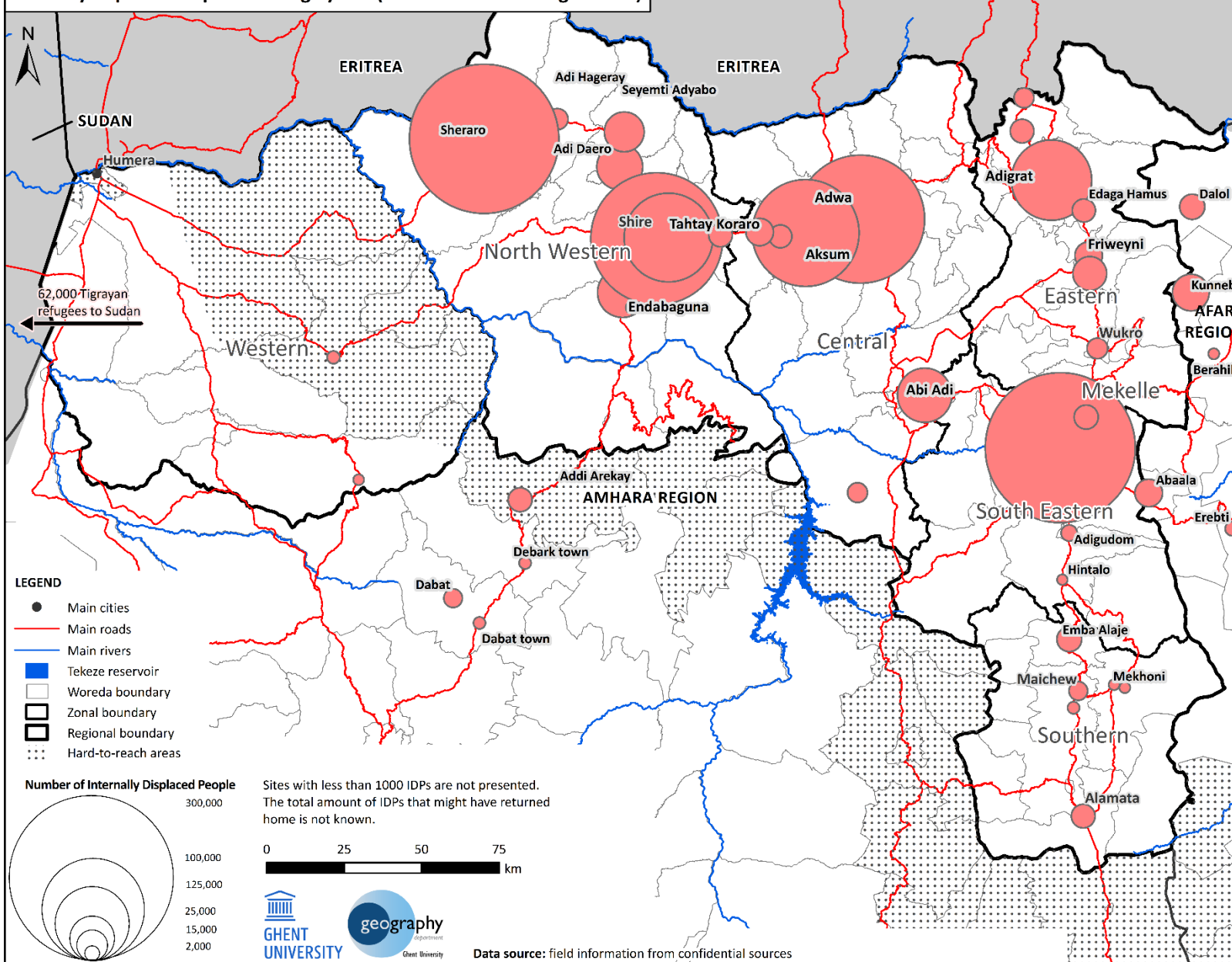
Fig. 5.7: When has food been distributed the last time (by August 2021):
 ■ irregular, ■ within the month, ■ one month ago, ■ two months ago, ■ three months ago, ■ more than three months ago, ■ none.

returned households and IDPs living in IDP sites, together with proper shelter, cash and protection.

In October, as the conflict moved more south to the centre of Ethiopia, there were little IDP movements detected in Tigray. Although, it can be expected that more IDPs started to return home. A small group of IDPs (<100) got displaced due to the loss of livelihood in their home area. Food assistance remains the top priority need for all displaced people.

In the first two weeks of November, no IDP movements have been detected in the Tigray region. In the third week of November approximately 40,000 IDPs got relocated in Tigray because of the conflict. Most of them were fleeing the Gulo Mekeda *woreda* close to the Eritrean border and ended in Adigrat town. Another group of around 1,000 IDPs were relocated from the Western zone to the Central zone. For some IDPs, with varying percentages, the need for protection, water and cash became less significant. Food, however, is still the most significant priority need for many people.

Internally Displaced People due to Tigray War (November 2020 to August 2021)



Map 18

Distribution of Internally Displaced People (IDPs) due to the Tigray War at the end of August 2021. The number of IDPs in “hard-to-reach” areas remains unknown and it is unclear how many IDPs may have returned home since August 2021.

Data source:

Field information from confidential sources

5.4. Humanitarian response

The OCHA situation report of 7 October summarises the humanitarian situation seven months into the conflict: “The overall situation in Northern Ethiopia continues to be highly unpredictable and is deteriorating by the day. In Tigray, the humanitarian situation remains increasingly dire, while the spillover of the conflict to neighboring Amhara and Afar regions is rapidly increasing the humanitarian needs in those areas. Humanitarian access in large areas inside Tigray remains viable, with some 75 per cent of the region fully accessible. Access to areas bordering Eritrea in the far north, western and southern parts of Northwestern Zone, remains inaccessible due to the fluid security situation. However, the lack of fuel and cash is significantly impacting the response. In addition, the delivery of humanitarian supplies to Tigray Region remains heavily constrained via the only access route through Afar (Semera-Abala-Mekelle corridor). Access to some areas in Afar and Amhara regions also remains restricted due to the ongoing conflict and insecurity.”¹³¹.

In addition to access constraints, continued disruptions to communication services and electricity (section 5.6), as well as the lack of emergency communications equipment, further undermine efforts of humanitarian actors to expand operations into areas outside the major cities and towns¹³², where 68% of the people continue to live in partially accessible and hard-to-reach areas (section 5.2).

Since the beginning of the conflict, the government and different humanitarian organisations (i.e. WFP, REST, WV, CARE, FH) have actively engaged in food distributions in different parts of the region. Early June 2021, the United Nations World Food Programme, which is leading the emergency nutrition response across Tigray, reported to have provided

emergency food assistance to 1.05 million people in the Northwestern and Southern Zones since the beginning of March¹³³. In addition, the Relief Society of Tigray (REST) mentioned¹³⁴ reaching 1.1 million people with food aid (in cooperation with USAID) in the first three weeks of March 2021. CARE (Cooperative for Assistance and Relief Everywhere), on the other hand, communicated to have reached 76,000 people in need by mid-April¹³⁵. Besides this, information on the number of people that have been reached with food assistance remains scarce, although in May 2021 it was clear that many people still had not yet been reached¹³⁶.

The next sections address the aid distribution in Tigray, from most recent to earlier situations.

5.4.1 Second round of aid assistance (as of May 2021)

A report by the Tigray Regional Emergency Coordination Centre¹³⁷ mentions that in the first round of food distribution (started late March) 90% of the target population could be reached, while in the second round, as of Mid-May, only 62% could be reached. Round 3 should have started early July, was modified to early August and still didn't start by mid-September.

Food aid rounds reflect the distribution of a 1 month food package (16 kg) to the target audience (which is now 6.3 million).

This means that at least 38% of the population only received food aid once (some probably nothing) in 5.5 months. And worse, almost 1.7 million IDP only received food aid once (also a large amount probably nothing) in 5.5 months.

Hence, a large proportion of the population lives on less than 100 g of food per day. Additionally, one must take into account that people ration their food gradually, so they eat more at the start of the package and less when it is depleting.

5.4.2 Detailed analysis of aid assistance in the first round (up to May 2021)

By 31 May, tables were circulated with detailed information on allocated, dispatched and distributed food aid in the Tigray Region, and presenting the results of the first round of food distributions, which started in early March¹³⁸. Then, in addition to approximately 10 to 15% of the IDPs, an estimated **2.2 million people** would have been reached with food aid, distributed by REST (38%), WFP (37%), World Vision (WV; 12%), Food for the Hungry (FV; 8%) and CARE (5%) in **50 out of the 88 woredas** (Map 19). With this challenging but important effort, nearly half of the people in need assumedly had been reached with aid, although there were large discrepancies between zones and *woredas* (Map 20). As food aid per person typically consists of 15 kg of grains, 1.5 kg of pulses (mainly split peas) and 450 ml of cooking oil (see section 5.5 for some reflections from the field), a total of **37.5k tons of food** have been distributed throughout the region; a figure that deviates from the 49.9k tons of food reportedly dispatched (Map 21).

This left 12.4k tons or 25% of the dispatched aid, unaccounted for during the (formal) aid distributions. Although this deviation may be explained by poor administration, it may also indicate the widespread looting of aid, which was already referred to by Ms Etenesh Nigussie (head of communication affairs for the Tigray Interim Administration) in February¹³⁹

and was re-confirmed by government documents at the end of April¹⁴⁰. As mentioned by OCHA at the end of February, at that time “it [was] unclear how much aid is reaching the intended beneficiaries”¹⁴¹.

From Maps 19, 20 and 21, it is striking that no aid had been distributed in the areas under control of the Amhara regional forces and militia (i.e. in Western Tigray, Northwestern Tigray south of the Tekeze River and parts of Southern Tigray), where the Ethiopian government was responsible for the food distributions. Hence, the question can be raised whether this is a data problem or whether no food aid has actually been distributed to these areas (despite the 12k tons of allocated aid). A possible explanation for the latter could be that (i) most ethnic Tigrayans have left Western Tigray (Map 18) and that (ii) life had approximately turned back to normal in the parts of Northwestern and Southern Tigray under control by the Amhara militia. In several other *woredas* in Northwestern, Central and Southeastern Tigray also no aid had been distributed, which could be due to active fighting and hence security issues more recently (Map 11) – information pertaining to June, before communications were cut.

As over 2 million people still have not yet been reached with food aid, major food gaps remain. People who have not been reached during the first round of food distributions were located in the Central (31%), Western (15%), Mekelle (15%), Eastern (13%), Southern (10%), Southeastern (9%) and Northwestern (7%) Zones of Tigray. In addition to this, it is unclear how many people have been reached more than once.

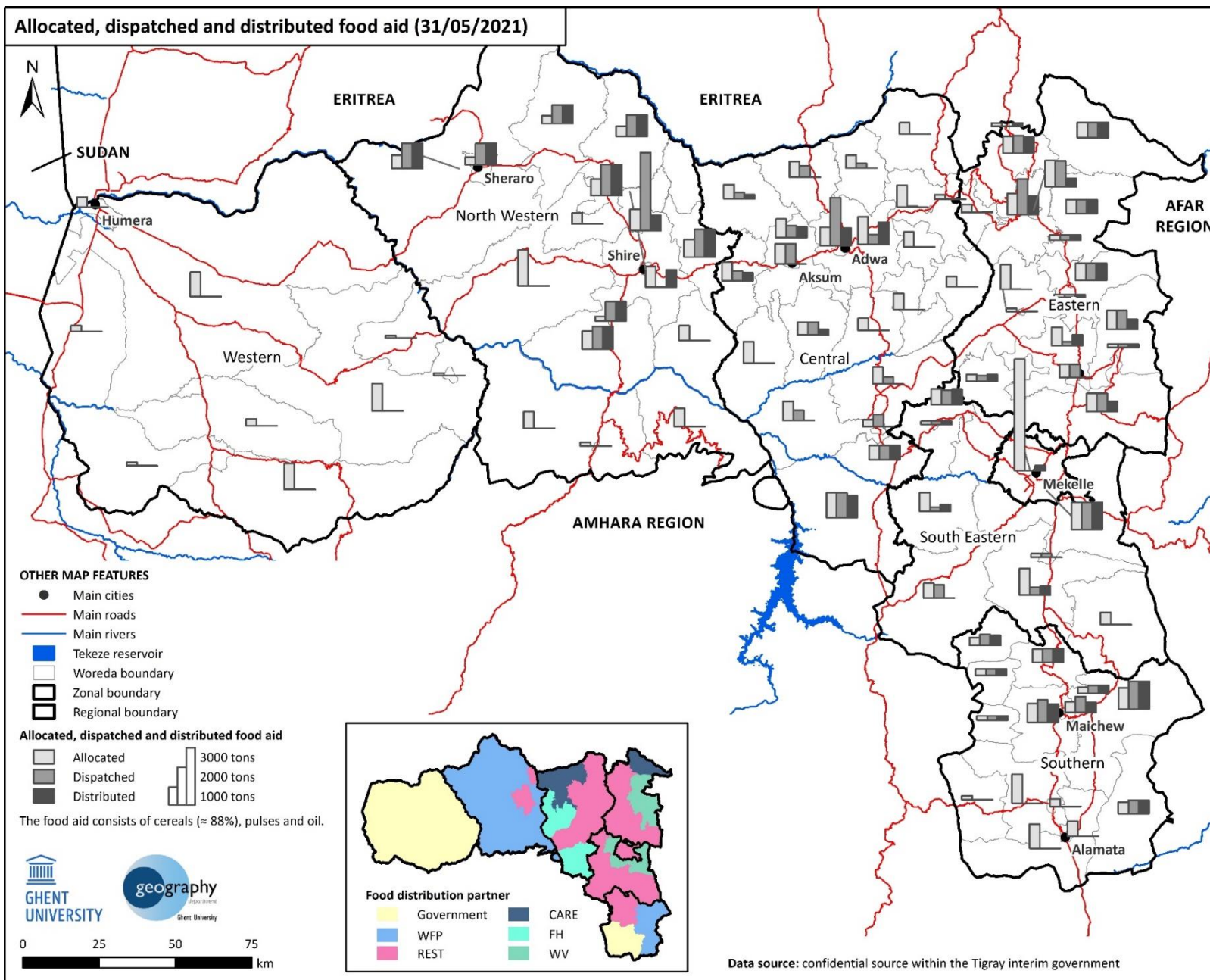
On top of these pending gaps, and as was already touched upon before, in many *woredas*, there is a clear discrepancy between the amount of dispatched aid and the aid that supposedly has been distributed to the people in need. Next to looting, another possible explanation for this could

be that aid was (informally) distributed at unintended locations, for example when lorry drivers were hindered by roadblocks along the way and decided to deliver the aid anywhere else. This also could explain the areas where the distributed aid exceeds the (formally) dispatched aid. As mentioned before, 12.4k tons of food were unaccounted for, which is the balance of the 15.4k tons of food that were dispatched but not distributed (Map 21 – areas in red) and the 3.0k tons of food that were additionally distributed across the region (Map 21 – areas in green).

An important remark here also is that we do not have any information on the amount of food that possibly may have been looted from the local distribution centres and hence wrongly has been labelled as ‘distributed’.

It is unclear what may be the cause for the situation in Mekelle, where the the dispatched and distributed aid were well below the allocated aid.

For further nuancing the data presented here, please also read section 5.5.



Map 19

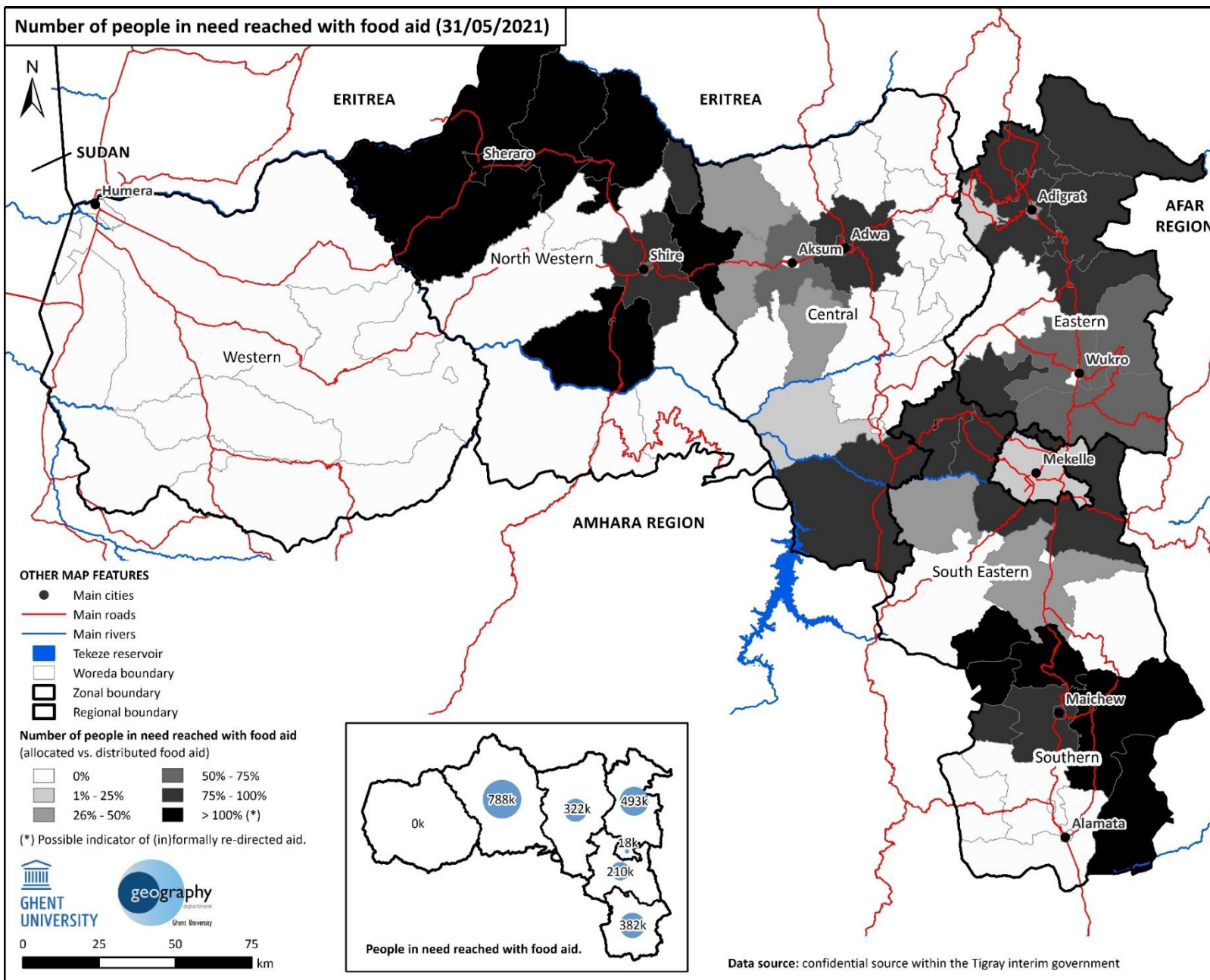
Allocated, dispatched and distributed food aid at *woreda* level (31/05/2021). Note that aid distributed to IDPs is not included in this map.

With:

- WFP = World Food Programme
- REST = Relief Society of Tigray
- CARE = Cooperative for Assistance and Relief Everywhere
- FH = Food for the Hungry
- WV = World Vision

Data source:

Confidential source within the Tigray interim government

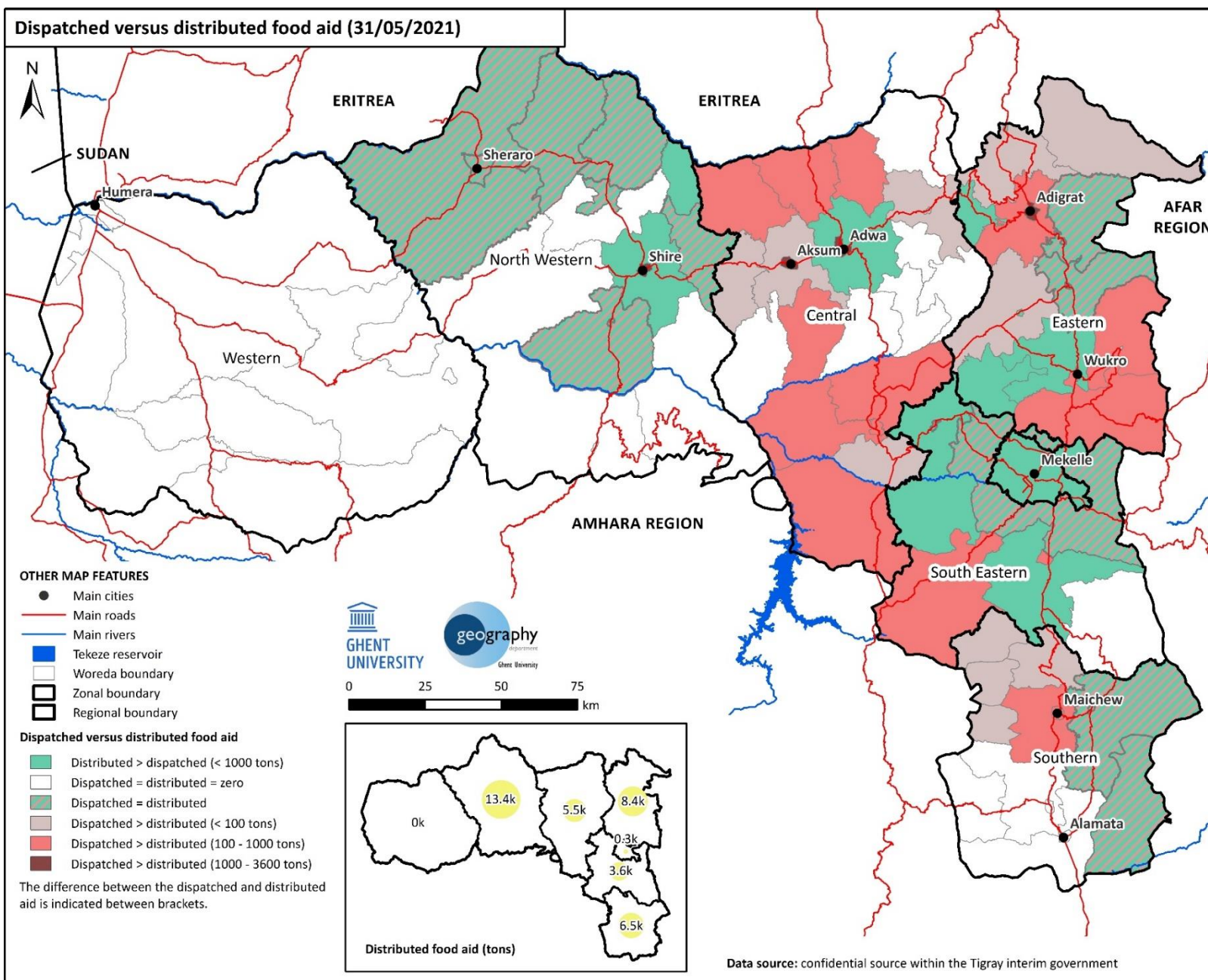


Map 20

Number of people in need reached with food aid (31/05/2021).

Data source:

Confidential source within the Tigray interim government



Map 21
Dispatched versus distributed food aid (31/05/2021).

Data source:
Confidential source within the Tigray interim government

5.5 Humanitarian aid distribution when Tigray was under control of Ethiopian and allied armies (November 2020-June 2021)

5.5.1 Context

In sharp contrast to the many challenges mentioned by humanitarian organisations, already by mid-February, the Ethiopian government said to have distributed aid in 32 *woredas*, while mixing up old and new *woreda* names, using *Amharanised* and duplicate *woreda* names¹⁴². Around the same time, it mentioned that 1.8 million people in need had been reached via the NDRMC and Joint Emergency Operation (JEOP) programme¹⁴³. By mid-March, the Ethiopian government also stated to cover 70% of all humanitarian assistance in the Tigray Region, and mentioned to have reached 4.2 up to 4.5 million citizens with relief supply¹⁴⁴. At the beginning of May, it stated that claims of extreme hunger¹⁴⁵ were falsified¹⁴⁶.

5.5.2 Functioning of aid distribution

On our request, during the month of February, a senior Tigrayan activist contacted people on the ground and provided this report on the functioning of aid distribution (which is still largely relevant in early June):

“One of the big problems is the absence of structures to reach out the needy. The Relief Society of Tigray (REST) was the main organised institution for this, but REST is now having a lot of problems:

- Its management is interim and the board members have been replaced; Amhara people are now dominating the board.
- REST’s 33 warehouses in various *woredas* (with capacities of 700 - 1000 tons) have been destroyed.
- 11 offices have been looted.
- 70 trucks and vehicles have been looted.

In absence of reliable quantitative and spatially distributed information on aid effectively delivered to the people in need, we can only present qualitative observations, derived from interviews. To fully understand the context, it should be mentioned also that on 8 February, the Ethiopian government officially dissolved the boards of the two largest local NGOs in Tigray¹⁴⁷, which are largely trusted by the people in the region. The Tigray Development Association (TDA) and the Relief Society of Tigray (REST) are formally be governed by 'a caretaker administrative board'.

- Other Tigray-based NGOs have been forced to defame REST.

“Having all these problems, REST’s hands are tied. But, USAID and CRF want to deliver aid through REST, aiming at reaching 1.3 million people. So, they are trying their best. But, lacking internet connections made them incapable to communicate with their foreign partners.”

“They continue trying to directly deliver aid to the needy, after the consultation of elders and others. There are logistics problems and people at the interim administration or the military are not willing to help. As there is no stable local administration in the *woredas* as well, it is hard to deliver aid. USAID is now forcing the federal government for going themselves down the level of *tabiyas* (sub-districts), as well as *woredas* far from the main roads to deliver aid.”

“If REST is having a hard time in reaching out to the public with its existing structures, it is almost impossible for others.”

“The others, like WFP, are trying to use the interim administration and the elders assigned by them, but the military is intervening in the process, making it impossible to deliver aid. Military vehicles have been

requisitioned for aid delivery. The military is taking much of the aid and together with the interim administration people, they sell it to flour factories, rather than bringing it to the needy.”

“The military have a clear intention, sometimes speak it out loudly, to starve the public to punish them and then to make the TDF surrender.”

5.5.3 *Witness from REST*

To triangulate the before testimonies, *back in February 2021*, we discreetly contacted one senior staff of the Relief Society of Tigray, who provided us the following information: “With REST, we have shifted back from development activities to humanitarian assistance, because Ethiopia is attacking us so badly. Food aid is only provided to towns and villages along the main roads, not to the rural areas. We are responsible for transporting food aid in bulk, but we do not distribute it directly to the beneficiaries. The names of beneficiaries and quantities are decided by others. We have no control, no decision. If somebody wants to be a member of the PP, they give him quintals¹ and quintals of grain. The poor get nothing. Those who manage to collect a lot of food aid sell it on the black market later on.”

Our witness continued: “We went to bring food aid to a town in Gulomakheda that is fully controlled by the Eritrean army. The Eritrean soldiers took all the food aid that we brought. I was so sad. On that occasion, I discussed with some farmers. They told me that the Eritreans took everything. They took all medicines from the hospital and have sent it to their country. Over there, the people are suffering and may die from the smallest thing.”

5.5.4 *Testimonies from people on the side of receiving aid*

In addition to reports from development actors, we also collected testimonies from the people who should be beneficiaries of aid (during the month of February). For this, we again contacted people from different



woredas in Tigray, and conducted several interviews over the phone (see table on next page – where we have included the corresponding included

¹ The quintal is the commonly used measurement unit for grains and small pulses in Ethiopia. 1 Qt = 100 kg.

the categories of the observed differences between dispatched and distributed aid – Map 21).

We do not claim that our interviews are fully representative for the entire *woreda* (or zone), but again the different testimonies confirm that aid is not fully reaching the people who need it, often due to limited access in rural areas, and because aid is transferred to others (e.g. by looting).

Disillusioned senior officers pertaining to the interim government and to REST again mentioned early June that looting and diversion of aid lorries were ongoing.

Zone	Woreda No.	Location	Map 21	Testimonies
NW	10	Adi Daero		“Residents were denied food aid after the town’s inhabitants refused to appoint PP officials as administrators. The residents demanded the evacuation of Eritrean soldiers instead.”
	15	Shire town: residents		“The initial wheat aid distribution was in December. Distribution was handled by the Ethiopian government, and the aid did not get to all of Shire’s residents. Furthermore, those that were given 7 kg of wheat were required to sign for 15 kg. If they refused to sign for 15 kg, they were denied the 7 kg. It is important to emphasize that there was no electricity and hence, there was no way of grinding the grain. During this period, three young men who were displaced and were taking shelter outside the warehouse, were killed after they were accused of stealing wheat, which was impossible as these youngsters did not have a place to stay and did not have the means to prepare the wheat.” “In the second week of February, USAID-labelled aid trucks have begun to arrive and people have been given 1 liter of cooking oil and 3 kg of split peas, and around 15 kg wheat per person. There is gross shortage of food in Shire! People have to sell all they have at low prices to be able to buy food; people are literally starving to death.”
	15	Shire town: IDPs	N/A	“The wheat aid given to the displaced people was 15 kg per person. The staff handed out wheat until 6 PM, until their workday was done. The next day, as people lined up early in the morning, they were told that the wheat was stolen as an excuse not to give more wheat. However, there is ample evidence that all the remaining wheat was transported to Eritrea by the Eritrean soldiers.”

				<p>"In January, 30 kg wheat per person was distributed, but only to the IDPs and not to the residents of the town. The IDPs were told that the 30 kg wheat was to last for the next two months and that they should not expect any more aid in these next two months."</p>
C	26	Yechila		"They only distributed 15 kg of grain per person, but there was no oil nor beans. All other places in Abergele woreda did not get any aid."
	29	Adwa		"Last time, they made us sign for having received 15 kg while they only gave 7 kg".
	33	Aksum		"I heard there has been food aid of 15 kg of grain per family, and only once. Neither I, nor my relatives have received aid. I am not so sure about how many families received that 15 kg of food aid. How many days would that last? Who takes the rest? The Eritreans?"
E	48	Adigrat		"They registered us four times saying that they will give aid but none was given. We think that the people who register us are taking the grain for themselves and resell it."
	54	Erob		A witness from Erob woreda mentioned to Associated Press that Ethiopian authorities are withholding food aid from families suspected of links to Tigray fighters: "If you don't bring your father, your brothers, you do not get the aid, you will starve". ¹⁴⁸
M	66	Mekelle		"Some people who I know received food aid and they only got 8 kg of wheat and expired corn flour, the so-called <i>fafa</i> ."
SE	70	Hagere Selam		"Mostly transport to and from Mekelle is possible. The road is closed from time to time when battles occur in nearby areas. Here, food aid distribution has started, 25 kg of grain per person. But it has been interrupted; I do not know the reason. The aid was brought by the Relief Society of Tigray. It was distributed by the appointed district administrator, under supervision of the army. The new administrator is not dedicated at all, he is afraid of the situation. People do not like him because he works with the soldiers."
S	78	Addishuhu		"They distributed 15 kg of grain per person, only once, there were no oil or beans."

Other: rural areas away from the main road	N/A	<p>In general, there is no information from rural dwellers as there is no telephone network. Several urban people told us: “food aid only comes to towns and large villages along the main roads, in minimal amounts. They do not bring it to the rural areas, and they do not call the people from the rural areas to collect it in town.”</p> <p>The Mekelle business community stated: “There is no humanitarian access outside Mekelle, and civilians are being killed....”¹⁴⁹</p>
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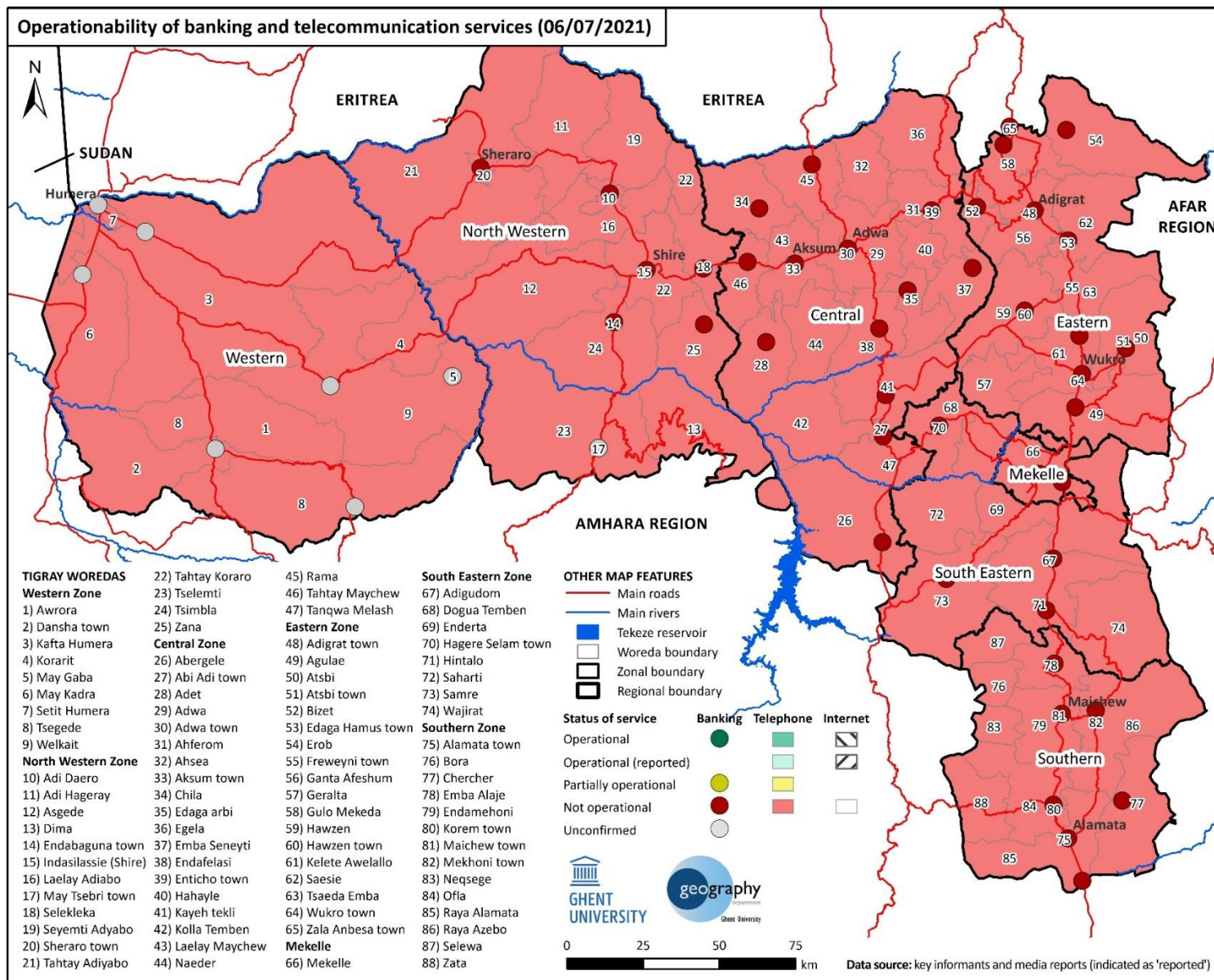
5.6 Essential public and private services after June 2021

Several essential public and private services have not been (fully) operational since the outbreak of the conflict in November 2020. These services include but are not limited to banking and telecommunication services, including internet access. While occupying Tigray, the Ethiopian army and allies tried to render some basic services, at least in Mekelle (see next section).

Over the second half of June, the war entered a new phase. The Tigray Government regained control over most areas, roads and towns of the Region. On 28 June 2021, a unilateral ceasefire was declared by the Ethiopian Government. Unfortunately, as of that date, all banks were closed and all communication lines were blocked again (Map 22), returning to the situation at the beginning of the conflict in November 2020. In addition, VSAT equipment of multiple (I)NGOs in Mekelle and other towns was dismantled by the Ethiopian National Defence Forces while withdrawing¹⁵⁰, and large amounts of money were taken from the banks by the withdrawing army, so that people cannot access cash and salaries

cannot be paid to government employees. Some bank agencies reopened, but without any means of transferring money. People who have kept their economies as cash in their house have been encouraged by the regional authorities to deposit it in the bank, so that other people can withdraw small amounts.

Simultaneously with the disruption of communication lines, the electricity supply was interrupted as well, even though it is necessary for urban water supply and many other services. Since 5 July, power has been partly restored in Mekelle and other towns, via electricity produced at the Tekeze hydropower dam. Due to near-absence of power generation during the war, the reservoir of the Tekeze dam was nearly full, and important releases of excess water needed to take place. When such releases take place, no power can be generated due to specific characteristics of the hydropower plant¹⁵¹. In November and December 2021 the Tekeze and Mekelle electric substations were again bombarded by the Ethiopian Airforce, putting Mekelle and other towns in the dark.



Map 22

Operability of banking services and telecommunication services (July - September 2021).

Data source:

Key informants in different *woredas* in Tigray and media reports

5.7 Service availability (November 2020-June 2021)

Based on interviews with key informants (n = 38) in various *woredas* (districts), we have documented and mapped the accessibility to these essential services, and provide an overview of the situation at the end of March 2021, which was still valid at the time the Ethiopian troops and allies withdrew from larger parts of Tigray on 28 June 2021. In this section, first we describe the situation until 28 June (5.6.1 to 5.6.3) and then discuss the situation after 28 June (5.6.4), which largely resembles the full blackout of the beginning of the war.

5.7.1 Banking services

Since the outbreak of the conflict, lack of access to banking services has been a major challenge for civilians in the Tigray Region. This, of course, has a great impact on daily life practices in rural areas as well as in urban centres as people experience difficulties to purchase food and other essential products (e.g. medicines) - wherever and whenever goods are available; weekly markets also have been interrupted and many shops have been looted or destroyed in the first months of the conflict. Interrupted banking services is one of the measures taken by the Government of Ethiopia, aiming to hit the TPLF and its allies, but having a lot of 'collateral' impact on civilians. Since the start of the conflict, banking services have been restored in (1) areas under control by Amhara forces (e.g. Korem, Alamata and Waja in Southern Tigray), (2) Mekelle and (3) other urban centres (e.g. Shire, Aksum, Adigrat, Edaga Hamus, Addishiho, Maichew and

For our interviews on essential services, we had difficulties to verify and collect information on most *woredas* located west and southwest of the Tekeze River. The main reason for this is that many Tigrayans (including most of our key informants) have fled this area due to the informal annexation by the neighbouring Amhara Region and ongoing atrocities against civilians. In some of these cases, we derived our information from media reports, and instead, we present a 'reported' but unconfirmed situation.

Mekhoni) – but still are restricted and unreliable in several major towns. At the end of March 2021, and continuing up to June 2021, for many Tigrayans, the regional capital Mekelle was the place to be for cash withdrawals, which forced people to travel from far and also made people to semi-permanently stay in Mekelle until the situation improves in other areas and banks become fully operational again. Among the civilian victims executed by soldiers² along the road from Mekelle to Adigrat in March were people who came to Mekelle for cash withdrawals.

In several areas, banks deliberately have been looted and destroyed by Ethiopian and Eritrean soldiers, in line with the destruction of other public and private properties throughout Tigray. In addition to this, it is important to note that in many areas only the Commercial Bank of Ethiopia (CBE) has re-opened, even though many people had transferred their money to the

² <https://msf.or.ke/en/magazine/msf-driver-assaulted-staff-witness-men-dragged-buses-and-killed-tigray>

Lion International Bank and Wegagen Bank in light of the increasing political tensions during the years preceding the onset of the conflict. As

salaries of civil servants are nearly exclusively paid via their bank accounts, many people have difficulties to access money.

Area	Towns with banking services	Information on banking services
Areas under control by the Amhara forces (informally annexed by the Amhara Region)	<ul style="list-style-type: none"> Western Zone: Humera, Dansha, Ketama Nigus, Adi Ramets, Mai Cadra, Adebay, May Gaba Northwestern Zone: May Tsebri 	Banking services are operational in Humera, and mainly include services from the CBE and Abay Bank, but also comprise of private banks in urban centres. The Wegagen and Lion International Banks were the main targets of looting and destruction in the Western Zone. For all other towns in this area, the operability remains unconfirmed (we received conflicting information on these areas).
	<ul style="list-style-type: none"> Southern Zone: Maichew, Mekhoni, Addishiho, Korem, Alamata, Waja 	Banking services (mainly CBE) are operational in Maichew, Mekhoni, Korem, Alamata and Waja. The services in Maichew and Mekhoni (located north of Korem, Alamata and Waja) were restored more recently (early March 2021) than those in Korem, Alamata and Waja, and are still not fully operational. In Maichew and Mekhoni, customers queue in front of banks for long hours and sometimes are told that the money is finished or that the server is down. Until the re-opening of the banks in Maichew and Mekhoni, people used to travelled either to Alamata or Mekelle. In Maichew and Mekhoni, the most popular banks (i.e. Wegagen Bank, Lion International Bank and Dashen Bank) remain closed. Similar to other areas, cash withdrawals and bank transfers are subject to restrictions (upper limit of 50,000 ETB per day). Even if such is the rule, bank officers are obliged to set their own upper limits (mostly 5000 ETB) in an attempt to distribute the limited amount of money among the long queueing customers.
Mekelle	Mekelle	Banking services are operational since late December, and mainly include services from the CBE and few private banks. At the end of March 2021, Mekelle still serves as the only reliable place where staff salaries are paid (via bank transfers) and cash withdrawals are mostly possible. Similar to other areas, cash withdrawals and bank transfers are subject to restrictions (upper limit of 50,000 ETB per day). In practice, bank officers limit the withdrawals to 5000 ETB.
Other areas	<ul style="list-style-type: none"> Northwestern Zone: Shire Central Zone: Aksum 	Banking services recently (early March 2021) were restored, although they are only partially operational . In every town, only one branch of the CBE has been re-opened. Similar to

	<ul style="list-style-type: none">• Eastern Zone: Wukro, Adigrat, Edaga hamus• Southern Zone: Addishiho	Maichew and Mekhoni, customers queue for hours to days and are frequently told that the cash money is finished and sometimes that the server is down. The number of customers is much higher than the banking services can support. Many people still travel to Mekelle to withdraw cash. The most popular banks (i.e. Wegagen Bank, Lion International Bank and Dashen Bank) remain closed also here. Similar to other areas, cash withdrawals and bank transfers are subject to restrictions (upper limit of 50,000 ETB per day). In practice, bank officers limit the withdrawals to 5000 ETB.
	<ul style="list-style-type: none">• Northwestern Zone: Sheraro, Adi Daero, Selekleka, Endabaguna• Central Zone: Rama, Adwa, Semema, Zana, Wukro (Marai), Edaga Arbi, Enticho, Maikinetal, Nebelet, Workamba, Abiy Adi, Yechilay• Eastern Zone: Bizet, Zala Anbessa, Fatsi, Dewhan, Senkata, Hawzen, Atsbi, Agulae• South Eastern Zone: Kwiha, Hagere Selam, Adigudom, Samre, Hiwane• Southern Zone: Chercher	Banking services are not operational . People are travelling to the nearest town with operational banking services, on the condition that the town is considered to be safe.
Dedebit Microfinance		Dedebit Microfinance was the most accessible financial institution in Tigray and has approximately 400,000 customers. Dedebit Microfinance especially is accessible to farmers and people in rural areas, as it also has service branches in each <i>‘niús-woreda’</i> (i.e. the administrative level between <i>tabiyas</i> and <i>woredas</i>), where there are no other banks or financial institutions. With the advancement of invading forces, the Dedebit Microfinance offices were frequently looted and destroyed. Neither its head office in Mekelle nor its branch service centres throughout Tigray are functional at the end of March 2021.

5.7.2 Telephone services

Telephone networks, managed and operated by the state-owned Ethio telecom, have been blocked at the beginning of the conflict in November 2020. This has severely limited the amount of information on the conflict that has reached the international community up to the end of June 2021. This also has strongly impeded the organisation and upscaling of the humanitarian response throughout the region, and obviously, this also has impacted the distribution of information between family members and friends within as well as outside the Tigray Region.

In territories under control by the Amhara forces (Western Zone and parts of the Northwestern and Southern Zones), telephone services have been restored some weeks after the occupation by the invading forces. However, it is also noted that there are areas where telephone communication is frequently interrupted, when coinciding with conflict incidents.

In Mekelle, the telephone network (for mobile phones as well as for landlines) had been restored by Mid-December, after approximately 40 days of intense conflicts. This re-opening of the telephone network - which coincided with the restoration of electricity supply in Mekelle - has been widely used by the Government of Ethiopia to strengthen the narrative that the situation had gone back to normal in Tigray. Since the re-opening of the

5.7.3 Internet services

Along with the telephone network, the internet has been blocked at the beginning of the conflict. At the end of March 2021, and continuing until the end of June, internet access only has been restored in most parts of Western Tigray, in May Tsebri (Northwestern Tigray) and in Alamata

telephone network in Mekelle, services frequently were interrupted for periods lasting from several hours to multiple days.

Weeks after the re-opening of networks in Maichew and Adigrat, telephone services to Aksum were restored in early February. By the end of February and early March, telephone services also have been restored to other major towns along the main roads. As a result, rural areas in the vicinity of these main roads also have started to receive telephone network. In some of these areas, the network is only available near the highest mountain peaks, whereas the rest remains fully out of access.

However, the communication blackout continued for up to eight months throughout the vast majority of Central Tigray, and large parts of Northwestern, Eastern and South Eastern Tigray. In these areas, rare access to the telephone network can be obtained near mountain peaks, 'hijacking' the network from neighbouring areas, including the Amhara and Afar Regions or neighbouring countries Sudan and Eritrea.

Note that governmental and non-governmental organisations have had access to telephone communication via satellite connections throughout the conflict.

(Southern Tigray). The vast majority of the Tigray Region remained without internet access.

This has strongly hampered research and development activities, personal and institutional communications, and small- and medium-sized enterprises, which increasingly have relied on internet services...

Some governmental and non-governmental organisations had been granted access to cable internet in several parts of the region. It is expected that these were the networks used to distribute videos on ongoing atrocities against civilians.

It may be useful to remind that internet services, as well as telephone networks, frequently also were not operational in remote rural areas of Tigray prior to the start of the war.

6 Agriculture and food security

6.1 Current and projected food security outcomes (June 2021 – January 2022)

Based on Ethiopia-wide maps produced by the Famine Early Warning Systems Network (**FEWS NET**), we have included maps on the current (June 2021) and projected (January 2022) food security outcomes in Tigray. As the projected outcomes are the same for both periods in many parts of Tigray, we have merged both maps and discuss them together under ‘projected outcomes’ between June 2021 and January 2022. Map 23 adopts the widely accepted Integrated Phase Classification (**IPC**), which describes the severity of food emergencies using a five-phase scale¹⁵². Details on each phase are captured in Fig. 6.2.

Due to the combined impacts of the ongoing conflict (Fig. 6.2), desert locusts, the poor macroeconomic situation, and the Covid-19 pandemic, the **current** (June 2021) humanitarian food assistance needs are well above average in Tigray. Extreme low levels of economic activities, high levels of internal displacements (Map 18), combined with restricted humanitarian access (Map 17) and limited food stocks have resulted in a food security **Emergency** situation for **over 2 million people** in several parts of Northwestern, Central, Eastern and South Eastern Tigray. This situation includes large food consumption gaps at the household level, resulting in high acute malnutrition and excess mortality. Due to internal migration flows, many rural households also need to share the (limited) previous harvest with relatives and guests, resulting in exhausted food stocks. Within the same areas, approximately **353,000 people** are **famine-affected** (IPC Phase 5) and hence at severe risk of starvation¹⁵³. **“This is the highest number of people in IPC Phase 5 since the 2011 famine in Somalia.”**¹⁵⁴

Note that 353,000 people are famine-affected but that none of Tigray’s districts is yet mapped under IPC Phase 5, as the following criteria¹⁵⁵ are not yet jointly met: (1) at least 20% of households face extreme food shortages with limited ability to cope; (2) acute malnutrition rates exceed 30%; and (3) death rate exceeding two persons per day per 10,000 persons.

In large parts of Northwestern, Southeastern and Southern Tigray, as well as in Mekelle, the current food security outcome includes the “Crisis” phase (for over 3 million people), whereas the food security situation is less acute in Western Tigray, with the “Stressed” phase¹¹². There is no area in Tigray under “Minimal” food security conditions, in contrast to peace years when larger areas of Tigray were not concerned with food security issues¹⁵⁶.



Fig. 6.1. After harvest, a farmer in Debre Genet had carefully stored the straw as fodder for the upcoming year in four two-metre high heaps. On 5 April 2021, the Eritrean army terrorised the village and burned down the fodder storages (© Kindeya Gebrehiwot).

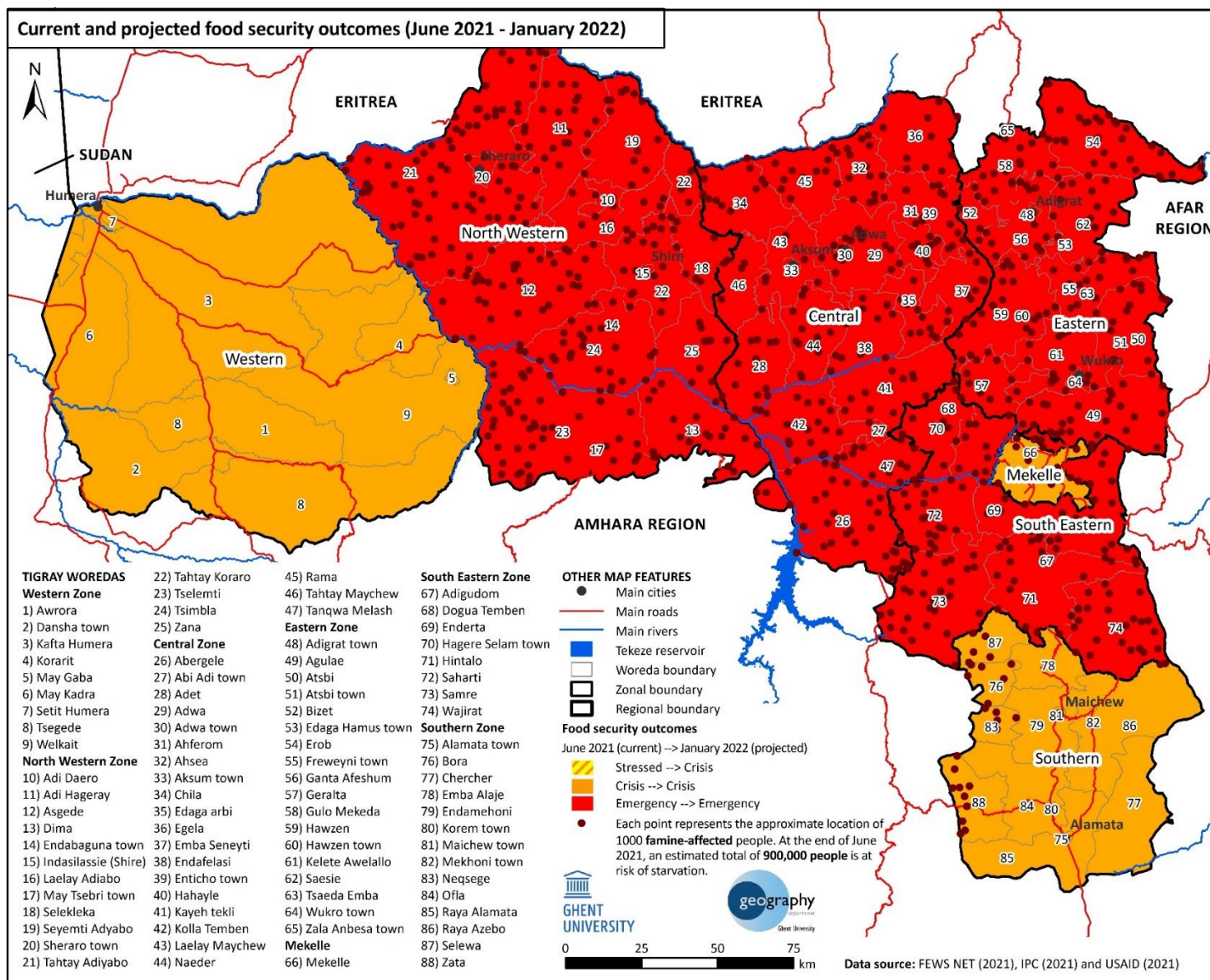
Do to total blackout, we have no view whether anticipated improvements in economic activity could effectively take place, despite significant restrictions on household access to food and income that were expected to persist (e.g. limited labour migration, access to credit, access to input supplies...), undermining the cultivation during the upcoming growing season. As a result, Emergency outcomes are anticipated to persist at least until January 2022 all over Central and Eastern Tigray, as well as in parts of Northwestern and South Eastern Tigray. This again highlights the importance of granting full and safe humanitarian access to these regions. In other areas, where economic activities are expected to increase in the coming months and where the households' production capacity is relatively higher, "Crisis" outcomes are expected. In none of the zones, it is expected to return to the "Minimal" or even the "Stressed" food security phase before January 2022¹⁵⁷.

Expecting a humanitarian assistance coverage of 60% of the population, approximately 400,000 people were deemed to be at risk of famine by September. In case the conflict would further escalate, "most areas of Tigray will be at risk of famine"¹⁵⁸.

Given the limited information available, it is difficult to assess the projected food security outcomes. In several areas, people may also face additional costs due to the looting of essential goods and the (partial) destruction of houses. Yet, in line with practices elsewhere¹⁵⁹, we used IPC, USAID or WFP estimates, and population statistics, to calculate, for Tigray, a minimum of 425 hunger deaths per day, and a "conservative maximum" of 1201 per day. That is, averaged, **one person dying of starvation per two minutes**. With difficulties of access and communication, such extrapolation from the numbers in the IPC phases is the only very approximate method to know the number of starvation victims.

PHASE 1 Minimal	Households are able to meet essential food and non-food needs without engaging in atypical and unsustainable strategies to access food and income.
PHASE 2 Stressed	Households have minimally adequate food consumption but are unable to afford some essential non-food expenditures without engaging in stress-coping strategies.
PHASE 3 Crisis	Households either: - Have food consumption gaps that are reflected by high or above-usual acute malnutrition; OR - Are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis-coping strategies.
PHASE 4 Emergency	Households either: - Have large food consumption gaps which are reflected in very high acute malnutrition and excess mortality; OR - Are able to mitigate large food consumption gaps but only by employing emergency livelihood strategies and asset liquidation.
PHASE 5 Famine	Households have an extreme lack of food and/or other basic needs even after full employment of coping strategies. Starvation, death, destitution, and extremely critical acute malnutrition levels are evident. (For Famine Classification, area needs to have extreme critical levels of acute malnutrition and mortality.)

Fig. 6.2: Overview of the different IPC food security phases



Map 23

Current (June 2021) and projected (January 2022) food security outcomes in Tigray.

Data source:

after FEWS NET (2021) and IPC (2021), USAID (2021)

6.2 Spring and summer rainfall in 2021 as compared to previous years and long-term averages

Using the CHIRPS 2.0 satellite rainfall product¹⁶⁰, we have analysed the rainfall conditions between February and April 2021 ('spring') and between May and August 2021 ('summer') and have compared these conditions with long-term averages and the conditions in previous years.

From this analysis, it appears that the **spring rains** in 2021 – with approximately 20 mm in Western Tigray, 100 mm in Eastern Tigray and 70 mm in Southern Tigray (Map 24) – were drier than in 2020 but slightly wetter than in 2019, and overall had 'normal' conditions throughout the region (following the conventions of the American Meteorological Society - Map 25). Exceptions on these 'normal' conditions are parts of the South Eastern, Southern and Western Zones, where 'abnormally dry' to 'moderately dry' and even 'severely dry' conditions were observed. Even though the rains came a bit late in spring 2021 (March was drier than average), based on the observed rainfall conditions, farmers should have been able to start ploughing during the months of March, April and May.

The **summer rainfall** conditions (up to August) are similar to those of 2019 and 2020 (Map 26). Based on long-term observations, we understand (Fig. 6.1; map 27) that most of Eastern, Southeastern and Southern Tigray, as well as parts of Western Tigray were wetter than normal. It was "extremely wet" around Alamata and Korem. See also the ombrothermic diagrammes for Maychew and Mekelle (Fig. 6.3). On the other hand, Northwestern Tigray and the northern part of the Central Zone were abnormally dry. Our own qualitative field observations¹⁶¹ show that by the end of August, it was still raining around Mekelle and south of it, but it had not been raining since the beginning of August in the Tsa'ida Imba district, north of Mekelle. The ombrothermic diagramme of nearby Adigrat also shows less rainfall in August (Fig. 6.1). Though the crops there did not yet suffer from drought by the end of August, they would have required at least one additional good rain event. Whether or not it rained in September will have been crucial for maturing the crops.

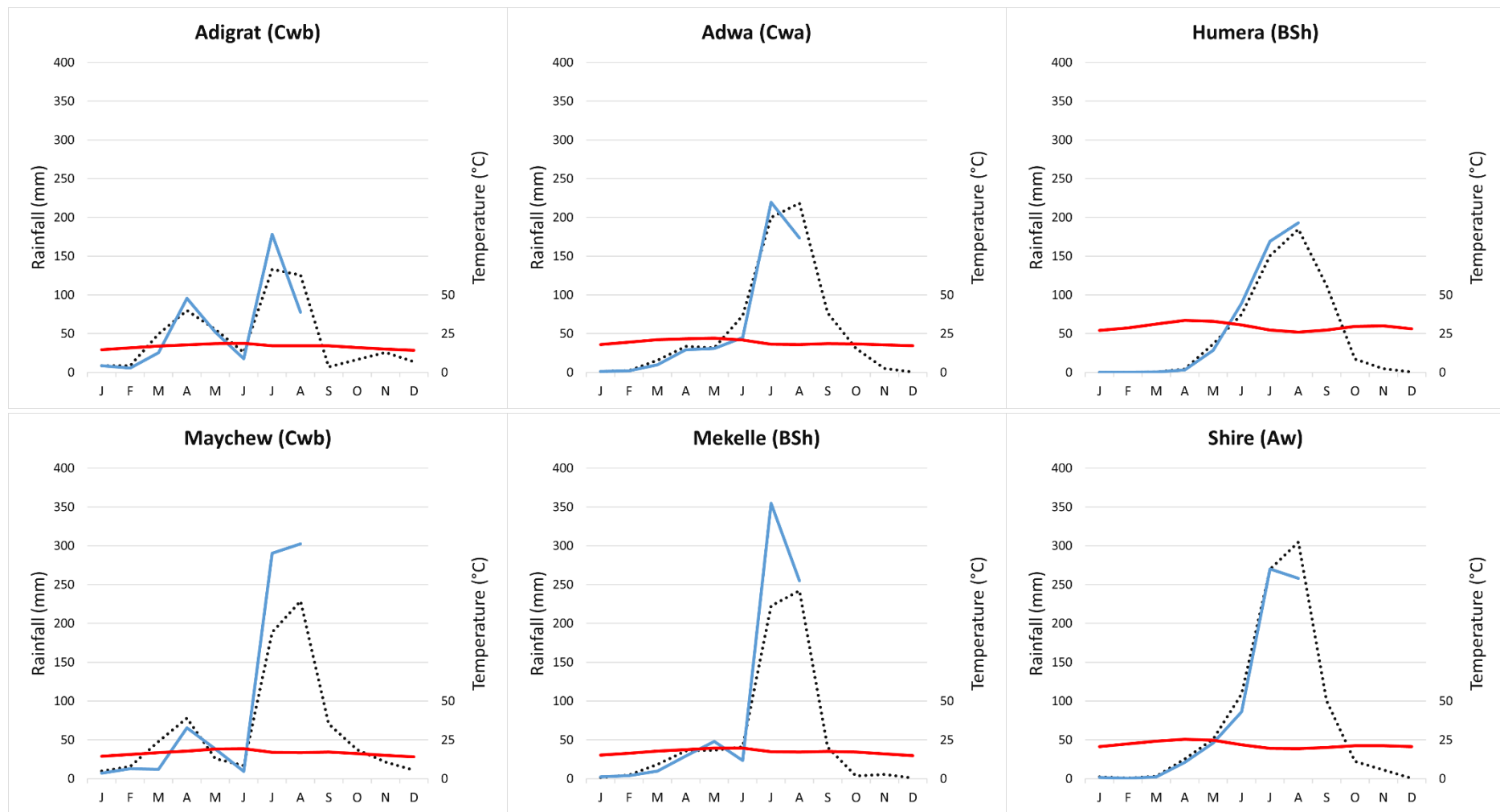
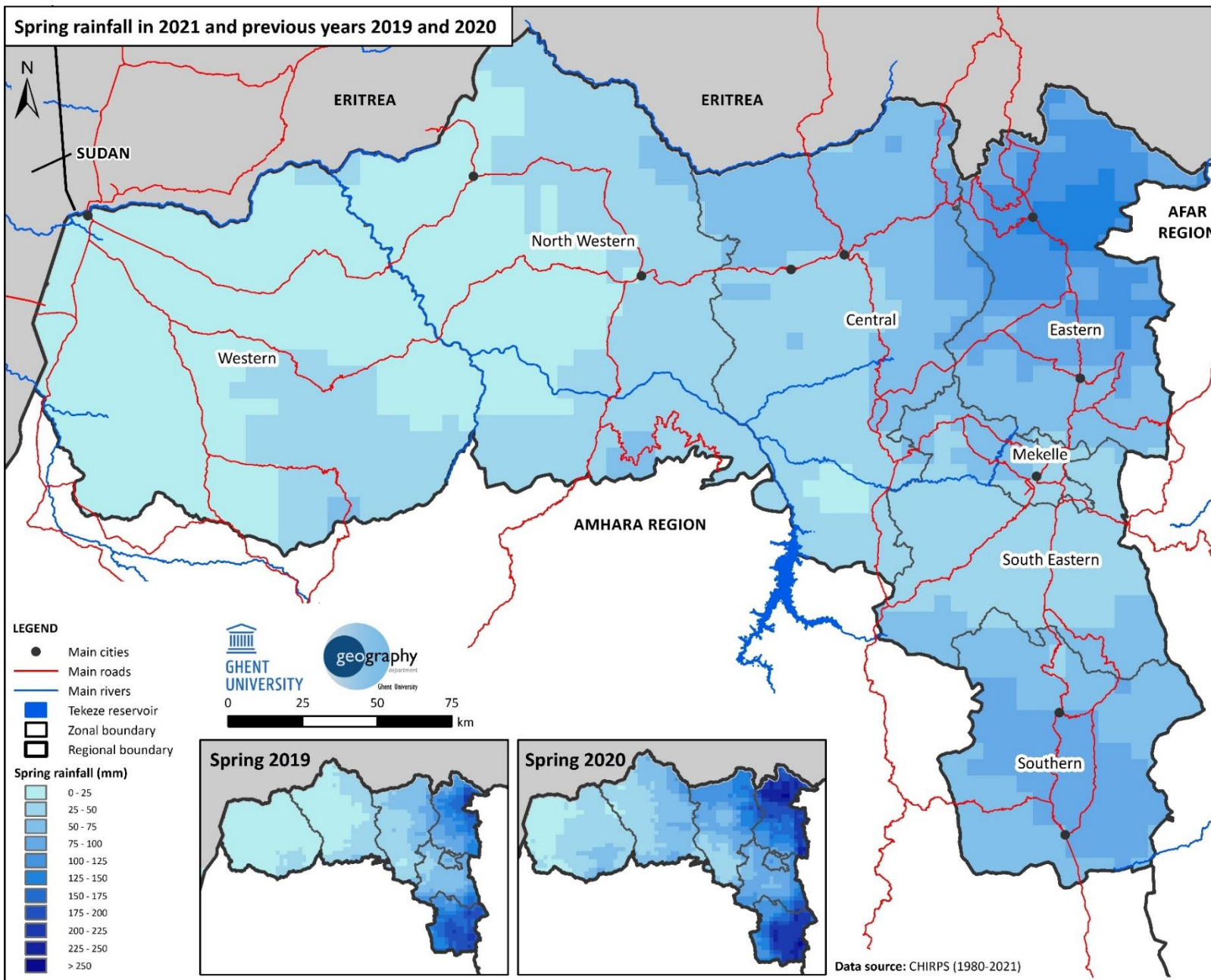


Fig 6.3: 2021 rainfall plotted on ombrothermic diagrams (precipitation scale = $2 \times$ temperature scale) for Tigray's zonal capitals (mean of years 1981–2020), with corresponding climate type based on the [Köppen classification](#): average monthly rainfall (mm), — monthly rainfall in 2021 and — average monthly temperature.

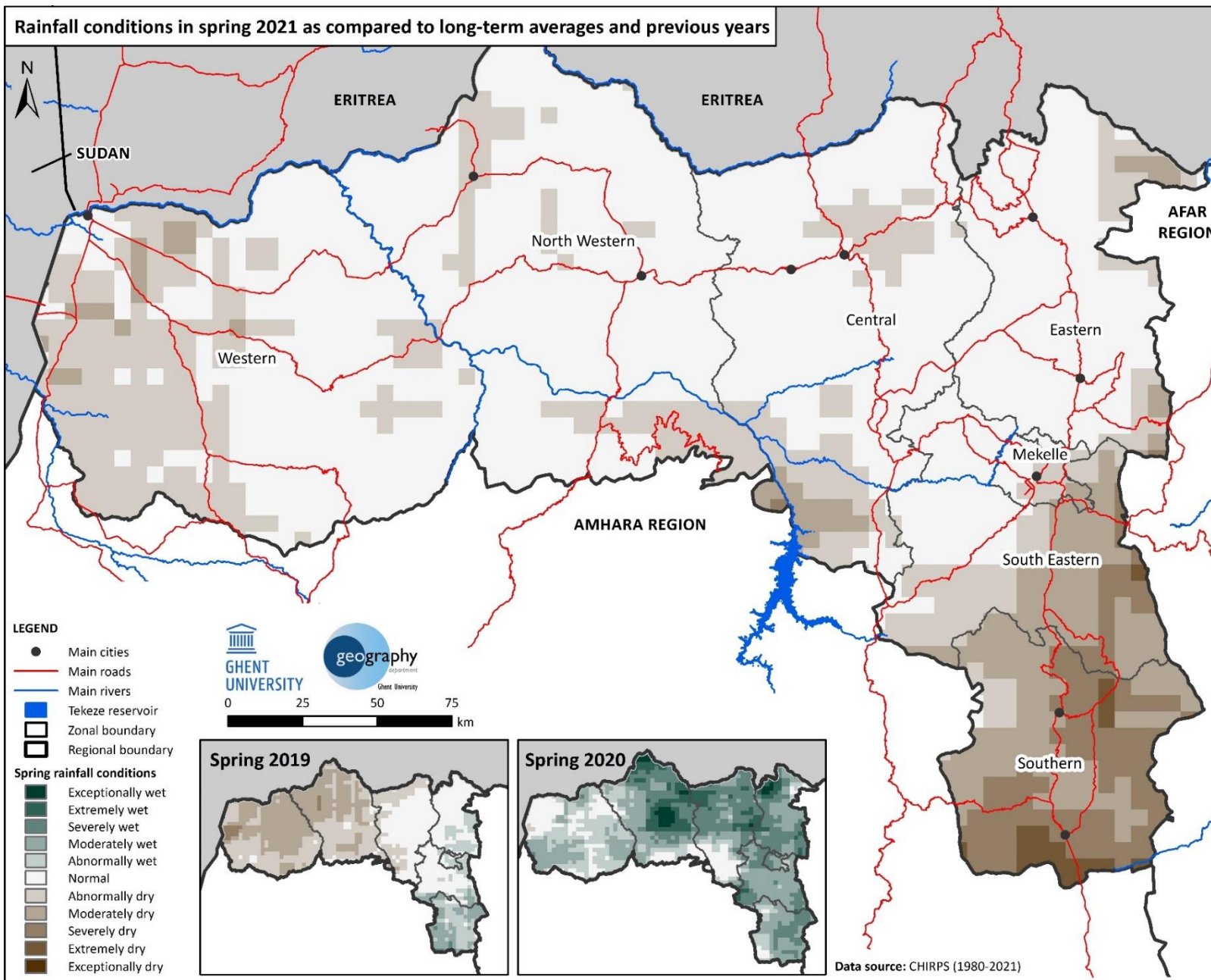


Map 24

Spring rainfall in February-April 2021 (inset maps allow a comparison to previous years).

Data source:

CHIRPS (2019 – 2021)

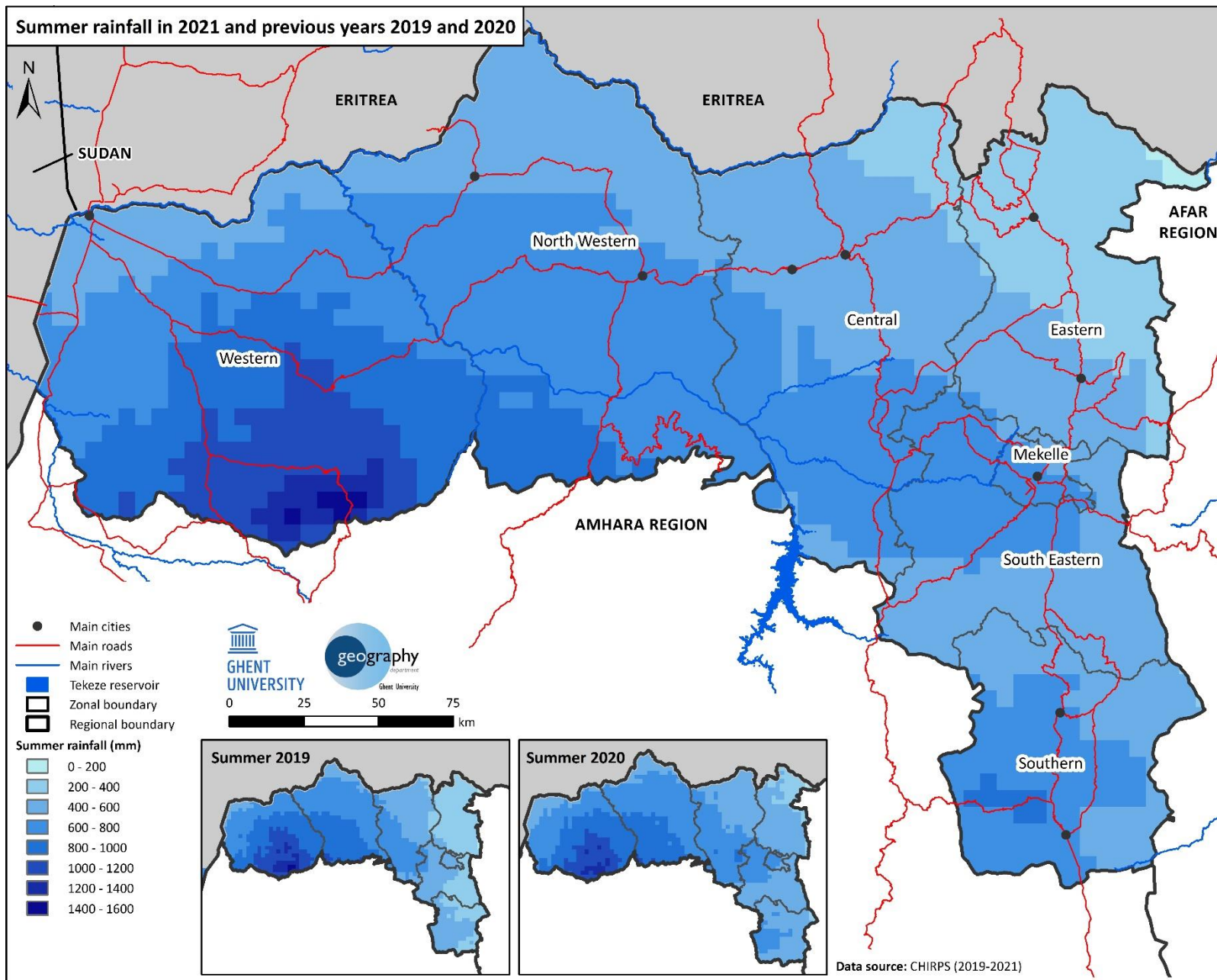


Map 25

Spring rainfall conditions in February-April 2021 as compared to long-term averages and previous years (inset maps). The nomenclature of rainfall conditions follows the American Meteorological Society (AMS) conventions.

Data source:

CHIRPS (1981 – 2021)

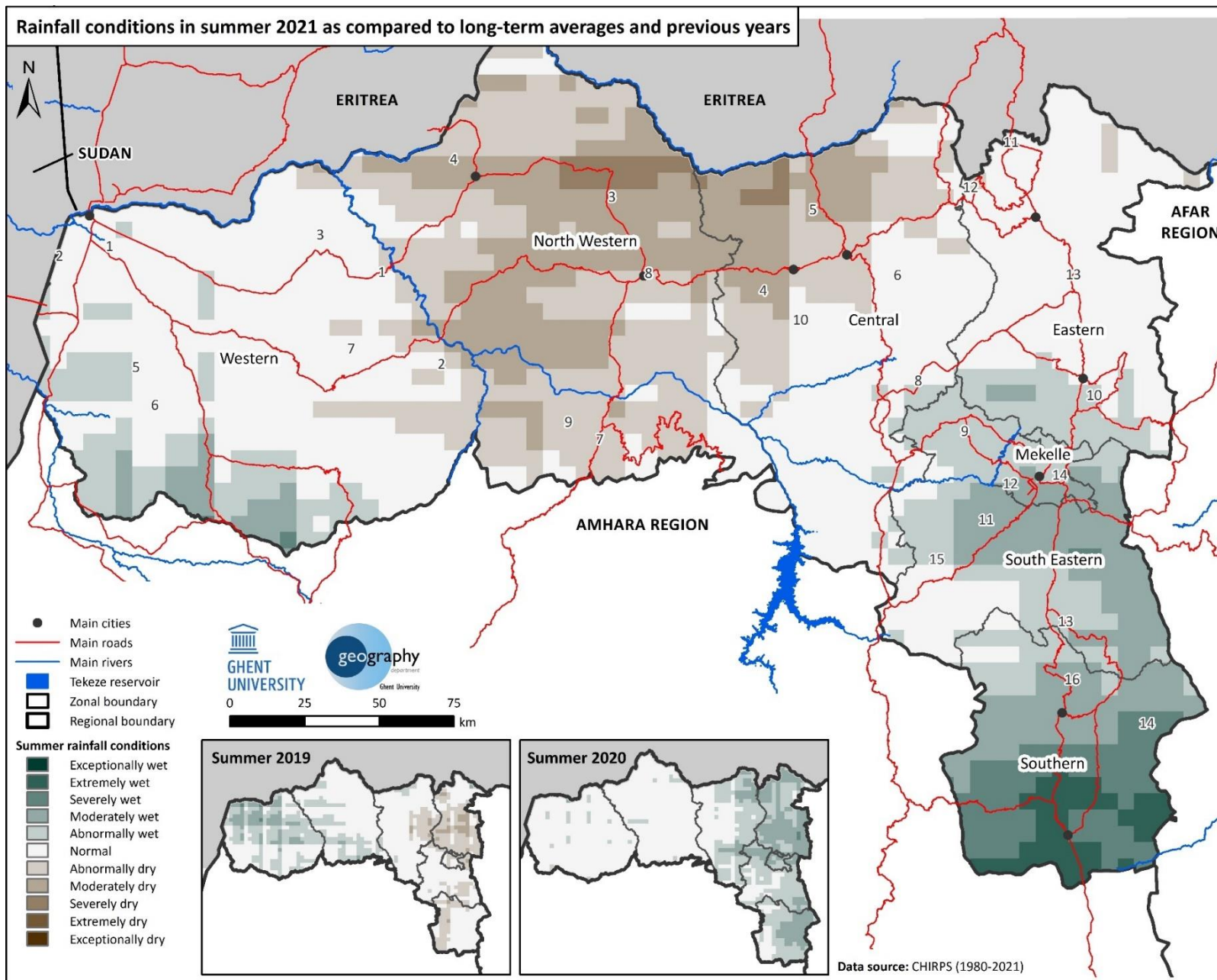


Map 26

Summer rainfall in May-August 2021 (inset maps allow a comparison to previous years).

Data source:

CHIRPS (2019 – 2021)



Map 27

Summer rainfall conditions in May-August 2021 as compared to long-term averages and previous years (inset maps). The nomenclature of rainfall conditions follows the American Meteorological Society (AMS) conventions.

Data source:

CHIRPS (1981 – 2021)

6.3 Outlook: the Tigray war may lead to another failed harvest in the next season

Since about 75% of the active population in Tigray is farmer¹⁶² and the humanitarian needs are already very high on the eve of the upcoming growing season (i.e. 5.2 million people are in dire need of humanitarian assistance)¹⁶², good farming conditions throughout the summer season are of crucial importance for the further development of the food situation in Tigray. Indeed, the harvest in November will need to feed the local communities until the following growing season in the next year. This is especially true for the many rural families that live in hard-to-reach areas, where humanitarian organisations have not yet managed to deliver food aid, and hence people particularly will depend on local yields.

In this section, we consider the rainfall conditions in 2021, in contrast to previous years and long-term averages, and discuss the state of ploughing during war conditions. A more detailed analysis of these topics is available in two separate papers^{163,164}.

6.3.1 *Ploughing and irrigation in spring 2021*

To verify this state of ploughing under ongoing war conditions, we have analysed Sentinel-2 satellite images pertaining to spring 2021 for fourteen rainfed and sixteen irrigated (contiguous) agricultural areas and have analysed some aerial photographs taken in the surroundings of Mekelle. In addition to this, we have conducted semi-structured interviews with seventeen key informants who all have a longstanding experience with the agricultural sector in Tigray and have an extensive network throughout the region. The interviews helped to understand all contextual factors and correctly interpret the remote sensing images. Our main findings are:

- Fewer rainfed croplands than normal have been ploughed in the surroundings of Mekelle in early May 2021 ;
- Fewer rainfed croplands than normal have been ploughed in several areas in Western Tigray, corresponding to the extreme high levels of out-migration due to ethnic cleansing;
- Relatively good ploughing conditions could be observed in the rest of the region: more lands have been ploughed than in rain-rich 2020, but less than in the slightly drier 2019;

- Unlike medium- to large-scale irrigation plantations (e.g. along the Tekeze River and southeast of Meihoni), farmer-led irrigation schemes are operational and even slightly increased in area as compared to the two preceding years. However, there is a shift from commercial crops (e.g. vegetables) to cereals, which require less human presence on the fields and hence involve fewer risks for the farmers.

Although these results gave hope that large parts of the agricultural areas would be sown timely, farmers had to operate in very difficult – sometimes even life-threatening – circumstances, and yields were already anticipated to be well below average. The main reasons for difficult farming conditions were:

- Ethnic cleansing in Western Tigray.
- Lack of farm inputs (e.g. fertiliser, chemicals, improved seeds...), oxen and farm tools due to widespread looting and destruction of infrastructure.
- Lack of advice from the agricultural offices.

- Eritrean soldiers forbade farm activities and threatened to kill farmers. Farmers consequently feared to be killed, which was a well-founded fear as several farmers already had been killed while ploughing their lands.
- Lack of manpower as many youngsters had joined the TDF and men particularly were targeted by (Eritrean) soldiers.
- Religious holidays in the Easter period that delayed ploughing.

Despite such difficult conditions, the Tigrayan farmers evaluated all risks involved with ploughing and adjusted their farming strategies to minimise the risks of looting and getting killed. These adjustments included:

- Ploughing very early in the morning (as early as 3 AM), before the soldiers started roaming and marauding.
- Organising lookouts to verify that no soldiers were approaching.
- Shifts to crops that are less labour-intensive.
- Shifts towards higher involvement of women in the land management (e.g. after ploughing, women may break down the larger soil clods or even may continue ploughing the unploughed parts of the field).

From this, it is clear that farmers were on their own and had to rely on their remarkable ability of self-organisation. Taking into account the resilience of the Tigrayan farming systems, the status of tillage gave hope that the growing season would not be entirely lost.

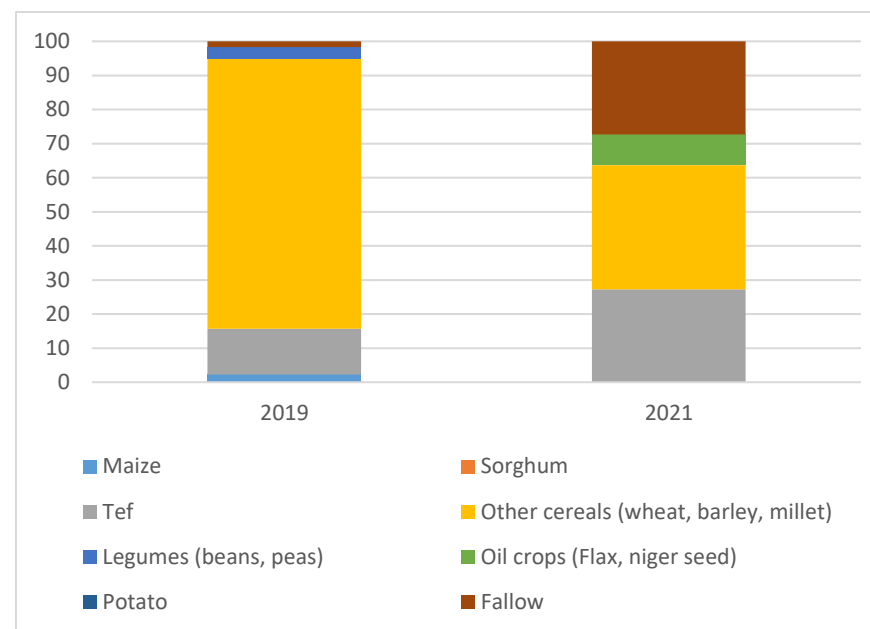


Fig. 6.4. Share of crop types and fallow in Kilde Awula'ilo district in peace year 2019 and war year 2021. Main changes are: (1) a large share of the land has been fallowed and also many oil crops have been grown (improved fallow); (2) strong decrease of land occupied with wheat, also because many farmers will have roasted and eaten their seeds while fleeing to the mountains at war time; (3) strong increase of tef fields – this is a crop that could be sown 2-3 weeks later than wheat or barley, i.e. after the Ethiopian and Eritrean soldiers left.

6.3.2 Cropping status in summer 2021

A team of Mekelle University and Ghent University geographers have studied the status of crop growth and fallowing. Collecting field data from

161 plots in very difficult conditions allowed evaluating the status of cropping in the wider surroundings of Mekelle, by the end of August 2021. The team observed that local farming communities are remarkably resilient, also in times of conflict and instability. Relying on indigenous knowledge and local practices, farmers shifted to the production of crops that need minimal effort and resources, but will also yield less harvest (Fig. 6.4). Large areas have been left fallow, and also, there have been very few directly consumable (“lean”) crops planted; the top lean crop maize needed early planting, which was impossible due to war conditions. We estimate that only 20-50% of the farmland will produce a reasonable yield



(Fig. 6.5), which is well below what is required to sustain the local population in a subsistence farming economy. We have no reason to believe that in other districts of Tigray, the situation would be significantly different, except for Western Tigray, where many more lands have been left fallow, due to ethnic cleansing of the population ¹⁶³.

Our study¹⁶⁵ tends to confirm OCHA’s statement on 2 September 2021 that “only 25% to 50% of the normal cereal production will be available this year as the agricultural planting season has been missed in many parts of Tigray” ¹⁶⁶.



Fig. 6.5. Crop stands in Central Tigray, on 8 September 2021. At left (near Zongji, Inda Felasi district): foreground tef, middleground sorghum, at the back ploughed fallow. At right (in Kayeh Tehli): mainly sorghum without fertiliser, with ploughed fallow on the hill. Crops near homesteads, at the middle of the hill, have a darker aspect due to use of manure. The crops are too short for early September due to late planting and it is feared that they will not reach maturity. (Photos Yirga Weldu)

7 References

7.1 Maps

- 1 ASTER DEM (2000). Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Map (DEM). Downloaded from <https://earthexplorer.usgs.gov/>.
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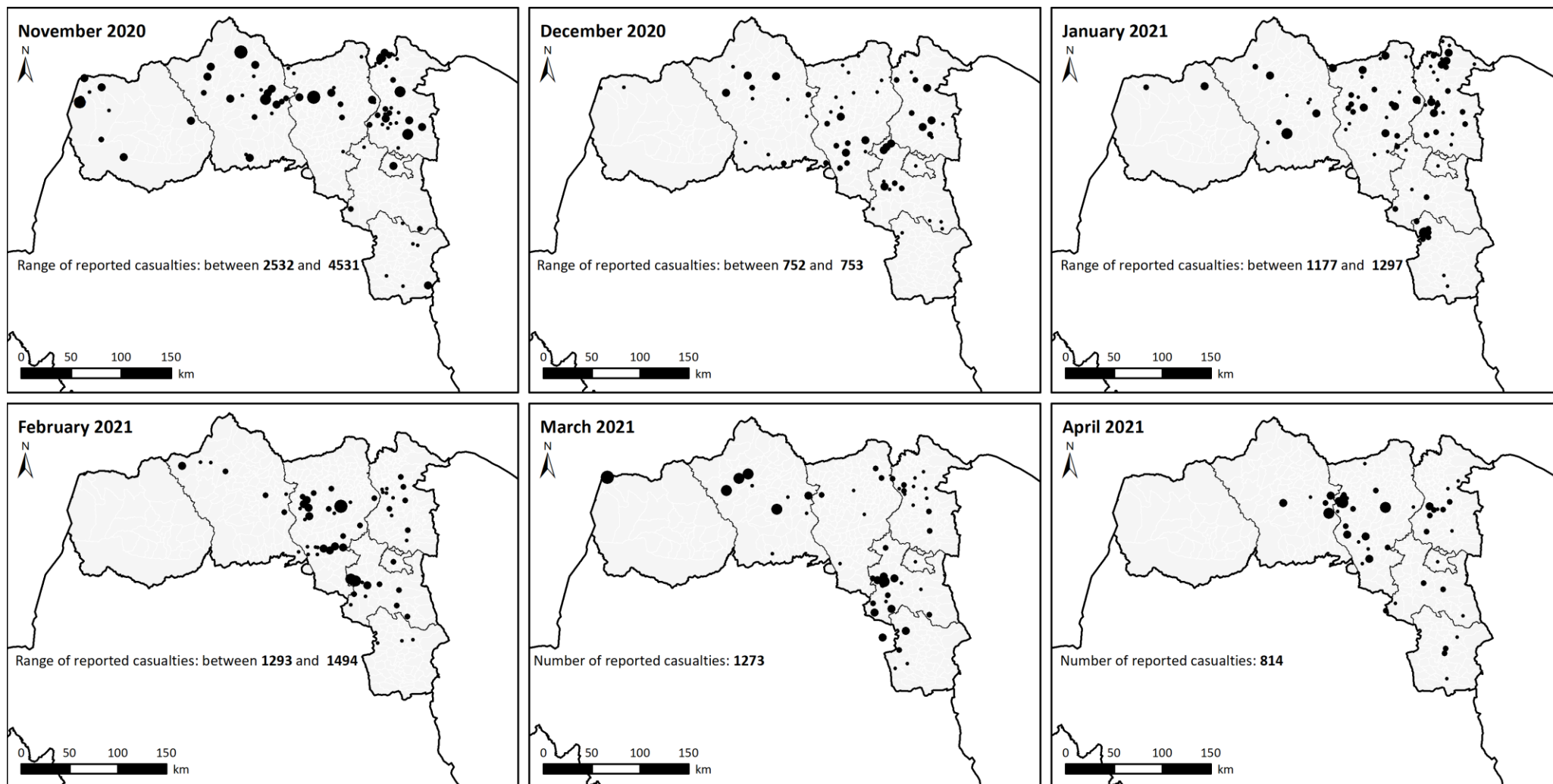
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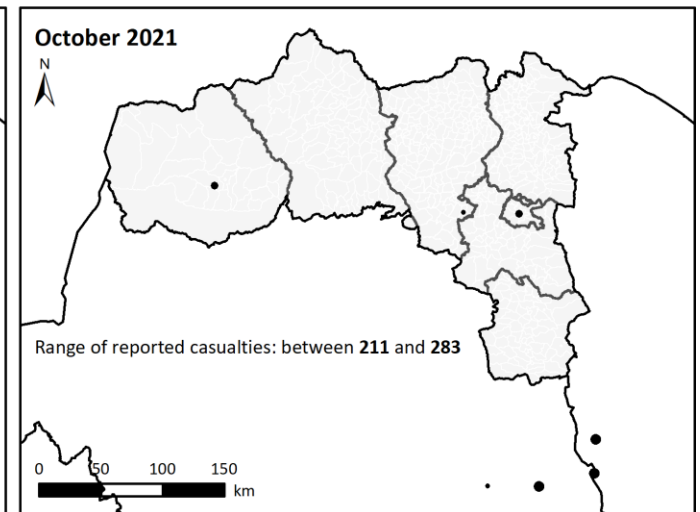
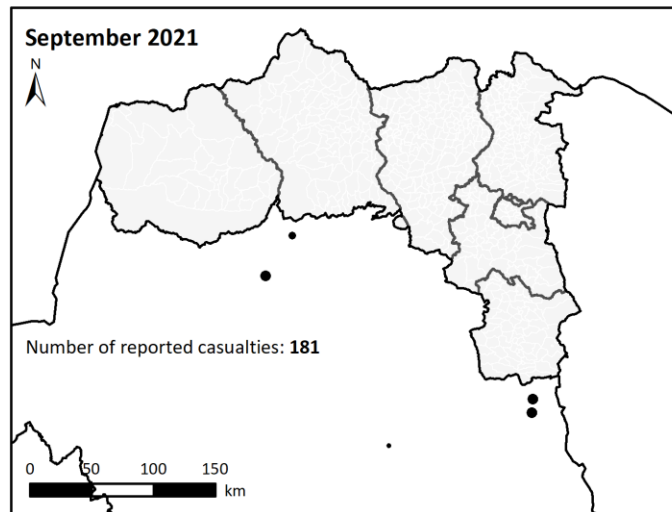
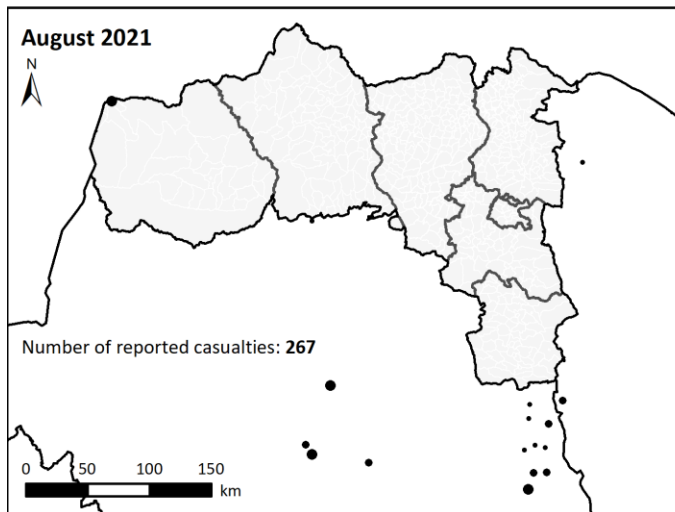
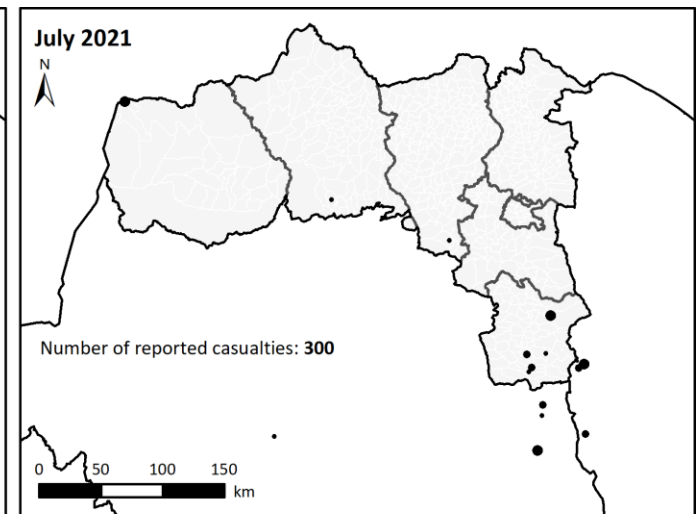
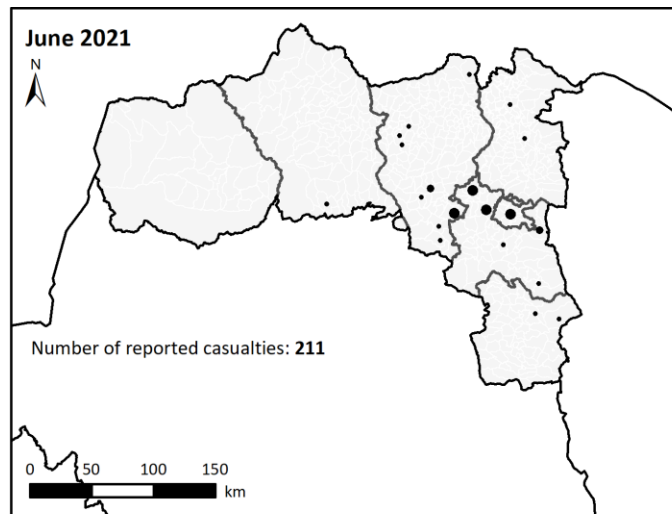
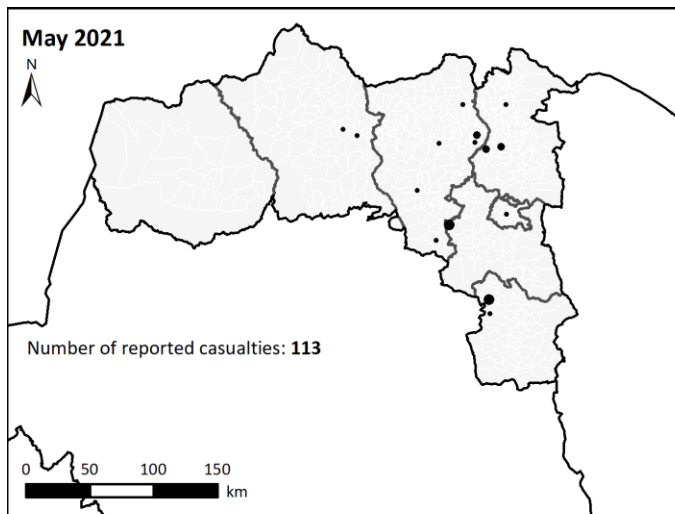
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ANNEX A – Overview of the reported casualties at monthly time step (November 2020 – October 2021)

Each dot on the maps presents a reported killed civilian in the Tigray War. At the end of November 2021, a total range of victims between minimum 9124 and maximum 11516 has been reported, which is only the tip of the iceberg as information only gradually becomes available due to (i) the ongoing telecommunication blackout and (ii) the continued inaccessibility of some hard-to-reach areas. The presented maps hence are not final and still can be adjusted in the future, with potential additions, removal of duplicates, and increases in locational accuracy. For example: victims who at first have been reported for a woreda capital, may actually pertain to an adjacent rural *tabiya*.





Incidents with civilian casualties – size of the symbol shows number of reported deadly civilian casualties per month and per *tabiya* (sub-district): from 1-4 (smallest symbol), over 5-19, 20-99, 100- 249, to 250 and more (largest symbol)